ANIMAL SPECIES SPECIALIST REPORT

PROPOSED AGRICULTURAL DEVELOPMENT OF ERF 385, HOEKWIL, GARDEN ROUTE MUNICIPALITY, WESTERN CAPE PROVINCE.

CAPENSIS

ADAM LABUSCHAGNE AND JACOBUS VISSER

MAY 2024

REPORT PREPARED FOR
ECO ROUTE ENVIRONMENTAL CONSULTANTS

NATIONAL LEGISLATION AND REGULATIONS GOVERNING THIS REPORT

This is a 'specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014, as amended.

APPOINTMENT OF SPECIALIST

Capensis Ecological Consulting (Pty) Ltd was appointed by Eco Route Environmental Consultants to provide specialist Animal Species consulting services for a proposed development in Hoekwil, Western Cape.

CONDITIONS RELATING TO THIS REPORT

The content of this report is based on the authors' best scientific and professional knowledge as well as available information. Capensis Ecological Consulting (Pty) Ltd reserves the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information become known to the author from on-going research or further work in this field, or pertaining to this investigation.

This report must not be altered or added to without the prior written consent of the authors. This also refers to electronic copies of the report which are supplied for the purposes of inclusion as part of other reports, including main reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If these form part of a main report relating to this investigation or report, this report must be included in its entirety as an appendix or separate section to the main report.

DETAILS OF THE SPECIALISTS

Dr Jacobus H. Visser (Zoology) Pr. Sci. Nat.
Blue Skies Research
13 Dennelaan Stilbaai 6674 Mobile: +27 83 453 7916
e-mail: BlueSkiesResearch01@gmail.com

Expertise

• Qualifications: PhD (Zoology)
• 29 years of in-the-field naturalist experience involving all faunal groups
• Zoologist with 17 years of professional experience
• 14 Peer-reviewed publications in high impact national and international scientific journals on the patterns and processes which drive and maintain faunal biodiversity, as well as on aspects of faunal biology and ecology
• Five IUCN Red List assessments
• Has conducted over 30 faunal assessments for the EIA process.

Adam Labuschagne MSc (Ecology & Evolutionary Biology) Cand. Sci. Nat.
Capensis Ecological Consulting
156 Main Road
Muizenberg
7945
Mobile: 072 830 6500
Email: adam@capensis.co.za

Expertise

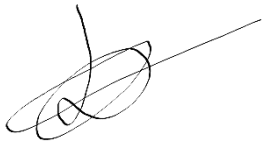
• Qualifications B. Sc. (Zoology), MSc (Ecology & Evolutionary Biology).
• Ecologist with experience in faunal and environmental surveying across a variety of terrestrial and freshwater habitats in United Kingdom, Malaysia, and South Africa.
• Experience with remote sensing and spatial ecology.

THE SPECIALIST

We, Jacobus H Visser and Adam Edward Labuschagne, as the appointed specialists hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
- other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the applicant all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation by interested and affected parties was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application;
- have ensured/will ensure the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
- have kept/will keep a register of all interested and affected parties that participate/d in the public participation process; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.
  Note: The terms of reference of the review specialist must be attached.

Signature of the specialists:



Dr. Jacoubs H. Visser

Mr Adam E. Labuschagne

Name of companies: Blue Skies Research & Capensis
Date: 14 May 2024

TABLE OF CONTENTS

1. INTRODUCTION

Capensis Ecological Consulting and Blue Skies Research has been appointed by Eco Route Environmental Consultants to provide specialist terrestrial animal biodiversity consulting services for a proposed agricultural development on ERF 385. The development, if approved, would include the clearing of approximately 15 Ha of vegetation, primarily Invasive Alien Plant Species (IAPs), from an area of ERF 385 (Figure 1) for the establishment of orchards.

2. TERMS OF REFERENCE FOR IMPACT ASSESSMENTS

2.1. GENERAL

Terrestrial Biodiversity assessments must follow guidelines set out in the following documents:

- Department of Environmental Affairs and Development Planning (DEA&DP) Guidelines for Involving Biodiversity Specialists in the EIA Process (Brownlie, 2005);
- Ecosystem Guidelines for Environmental Assessment in the Western Cape (Cadman et al., 2016); and
- Protocol for the assessment and reporting of environmental impacts on terrestrial biodiversity (Government Gazette 2020).

2.2. SPECIFIC

- Identify any SCC which were found, observed or are likely to occur within the survey area.
- Provide evidence (photographs or sound recordings) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognised online database facility, immediately after site inspection has been performed (prior to preparing the report)
- Describe the sensitivity of the site and its environs and map these resources.
- Identify any areas not suitable for development activities (No-Go Areas) and related buffers that should be implemented.
- Describe the direct, indirect and cumulative impacts (both before and after mitigation) and provide an assessment of the significance of the impacts.
- Describe the measures to mitigate any impacts, and an indication of whether or not the measures (if implemented) would change the significance of the impact.
- On the basis of the impact assessment findings provide an authorisation opinion regarding whether or not the proposed activity should proceed.

3. PROTOCOL FOR DETERMINING LEVEL OF REPORTING

Prior to the commencement of the survey, the sensitivity of the site was assessed using the Department of Forestry, Fisheries and the Environmental (DFFE) Screening Tool (https://screening.environment.gov.za/screeningtool/). The results of the screening tool indicate that the site has a "High" Animal Species sensitivity (Figure 1). This is due to the potential occurrence of thirteen Species of Conservation Concern (SCC) (Table 1). Two animal species listed as SCC have been identified at the site or within close proximity to the Study area and therefore an **Animal Species Specialist Assessment** is required for this site. This Animal Species Specialist assessment forms part of this input as required in the Protocol for the assessment and reporting of environmental impacts on terrestrial biodiversity (Government Gazette, 2020).

Table 1. Species of Conservation Concern (SCC) identified by DFFE screening tool as potentially occurring in or adjacent to the study area.

Sensitivity	Class	Species
High	Aves	*Circus ranivorus*
High	Aves	*Stephanoaetus coronatus*
High	Aves	*Neotis denhami*
High	Aves	*Bradypterus sylvaticus*
High	Aves	*Falco biarmicus*
High	Aves	*Polemaetus bellicosus*
Medium	Amphibia	*Afrixalus knysnae*
Medium	Aves	*Sarothrura affinis*
Medium	Insecta	*Tsitana dicksoni*
Medium	Mammalia	*Chlorotalpa duthiae*
Medium	Mammalia	*Sensitive species 8*
Medium	Invertebrate	*Forest Invertebrate*
Medium	Insecta	*Aneuryphyrus montanus*

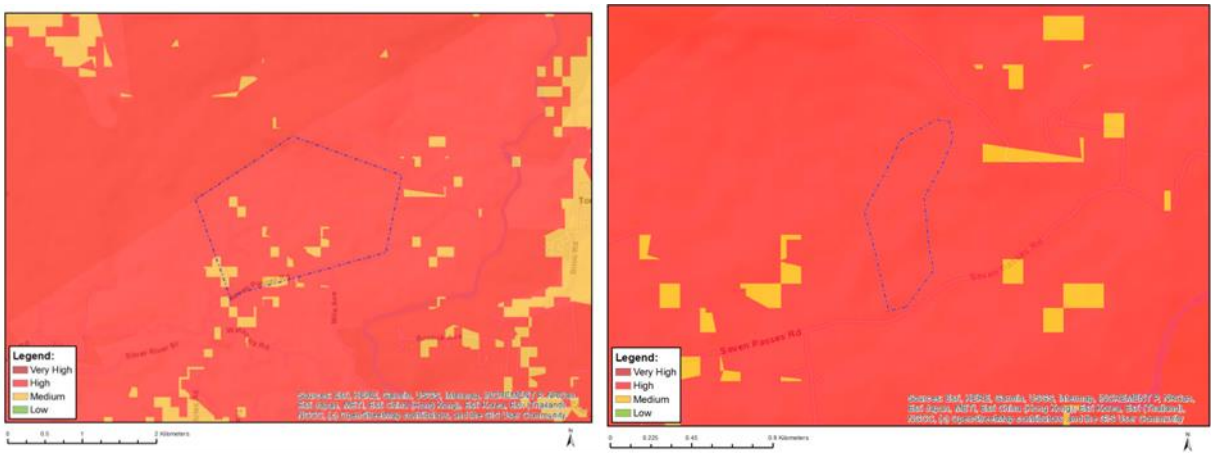


Figure 1. Map of relative animal species theme sensitivity generated from the DFFE Screening Tool (https://screening.environment.gov.za). (left shows the outline of the parent farm (Erf 385); (right) shows the proposed development footprint.

4. METHODOLOGY, LIMITATIONS AND ASSUMPTIONS

4.1 DESKTOP SURVEY

Prior to conducting the site visit, a desktop survey was performed. The following sources were used to inform this study:

- *Site boundaries:* The property boundaries have been downloaded from the Cape Farm Mapper Website (https://gis.elsenburg.com/apps/cfm/).
- *Animal Species*: A list of sensitive animal species for the site was generated using the National web-based screening tool (screening.enviornment.gov.za). A full faunal inventory (Appendix 4) containing all potential animal species that may be encountered at the site was generated using QDS records for locus 3322DC from the Animal Demography Unit maps; MammalMap (http://mammalmap.adu.org.za/) (Appendix 5), FrogMap (http://adu.org.za/frog_atlas.php) (Appendix 6), LepiMAP (http://vmus.adu.org.za/?vm=LepiMAP) (Appendix 7) and ReptileMap (http://sarca.adu.org.za) (Appendix 8). Data on avifauna was generated from SABAP2 for pentad 3355_2235 (https://www.birdmap.africa/) (Appendix 9). Local occurrences of sensitive species on or near the site was verified using iNaturalist.

A total of thirteen SCC were identified as potentially occurring in the study area by the DFFE screening tool (Table 1-2). A summary of each species' habitat preference, threat status and likelihood of occurrence within the study area is indicated in Table 2. Local or National threat statuses are derived from Taylor *et al*., (2015) for birds, Child *et al*., (2016) for mammals, and Mercenero *et al*., (2013) for butterflies. International threat statuses were obtained from the IUCN Red List of Threatened Species (https://www.iucnredlist.org/).

4.2 SURVEY METHODOLOGY

The study area was visited on the 20th of March 2024 and surveyed on foot. Sample waypoint positions were obtained using a Garmin eTrex 10. The survey route is shown in Figure 6. Photographs were taken using a Nikon D5300 and georeferenced by syncing photos with GPS track data. Sampling efforts were focused on areas most likely to host SCC. Records of animal species were based on visual observations (seeing the animal/scat/spoor), acoustic observations, and species-specific habitat modifications (burrows/nests). All animal species observed are recorded in Appendix 4. Habitat information, including quality and species compositions was compared to species specific habitat requirements and is used as a proxy for the likelihood of occurrence of SCC not observed during the field survey.

4.3 LIMITATIONS AND ASSUMPTIONS

The site visit was carried out during the day in late summer/early autumn. The timing of the survey was near optimal for the detection of invertebrate and herpetofauna as their activity peaks during the warmer parts of the year. A notable exception to this is amphibians, where the optimal time of year to survey is during their breeding season, typically from October to December in the area around George. Due to the limited time spent in the field it is possible that not all of the SCC identified by the screening tool (especially those species that are cryptic or nocturnal) could be confirmed without specialised survey techniques such as camera trapping or audio recording.

Table 2. Summary of SCC threat status, habitat requirements, and likelihood of occurrence.

Species	Common Name	Threat Status		Habitat Requirements	Likelihood of Occurrence
		National	International		
Circus ranivorus	African Marsh Harrier	Endangered Decreasing (< 2 500 adult individuals)	Least Concern Decreasing	This species requires permanent wetland, with nests situated in reed beds over open water. Hunting occurs over adjacent floodplains, agricultural land and Fynbos (Simmons, 2005a)	Very Low - Despite the close proximity to the Touws River Mouth and Langvlei estuary there is no habitat to support this species within or adjacent to this site.
Stephanoaetus coronatus	Crowned Eagle	Vulnerable decreasing (< 1000 adult individuals)	Near Threatened Decreasing	Forest, including gallery and riverine forest, is this species preferred habitat. Will readily inhabit exotic tree plantations (Simmons, 2005b)	Moderate - Suitable habitat exists in the neighbouring intact forest, as well as suitable nesting sites in transformed habitats. One observation is located <15 km to the west of the site in 2023.
Neotis denhami	Denham's Bustard	Vulnerable Decreasing	Near Threatened Decreasing	Requires grassland habitat. In the Western Cape they can inhabit mosaics of agricultural land and natural vegetation (Allan, 2005)	Very Low - The is a lack of suitable open habitat to support this species within or in close proximity to the site.
Bradypterus sylvaticus	Knysna Warbler	Vulnerable	Vulnerable Decreasing	Dense and tangled understorey vegetation on forest margins and riparian vegetation, including in bramble thickets (Smith, 2005) and suburban gardens (Pryke *et al*., 2011)	Moderate - Suitable habitat, consisting of dense riverine vegetation can be found in the drainage lines in close proximity of the site.
Falco biarmicus	Lanner Falcon	Vulnerable Decreasing	Least Concern Decreasing	Open Grassland, cleared woodland, and agricultural areas. Utilises cliffs as roost sites but will use tall trees, pylons or buildings	Low – There is a lack of suitable open habitat to support this species.
Polemaetus bellicosus	Martial Eagle	Endangered decreasing (< 800 adult individuals)	Endangered Decreasing	Arid and mesic savannah but will use forest edges or open shrubland (Simmons, 2005c)	Low - There is a lack of suitable habitat to support this species.

Afrixalus knysnae	Knysna Leaf Folding Frog	Endangered Decreasing	Endangered Decreasing	Small dams and ephemeral water sources within the coastal mosaic of fynbos and forest, containing lots of emergent vegetation. High water quality is a requirement for this species.	Moderate - Lack of suitable habitat. The quality of water in the adjacent streams is unknown but likely affected by agricultural runoff and high sediment loads. Western sub-population is located in Saasveld, <20km to the west.
Sarothrura affinis	Striped Flufftail	Vulnerable Decreasing	Least Concern Decreasing	Dense vegetation (Taylor, 1994). In the Western Cape it is found in dense *Psoralea-Osmitopsis* Fynbos in moist environments (Graham & Ryan, 1993). Has been known to make use of dense Restioid thickets.	Very Low - There is a lack of suitable habitat to support this species within or in close proximity to the site.
Tsitana dicksoni	Dickson's Sylph	Rare Low Density	Least Concern Unknown	Hillsides and Mountains, specifically in grassy spots in montane fynbos vegetation.	Very Low - There is a lack of suitable habitat to support this species within or in close proximity to the site.
Chlorotalpa duthiae	Duthie's Golden Mole	Vulnerable Unknown	Vulnerable Unknown	Alluvial sand or sandy loam soils in Afrotemperate forests, including coastal platform and scarp forests). Prefers deeper forest but can exist in gardens and cultivated areas (pasture/alien plantations) (Bronner, 2015)	Confirmed - Suitable habitat for this species is present at the site, with the species also confirmed to occur here in high numbers. Whilst showing a preference for deeper forest, *C. duthiae* has been documented in altered or transformed habitat, including alien tree infestations, particularly on the boundary with better quality habitat of the site.
Sensitive species 8	N/A	Vulnerable Decreasing	Least Concern Decreasing	Dense indigenous forest and thickets, avoiding areas of high disturbance (Venter *et al*., 2016)	High - Intact good quality forest with good connectivity directly abuts the site. It is unlikely to utilise the majority of the site as this species tends to avoid disturbed areas but may use site to travel between better quality habitat.
Aneuryphyrus montanus	Yellow-Winged Agile Grasshopper	Vulnerable Decreasing	Vulnerable Decreasing	Recently burnt Sclerophyll fynbos vegetation. Prefers south-facing cool slopes (Kinvig, 2005)	Very Low - not known from the area and lacks suitable habitat at or in close proximity to the site.

5. STUDY AREA

5.1. LOCALITY

The study area is situated on a fruit farm, Wilderness Fruit, located near Hoekwil - a village situated to the north of Wilderness, and east of George. The area is primarily agricultural, consisting of a mix of forestry, dairy, and fruit production, within a matrix of protected areas. These include the Garden Route National Park, which essentially encircles the study area, plus the Witfontein Nature Reserve directly to the north of the study site. Furthermore, the site falls within the greater Garden Route Biosphere Reserve. The Touws River runs to the east and south of the site respectively. The climate of the area is classified as *Cfb* or temperate oceanic, with no pronounced wet or dry season (Beck *et al*., 2017).

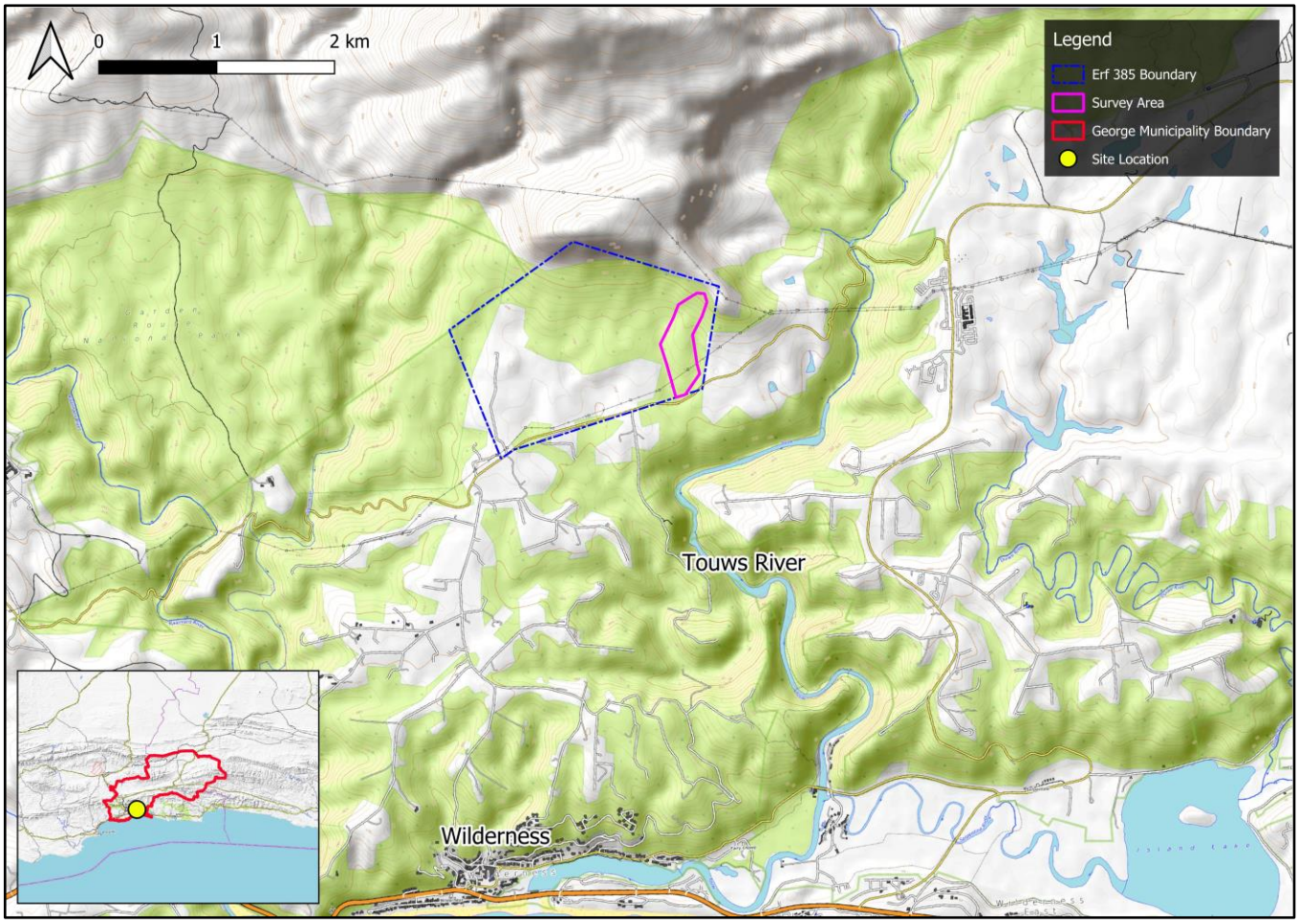


Figure 2. The location of the study area within the context of the George Municipality and closest towns, overlaid on an Open Topo World ™ Map.

5.2 VEGETATION AND HABITATS

During the site visit several broad habitat types were identified within and adjacent to the study area. These include intact southern Afrotemperate forest, Degraded Forest, Semi-intact and degraded fynbos, Degraded to highly degraded Fynbos, and Highly degraded fynbos. A more detailed description of each habitat type can be found in the Terrestrial Biodiversity and Plant Species Specialist report compiled by botanical specialist Greg Nicolson (May 2024).

5.2.1 Intact Forest

An area of intact southern Afromontane Forest borders the study area along its north-western boundary. The patch of forest contains several drainage lines that feed a perennial watercourse that forms the western boundary of the study area. This habitat comprises a tall evergreen forest with mature forest trees (*Ocotea bullata, Curtisia dentata, Podocarpus latifolius, Afrocarpus falcatus, Olea capensis*) and a dense herbaceous understory (*Gonioma kamasii, Burchellia bubalina, Trichocladus citrinus*). The ecological functioning of this habitat is high, and is highly likely to provide habitat for forest specialist faunal species. It should be noted that this habitat currently falls **outside of the proposed development footprint** but it is possible that edge effects as a result of the development may impinge on this area.

Figure 3. The Intact Forest habitat adjacent to the site along the north-west boundary (left). The semi-intact forest is recovering post disturbance (likely a fire) and is dominated by pioneer species like *Virgilia oroboides* (right).

5.2.2 Degraded Forest

Located to the south-west of the more intact forest habitat, this habitat is dominated by *Vigillia oroboides* (Keurboom), with a moderate concentration of *Acacia mearnsii* (Black Wattle) and low concentration of *Acacia melanoxylon* (Blackwood). Other indigenous pioneer species include *Diospyros glabra, Dipogon lignosus, Clutia pulchella,* and *Pteridium aquilinum*. This habitat forms part of the ecotone between forest and fynbos habitats of the northern part of the study site. Despite the invasion of *A. mearnsii* and *A. melaoxylon* this habitat may provide refuge for more disturbance tolerant animal species.

5.2.3 Semi-intact fynbos and degraded fynbos

The semi-intact fynbos and degraded fynbos habitats are located in the northernmost portion of the study area, with the quality of these habitats decreasing towards the south. An isolated patch of semi-intact fynbos can also be found within an Eskom powerline servitude in the south of the site. Fynbos species are dominant, including *Restio scaberulus, Erica canaliculata,* and *Phylica purpurea*. As per the terrestrial biodiversity report, it is likely that the original vegetation over the majority of the study would have been a fynbos-forest mosaic determined by the local fire regime.

Figure 4. The Semi-intact fynbos at the far northern end of the site (left) and below the Eskom Powerlines (right).

5.2.4 Degraded to highly degraded fynbos

Both of these two habitats are comprised primarily of *A. mearnsii*, with disturbance tolerant indigenous species persisting to a greater or lesser degree in the undergrowth or near more natural habitat. *Eucalyptus* cf. *cladocalyx* (Sugar Gum) was grown intensively at the site in the past. This habitat offers very little to support faunal species.

Figure 5. The edges of the study area typically have a slightly higher indigenous species diversity due to their proximity to the drainage lines (left). Degraded fynbos totally dominated by IAPs (right) characterises the larger part of the site.

6. SURVEY RESULTS

For the purpose of this study, the likely presence of a species not directly observed was determined based on strong associations between species and specific habitats. Therefore, the suitability and availability of a specific habitat has been used to determine the likelihood of occurrence of any potential SCC at the site.

A total of 40 species were observed during the field survey (Appendix 4). Two species of conservation concern were documented, one of which was not flagged by the DFFE screening tool as the tool does not highlight species listed by IUCN criteria as being Near Threatened or data deficient. The two species of conservation concern encountered were *Campethera notata* (Knysna Woodpecker), classified as Near Threatened, and *Chlorotalpa duthiae* (Duthie's Golden Mole), classified as Vulnerable. Based on the habitats present on the site, and accounting for the presence of two species of conservation concern, the following sensitivity map has been compiled (Figure 6). The high sensitivity area shown in Figure 6 represents a 50m buffer from intact forest habitat outside the proposed development footprint. This 50m buffer is to mitigate any potential impacts that the development may have on the forest habitat (See section 10.5).

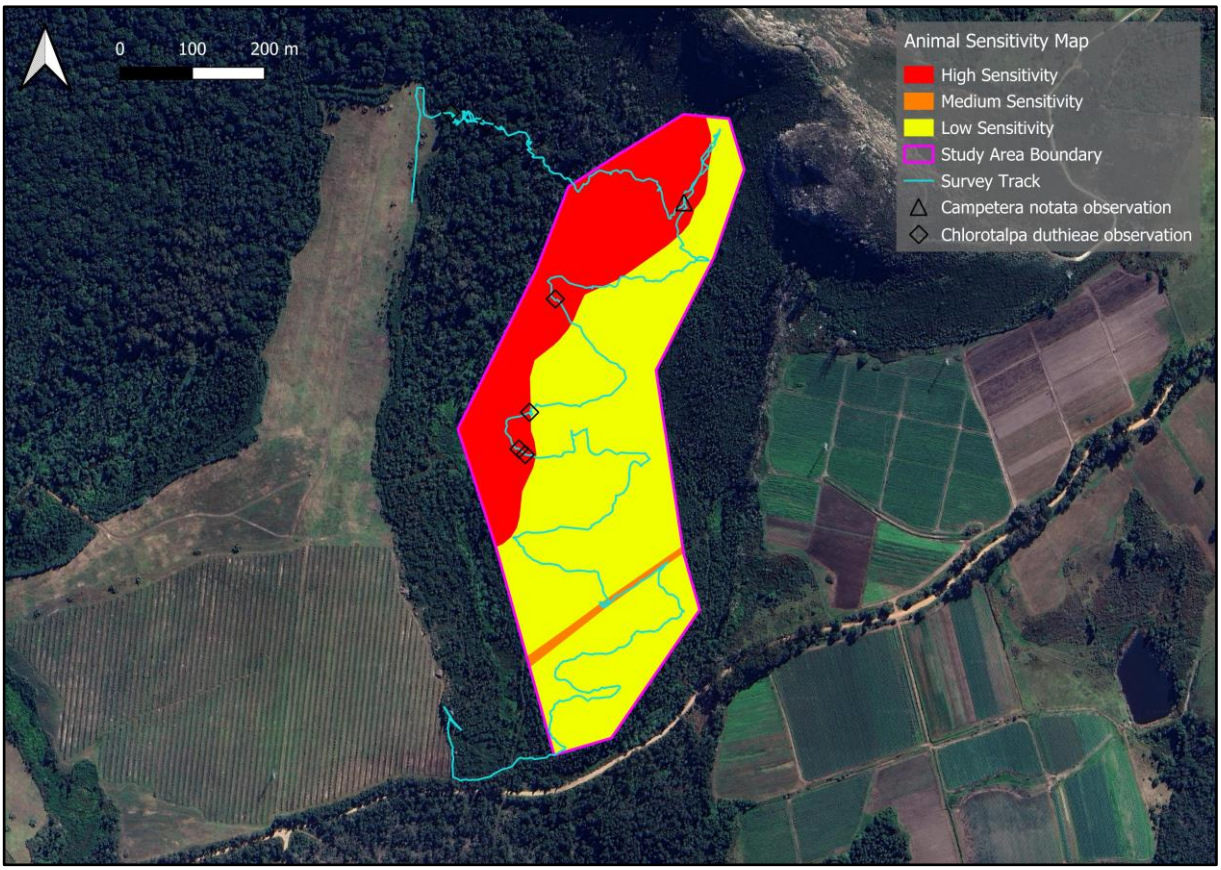


Figure 6. Sensitivity map of the survey area on Erf 385. High sensitivity areas (Red) include a 50m buffer on intact forest habitat, and the observations of SCC.

6.1. ASSESMENT OF POTENTIAL SCC

6.1 *Circus ranivorus*

Circus ranivorus (Marsh Harrier) requires large wetland habitats for nesting and hunting behaviour. Based on this habitat requirement, it is unlikely that this development would impact this particular species. Extensive reed beds can be found approximately 6 km to the south and south-west, along the edges of the Touws River and associated wetland habitats, but it is highly unlikely that the proposed development will impact the preferred habitat of this species in the local area. Small wetland habitats can be found along the western boundary of the study area, but these are not large enough to support any subpopulations of this species

6.2 *Stephanoaetus coronatus*

Stephanoaetus coronatus (Crowned Eagle) are found in forest habitats, including gallery and riverine forest patches (Taylor *et al.*, 2015). The abundance of southern Afrotemperate forest in the area around the site indicates that this species is likely to occur in the area. The last observation of this species in SABAP2 records for the study area landscape was in 2018, with the latest sighting on iNaturalist in August 2023 approximately 15km to the east. It is likely that this species is present at low densities in the surrounding area. The development of the study area, however, is unlikely to have a significant effect on the subpopulation of Crowned Eagle in the area as the vegetation being removed does not constitute its preferred habitat and is unlikely to have significant detrimental effects on prey species.

6.*3 Neotis denhami*

The preferred habitat of *Neotis denhami* (Denham's Bustard) in the Western Cape is that of a mosaic of cultivated pasture, croplands and natural vegetation. Whilst grassland habitat is preferred, this species will secondarily use shrubland and sparse woodland habitats. The latest observation of this species within the SABAP2 pentad was in May 2023, with the latest iNaturalist observation recorded in October 2023 approximately 7km to the east (observed in dairy pasture). The proposed development is unlikely to have a significant impact on this species as the dense vegetation being cleared is highly unlikely to be utilised by the Denham's Bustard.

6.4 *Bradypterus sylvaticus*

The Knysna Warbler, *Bradypterus sylvaticus*, prefers dense tangled vegetation found along the margins of afrotemperate forest or riparian corridors. In transformed habitats it shows preference for dense invasive *Rubus* patches. An uncommon to rare local endemic, it is difficult to observe during field surveys. It is likely that is species may be present at the site given the presence of good quality dense and tangled habitat, especially along the watercourse to the west (and outside of) of the site. The last observation in SABAP2 records was in February 2024, with the latest iNaturalist observation recorded in November 2023 approximately 2km to the south, in the riverine vegetation of the Touws River. The development of the site poses a potential threat to this species, should the forest margins and western watercourse be impacted during clearing operations.

6.5 *Falco biarmicus*

Lanner Falcons (*Falco biarmicus*) tend to use open grassland, cleared woodland and other agricultural areas for hunting behaviour. Whilst this species prefers to nest in cliffs, they will also utilise trees and tall man-made structures such as pylons or telephone poles. The latest recorded of *F. biarmucus* in the SABAP2 records for the study area landscape was in March 2019, with the latest iNaturalist observation in December 2022 at the Garden Route Botanical Garden in George (~15km to the west). It is therefore unlikely that the proposed development will affect *F. biarmicus*. Conversely, the clearing of dense alien vegetation may open up suitable hunting habitat, whilst the position of the pylons in the Eskom servitude offers suitable nesting and roosting sites.

6.6 *Polemaetus bellicosus*

Polemaetus bellicosus (Martial Eagle) shows a preference for mesic and arid savannah habitats but can be found along forest edges and in open shrubland (Taylor *et al*., 2015). The latest observation in the SABAP2 database for the study area landscape was in March 2017, whilst the latest iNaturalist observation was recorded in Rondevlei (15km South-East) in August 2023. It is unlikely that this species will utilize the alien and invasive vegetation on the site, but may utilize areas outside of the project footprint for hunting opportunities.

6.7 *Afrixalus knysnae*

The Knysna Leaf Folding Frog (*Afrixalus knysnae*) inhabits a limited range (EOO 816m^2; AOO 27m^2) of coastal forest, mountain fynbos and afromontane forest wetland habitats, stretching from George in the Western Cape to the Border of the Eastern Cape. It inhabits shallow water bodies with sufficient emergent vegetation and high-water quality. According to the aquatic specialist (*pers. comms.*) the water quality of the streams bordering the proposed site is sufficiently high to potentially support this species. The closest known population of this species is in Saasveld (~10km to the west). It is unlikely that the proposed development poses a risk to this species, however a sufficient riverine buffer should be maintained in the context of the current development in order to mitigate run-off effects on the adjacent wetland habitats.

6.8 Sarothrura affinis

Striped Flufftails (*Sarothrura affinis*) is an uncommon to rare resident in grassland habitat, with a range that spreads along the coastal mountains from the Cape Peninsula to KwaZulu-Natal and south-eastern Mpumalanga. The closest iNaturalist observation of this species to the study area is approximately 8km to the north-west (from December 2018). Given the preference of this species for grassland habitats it is highly unlikely that the proposed development will impact on this species.

6.9 *Tsitana dicksoni*

Dickson's Sylph is a rare species that inhabits a restricted range stretching from Franschoek in the west to Kareedouw in the east. Known from three sub-populations along the Cape Fold Mountains (Hawequas, Langeberg East, and Outeniqua) this species is found in grassy fynbos habitats. The habitat in the proposed development footprint is highly unlikely to support this species, and any cumulative impacts will not contribute to loss of the preferred habitat of this species.

6.10 *Chlorotalpa duthiae*

Duthie's Golden Moe inhabits alluvial and sandy soils in afrotemperate forests along the southern coast of the country, from Wilderness to Port Elizabeth. Whilst this species can tolerate mild disturbance, and has been known to inhabit pasture, forest edges, and suburban gardens, it generally prefers unaltered forest habitat. There is significant overlap of the range with *Amblysomus corriae* (Fynbos Golden Mole) which can make identification of this species difficult without direct observation. Given the habitat and substrate present at the site it is highly likely that the tunnels documented within the study area (Figure 7, Photo 1) are those of *Chlorotalpa duthiae*, especially since the Fynbos Golden Mole is rarely found in forested environments, preferring loose sandy soils on the coastal shelf. The location of the sub-surface foraging tunnels was fairly close to the intact area of forest situated on the western side of the survey area, also moving slightly into the buffer zone around the western watercourse. It is likely that the development of the proposed area will have a negative effect on this species. However, due to the relatively small area of habitat that will be lost, combined with the presence of highly suitable habitat adjacent to the site it is not likely that the subpopulation in the Forested habitat adjacent to the site will be severely negatively impacted.

6.11 Sensitive species 8

The name of this species is withheld due to potential risks from over exploitation. As a forest specialist, Sensitive Species 8 requires dense forest or thicket. This species is likely to occur in the area around the site as good quality habitat is present in the drainage lines and riparian corridors on the western and eastern boundaries of the study area, linking larger tracts of intact forest to the north and south of the site. No spoor was detected during the survey. It is likely that this species is present in the intact forest habitat outside of the proposed development footprint. Should riparian buffer zones be protected, a north-south corridor for this species will be preserved and the impact of the proposed development should be low.

6.12 *Aneuryphyrus montanus*

The preferred habitat for this species consists of recently burnt sclerophyllous fynbos (Brown, 1960). The closest observation of this species to the study area is the Swartberg Pass. Given the lack of suitable habitat it is highly unlikely that this species occurs on or near the study area.

6.13 *Campethera notata*

Campethera notata (Knysna Woodpecker) utilises a wide range of wooded and forested habitats. The most suitable habitat includes coastal milkwood thicket and Afrotemperate forests but Knysna Woodpeckers will utilise tall protea stands and invasive alien trees (Taylor *et al*., 2015). One individual was observed during the survey, perching in a stand of *Acacia mearnsii*, having flown in from the direction of the intact forest habitat to the west of the site in response to a play-back call. The latest observation in the SABAP2 database was from March 2024, with the latest iNaturalist observation being December 2023, approximately 6km south of the site (Wilderness). As the proposed development includes the removal of *A. mearnsii*, it is unlikely to have a negative effect on the range of this species as *C. notata* rarely uses stands of invasives for foraging or nesting purposes.

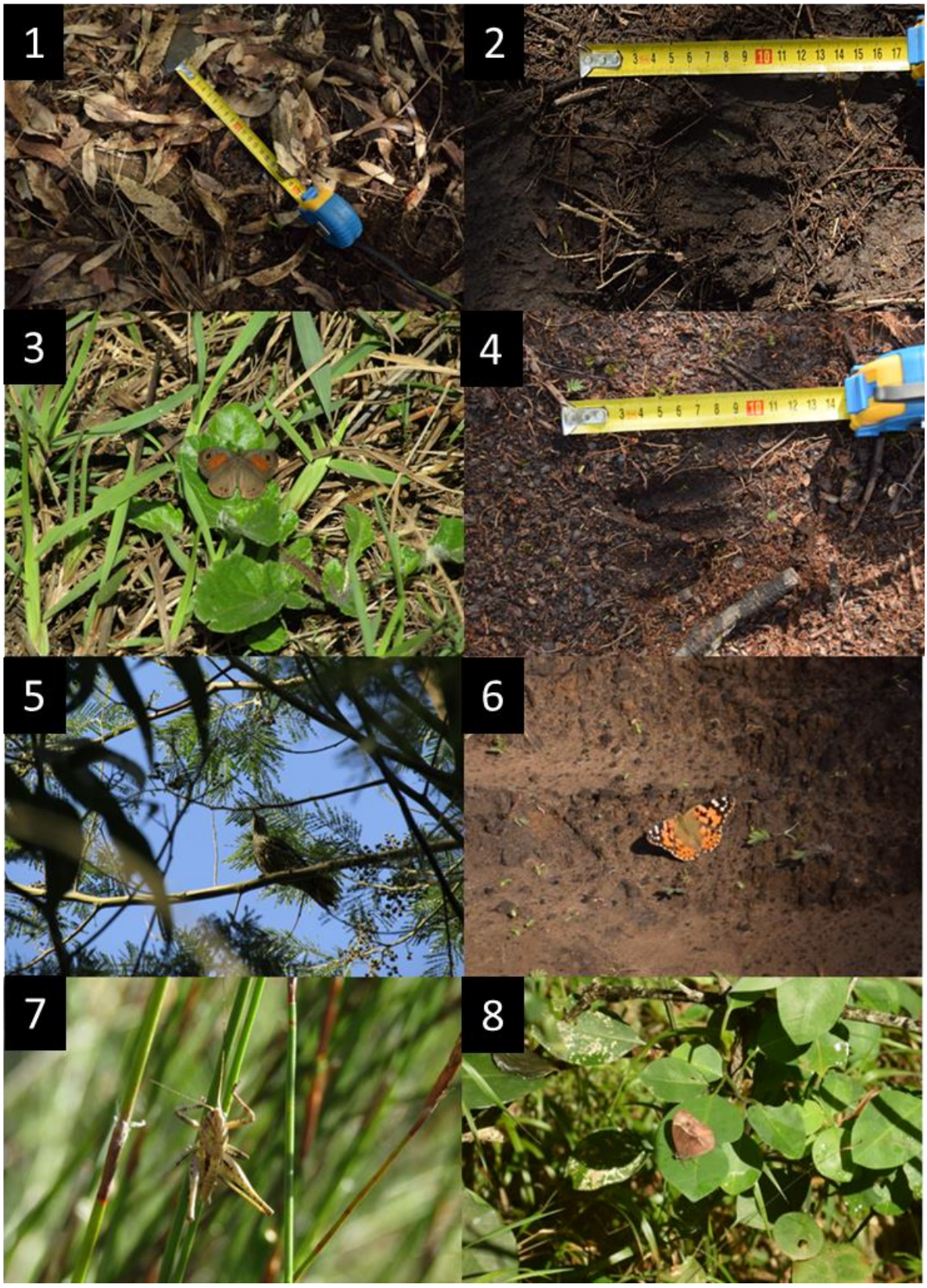


Figure 7. Some of the species encountered during the field survey. Plates (1) *Chlorotalpa duthiae* burrow; (2) *Potamochoerus larvatus* spoor; (3) *Cassionympha cassius*; (4) *Tragelaphus scriptus* spoor; (5) *Campethera notata*; (6) *Vanessa cardui*; (7) *Alfredectes semiaenus*; (8) *Bicyclus safitza*.

9. EVALUATION OF SITE ECOLOGICAL IMPORTANCE (SEI)

Site Ecological Importance (SEI) is considered to be a function of the biodiversity importance (BI) of the receptor (species of conservation concern or habitat type present on the site) and its resilience to impacts (receptor resilience [RR]). This is calculated as follows:

SEI = BI + RR

Where BI is a function of conservation importance (CI) and the functional integrity (FI) of the receptor as follows:

BI = CI + FI

Conservation importance is defined here as:

> *"The importance of a site for supporting biodiversity features of conservation concern present, e.g. populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes."*

Functional integrity (FI) of the receptor is defined as:

> *"The receptors' current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions. Simply stated, FI is: 'A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts."*

Table 3. Conservation importance (CI) criteria (Government Gazette No. 43855, 30 October 2020).

Conservation Importance (CI)	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global EOO of < 10 km2. Any area of natural habitat of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type. Globally significant populations of congregatory species (> 10% of global population).
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).

Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.
Low	No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.
Very Low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

Table 4. Functional Integrity criteria (Government Gazette No. 43855, 30 October 2020).

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

Once the CI and FI for habitats within the study site has been assessed, the BI can be calculated using the Matrix in Table 5.

Table 5. Matrix for calculating Biodiversity Importance (BI) (Government Gazette No. 43855, 30 October 2020)

Biodiversity Importance (BI)		Conservation Importance (CI)				
		Very high	High	Medium	Low	Very low
Functional Integrity (FI)	Very high	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

Lastly, the Receptor Resilience (RR) of the habitats present at the site can be calculated using the criteria in Table X. The Receptor Resilience (RR) is defined as:

> *"The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention."*

Table 5. Receptor Resilience criteria (Government Gazette No. 43855, 30 October 2020)

Receptor Resilience (RR)	Fulfilling Criteria
Very High	Habitat that can recover rapidly (~ less than 5 years) to restore > 75%28 of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

The SEI for each habitat was calculated using the formula **SEI = BI + RR**, and the matrix laid out in Table 6. The interpretation of the SEI for each development actions allowed for each SEI category are outlined in Table 7.

Table 6. Matrix for calculating Site Ecological Importance (SEI) (Government Gazette No. 43855, 30 October 2020)

Site Ecological Importance (SEI)		Biodiversity Importance (BI)				
		Very high	High	Medium	Low	Very low
Receptor Resilience (RR)	Very high	Very high	Very high	High	Medium	Low
	High	Very high	Very high	High	Medium	Very low
	Medium	Very high	High	Medium	Low	Very low
	Low	High	Medium	Low	Very low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

Table 7. Guidelines for interpreting SEI in the context of the proposed development activities (Government Gazette No. 43855, 30 October 2020)

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

9.1 SEI FOR SCC HABITATS IN THE STUDY AREA

The SEI for habitats within the study area are shown in Table 8 and depicted in Figure 8. The study area consists of three habitats (Degraded forest; Semi-intact to degraded Fynbos; and Degraded to highly degraded Fynbos). Only one habitat type present within the proposed project footprint (degraded forest) was found to host a small sub-population of *Chlorotalpa duthiae* (approximately 4 individuals were found in this habitat).

Table 8. Evaluation of SEI for SCC habitats within the study area. BI = Biodiversity Importance, RR = Receptor Resilience.

Habitat Type	Conservation Importance	Functional Integrity	Receptor Resilience	Site Ecological Importance
Degraded Forest	High- Confirmed presence of small sub-population of *C. duthiae*, listed as **Vulnerable.**	Medium - Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential	Medium - Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	Medium
Semi-intact to degraded Fynbos	Medium - >50% of receptor contains natural habitat with potential to support SCC	Medium - Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential	Medium - Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	Medium
Degraded to Highly Degraded Fynbos	Low - No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC	Very Low - Several major current negative ecological impacts.	Medium - Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	Very Low

Figure 8. Map showing Site Ecological Importance (SEI) for Erf 385. Note that the majority of the site has a very low ecological importance. Areas with Medium to High SEI are found primarily on the western and northern portions of the site

10. IMPACT ASSESSMENT

The impact assessment is a measure of the impacts likely to occur on the affected environment, specifically the animal species present, ecological processes, important species and habitats. They are considered for (a) the 'No Go' scenario, (b) unmitigated Scenario and (c) the preferred alternative (including mitigation measures). Direct, indirect and cumulative impacts of the proposed project are considered below. The impact assessment methodology is explained in detail in Appendix 1.

10.1. 'NO GO' OR NO DEVELOPMENT SCENARIO

The 'No Go' or no development scenario takes into consideration the impacts associated with the no development option. It is a prediction of the future state of the affected area in the event of no development activities taking place and is based on the current and/or anticipated future land use. If no development were to take place and the *status quo* would remain the same, the site would continue to be invaded by IAPs into the parts of the site with some representative indigenous vegetation, leading to a depletion of the indigenous

seed bank, threating the positive recovery of the habitat post fire. Should the current vegetation remain, the degraded landscape would continue to provide cover for animal species, as well as nest sites for certain raptor and bird species. In the medium term, the impact of the No-Go scenario is **Low Negative** as it would likely result in the complete loss naturally occurring habitats on the site as a result of invasion by IAPs. This biotic disruption threatens the long-term viability of several species of conservation concern that rely on good quality, undisturbed habitat. However, it is the legal responsibility of the landowner to remove and control these species so this should not be considered as a reason to allow development on the site.

10.2. DIRECT IMPACTS

Direct impacts are those that would occur as a direct result of the agricultural developments proposed. The clearance of approximately 15 Ha of degraded habitat is likely to have several direct effects in the faunal diversity present at the site. The direct impacts are considered separately for the following components:

1. Loss of habitat likely to support species of conservation concern.
2. Loss of species of conservation concern (SCC).
3. Anthropogenic disturbance (noise/vibration from machinery and people)
4. Possible contamination by pesticides, herbicides and other chemicals.

Whilst the majority of the proposed development consists of degraded to highly degraded habitats, the surrounding landscape hosts large areas of intact habitat and the development of the study area poses a risk to habitat connectivity. Furthermore, two species of conservation concern were found on the site, with 4 other SCC also likely to be present in the surrounding area. As a result, the impact of the proposed development on SCC is rated as **Moderate negative** and several mitigation measures are proposed.

Table 9. Impact table for potential loss of habitat likely to support species of conservation concern during the construction and operational phase of the proposed developments

	Loss of Habitat	**Loss of SCC**	**Anthropogenic disturbance**	**Risk of pollution**	**No-Go Alternative**
Potential impact and risk:	Potential loss of habitat likely to support species of conservation concern	Potential loss of one SCC from site.	Anthropogenic disturbance (noise/vibration)	Potential contamination from pesticides/herbicides/pesticides/ herbicides/other agricultural chemicals	Status quo remains
Nature of impact:	Negative	Negative	Negative	Negative	Negative
Extent and duration of impact:	Site (1) Local (2) and Long-term (3)	Site (1), Local (2) and Long-term (3)	Site (1) and Long-term (3)	Site (1) and Long-term (3)	Site (1) and Long-term (3)
Magnitude	Medium (2)	High (3)	Medium (2)	Medium (2)	Low (1)
Consequence of impact or risk:	Highly detrimental (8)	Highly detrimental (9)	Moderately detrimental (6)	Moderately detrimental (6)	Moderately detrimental (6)
Probability of occurrence:	Definite (4)	Definite (4)	Definite (4)	Probable (3)	Probable (3)
Degree to which the impact may cause irreplaceable loss of resources:	Low	High	Low	Medium	Low
Degree to which the impact can be reversed:	Low	Low	High	Medium	Low
Cumulative impact prior to mitigation:	Low	Medium	Low	Low	Low
Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	High (32)	High (36)	Low (24)	Low (24)	Very Low (18)

Degree to which the impact can be avoided:	Low	Low	Low	Medium	Low
Degree to which the impact can be managed:	Low	Low	Medium	High	Low
Degree to which the impact can be mitigated:	Low	Low	Medium	High	Low
Proposed mitigation:	• 50m Buffer for forest habitat. • 30m Wetland/water course buffer	• 50m Buffer for forest habitat. • 30m Wetland/water course buffer	• Restrict human presence in buffer zones • Avoid use of heavy machinery during dawn/dusk periods	• 30m Wetland/water course buffer • Strict adherence to application of herbicide/pesticide protocols • Avoid applying aerosolized herbicide/pesticide during windy conditions	N/A
Residual impacts:	Low	Low	Low	Low	Low
Cumulative impact post mitigation:	Low	Low	Low	Low	Low
Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)	Very low (15)	Low (24)	Very Low (15)	Very Low (18)	Very Low (18)

10.3 INDIRECT IMPACTS

Indirect impacts occur mostly at the operational stage and are less obvious. Examples include loss of diversity due to loss of connectivity between habitats. One indirect impact associated with this development is the increased anthropogenic presence in the area during construction and harvesting phase. Many animals, in particular mammal species, are intolerant of human activity and tend to avoid areas where they are likely to encounter humans.

10.4 CUMULATIVE IMPACTS

Cumulative impacts are those impacts linked to the cumulative loss of SCC or habitats that can support SCC. Given that the habitat in the study area is comprised predominantly of IAPs, the cumulative impact of the loss of this vegetation is likely to be low. Whilst it is highly likely that one species of conservation concern (*C. duthiae*) may be impacted by the development, the cumulative effect of this impact is estimated to be low given the small population that inhabits the degraded forest habitat. The estimated extent of occurrence of *C. duthiae* is approximately 14,000 km^2, whilst the observed area of occupancy is 144 km^2. The total area of vegetation lost should the site be developed will be approximately 15 Ha. As *C. duthiae* was only observed in a small area of the proposed development footprint the area of habitat cleared will be >1% of the total AOO. It should be noted that the vegetation being cleared constitutes low quality habitat for the species. The majority of the subpopulation, as well as suitable habitat for this species, currently falls outside of the project footprint.

10.5 MITIGATION

Mitigation options are generally considered in terms of the following mitigation hierarchy: (1) avoidance, (2) minimization, (3) restoration and (4) offsets. A distinction is also made between essential mitigation (non-negotiable mitigation measures that lower the impact significance) and non-essential mitigation (best practise measures that do not lower the impact significance).

In terms of essential mitigation measures the following actions are necessary to reduce the impact of the development:

1. A buffer of 50m from intact forest habitats (Figure 9). This boundary is intended to mitigate any potential edge effects that may result from the clearing of adjacent vegetation. Forest species tend to be intolerant of disturbance and therefore this

buffer intends to reduce disturbance during the construction and operational phases of developments.

2. A 30m buffer along all water courses and wetland habitats (Figure 9), as per the Aquatic Specialist Report (James, 2024). Due to the steep topography, there is a high risk of runoff in both the construction and operational phases of the development. This can be in the form of increased sediment loads as a result of erosion, or through runoff containing agricultural products such as pesticide or herbicide. This is vital to ensure the viability of amphibian and aquatic invertebrate populations that are sensitive to poor water quality.
3. Removal of all Invasive Alien Plants (IAPs) in buffers. The removal of these plants is key to allow for the recovery of the natural edaphic climax community, thereby improving habitat quality for resident faunal populations. The rehabilitation must be undertaken in a phased approach, according to a rehabilitation plan and undertaken by a qualified botanist or restoration ecologist.
4. Strict adherence to guidelines regarding use of pesticides, herbicides and other agricultural chemicals.
5. Avoid using heavy machinery in close proximity to buffer zones, and where possible limit human presence within buffer zones.

Whilst not an essential mitigation measure, it is recommended that any particularly large IAP individuals be ring barked and left to stand within buffer zones, where possible. Referred to as snags in forestry, these dead trees will provide good quality nesting sites for *Campethera notata* and other woodpeckers species as well as raptors such as *Stephanoetus coronatus* or *Polemaetus bellicosus*.

Best practise mitigation

1. Mark off the areas that are not going to be developed prior to undertaking any works, and ensure that no unnecessary loss of adjacent vegetation occurs.
2. Sites for building material stocks, vehicles, toilets etc must be clearly marked and restricted to the developmental footprint, existing roads or existing disturbed areas.
3. Avoid using heavy machinery within the prescribed buffer zones. This reduces the risk of soil compaction which would have a deleterious effect on the burrowing behaviour of any remaining mole species within these habitats.

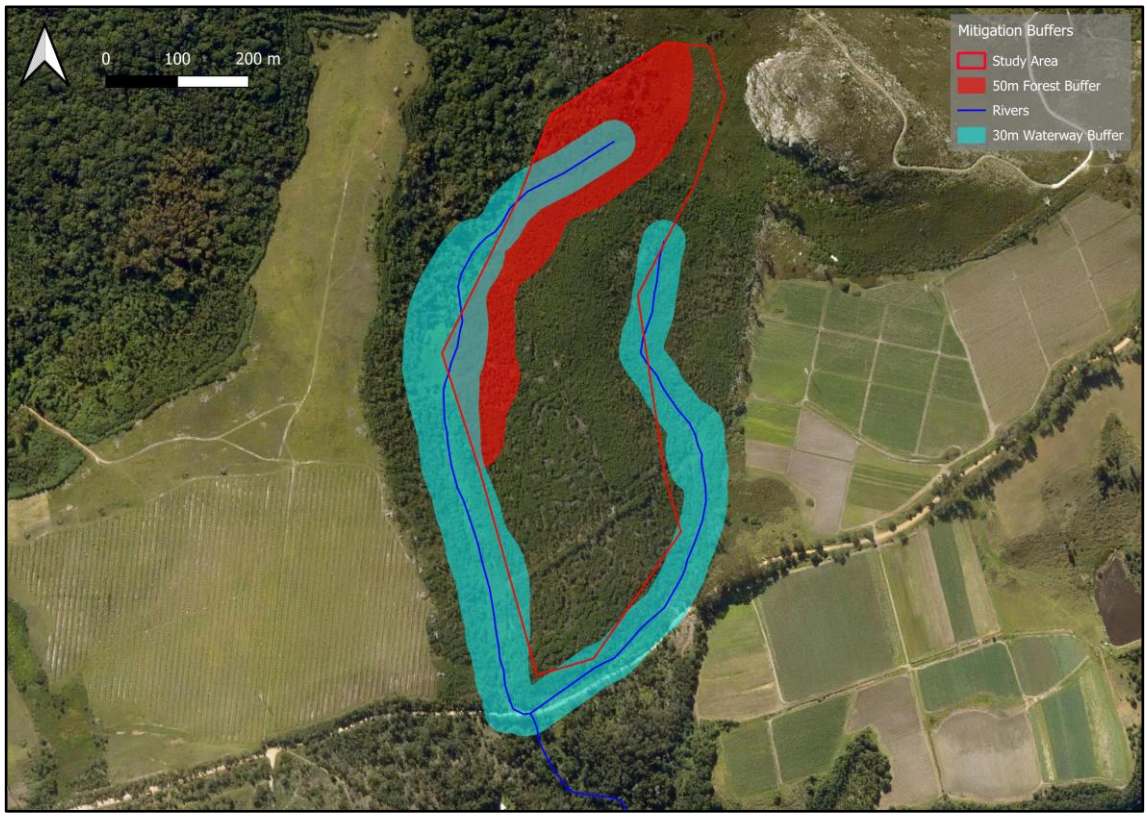


Figure 9. Map showing the recommended 50m Forest buffer and 30m Riverine buffers for the proposed development site.

11. CONCLUSIONS AND RECOMMENDATIONS

A total of 40 animal species were observed in the study area, with two being of conservation concern. The two species in question are *Campethera notata* (Knysna Woodpecker) and *Chlorotalpa duthiae* (Duthie's Golden Mole). Based on the habitat present at or in close proximity to the site there is the potential for the locality to support four additional SCC, including *Afrixalus kysnae, Bradypterus sylvaticus,* Sensitive Species 8*,* and *Stephanoaetus coronatus*. The direct impact of the proposed development is estimated to have a moderate negative impact without mitigation measures, with the likely loss of *C. duthiaea* from within the development footprint, as well as loss of potential habitat for SCC. Should appropriate mitigation measures be followed, including a 50m buffer zone around intact forest habitat and a 30m buffer from aquatic habitats, the impact of the proposed development on SCC present at the site (or potentially occurring SCC) is considered to be low negative. It should be noted that *C. duthiaea* is highly likely to be lost from within the proposed development footprint as this species is fairly intolerant to soil disturbance, even when accounting for the appropriate mitigation methods. However, the sub-population of this species is unlikely to be heavily impacted as the preferred habitat for this species (intact forest) can be found outside the site footprint and is unlikely to be significantly negatively impacted by the proposed development.

11. REFERENCES

Allan D G (2005). in *Denham's Bustard Neotis denhami*, Edited by Hockey, P A R and Dean, W R J and Ryan, P G, The Trustees of the John Voelcker Bird Book Fund: 297-293

Beck, H.E., Zimmermann, N.E., McVicar, T.R., Vergopolan, N., Berg, A. and Wood, E.F., 2018. Present and future Köppen-Geiger climate classification maps at 1-km resolution. *Scientific data*, *5*(1), pp.1-12.

Bronner, G.N. 2015. Chlorotalpa duthiae. The IUCN Red List of Threatened Species 2015: e.T4768A21285581. https://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T4768A21285581.en.

Brown H.D. (1960). New Grasshoppers (Acridoidea) from the Great Karroo and the South Eastern . Journal of the Entomological Society of South Africa, 23.0: 126–143.

Brownlie, S. 2005. *Guideline for involving biodiversity specialists in EIA processes: Edition 1.*CSIR Report No. ENV-S-C 2005-053 C. Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning.

Cadman, M., de Villiers, C., Holmes, P., Rebelo, T., Helme, N., Euston Brown, D., Clark, B., Milton, S., Dean, R., Brownlie, S., Snaddon, K., Day, L., Ollis, D., Job, N., Dorse, C., Wood, J., Harrison, J., Palmer, G., Maree, K., Manuel, J., Holness, S., Ralston, S. and Driver, A. 2016. Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape Fynbos Forum, Edition 2.

Cape Farm Mapper website: https://gis.elsenburg.com/apps/cfm/

Child, M.F., Roxburgh, L., Do Linh San, E., Raimondo, D. and Davies-Mostert, H., 2017. The red list of mammals of South Africa, Swaziland and Lesotho 2016.

Graham J, Ryan P G (1984). Striped Flufftail (R207). *Promerops*, 162: 7.

Government Gazette No. 26436. 2004. National Environmental Management: Biodiversity Act 2004.

Government Gazette No. 43110, 20 March 2020. Procedures for the assessment and minimum criteria for reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation.

Government Gazette No. 43855, 30 October 2020. Procedures for the assessment and minimum criteria for reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation.

Government Gazette No. 49208, 28 July 2023. Amendment to the protocols for the specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Plant and Animal species in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998.

Kinvig R.G. (2005). Biotic indicators of grassland condition in Kwazulu-Natal, with management recommendations. University of KwaZulu-Natal.

Mecenero, S., 2013. *Conservation assessment of butterflies of South Africa, Lesotho and Swaziland: Red List and atlas*. University of Cape Town: Saftronics (Pty).

Pryke J S, Samways M J, Hockey P A R (2011). Persistence of the threatened Knysna warbler Bradypterus sylvaticus in an urban landscape: do gardens substitute for fire?. African Journal of Ecology, 49(2): 199-208.

Simmons R E (2005) (a). in *African Marsh-Harrier Circus ranivorus*, Edited by Hockey, P A R and Dean, W R J and Ryan, P G, The Trustees of the John Voelcker Bird Book Fund: 501-502.

Simmons R E (2005) (b). in *African Crowned Eagle Stephanoaetus coronatus*, Edited by Hockey, P A R and Dean, W R J and Ryan, P G, The Trustees of the John Voelcker Bird Book Fund: 541-542.

Simmons R E (2005) (c). in Martial Eagle Polemaetus bellicosus, Edited by Hockey, P A R and Dean, W R J and Ryan, P G, The Trustees of the John Voelcker Bird Book Fund: 538-539.

Smith N (2005). in Knysna Warbler Bradypterus sylvaticus, Edited by Hockey, P A R and Dean, W R J and Ryan, P G, The Trustees of the John Voelcker Bird Book Fund: 793-794.

Taylor P B (1994). The biology, ecology and conservation of four flufftail species Sarothrura (Aves: Rallidae)

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

Venter, J., Seydack, A., Ehlers Smith, Y., Uys, R. and Child, M., 2016. A conservation assessment of …. *The Red List of mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, Johannesburg*.

APPENDIX 1: ASSESSMENT METHODOLOGY

For each impact, the **nature** (positive/negative), **extent** (spatial scale), **magnitude/intensity** (intensity scale), **duration** (time scale), **consequence** (calculated numerically) and **probability** of occurrence is ranked and described. These criteria would be used to ascertain the **significance** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place.
The tables below show the rankings of these variables, and defines each of the rating categories.

Table 2: Assessment criteria for the evaluation of impacts

CRITERIA	RANK	DESCRIPTION
Nature	**Positive (+)**	The environment will be positively affected.
	Negative (-)	The environment will be negatively affected.
Extent or spatial influence of impact	**National (4)**	Beyond provincial boundaries, but within national boundaries.
	Regional (3)	Beyond a 10 km radius of the proposed activities, but within provincial boundaries.
	Local (2)	Within a 10 km radius of the proposed activities.
	Site specific (1)	On site or within 100 m of the proposed activities.
	Zero (0)	Zero extent.
Magnitude/ intensity of impact (at the indicated spatial scale)	**High (3)**	Natural and/ or social functions and/ or processes are *severely* altered.
	Medium (2)	Natural and/ or social functions and/ or processes are *notably* altered.
	Low (1)	Natural and/ or social functions and/ or processes are *slightly* altered.
	Zero (0)	Natural and/ or social functions and/ or processes remain *unaltered.*
Duration of impact	**Long Term (3)**	More than 10 years, but impact ceases after the operational phase.
	Medium Term (2)	Between 3 – 10 years.
	Short Term (1)	Construction period (up to 3 years).
	None (0)	Zero duration.
Consequence (Nature x (Extent + Magnitude/ Intensity + Duration))	**Extremely beneficial/ detrimental (10 – 11) (+/-)**	The impact is *extremely* beneficial/ detrimental.
	Highly beneficial/ detrimental (8 – 9) (+/-)	The impact is *highly* beneficial/ detrimental.
	Moderately beneficial/ detrimental (6 – 7) (+/-)	The impact is *moderately* beneficial/ detrimental.

	Slightly beneficial/ detrimental (4 – 5) (+/-)	The impact is *slightly* beneficial/ detrimental.
	Negligibly beneficial/ detrimental (1 – 3) (+/-)	The impact is *negligibly* beneficial/ detrimental.
	Zero consequence (0) (+/-)	The impact has zero consequence.
Probability of occurrence	**Definite (4)**	Estimated at a greater than 95% chance of the impact occurring.
	Probable (3)	Estimated 50 – 95% chance of the impact occurring.
	Possible (2)	Estimated 6 – 49% chance of the impact occurring.
	Unlikely (1)	Estimated less than 5% chance of the impact occurring.
	None (0)	Estimated no chance of impact occurring.

The **significance** of an impact is derived by taking into account the **consequence** (nature of the impact and its extent, magnitude/intensity and duration) of the impact and the **probability** of this impact occurring through the use of the following formula:

Significance Score = Consequence x Probability

The means of arriving at a significance rating is explained in Table 3.

Table 3: Definition of significance ratings

SIGNIFICANCE SCORE	SIGNIFICANCE RATINGS	
32 – 40	**High (+)**	**High (-)**
25 – 31	**Medium (+)**	**Medium (-)**
19 – 24	**Low (+)**	**Low (-)**
10 – 18	**Very-Low (+)**	**Very-Low (-)**
1 – 9	**Negligible**	

Once the significance of an impact has been determined, the **confidence** in the assessment of the impact, as well as the degree of **reversibility** of the impact and **irreplaceable loss of resources** would be determined using the rating systems outlined in Table 4, 5 and 6 respectively. Lastly, the **cumulative impact** is ranked and described as outlined in Table 7.

Table 4: Definition of confidence ratings

CONFIDENCE RATINGS	CRITERIA
High	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Medium	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Low	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

Table 5: Degree of reversibility

REVERSABILITY OF IMPACT	CRITERIA
High	High potential for reversibility.
Medium	Medium potential for reversibility.
Low	Low potential for reversibility.
Zero	Zero potential for reversibility.

Table 6: Degree of irreplaceability

IRREPLACEABLE LOSS OF RESOURCES	CRITERIA
High	Definite loss of irreplaceable resources.
Medium	Medium potential for loss of irreplaceable resources.
Low	Low potential for loss of irreplaceable resources.
Zero	Zero potential for loss of irreplaceable resources.

Table 7: Cumulative Impact on the environment

CUMULATIVE IMPACTS	CRITERIA
High	The activity is one of *several* similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Medium	The activity is one of a *few* similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the geographical, physical, biological, social, economic and cultural aspects of the environment.
Low	The activity is localised and might have a negligible cumulative impact.
Zero	No cumulative impact on the environment.

APPENDIX 2: ABBREVIATED CURRICULUM VITAE: JACOBUS VISSER

Experience

- 29 years of in-the-field naturalist experience involving a variety of faunal groups (mammals, amphibians, reptiles, avifauna, butterflies, grasshoppers and scorpions)
- Zoologist with 17 years of professional experience
- 14 Peer-reviewed publications in high impact national and international scientific journals
- 5 IUCN Red List assessments
- 3 years of consultation experience as a Fauna Specialist (trading as Blue Skies Research).

Education and qualifications

- PhD (Zoology), University of Johannesburg (2015 - 2017)
- MSc (Zoology), Stellenbosch University (2011 - 2013)
- BSc Honours (Zoology) cum laude, Stellenbosch University (2010)
- BSc (Biodiversity and Ecology) cum laude, Stellenbosch University (2007 - 2009)

Personal Details

- Jacobus Hendrik Visser
- 13 Dennelaan, Stilbaai, 6674
- Cell: 083 453 7916. Office: 028 754 2484
- BlueSkiesResearch01@gmail.com.
- Date of birth – 10/02/1988
- Marital status – Married
- Dependents – None

Scientific publications

- **Visser J.H.** (2013). Gene-flow in the rock hyrax (Procavia capensis) at different spatial scales. MSc thesis, Stellenbosch University, Stellenbosch, South Africa. https://core.ac.uk/download/pdf/37420485.pdf
- **Visser J.H.** (2017). Evolution of the South African Bathyergidae: patterns and processes. PhD dissertation, University of Johannesburg, Johannesburg, South Africa.
- **Visser J.H.,** Bennett N.C., Jansen van Vuuren B. (2014). Local and regional scale genetic variation in the Cape dune mole-rat, Bathyergus suillus. PLos ONE 9(9):e107226. https://doi.org/10.1371/journal.pone.0107226
- **Visser J.H.**, Bennett N.C., Jansen van Vuuren B. (2017). Distributional range, ecology and mating system of the Cape mole-rat, Georychus

capensis family Bathyergidae. Canadian Journal of Zoology 95 (10): 713-726. https://doi.org/10.1139/cjz-2017-0016

- **Visser J.H**., Bennett N.C., Jansen van Vuuren B. (2018). Spatial genetic diversity in the Cape mole-rat, Georychus capensis: Extreme isolation of populations in a subterranean environment. PLoS ONE 13(3): e0194165. https://doi.org/10.1371/journal.pone.0194165
- **Visser J.H.,** Bennett N.C., Jansen van Vuuren B. (2019). Evolutionary and ecological patterns within the South African Bathyergidae: Implications for taxonomy. Molecular Phylogenetics and Evolution 130, 181-197. https://doi.org/10.1016/j.ympev.2018.10.017
- **Visser J.H**., Bennett N.C., Jansen van Vuuren B. (2019). Phylogeny and biogeography of the African Bathyergidae: a review of patterns and processes. Journal of Biogeography PeerJ 7:e7730. https://doi.org/10.7717/peerj.7730
- **Visser J.H**., Geerts S. (2020). Describing sexual dimorphism and fine scale spatial distributions in the Drab Thick-tail Scorpion, Parabuthus planicauda. African Zoology 55 (3): 250-256. https://doi.org/10.1080/15627020.2020.1796525
- **Visser J.H**., Geerts S. (2021). Static allometry and sexual dimorphism in the Striped Lesser-thicktail Scorpion, Uroplectes lineatus. Arachnology 18 (7), 700–707. https://doi.org/10.13156/arac.2020.18.7.700
- **Visser J.H.,** Geerts S. (in review). Sexual dimorphism and static allometry in the burrowing scorpion, Opistophthalmus pallipes. African Zoology.
- **Visser J.H**., Geerts S. (2021). Sexual dimorphism and static allometry in the South African scorpion Opistophthalmus karrooensis. Arachnology 18 (9), 1057-1063.
- **Visser J.H**., Geerts S., Jansen van Vuuren B. (2021). Phylogeographic patterns in a semi-lithophilous burrowing scorpion from South Africa, Opistophthalmus pallipes. Zoological Science 38 (1): 36-44. https://doi.org/10.2108/zs200094
- **Visser J.H**., Robinson T.J., Jansen van Vuuren B. (2020). Spatial genetic structure in the rock hyrax (Procavia capensis) across the Namaqualand and western Fynbos areas of South Africa - a mitochondrial and

microsatellite perspective. Canadian Journal of Zoology 98 (8): 557-571. https://doi.org/10.1139/cjz-2019-0154

- Uhrová M., Mikula O., Bennett N.C., Van Daele P., Piálek L., Bryja J., **Visser J.H.**, Jansen van Vuuren B., Šumbera R. (2022). Species limits and phylogeographic structure in two genera of solitary African mole-rats Georychus and Heliophobius. Molecular Phylogenetics and Evolution 167 (2022) 107337

APPENDIX 3: ABBREVIATED CURRICULUM VITAE: ADAM LABUSCHAGNE

Experience

- Terretrial and aquatic ecological field experience across a wide range of biomes including Tropical Asia, Tempereate Europe, and the CFR
- Data management and analysis
- Experience with statisical and GIS programs including R and QGIS.
- Species distribution and Ecoloigcal Niche modelling experience.
- MSc Thesis Title "*Using satellite telemetry to understand the movement ecology and diving behavioir of Caretta caretta in the Cape Verde Archipelago"*
- Completed 17 Botanical/Terrestrial Biodiversity specialist survey reports

Career History

- 2023 – present: Independent ecologist at Capensis Ecological Surveys
- August 2023 – present: Independent Ecologist and Field Technician at Inkululeko Wildlife Services
- March 2023 – present: Independent ecology specialist and associate of Bergwind Botanical Surveys & Tours CC.
- December 2020-February 2023: Field Manager and Research Officer at Human Wildlife Solutions.

Education and qualifications

- Cand. Nat. Sci. (133686)
- MSc (Ecology & Evolutionary Biology) – Queen Mary University (2019).
- BSc (Zoology) – University of Roehampton (2015-2018)

Personal Details

- Adam Labuschagne
- 36a Wilson Street, Hunters Home, Knysna, 6571
- Cell: 072 830 6500.
- adam@capensis.co.za
- Date of birth – 31/10/1994
- Marital status – Single
- Dependents – None

APPENDIX 4: SPECIES LIST FOR ERF 385, HOEKWIL

Family	Scientific Name	Common Name	Date Observed
Birds			
Accipitridae	*Buteo rufofuscus*	Jackal Buzzard	11/04/2024
Accipitridae	*Elanus caeruleus*	Black-shouldered Kite	11/04/2024
Accipitridae	*Haliaeetus vocifer*	African Fisheagle	11/04/2024
Cisticolidae	*Cisticola fulvicapilla*	Neddicky	11/04/2024
Columbidae	*Streptopelia semitorquata*	Red-eyed Dove	11/04/2024
Dicruridae	*Dicrurus adsimilis*	Forktail Drongo	11/04/2024
Laniidae	*Lanius collaris*	Fiscal Shrike	11/04/2024
Locustellidae	*Bradypterus baboecala*	Little Rush Warbler	11/04/2024
Malaconotidae	*Chlorophoneus olivaceus*	Olive Bushshrike	11/04/2024
Motacillidae	*Macronyx capensis*	Cape Longclaw	11/04/2024
Muscicapidae	*Cossypha caffra*	Cape Robin-chat	11/04/2024
Musophagidae	*Tauraco corythaix*	Knysna Turaco	11/04/2024
Nectariindae	*Cinnyris chalybeus*	Southern Double-collared Sunbird	11/04/2024
Numididae	*Numida meleagris*	Helmeted Guineafowl	11/04/2024
Oriolidae	*Oriolus larvatus*	Black-headed Oriole	11/04/2024
Picidae	*Campethera notata*	Knysna Woodpecker	11/04/2024
Platysteridae	*Batis capensis*	Cape Batis	11/04/2024
Pycnonotidae	*Andropadus importunus*	Sombre Greenbul	11/04/2024
Sturnidae	*Sturnus vulgaris*	Common Starling	11/04/2024
Sturnidae	*Onychognatus morio*	Red-winged Starling	11/04/2024
Threskiornithidae	*Bostrychia hagedash*	Hadeda Ibis	11/04/2024
Insects:	Lepidoptera		
Nymphalidae	*Bicyclus safitza*	Common Bush Brown	11/04/2024
Nymphalidae	*Bicyclus safitza safitza*	Bush Brown	11/04/2024
Nymphalidae	*Cassionympha cassius*	Rainforest Brown	11/04/2024
Nymphalidae	*Dira clytus clytus*	Cape Autumn Widow	11/04/2024
Nymphalidae	*Vanessa cardui*	Painted Lady	11/04/2024
Insects:	*Orthoptera*		
Acrididae	*Eyprepocnemis plorans*	Lamenting Grasshopper	11/04/2024
Acrididae	*Paracinema tricolor*	Vlei Grasshopper	11/04/2024
Tettgonidae	*Alfredectes semiaeneus*	Alfreds Shieldback	11/04/2024
Tettgonidae	*Conocephalus maculatus*	Spotted meadow Katydid	11/04/2024
Amphibians			
Bufonidae	*Sclerophrys capensis*	Raucos Toad	11/04/2024
Pyxicephalidae	*Cacosternum nanum*	Bronze Caco	11/04/2024
Pyxicephalidae	*Strongylopus grayii*	Clicking stream frog	11/04/2024

Mammals			
Bathyergidae	*Chlorotalpa duthiae*	Duthie's Golden Mole	11/04/2024
Bovidae	*Raphicerusmelanotis*	Cape Grysbok	11/04/2024
Bovidae	*Sylvicapra grimmia*	Bush Duiker	11/04/2024
Bovidae	*Tragelaphus scriptus*	Bushbuck	11/04/2024
Cercopithecidae	*Papio ursinus*	Chacma Baboon	11/04/2024
Hystricidae	*Hystrix africaeaustralis*	Cape Porcupine	11/04/2024
Suidae	*Potamochoerus arvatus*	Bushpig	11/04/2024

APPENDIX 5: MAMMAL RECORDS FOR QDS 3323DC FROM ADU MAMMALMAP

Species Code	Family	Scientific name	Common name	Red list	Last recorded observation
216510	Balaenidae	Eubalaena australis	Southern Right Whale	Least Concern (2016)	06/09/2013
151400	Bathyergidae	Bathyergus suillus	Cape Dune Mole-rat	Least Concern (2016)	11/02/1991
151470	Bathyergidae	Cryptomys hottentotus	Southern African Mole-rat	Least Concern (2016)	12/02/1991
151590	Bathyergidae	Georychus capensis	Cape Mole-rat	Least Concern (2016)	01/01/1980
212150	Bovidae	Damaliscus pygargus pygargus	Bontebok	Vulnerable (2016)	01/01/1984
213120	Bovidae	Oreotragus oreotragus	Klipspringer	Least Concern (2016)	31/05/2006
216360	Bovidae	Pelea capreolus	Vaal Rhebok	Near Threatened (2016)	01/01/1980
215570	Bovidae	Philantomba monticola	Blue Duiker	Vulnerable (2016)	
213320	Bovidae	Raphicerus campestris	Steenbok	Least Concern (2016)	31/05/2006
213370	Bovidae	Raphicerus melanotis	Cape Grysbok	Least Concern (2016)	20/10/2021
215700	Bovidae	Sylvicapra grimmia	Bush Duiker	Least Concern (2016)	01/01/1980
213970	Bovidae	Tragelaphus scriptus	Bushbuck	Least Concern	08/01/2017
198600	Canidae	Canis mesomelas	Black-backed Jackal	Least Concern (2016)	16/07/2007
113300	Cercopithecidae	Chlorocebus pygerythrus	Vervet Monkey	Least Concern (2016)	19/10/2021
113310	Cercopithecidae	Chlorocebus pygerythrus pygerythrus	Vervet Monkey (subspecies pygerythrus)	Least Concern (2008)	30/09/2011
114040	Cercopithecidae	Papio ursinus	Chacma Baboon	LC (IUCN, 2016)	22/09/2022
106140	Chrysochloridae	Amblysomus corriae	Fynbos Golden Mole	Near Threatened (2016)	13/12/1987
105890	Chrysochloridae	Chlorotalpa duthiae	Duthie's Golden Mole	Vulnerable (2016)	01/06/1984
105950	Chrysochloridae	Chrysochloris asiatica	Cape Golden Mole	Data Deficient	20/12/2020
191660	Felidae	Caracal caracal	Caracal	Least Concern (2016)	07/04/2018
192070	Felidae	Felis silvestris	Wildcat	Least Concern (2016)	26/01/2005

193900	Felidae	Panthera pardus	Leopard	Vulnerable (2016)	01/01/1980
195840	Herpestidae	Atilax paludinosus	Marsh Mongoose	Least Concern (2016)	28/05/2014
196940	Herpestidae	Herpestes ichneumon	Egyptian Mongoose	Least Concern (2016)	14/07/2023
196300	Herpestidae	Herpestes pulverulentus	Cape Gray Mongoose	Least Concern (2016)	13/04/2011
151730	Hystricidae	Hystrix africaeaustralis	Cape Porcupine	Least Concern	01/01/1980
158240	Leporidae	Lepus saxatilis	Scrub Hare	Least Concern	
181130	Molossidae	Chaerephon pumilus	Little Free-tailed Bat	Least Concern (2016)	09/10/1979
182640	Molossidae	Tadarida aegyptiaca	Egyptian Free-tailed Bat	Least Concern (2016)	09/10/1979
148270	Muridae	Mus (Nannomys) minutoides	Southern African Pygmy Mouse	Least Concern	01/01/1980
217980	Muridae	Myomyscus verreauxi	Verreaux's Mouse	Least Concern	22/11/1988
151100	Muridae	Otomys irroratus	Southern African Vlei Rat	Least Concern (2016)	06/01/2019
150360	Muridae	Rhabdomys pumilio	Xeric Four-striped Grass Rat	Least Concern (2016)	23/02/2022
201180	Mustelidae	Aonyx capensis	African Clawless Otter	Near Threatened (2016)	11/06/2003
202070	Mustelidae	Ictonyx striatus	Striped Polecat	Least Concern (2016)	01/01/1980
203170	Mustelidae	Mellivora capensis	Honey Badger	Least Concern (2016)	19/05/2001
205210	Mustelidae	Poecilogale albinucha	African Striped Weasel	Near Threatened (2016)	12/08/2010
136590	Nesomyidae	Dendromus melanotis	Gray African Climbing Mouse	Least Concern (2016)	05/11/1984
136600	Nesomyidae	Dendromus mesomelas	Brants's African Climbing Mouse	Least Concern (2016)	21/10/1984
106780	Orycteropodidae	Orycteropus afer	Aardvark	Least Concern (2016)	26/06/1976
107300	Procaviidae	Procavia capensis capensis	Cape Rock Hyrax	Least Concern (IUCN 2015)	06/02/2003
171650	Rhinolophidae	Rhinolophus clivosus	Geoffroy's Horseshoe Bat	Least Concern (2016)	18/11/1979
160860	Soricidae	Crocidura flavescens	Greater Red Musk Shrew	Least Concern (2016)	02/03/1982
163350	Soricidae	Myosorex varius	Forest Shrew	Least Concern (2016)	16/12/2022

162860	Soricidae	Suncus etruscus	Etruscan Shrew		18/05/1976
162890	Soricidae	Suncus infinitesimus	Least Dwarf Shrew	Least Concern (2016)	04/03/1977
207810	Suidae	Potamochoerus porcus	Red River Hog		12/06/2003
187740	Vespertilionidae	Cistugo lesueuri	Lesueur's Wing-gland Bat	Least Concern (2016)	
187750	Vespertilionidae	Cistugo seabrae	Angolan Wing-gland Bat	Near Threatened (2016)	12/07/1978
187170	Vespertilionidae	Pipistrellus melckorum	Melcks' Serotine		
195120	Viverridae	Genetta genetta	Common Genet	Least Concern (2016)	24/11/1989
195300	Viverridae	Genetta tigrina	Cape Genet (Cape Large-Spotted Genet)	Least Concern (2016)	31/07/2023

APPENDIX 6: FROG RECORDS FOR QDS 3323DC FROM ADU FROGMAP

Species Code	Family	Scientific name	Common name	Red list	Last recorded
170	Brevicipitidae	Breviceps fuscus	Plain Rain Frog	Least Concern	18/09/2014
370	Bufonidae	Sclerophrys capensis	Raucous Toad	Least Concern	10/12/2023
350	Bufonidae	Sclerophrys pardalis	Eastern Leopard Toad	Least Concern	
510	Heleophrynidae	Heleophryne regis	Southern Ghost Frog	Least Concern	12/06/2013
40	Hyperoliidae	Afrixalus knysnae	Knysna Leaf-folding Frog	Endangered B1ab(i,ii,iii,v)+2ab(i,ii,iii,v) (2016)	16/11/2013
580	Hyperoliidae	Hyperolius horstockii	Arum Lily Frog	Least Concern	06/10/2001
590	Hyperoliidae	Hyperolius marmoratus	Painted Reed Frog	Least Concern (IUCN ver 3.1, 2013)	16/12/2023
920	Hyperoliidae	Semnodactylus wealii	Rattling Frog	Least Concern	18/09/2014
1050	Pipidae	Xenopus laevis	Common Platanna	Least Concern (IUCN 2020)	18/09/2014
880	Pyxicephalidae	Amietia delalandii	Delalande's River Frog	Least Concern (2017)	28/12/2017
890	Pyxicephalidae	Amietia fuscigula	Cape River Frog	Least Concern (2017)	05/11/2023
895	Pyxicephalidae	Amietia vandijki	Van Dijk's River Frog	Least Concern (2013)	28/12/2017
400	Pyxicephalidae	Cacosternum boettgeri	Common Caco	Least Concern (2013)	06/10/2001
430	Pyxicephalidae	Cacosternum nanum	Bronze Caco	Least Concern (2013)	21/09/2022
940	Pyxicephalidae	Strongylopus fasciatus	Striped Stream Frog	Least Concern	15/05/2015
950	Pyxicephalidae	Strongylopus grayii	Clicking Stream Frog	Least Concern	29/11/2021
1000	Pyxicephalidae	Tomopterna delalandii	Cape Sand Frog	Least Concern (IUCN 2013)	07/06/1976

APPENDIX 7: LEPIDOPTERAN RECORDS FOR QDS 3323DC FROM ADU LEPIMAP

Species code	Family	Scientific name	Common name	Red list category	Last recorded
629210	CRAMBIDAE	Aethaloessa floridalis			01/01/2005
604530	CRAMBIDAE	Autocharis sp.			01/01/2005
629730	CRAMBIDAE	Cirrhochrista grabczewskyi			30/12/2004
632090	CRAMBIDAE	Palpita unionalis			01/11/2015
651080	CRAMBIDAE	Palpita vitrealis			01/11/2015
633100	CRAMBIDAE	Spoladea recurvalis			11/03/2023
539260	EREBIDAE	Amata khulweinii			15/12/1999
506210	EREBIDAE	Asota speciosa			16/12/2021
522710	EREBIDAE	Cyligramma latona			17/05/2022
515520	EREBIDAE	Eyralpenus testaceus			01/01/2005
672036	EREBIDAE	Metarctia sp.			01/11/2015
517850	EREBIDAE	Utetheisa pulchella			01/04/2021
577850	GEOMETRIDAE	SUBFAMILY LARENTIINAE			18/12/2021
544825	GEOMETRIDAE	Chiasmia simplicilinea	Oblique Peacock		02/11/2023
545590	GEOMETRIDAE	Drepanogynis sp.			19/02/2017
545980	GEOMETRIDAE	Drepanogynis cambogiaria		Not Threatened (NT) [not an IUCN category]	31/01/2005
548190	GEOMETRIDAE	Eulycia accentuata		Not Threatened (NT) [not an IUCN category]	01/01/2005
550720	GEOMETRIDAE	Obolcola decisa		Not Threatened (NT) [not an IUCN category]	01/01/2005
634910	GEOMETRIDAE	Scopula sp.			01/01/2005
553450	GEOMETRIDAE	Xylopteryx protearia		Not Threatened (NT) [not an IUCN category]	19/02/2017
553510	GEOMETRIDAE	Zamarada sp.			01/01/2005
472101	HESPERIIDAE	Afrogegenes sp.			06/03/2021
472120	HESPERIIDAE	Afrogegenes letterstedti	Brown dodger	Least Concern (SABCA 2013)	12/03/2023
468730	HESPERIIDAE	Eagris nottoana knysna	Rufous-winged elfin	Least Concern (SABCA 2013)	01/11/2014
470950	HESPERIIDAE	Gomalia elma elma	Green-marbled skipper	Least Concern (SABCA 2013)	04/01/2024

471670	HESPERIIDAE	Metisella metis paris	Gold-spotted sylph	Least Concern (SABCA 2013)	04/01/2024
472530	HESPERIIDAE	Pelopidas thrax	White-branded swift	Least Concern (SABCA 2013)	01/03/2024
471340	HESPERIIDAE	Spialia spio	Mountain sandman	Least Concern (SABCA 2013)	04/01/2024
586240	LIMACODIDAE	Hamartia medora			23/02/2018
459210	LYCAENIDAE	Aloeides macmasteri	Large plain russet	Least Concern (SABCA 2013)	26/11/1988
459440	LYCAENIDAE	Aloeides pallida littoralis	Giant russet	Data Deficient (SABCA 2013)	23/12/2005
459470	LYCAENIDAE	Aloeides pierus	Veined russet	Least Concern (SABCA 2013)	19/12/1987
460430	LYCAENIDAE	Anthene amarah amarah	Black-striped ciliate blue	Least Concern (SABCA 2013)	26/03/2018
460620	LYCAENIDAE	Anthene definita definita	Steel-blue-ciliate blue	Least Concern (SABCA 2013)	16/11/2023
463650	LYCAENIDAE	Cacyreus dicksoni	Karoo geranium bronze	Least Concern (SABCA 2013)	12/12/2016
463710	LYCAENIDAE	Cacyreus fracta fracta	Water geranium bronze	Least Concern (SABCA 2013)	22/05/2020
463670	LYCAENIDAE	Cacyreus lingeus	Bush bronze	Least Concern (SABCA 2013)	26/11/2021
463680	LYCAENIDAE	Cacyreus marshalli	Common geranium bronze	Least Concern (SABCA 2013)	04/01/2024
457300	LYCAENIDAE	Chrysoritis palmus margueritae	Water opal	Least Concern (SABCA 2013)	26/03/2022
465000	LYCAENIDAE	Eicochrysops messapus messapus	Cupreous ash blue	Least Concern (SABCA 2013)	26/03/2013
463230	LYCAENIDAE	Lampides boeticus	Pea blue	Least Concern (SABCA 2013)	08/04/2017
467230	LYCAENIDAE	Lepidochrysops patricia	Patrician giant cupid	Least Concern (SABCA 2013)	15/06/1988
463950	LYCAENIDAE	Leptotes sp.			04/01/2024
463980	LYCAENIDAE	Leptotes brevidentatus	Short-toothed zebra blue	Least Concern (SABCA 2013)	27/02/2008
464050	LYCAENIDAE	Leptotes pirithous pirithous	Common zebra blue	Least Concern (SABCA 2013)	23/10/2011
451070	LYCAENIDAE	Myrina silenus ficedula	Common fig tree blue	Least Concern (SABCA 2013)	28/06/2023
460180	LYCAENIDAE	Phasis thero thero	Silver arrowhead	Least Concern (SABCA 2013)	27/02/2008
464520	LYCAENIDAE	Tarucus thespis	Vivid pierrot	Least Concern (SABCA 2013)	22/05/2020
440780	LYCAENIDAE	Thestor murrayi	Garden route skolly	Least Concern (SABCA 2013)	14/12/1996
464605	LYCAENIDAE	Zizeeria knysna knysna	African grass blue	Least Concern (SABCA 2013)	07/03/2024
464720	LYCAENIDAE	Zizula hylax	Tiny grass blue	Least Concern (SABCA 2013)	15/06/1988
500100	NOCTUIDAE	Acontia sp.			25/10/2023
574800	NOCTUIDAE	Heliothis scutuligera			22/05/2020
410580	NYMPHALIDAE	Acraea horta	Garden acraea	Least Concern (SABCA 2013)	02/01/2023
415230	NYMPHALIDAE	Aeropetes tulbaghia	Table mountain beauty	Least Concern (SABCA 2013)	15/06/1988
409730	NYMPHALIDAE	Amauris echeria echeria	Chief	Least Concern (SABCA 2013)	01/02/2014

416120	NYMPHALIDAE	Bicyclus safitza safitza	Black-haired bush brown	Least Concern (SABCA 2013)	01/03/2024
419750	NYMPHALIDAE	Cassionympha cassius	Rainforest dull brown	Least Concern (SABCA 2013)	30/03/2024
435200	NYMPHALIDAE	Charaxes brutus natalensis	White-barred charaxes	Least Concern (SABCA 2013)	27/02/2008
433670	NYMPHALIDAE	Charaxes karkloof trimeni	Karkloof charaxes	Least Concern (SABCA 2013)	11/10/2003
437080	NYMPHALIDAE	Charaxes varanes varanes	Pearl charaxes	Least Concern (SABCA 2013)	10/10/2022
437190	NYMPHALIDAE	Charaxes xiphares xiphares	Forest-king charaxes	Least Concern (SABCA 2013)	23/03/2009
420240	NYMPHALIDAE	Cymothoe alcimeda alcimeda	Battling glider	Least Concern (SABCA 2013)	28/04/2017
409280	NYMPHALIDAE	Danaus chrysippus orientis	African plain tiger	Least Concern (SABCA 2013)	12/03/2023
415440	NYMPHALIDAE	Dira clytus clytus	Cape autumn widow	Least Concern (SABCA 2013)	01/04/2021
408850	NYMPHALIDAE	Eurytela hiarbas angustata	Pied piper	Least Concern (SABCA 2013)	04/01/2024
439300	NYMPHALIDAE	Hypolimnas misippus	Common diadem	Least Concern (SABCA 2013)	28/03/2019
438280	NYMPHALIDAE	Junonia hierta cebrene	Yellow pansy	Least Concern (SABCA 2013)	17/04/2022
438340	NYMPHALIDAE	Junonia oenone oenone	Dark blue pansy	Least Concern (SABCA 2013)	15/12/1986
438380	NYMPHALIDAE	Junonia orithya madagascariensis	African blue pansy	Least Concern (SABCA 2013)	17/05/2022
415130	NYMPHALIDAE	Melanitis leda	Common evening brown	Least Concern (SABCA 2013)	15/06/1900
438810	NYMPHALIDAE	Precis archesia archesia	Garden inspector	Least Concern (SABCA 2013)	16/12/2023
419840	NYMPHALIDAE	Pseudonympha magus	Silver-bottom brown	Least Concern (SABCA 2013)	20/10/2021
415600	NYMPHALIDAE	Serradinga kammanassiensis	Kammanassie speckled widow	Least Concern (SABCA 2013)	14/12/1998
420130	NYMPHALIDAE	Stygionympha vigilans	Western hillside brown	Least Concern (SABCA 2013)	14/12/1998
414160	NYMPHALIDAE	Telchinia rahira rahira	Marsh telchinia	Least Concern (SABCA 2013)	13/02/2024
438050	NYMPHALIDAE	Vanessa cardui	Painted lady	Least Concern (SABCA 2013)	04/01/2024
438130	NYMPHALIDAE	Vanessa hippomene hippomene	Southern short-tailed admiral	Least Concern (SABCA 2013)	10/03/1987
400410	PAPILIONIDAE	Papilio dardanus cenea	Mocker swallowtail	Least Concern (SABCA 2013)	13/02/2024
400530	PAPILIONIDAE	Papilio demodocus demodocus	Citrus swallowtail	Least Concern (SABCA 2013)	09/02/2024
401360	PAPILIONIDAE	Papilio nireus lyaeus	Narrow green-banded swallowtail	Least Concern (SABCA 2013)	08/03/2024
407450	PIERIDAE	Belenois aurota	Pioneer caper white	Least Concern (SABCA 2013)	11/07/2021
407590	PIERIDAE	Belenois creona severina	African caper white	Least Concern (SABCA 2013)	04/01/2024
407630	PIERIDAE	Belenois gidica abyssinica	African veined white	Least Concern (SABCA 2013)	04/01/2024
408170	PIERIDAE	Belenois zochalia zochalia	Forest caper white	Least Concern (SABCA 2013)	08/01/2020
403120	PIERIDAE	Catopsilia florella	African migrant	Least Concern (SABCA 2013)	23/02/2022
403160	PIERIDAE	Colias electo electo	African clouded yellow	Least Concern (SABCA 2013)	10/03/2014

403790	PIERIDAE	Colotis antevippe gavisa	Red tip	Least Concern (SABCA 2013)	15/12/1996
404160	PIERIDAE	Colotis euippe mediata	Smoky orange tip		21/11/1982
404180	PIERIDAE	Colotis euippe omphale	Southern round-winged orange tip	Least Concern (LC)	04/01/2024
407190	PIERIDAE	Dixeia charina charina	African ant-heap white	Least Concern (SABCA 2013)	04/01/2024
402930	PIERIDAE	Eurema brigitta brigitta	Broad-bordered grass yellow	Least Concern (SABCA 2013)	27/03/2020
405670	PIERIDAE	Mylothris agathina agathina	Eastern dotted border	Least Concern (SABCA 2013)	09/03/2024
403400	PIERIDAE	Nepheronia buquetii buquetii	Buquet's vagrant	Least Concern (SABCA 2013)	14/10/2019
405490	PIERIDAE	Pieris brassicae	Cabbage white	Least Concern (SABCA 2013)	04/01/2022
403570	PIERIDAE	Pinacopteryx eriphia eriphia	Zebra white	Least Concern (SABCA 2013)	15/06/1988
405610	PIERIDAE	Pontia helice helice	Southern meadow white	Least Concern (SABCA 2013)	25/10/2023
662370	PSYCHIDAE	FAMILY PSYCHIDAE			19/12/2014
609360	PTEROPHORIDAE	FAMILY PTEROPHORIDAE	Unidentified PTEROPHORIDAE		17/04/2022
557810	PYRALIDAE	Lamoria sp.			01/01/2005
619450	PYRALIDAE	Tegulifera oblunata			19/02/2017
621210	SATURNIIDAE	Bunaea alcinoe			11/10/2019
622080	SATURNIIDAE	Heniocha apollonia			20/02/2008
670820	SPHINGIDAE	Agrius convolvuli			18/01/2020
626730	SPHINGIDAE	Cephonodes hylas virescens			16/04/2020
626760	SPHINGIDAE	Coelonia fulvinotata			06/12/2023
626930	SPHINGIDAE	Hippotion celerio			22/04/2020
627400	SPHINGIDAE	Macroglossum trochilus			14/04/2020
629000	SPHINGIDAE	Theretra capensis			20/11/2023

APPENDIX 8: REPTILE RECORDS FOR QDS 3323DC FROM ADU REPTILEMAP

Species code	Family	Scientific name	Common name	Red list Category	Last recorded observation
1490	Agamidae	Agama atra	Southern Rock Agama	Least Concern (SARCA 2014)	15/06/1900
1260	Chamaeleonidae	Bradypodion damaranum	Knysna Dwarf Chameleon	Least Concern (SARCA 2014)	18/03/2022
4560	Colubridae	Crotaphopeltis hotamboeia	Red-lipped Snake	Least Concern (SARCA 2014)	04/12/2021
4750	Colubridae	Dasypeltis scabra	Rhombic Egg-eater	Least Concern (SARCA 2014)	16/12/2006
4690	Colubridae	Dispholidus typus typus	Boomslang	Least Concern (IUCN 2021, sp. level)	11/10/2019
4600	Colubridae	Philothamnus hoplogaster	South Eastern Green Snake	Least Concern (IUCN 2021)	17/03/2022
4620	Colubridae	Philothamnus occidentalis	Western Natal Green Snake	Least Concern (IUCN 2022)	05/11/2023
2830	Cordylidae	Chamaesaura anguina anguina	Cape Grass Lizard	Least Concern (SARCA 2014)	26/11/1981
2910	Cordylidae	Cordylus cordylus	Cape Girdled Lizard	Least Concern (SARCA 2014)	06/10/2006
2900	Cordylidae	Ninurta coeruleopunctatus	Blue-spotted Girdled Lizard	Least Concern (SARCA 2014)	04/03/2021
3210	Cordylidae	Pseudocordylus microlepidotus microlepidotus	Cape Crag Lizard	Least Concern (SARCA 2014)	09/08/2003
3231	Cordylidae	Pseudocordylus microlepidotus subsp. ?	Cape Crag Lizard (subsp. ?)		22/04/1980
5370	Elapidae	Hydrophis platurus	Yellow-bellied Sea Snake	Least Concern (SARCA 2014)	21/05/1975
5340	Elapidae	Naja nivea	Cape Cobra	Least Concern (SARCA 2014)	16/01/1980
1100	Gekkonidae	Afrogecko porphyreus	Marbled Leaf-toed Gecko	Least Concern (SARCA 2014)	24/04/2020
320	Gekkonidae	Lygodactylus capensis	Common Dwarf Gecko	Least Concern (SARCA 2014)	28/03/2023
550	Gekkonidae	Pachydactylus geitje	Ocellated Gecko	Least Concern (SARCA 2014)	08/05/1978
3600	Gerrhosauridae	Tetradactylus seps	Short-legged Seps	Least Concern (SARCA 2014)	29/01/2022
1890	Lacertidae	Pedioplanis lineoocellata pulchella	Common Sand Lizard	Least Concern (SARCA 2014)	15/06/1900
1950	Lacertidae	Tropidosaura gularis	Cape Mountain Lizard	Least Concern (SARCA 2014)	09/08/2003
4510	Lamprophiidae	Duberria lutrix lutrix	South African Slug-eater	Least Concern (IUCN 2021, sp. level)	12/04/2022

5130	Lamprophiidae	Homoroselaps lacteus	Spotted Harlequin Snake	Least Concern (SARCA 2014)	31/01/1979
4340	Lamprophiidae	Lycodonomorphus inornatus	Olive House Snake	Least Concern (SARCA 2014)	20/03/2017
4380	Lamprophiidae	Lycodonomorphus rufulus	Brown Water Snake	Least Concern (SARCA 2014)	16/11/2021
4840	Lamprophiidae	Psammophis crucifer	Cross-marked Grass Snake	Least Concern (SARCA 2014)	02/04/2020
4890	Lamprophiidae	Psammophis notostictus	Karoo Sand Snake	Least Concern (SARCA 2014)	31/01/2007
4960	Lamprophiidae	Psammophylax rhombeatus	Spotted Grass Snake	Least Concern (SARCA 2014)	23/03/2020
4540	Lamprophiidae	Pseudaspis cana	Mole Snake	Least Concern (SARCA 2014)	15/06/1900
3990	Leptotyphlopidae	Leptotyphlops nigricans	Black Thread Snake	Least Concern (IUCN 2022)	20/05/1981
2060	Scincidae	Acontias meleagris	Cape Legless Skink	Least Concern (SARCA 2014)	23/02/2013
2310	Scincidae	Trachylepis capensis	Cape Skink	Least Concern (SARCA 2014)	23/10/2023
2340	Scincidae	Trachylepis homalocephala	Red-sided Skink	Least Concern (SARCA 2014)	23/11/2021
5530	Testudinidae	Chersina angulata	Angulate Tortoise	Least Concern (SARCA 2014)	18/10/2021
5550	Testudinidae	Homopus areolatus	Parrot-beaked Tortoise	Least Concern (SARCA 2014)	15/06/1900
5691	Testudinidae	Psammobates tentorius subsp. ?	Tent Tortoise (subsp. ?)	Least Concern (SARCA 2014)	15/06/1900
5540	Testudinidae	Stigmochelys pardalis	Leopard Tortoise	Least Concern (SARCA 2014)	20/10/2021
3850	Typhlopidae	Rhinotyphlops lalandei	Delalande's Beaked Blind Snake	Least Concern (SARCA 2014)	15/06/1900
5410	Viperidae	Bitis arietans arietans	Puff Adder	Least Concern (IUCN 2014)	05/11/2023
5390	Viperidae	Causus rhombeatus	Rhombic Night Adder	Least Concern (IUCN 2021)	04/04/2024

APPENDIX 9: AVIFAUNA RECORDS FOR SABAP2 PENTAD 3355_2235

Reference Number	Scientific Name	Common Name	Latest observation
722	Telophorus zeylonus	Bokmakierie	04/01/2024
72	Scopus umbretta	Hamerkop	09/02/2024
1016	Anas platyrhynchos	Mallard	19/12/2023
637	Cisticola fulvicapilla	Neddicky	09/02/2024
622	Apalis thoracica	Bar-throated Apalis	13/04/2024
269	Recurvirostra avosetta	Pied Avocet	21/07/2021
432	Tricholaema leucomelas	Acacia Pied Barbet	22/02/2023
431	Lybius torquatus	Black-collared Barbet	16/12/2023
672	Batis capensis	Cape Batis	13/04/2024
808	Euplectes orix	Southern Red Bishop	28/02/2024
810	Euplectes capensis	Yellow Bishop	19/12/2023
67	Ixobrychus minutus	Little Bittern	06/01/2024
709	Laniarius ferrugineus	Southern Boubou	28/04/2024
546	Phyllastrephus terrestris	Terrestrial Brownbul	13/04/2024
543	Pycnonotus capensis	Cape Bulbul	28/04/2024
545	Pycnonotus tricolor	Dark-capped Bulbul	21/11/2020
873	Emberiza capensis	Cape Bunting	16/03/2015
872	Emberiza tahapisi	Cinnamon-breasted Bunting	-
717	Chlorophoneus olivaceus	Olive Bushshrike	13/04/2024
219	Neotis denhami	Denham's Bustard	17/05/2023
154	Buteo buteo	Common Buzzard	24/01/2024
155	Buteo trizonatus	Forest Buzzard	12/04/2024
152	Buteo rufofuscus	Jackal Buzzard	09/02/2024
627	Camaroptera brachyura	Green-backed Camaroptera	12/04/2024
861	Serinus alario	Black-headed Canary	12/02/2012
863	Crithagra sulphurata	Brimstone Canary	09/02/2024

857	Serinus canicollis	Cape Canary	09/02/2024
858	Crithagra scotops	Forest Canary	13/04/2024
869	Crithagra leucoptera	Protea Canary	28/02/2014
865	Crithagra albogularis	White-throated Canary	13/04/2024
866	Crithagra flaviventris	Yellow Canary	13/04/2024
570	Oenanthe familiaris	Familiar Chat	14/09/2022
638	Cisticola subruficapilla	Grey-backed Cisticola	11/09/2021
646	Cisticola tinniens	Levaillant's Cisticola	12/04/2024
629	Cisticola juncidis	Zitting Cisticola	09/02/2024
212	Fulica cristata	Red-knobbed Coot	28/04/2024
48	Phalacrocorax capensis	Cape Cormorant	01/10/2023
50	Microcarbo africanus	Reed Cormorant	28/04/2024
47	Phalacrocorax lucidus	White-breasted Cormorant	28/04/2024
4131	Centropus burchellii	Burchell's Coucal	28/02/2024
199	Crecopsis egregia	African Crake	31/05/2021
203	Zapornia flavirostra	Black Crake	09/02/2024
216	Grus paradisea	Blue Crane	26/12/2022
621	Sylvietta rufescens	Long-billed Crombec	10/06/2023
523	Corvus capensis	Cape Crow	09/02/2024
522	Corvus albus	Pied Crow	09/02/2024
350	Chrysococcyx cupreus	African Emerald Cuckoo	24/03/2024
344	Cuculus clamosus	Black Cuckoo	06/01/2024
352	Chrysococcyx caprius	Diederik Cuckoo	18/12/2023
351	Chrysococcyx klaas	Klaas's Cuckoo	24/03/2024
343	Cuculus solitarius	Red-chested Cuckoo	01/02/2024
127	Aviceda cuculoides	African Cuckoo-Hawk	02/01/2022
513	Campephaga flava	Black Cuckooshrike	19/12/2023
516	Ceblepyris caesius	Grey Cuckooshrike	09/02/2024
52	Anhinga rufa	African Darter	28/04/2024
316	Streptopelia capicola	Cape Turtle Dove	28/04/2024
317	Spilopelia senegalensis	Laughing Dove	24/03/2024

322	Columba larvata	Lemon Dove	09/02/2024
318	Oena capensis	Namaqua Dove	15/11/2021
314	Streptopelia semitorquata	Red-eyed Dove	12/04/2024
940	Columba livia	Rock Dove	07/02/2022
319	Turtur tympanistria	Tambourine Dove	19/12/2023
517	Dicrurus adsimilis	Fork-tailed Drongo	28/04/2024
95	Anas sparsa	African Black Duck	09/02/2024
10006	Anas platyrhynchos	Domestic Duck	25/01/2023
103	Oxyura maccoa	Maccoa Duck	01/01/2022
104	Thalassornis leuconotus	White-backed Duck	19/12/2023
100	Dendrocygna viduata	White-faced Whistling Duck	10/05/2023
96	Anas undulata	Yellow-billed Duck	09/02/2024
149	Haliaeetus vocifer	African Fish Eagle	23/03/2024
139	Hieraaetus pennatus	Booted Eagle	18/02/2021
143	Stephanoaetus coronatus	Crowned Eagle	06/11/2018
138	Lophaetus occipitalis	Long-crested Eagle	02/03/2024
142	Polemaetus bellicosus	Martial Eagle	18/04/2017
133	Aquila verreauxii	Verreaux's Eagle	06/01/2024
367	Bubo capensis	Cape Eagle-Owl	22/10/2022
368	Bubo africanus	Spotted Eagle-Owl	28/02/2024
58	Ardea alba	Great Egret	16/01/2020
60	Ardea intermedia	Intermediate Egret	10/10/2022
59	Egretta garzetta	Little Egret	28/04/2024
61	Bubulcus ibis	Western Cattle Egret	12/04/2024
119	Falco amurensis	Amur Falcon	21/01/2022
114	Falco biarmicus	Lanner Falcon	27/03/2019
113	Falco peregrinus	Peregrine Falcon	06/01/2024
833	Lagonosticta rubricata	African Firefinch	-
707	Lanius collaris	Southern Fiscal	12/04/2024
86	Phoenicopterus roseus	Greater Flamingo	24/10/2020
206	Sarothrura elegans	Buff-spotted Flufftail	17/10/2021

205	Sarothrura rufa	Red-chested Flufftail	17/10/2019
655	Muscicapa adusta	African Dusky Flycatcher	13/04/2024
682	Terpsiphone viridis	African Paradise Flycatcher	13/04/2024
680	Trochocercus cyanomelas	Blue-mantled Crested Flycatcher	23/03/2024
678	Stenostira scita	Fairy Flycatcher	13/04/2024
665	Melaenornis silens	Fiscal Flycatcher	12/04/2024
654	Muscicapa striata	Spotted Flycatcher	23/03/2024
44	Morus capensis	Cape Gannet	04/06/2023
10004	Anser anser	Domestic Goose	08/02/2024
89	Alopochen aegyptiaca	Egyptian Goose	28/04/2024
88	Plectropterus gambensis	Spur-winged Goose	15/02/2024
160	Accipiter tachiro	African Goshawk	28/04/2024
618	Sphenoeacus afer	Cape Grassbird	24/09/2021
5	Podiceps nigricollis	Black-necked Grebe	20/10/2023
4	Podiceps cristatus	Great Crested Grebe	28/04/2024
6	Tachybaptus ruficollis	Little Grebe	28/04/2024
551	Andropadus importunus	Sombre Greenbul	28/04/2024
263	Tringa nebularia	Common Greenshank	21/10/2020
192	Numida meleagris	Helmeted Guineafowl	12/04/2024
288	Chroicocephalus cirrocephalus	Grey-headed Gull	19/12/2023
289	Chroicocephalus hartlaubii	Hartlaub's Gull	15/02/2024
287	Larus dominicanus	Kelp Gull	13/04/2024
167	Circus ranivorus	African Marsh Harrier	01/10/2023
169	Circus maurus	Black Harrier	04/06/2023
171	Polyboroides typus	African Harrier-Hawk	18/12/2023
69	Nycticorax nycticorax	Black-crowned Night Heron	27/05/2023
55	Ardea melanocephala	Black-headed Heron	15/02/2024
56	Ardea goliath	Goliath Heron	22/10/2022
54	Ardea cinerea	Grey Heron	12/04/2024
57	Ardea purpurea	Purple Heron	08/02/2024
62	Ardeola ralloides	Squacco Heron	16/10/2021

63	Butorides striata	Striated Heron	24/05/2023
115	Falco subbuteo	Eurasian Hobby	22/11/2011
132	Pernis apivorus	European Honey-buzzard	10/01/2020
443	Prodotiscus regulus	Brown-backed Honeybird	20/12/2015
440	Indicator indicator	Greater Honeyguide	30/12/2018
442	Indicator minor	Lesser Honeyguide	15/10/2023
441	Indicator variegatus	Scaly-throated Honeyguide	05/12/2023
418	Upupa africana	African Hoopoe	23/03/2024
81	Threskiornis aethiopicus	African Sacred Ibis	12/04/2024
83	Plegadis falcinellus	Glossy Ibis	06/12/2021
84	Bostrychia hagedash	Hadada Ibis	12/04/2024
123	Falco rupicolus	Rock Kestrel	15/02/2024
402	Halcyon albiventris	Brown-hooded Kingfisher	28/02/2024
395	Megaceryle maxima	Giant Kingfisher	28/04/2024
396	Alcedo semitorquata	Half-collared Kingfisher	01/02/2024
397	Corythornis cristatus	Malachite Kingfisher	12/04/2024
394	Ceryle rudis	Pied Kingfisher	28/04/2024
130	Elanus caeruleus	Black-winged Kite	27/07/2023
129	Milvus aegyptius	Yellow-billed Kite	09/02/2024
243	Vanellus melanopterus	Black-winged Lapwing	12/11/2023
245	Vanellus armatus	Blacksmith Lapwing	28/04/2024
242	Vanellus coronatus	Crowned Lapwing	16/12/2023
488	Calandrella cinerea	Red-capped Lark	21/11/2020
703	Macronyx capensis	Cape Longclaw	19/12/2023
510	Riparia cincta	Banded Martin	27/12/2011
509	Riparia paludicola	Brown-throated Martin	23/03/2024
507	Delichon urbicum	Common House Martin	23/05/2023
506	Ptyonoprogne fuligula	Rock Martin	15/02/2024
210	Gallinula chloropus	Common Moorhen	28/04/2024
392	Urocolius indicus	Red-faced Mousebird	23/03/2024
390	Colius striatus	Speckled Mousebird	28/04/2024

391	Colius colius	White-backed Mousebird	13/04/2024
373	Caprimulgus pectoralis	Fiery-necked Nightjar	24/03/2024
372	Caprimulgus rufigena	Rufous-cheeked Nightjar	22/02/2023
74	Anastomus lamelligerus	African Openbill	04/02/2010
521	Oriolus larvatus	Black-headed Oriole	12/04/2024
172	Pandion haliaetus	Western Osprey	06/11/2022
362	Strix woodfordii	African Wood Owl	19/12/2023
359	Tyto alba	Western Barn Owl	06/01/2024
231	Haematopus moquini	African Oystercatcher	13/04/2024
1021	Pavo cristatus	Indian Peafowl	05/12/2023
42	Pelecanus onocrotalus	Great White Pelican	06/01/2023
312	Columba arquatrix	African Olive Pigeon	01/02/2024
311	Columba guinea	Speckled Pigeon	12/04/2024
692	Anthus cinnamomeus	African Pipit	15/10/2023
10877	Anthus nicholsoni	Nicholson's Pipit	29/02/2016
694	Anthus leucophrys	Plain-backed Pipit	19/12/2023
233	Charadrius hiaticula	Common Ringed Plover	08/03/2016
237	Charadrius pecuarius	Kittlitz's Plover	28/10/2016
238	Charadrius tricollaris	Three-banded Plover	28/10/2016
235	Charadrius marginatus	White-fronted Plover	05/12/2023
102	Netta erythrophthalma	Southern Pochard	02/12/2023
4139	Prinia maculosa	Karoo Prinia	09/02/2024
712	Dryoscopus cubla	Black-backed Puffback	23/03/2024
189	Coturnix coturnix	Common Quail	19/12/2023
805	Quelea quelea	Red-billed Quelea	19/12/2023
197	Rallus caerulescens	African Rail	06/01/2024
524	Corvus albicollis	White-necked Raven	12/04/2024
589	Pogonocichla stellata	White-starred Robin	23/03/2024
581	Cossypha caffra	Cape Robin-Chat	13/04/2024
578	Cossypha dichroa	Chorister Robin-Chat Robin-Chat	24/03/2024
579	Cossypha natalensis	Red-capped Robin-Chat	01/02/2024

416	Eurystomus glaucurus	Broad-billed Roller	07/11/2018
258	Actitis hypoleucos	Common Sandpiper	30/12/2014
511	Psalidoprocne pristoptera holomelas	Black (Southern Africa) Saw-wing	28/02/2024
583	Cercotrichas coryphoeus	Karoo Scrub Robin	-
867	Crithagra gularis	Streaky-headed Seedeater	23/03/2024
29	Ardenna grisea	Sooty Shearwater	04/12/2010
90	Tadorna cana	South African Shelduck	15/05/2018
94	Spatula smithii	Cape Shoveler	23/03/2024
708	Lanius collurio	Red-backed Shrike	20/12/2015
855	Crithagra totta	Cape Siskin	04/03/2017
250	Gallinago nigripennis	African Snipe	12/02/2021
786	Passer melanurus	Cape Sparrow	23/03/2024
784	Passer domesticus	House Sparrow	19/12/2023
4142	Passer diffusus	Southern Grey-headed Sparrow	23/03/2024
159	Accipiter melanoleucus	Black Sparrowhawk	20/10/2023
158	Accipiter minullus	Little Sparrowhawk	13/02/2023
156	Accipiter rufiventris	Rufous-breasted Sparrowhawk	10/02/2022
85	Platalea alba	African Spoonbill	18/12/2023
181	Pternistis capensis	Cape Spurfowl	15/02/2024
188	Pternistis afer	Red-necked Spurfowl	23/03/2024
740	Notopholia corusca	Black-bellied Starling	23/03/2024
737	Lamprotornis nitens	Cape Starling	-
733	Sturnus vulgaris	Common Starling	12/04/2024
744	Onychognathus nabouroup	Pale-winged Starling	09/12/2020
746	Lamprotornis bicolor	Pied Starling	26/04/2018
745	Onychognathus morio	Red-winged Starling	13/04/2024
270	Himantopus himantopus	Black-winged Stilt	04/08/2022
253	Calidris minuta	Little Stint	22/10/2022
576	Saxicola torquatus	African Stonechat	12/04/2024
80	Ciconia ciconia	White Stork	01/01/2022
749	Promerops cafer	Cape Sugarbird	27/05/2023

772	Chalcomitra amethystina	Amethyst Sunbird	12/04/2024
771	Hedydipna collaris	Collared Sunbird	13/04/2024
758	Cinnyris afer	Greater Double-collared Sunbird	12/04/2024
765	Cyanomitra veroxii	Grey Sunbird	01/02/2024
751	Nectarinia famosa	Malachite Sunbird	10/06/2023
753	Anthobaphes violacea	Orange-breasted Sunbird	-
760	Cinnyris chalybeus	Southern Double-collared Sunbird	28/04/2024
493	Hirundo rustica	Barn Swallow	02/03/2024
502	Cecropis cucullata	Greater Striped Swallow	15/02/2024
503	Cecropis abyssinica	Lesser Striped Swallow	16/12/2023
498	Hirundo dimidiata	Pearl-breasted Swallow	24/08/2022
495	Hirundo albigularis	White-throated Swallow	15/02/2024
208	Porphyrio madagascariensis	African Swamphen	28/04/2024
380	Apus barbatus	African Black Swift	08/02/2024
387	Cypsiurus parvus	African Palm Swift	15/02/2024
386	Tachymarptis melba	Alpine Swift	15/02/2024
384	Apus horus	Horus Swift	22/02/2023
385	Apus affinis	Little Swift	24/03/2024
383	Apus caffer	White-rumped Swift	15/02/2024
713	Tchagra tchagra	Southern Tchagra	13/01/2024
99	Spatula hottentota	Blue-billed Teal	09/02/2024
98	Anas capensis	Cape Teal	04/08/2022
97	Anas erythrorhyncha	Red-billed Teal	09/02/2024
290	Hydroprogne caspia	Caspian Tern	11/09/2021
291	Sterna hirundo	Common Tern	30/08/2023
298	Thalasseus bergii	Greater Crested Tern	01/02/2024
296	Thalasseus sandvicensis	Sandwich Tern	28/02/2021
305	Chlidonias hybrida	Whiskered Tern	08/03/2016
304	Chlidonias leucopterus	White-winged Tern	14/06/2020
275	Burhinus capensis	Spotted Thick-knee	09/02/2024
274	Burhinus vermiculatus	Water Thick-knee	28/04/2024

1105	Turdus olivaceus	Olive Thrush	23/03/2024
393	Apaloderma narina	Narina Trogon	19/12/2023
4133	Tauraco corythaix	Knysna Turaco	28/04/2024
686	Motacilla capensis	Cape Wagtail	28/04/2024
690	Motacilla cinerea	Grey Wagtail	09/04/2021
606	Acrocephalus baeticatus	African Reed (Old, Use Common Reed Warbler) Warbler	11/01/2023
14242	Acrocephalus scirpaceus	Common Reed Warbler	14/01/2024
603	Acrocephalus arundinaceus	Great Reed Warbler	26/06/2017
611	Bradypterus sylvaticus	Knysna Warbler	09/02/2024
604	Acrocephalus gracilirostris	Lesser Swamp Warbler	28/04/2024
609	Bradypterus baboecala	Little Rush Warbler	24/03/2024
607	Acrocephalus palustris	Marsh Warbler	21/01/2021
608	Acrocephalus schoenobaenus	Sedge Warbler	07/04/2021
612	Cryptillas victorini	Victorin's Warbler	19/12/2023
599	Phylloscopus trochilus	Willow Warbler	23/03/2024
671	Phylloscopus ruficapilla	Yellow-throated Woodland Warbler	09/02/2024
843	Estrilda astrild	Common Waxbill	23/03/2024
825	Coccopygia melanotis	Swee Waxbill	28/04/2024
799	Ploceus capensis	Cape Weaver	12/04/2024
803	Ploceus velatus	Southern Masked Weaver	02/12/2023
568	Oenanthe pileata	Capped Wheatear	06/05/2011
1172	Zosterops virens	Cape White-eye	13/04/2024
846	Vidua macroura	Pin-tailed Whydah	01/02/2024
419	Phoeniculus purpureus	Green Wood Hoopoe	09/02/2024
450	Dendropicos fuscescens	Cardinal Woodpecker	12/11/2023
445	Geocolaptes olivaceus	Ground Woodpecker	28/01/2020
448	Campethera notata	Knysna Woodpecker	23/03/2024
452	Dendropicos griseocephalus	Olive Woodpecker	12/04/2024

APPENDIX 5: MINIMUM CONTENT REQUIREMENTS FOR TERRESTRIAL BIODIVERSITY SPECIALIST REPORTS AS PER PROTOCOL FOR THE SPECIALIST ASSESSMENT OF ENVIRONMENTAL IMPACTS ON TERRESTRIAL BIODIVERSITY (GN 320 OF 20 MARCH 2020)

Protocol ref	**Terrestrial Animal Species Specialist Assessment Report Content**	**Section / Page**
3.1.1.	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page ii and Appendix 2-3
3.1.2.	a signed statement of independence by the specialist;	Page iii
3.1.3.	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 4
3.1.4.	a description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Section 4
3.1.5.	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;	Section 4
3.1.6.	a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 6
3.1.7.	additional environmental impacts expected from the proposed development;	Section 10
3.1.8.	any direct, indirect and cumulative impacts of the proposed development;	Section 10
3.1.9.	the degree to which impacts and risks can be mitigated;	Section 10
3.1.10.	the degree to which the impacts and risks can be reversed;	Section 10
3.1.11.	the degree to which the impacts and risks can cause loss of irreplaceable resources;	Section 10
3.1.12.	proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 10
3.1.13.	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;	N/A
3.1.14.	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	Section 11
3.1.15.	any conditions to which this statement is subjected.	Section 11