

Stockpile Areas and Geotechnical Assessments for the Proposed Extension of Rand Street, George, Western Cape

Terrestrial Animal Species Specialist Assessment:
Site Sensitivity Verification Report and Impact Assessment



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Version: Final



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- I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP);
- At the time of conducting the study and compiling this report I did not have any interest, hidden or otherwise, in the proposed development that this study has reference to, except for financial compensation for work done in a professional capacity;
- Work performed for this study was done in an objective manner. Even if this study results in views and findings that are not favourable to the client/applicant, I will not be affected in any manner by the outcome of any environmental process of which this report may form a part, other than being members of the general public;
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- All the particulars furnished by me in this document are true and correct.

A handwritten signature in black ink, appearing to read 'Kim Daniels', enclosed within a large, loopy oval shape.

Kim Daniels (MSc)

May 2026

SUMMARY OF EXPERIENCE AND ABRIDGED CV

- KIM DANIELS

Core skills

Three years of work experience (research assistance and education) for projects aimed at investigating invertebrate diversity, plant diversity, insect ecology, disease ecology, invasive species, plant systematics, herpetology, and climate change impacts on a variety of taxa.

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Visiting academic for the Organization of Tropical Studies' African Ecology and Conservation course

Internships in Entomology, Horticulture, and Plant Conservation

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Field assistant at Valuing Orchard and Integrated Crop Ecosystem Services Project

Qualifications

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ABBREVIATIONS AND ACRONYMS

CBA	Critical Biodiversity Area
CD:NGI	Chief Directorate: National Geo-spatial Information
DFFE	Department of Forestry, Fisheries, and the Environment
ESA	Ecological Support Area
EWT	Endangered Wildlife Trust
NEMA	National Environmental Management Act
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDP	Site Development Plan
SSVR	Site Sensitivity Verification Report
WCBSP	Western Cape Biodiversity Spatial Plan

1. INTRODUCTION

Confluent Environmental Pty (Ltd) was appointed by HilLand Environmental to compile a Faunal Specialist's Assessment for preliminary work required to inform, and plan for the proposed extension of Rand Street between the areas of Thembaletu and Pacaltsdorp in George, Western Cape. The proposed road consists of two sections: A north-south section from PW Botha Boulevard across the N2 Highway towards Pacaltsdorp and an east-west section known as the Rosedale Extension. These are new roads that mostly traverse greenfield sites on municipal land. The erven are mostly large land parcels which connect to higher density residential areas (Figure 1). While the proposed extension of Rand Street is the subject of a separate application in process, the preliminary work required is the subject of this report.

This assessment will focus on areas proposed as stockpile sites and associated haul roads, geotechnical test pits, and water level monitoring boreholes (Figure 1). No water will be taken from the latter. These are for water chemistry tests and water level monitoring only. Locations proposed for these activities are indicated relative to delineated watercourses and the Rand Street extension route in Figure 1.

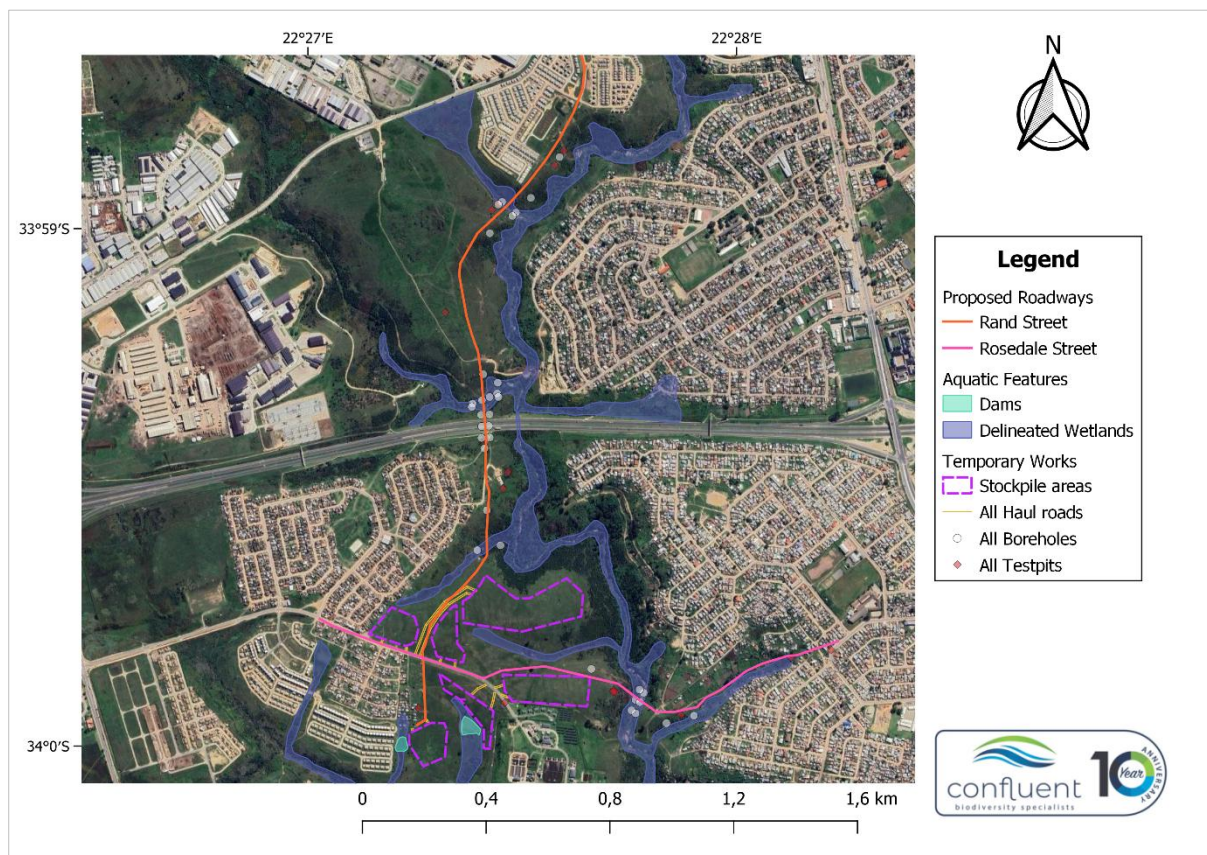


Figure 1. Layout of proposed preliminary activities required for the Rand Street extension.

1.1 Description of Preliminary Works

Watercourses mapped in Figure 1 have already been delineated as part of the initial Site Sensitivity Verification (SSV) for Aquatic Biodiversity (J. Dabrowski, Confluent Environmental)

for the proposed road route. Additionally, a faunal SSVR was conducted to inform the alignment of the road (V. Martins and K. Daniels, Confluent Environmental). The current layout is indicated in Figure 1 along with the proposed preliminary works required. These are explained in more detail below.

1.1.1 Stockpile Areas & Haul Roads

George Municipality would like to finalise the project stockpile areas in the short-term because they have active projects around the city producing fill from excavations that could be used for the Rand Street Extension project, but there is nowhere to store it. They would like to commence storing materials with the necessary approvals while the applications for approval for the proposed road extension proceed.

A total of 6 possible stockpile areas were provided for this assessment (Figure 2). The stockpile areas were delineated by the engineering team at a desktop level, and represent a greater area than necessary, providing the opportunity to refine these areas based on environmental sensitivities observed during fieldwork.

Associated haul roads all lead off Rosedale Road which currently ends in the Outeniqua Wastewater Treatment Works.

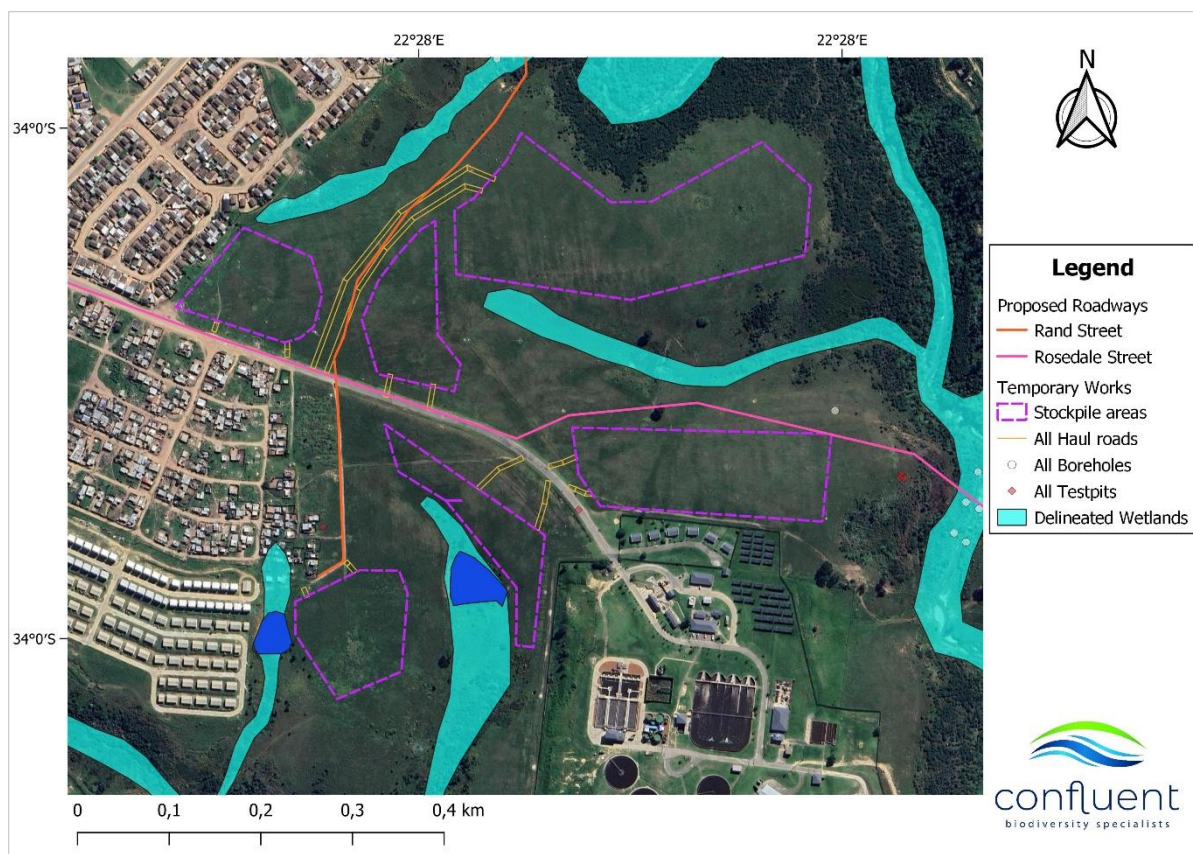


Figure 2. Enlargement of the areas proposed for stockpiling for the Rand Street Extension.

1.1.2 Geotechnical Site Investigations

The consulting engineers, SMEC, provided a detailed method statement for the geotechnical site investigations (SMEC South Africa 2026). This covers the methods for both test pits and rotary core drilling (monitoring boreholes). The locations of each borehole and test pit proposed are provided in Figure 3. From this layout some of the boreholes and test pits will be drilled in, or close to parts of the delineated wetland areas.

In summary, where no existing access roads are available, sites will be accessed through routes agreed to with the municipality. Where access is on steep slopes then the route will generally follow natural contours to ensure easier accessibility.

For both the monitoring boreholes and the test pits, an area of 5m x 5m is likely to be disturbed. Some boreholes will be used for monitoring groundwater levels and collecting water samples over 12 months, while others will be for the assessment of soil cores. In both cases, no water will be abstracted from the boreholes

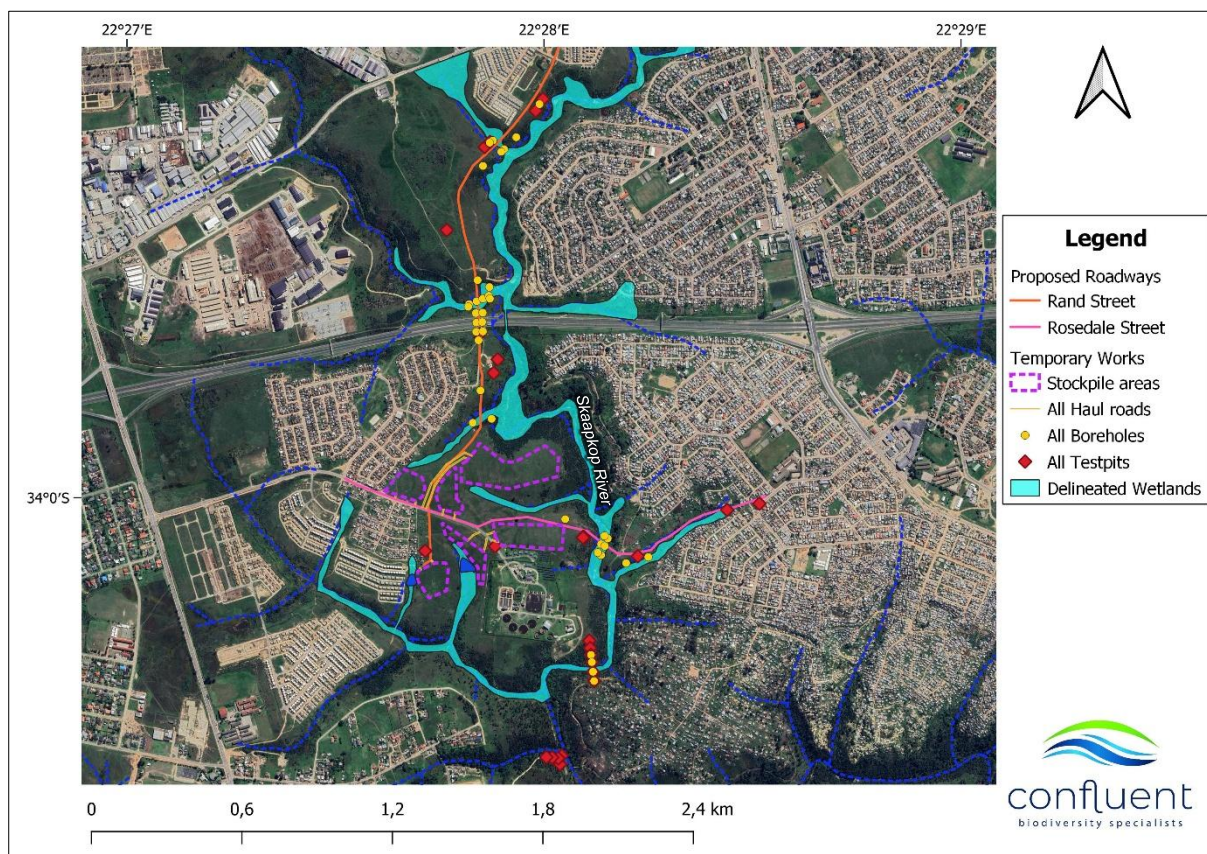


Figure 3. Enlargement of locations for geotechnical investigations.

2. TERMS OF REFERENCE

2.1 Online Screening Tool

The scope of work for this report is guided by the legislative requirements of the National Environmental Management Act (NEMA; Act 107 of 1998).

The Department of Forestry, Fisheries and the Environment (DFFE) Screening Tool determined a HIGH sensitivity for the terrestrial animal species theme across the different portions the proposed street will cross (Figure 4), with several animal Species of Conservation Concern (SCC) potentially present (Table 1).

As per Published Government Notice No. 1150 of the Government Gazette 43855 (30 October 2020):

A **HIGH** sensitivity rating indicates:

1. Confirmed habitat for SCC.
2. SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.

These areas are unsuitable for development due to a very likely impact on SCC.

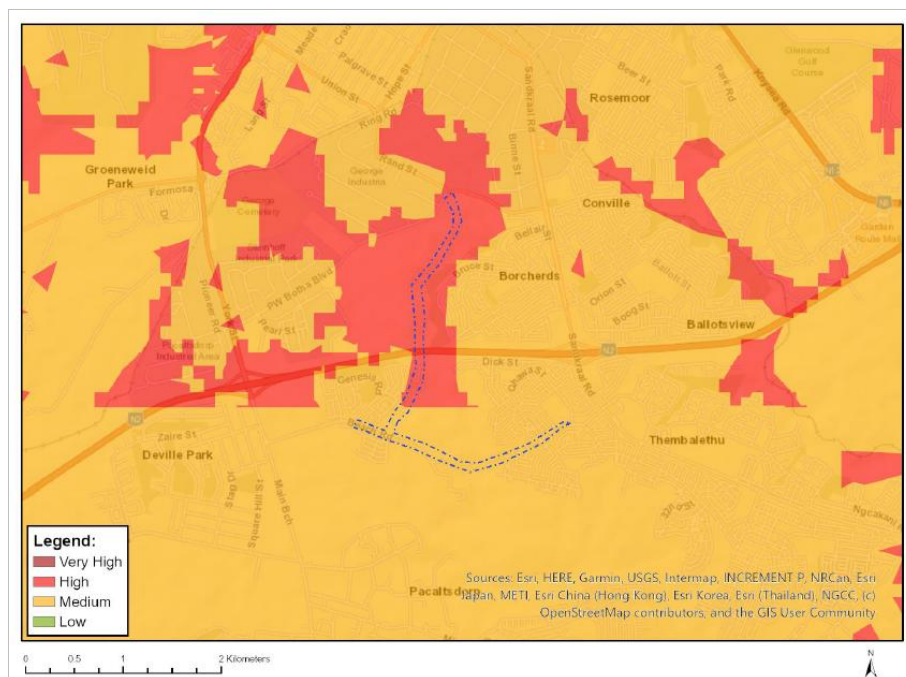


Figure 4. DFFE Online Screening Tool outcome for the terrestrial animal species theme across Rand Street Extension, George Municipality. The proposed roads are indicated by the blue dashed line.

Table 1. Species of Conservation Concern highlighted by the DFFE Online Screening Tool for Rand Street Extension, George Municipality.

Sensitivity	Taxa	Species	Common name	Red List Status
High+ Medium	Avifauna	<i>Bradypterus sylvaticus</i>	Knysna Warbler	Vulnerable (SANBI); Near Threatened (BLSA)
High+ Medium	Avifauna	<i>Circus ranivorus</i>	African Marsh Harrier	Endangered (SANBI); Vulnerable (BLSA)
High	Avifauna	<i>Polemaetus bellicosus</i>	Martial Eagle	Endangered (SANBI + BLSA)
Medium	Amphibian	<i>Afrixalus knysnae</i>	Knysna Leaf-Folding frog	Endangered
Medium	Avifauna	<i>Neotis denhami</i>	Denham's bustard	Endangered (SANBI); Vulnerable (BLSA 2025)
Medium	Avifauna	<i>Stephanoaetus coronatus</i>	Crowned Eagle	Vulnerable (SANBI + BLSA)
Medium	Invertebrates	<i>Aneuryphymus montanus</i>	Yellow-winged Agile Grasshopper	Vulnerable
Medium	Mammals	-	Sensitive species 8	Vulnerable
Medium	Mammals	<i>Chlorotalpa duthieae</i>	Duthie's Golden Mole	Vulnerable

* Red list status as per [SANBI's Red List of South African Species](#) for most SCC. [Bird Life South Africa \(BLSA\) Red List](#) 2025 status is given for avifauna. The 2025 update of the [Endangered Wildlife Trust Red List](#) shows no change in status for the mammals highlighted.

2.2 Scope of Work

The purpose of this report is to verify the site sensitivity of the site for the terrestrial animal species theme in accordance with the protocols specified in the Published Government Notice No. 1150, Government Gazette 43855 (30 October 2020).

The site sensitivity verification includes:

- A desktop assessment, to:
 - Characterize the vegetation, climate, general habitat features and topography of the property.
 - Assess the property's location within the context of the Western Cape Biodiversity Spatial Plan (WCBSP).
 - Conduct a historical assessment of the property and immediate surroundings for any disturbances, development and changes in land use or habitat characteristics over time.
 - Provide information on the habitat requirements for Species of Conservation concern highlighted by the DFFE online screening tool, in addition to other SCC indicated through online resources (e.g. Virtual Museum, iNaturalist) for the property and surrounding areas.
- On-site inspection(s) and field assessments to:

- Verify the current land use and identify current impacts or disturbances on the property.
- Characterize faunal habitats, determine the habitat suitability and the likelihood of SCC occurring on the property.
- Conduct taxa-specific sampling for SCC in suitable habitats.
- Any other available and relevant information from
 - Discussions with landowners/neighbours.
 - Previous report findings for the property or surrounding areas.

Should the site sensitivity verification indicate a **LOW** sensitivity, then a Terrestrial Animal Species Compliance Statement will be issued.

Should the site sensitivity verification confirm a **HIGH** sensitivity, then a Terrestrial Animal Species Specialist Assessment will be compiled. As per the published protocols and guidelines (SANBI 2020), areas of **MEDIUM** sensitivity are also ascribed a **HIGH** sensitivity if SCC are likely to occur.

3. DESKTOP ASSESSMENT

3.1 Vegetation, Climate, and General Habitat

The town has moderately hot summers, with mild to chilly winters. Rains usually occur during the winter months, which are brought on by the humid sea-winds from the Indian ocean. Average temperatures range between 23⁰C and 10⁰C with the hottest days experienced in January to February peaking at 28⁰C and the coldest days experienced in June to August not falling below 5⁰C. Rain occurs throughout the year peaking in October and November (Figure 5).

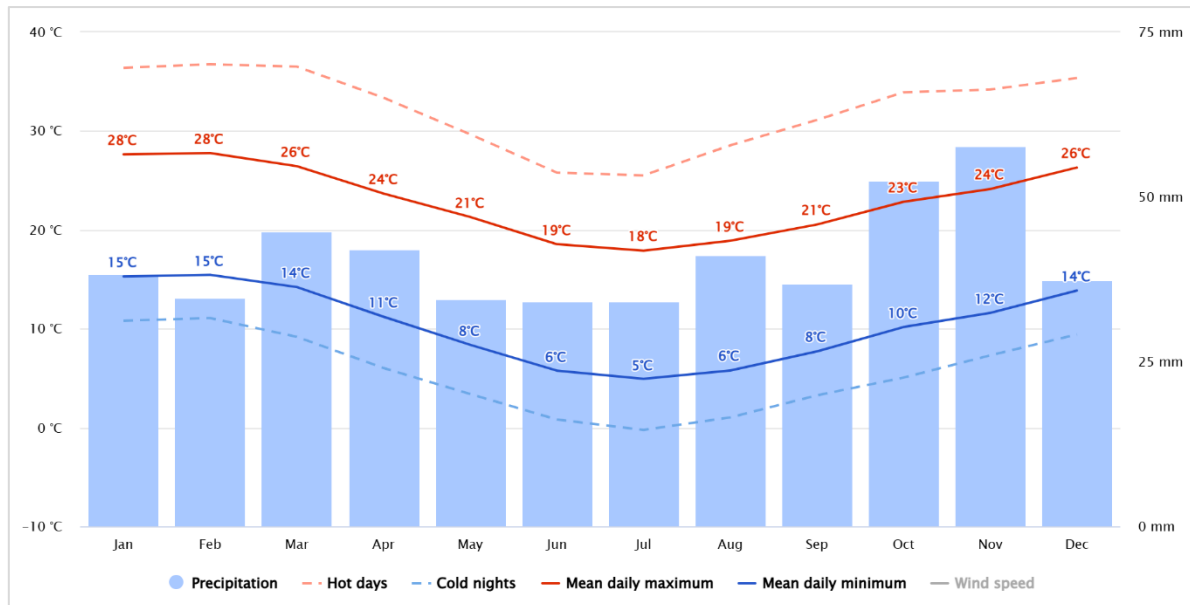


Figure 5. Summary of historical climate (modelled) for Geogee, Western Cape (www.meteoblue.com).

The mapped vegetation type at the site is Garden Route Granite Fynbos (FFg 5; Critically Endangered). This vegetation type typically consists of dense proteoid and ericoid shrubby grassland. In the vegetation type, proteoid and graminoid fynbos are dominant with ericaceous fynbos in seeps. The easterly distribution of the vegetation type contains graminoid and ericaceous fynbos are dominant on the flat plateaus, with proteas confined to the steep slopes. (Mucina and Rutherford 2006, Rebelo, et al. 2006).

Satellite imagery from Google Earth and Cape Farm Mapper was used to assess general vegetation structure, elevational gradients, and water bodies within the project area (Figure 6). The stockpile and haul road sites in question are largely grassed with bushes in parts. Test pit and borehole sites vary in vegetation largely depending on elevation in valleys in the landscape (lower elevation is generally bushier vegetation). Elevation is lower into delineated watercourses given in previous studies on the Rand Street Extension project. All wetlands and watercourses are to be assessed in the Aquatic Specialist's Report (J. Dabrowski, Confluent Environmental).

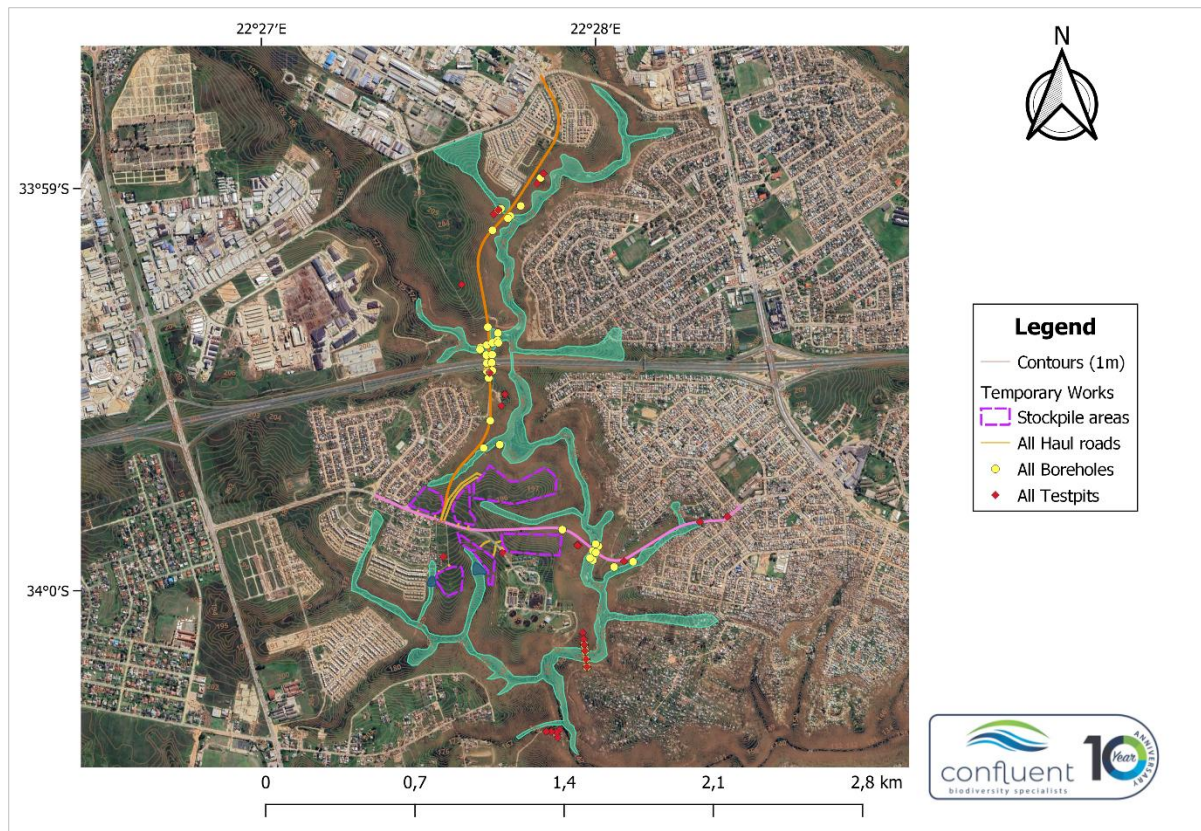


Figure 6. The proposed development sites with 1m contour lines (in brown) and in relation to delineated watercourses (in blue).

3.2 Western Cape Biodiversity Spatial Plan

The Western Cape Biodiversity Act 6 of 2021 (WCBA) recognises the unique biodiversity in the Western Cape, the Republic's international obligations, the province's dependence on ecosystem services, the need for access and benefit sharing, and the need to ensure long-term ecological resilience.

Section 35 of the WCBA defines that the purpose of a Biodiversity Spatial Plan is to:

- Set biodiversity targets.
- Spatially identify one or more categories of biodiversity priority areas that will ensure the continued existence and functioning of biodiversity and ecosystems, including the delivery of ecosystem services.
- Provide guidelines that set out the desired management objectives for land and resource use in each category of biodiversity priority areas.
- Provide spatial planning and land-use decision-making guidelines to ensure environmentally sustainable development and resource use, as well as ecological and spatial resilience in the province.

- Ensure that the ecological infrastructure in the province is maintained, ecosystem fragmentation and loss are avoided, and the resilience of ecosystems and human communities to the impacts of climate change is strengthened.

To this end, additional mapping layers were considered including the Western Cape Biodiversity Spatial Plan (Cape Nature 2023) with Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) assessed in Figure 7 and Table 2.

The flat areas of the project area, especially the stockpile sites, are categorised as CBA1 areas whilst the areas close to densely vegetated watercourses are CBA2 (definitions for these are provided in Table 2). Both are outlined as Terrestrial and Threatened Ecosystems for Garden Route Granite Fynbos.

The reasons for the WCBSP assignment are given in the 2017 WCBSP (CapeNature 2017) since the BSP reasons layer for 2023 is yet to be released, although it is unlikely to report any significant changes (*pers. comm.*— Cape Nature (March 2025)). Grey entries either do not apply to the site or are outside of the scope of this report to provide comment on:

- Bontebok Extended Distribution Range: This theme addresses the ability of the site to support population/s of Vulnerable Bontebok (*Damaliscus pygargus pygargus*) as it forms part of the Extended Distribution Range of the species given in the Biodiversity Management Plan for Bontebok (Department of Environmental Affairs, Notice 887 of 2017). Suitable natural habitat for Bontebok is described as renosterveld patches, grassy micro-habitat patches in fynbos areas, and strandveld. None of these habitats are available at the site even considering its connections to other areas in the landscape. Mapped vegetation types outlined as suitable to support this species are given as Shale Renosterveld which does not occur at the present site. This species is highly unlikely to occur at the site.
- Water Source Protection—Kaaibans: This theme is not addressed by this report
- Watercourse protection Southern Coastal Belt: This theme is not addressed by this report.
- Watercourse protection- South Eastern Coastal Belt: This theme is not addressed by this report.

No sensitive features are outlined in WCBSP reasons that directly relate to fauna likely to occur at the site. Features pertaining to aquatic sensitivities are noteworthy since faunal SCC highlighted in the present report depend on these resources for habitat (such as the amphibian SCC) feeding and breeding. Consideration should be given to maintaining natural vegetation and aquatic features as far as possible across the site, in line with the recommendations of the specialist report for this discipline.

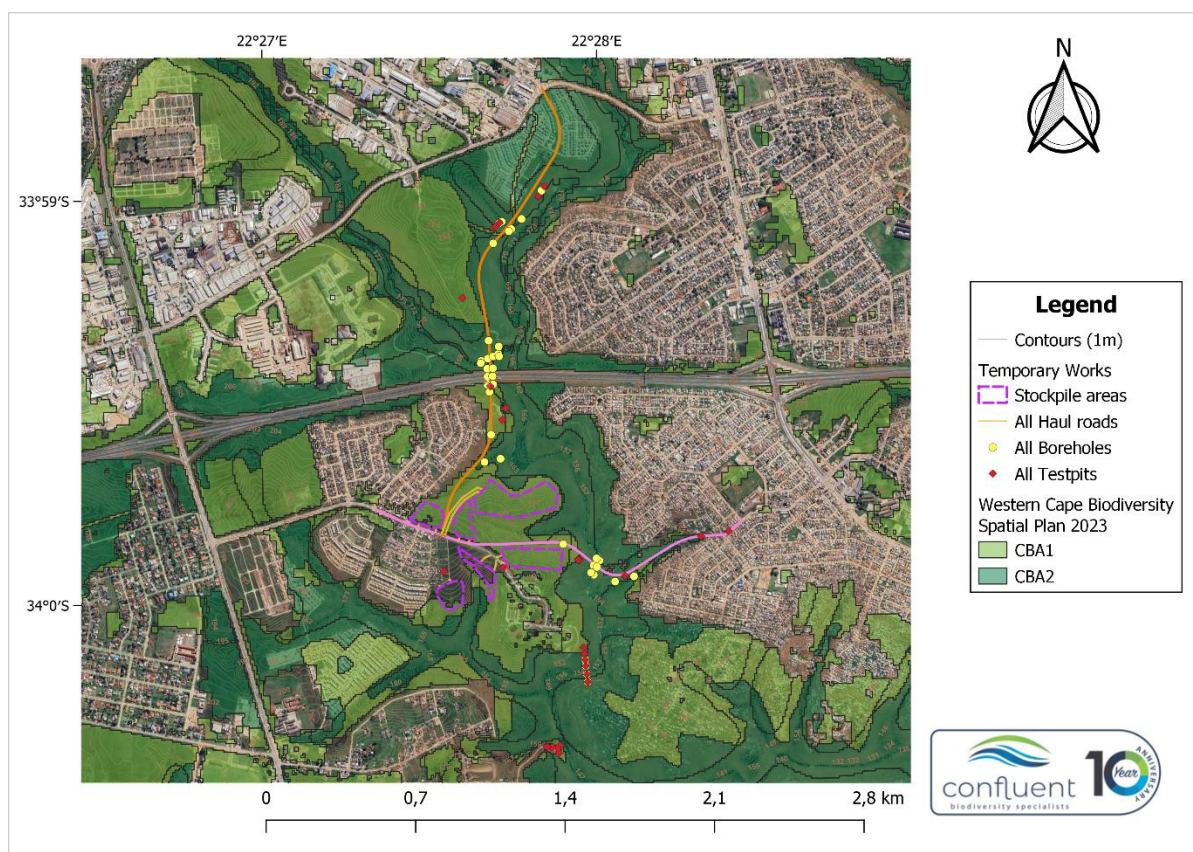


Figure 7. Map of the project areas with layers for the 2023 Western Cape Biodiversity Spatial Plan's CBA1 and CBA2 zones.

Table 2. Definitions and objectives for conservation categories identified in the Western Cape Biodiversity Spatial Plan (Cape Nature 2023).

WCBSP Category	Definition	Management Objective
Critical Biodiversity Area 1 (CBA1)	Areas in a natural condition. Required to meet biodiversity targets for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.
Critical Biodiversity Area 2 (CBA2)	Areas in a degraded or secondary condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.	Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate.

3.3 Historical Assessment of Project Area

Historical imagery was sourced from the CD:NGI as well as Google Earth satellite imagery over the past 80 years (Figure 8). 1936 and 1974 show the landscape has historically been used for agriculture, with the proposed stockpile areas showing no change from what is observed in 2026, namely transformed areas dominated by grassy vegetation. This area was likely historically grazed as it presently is. In 1973, some residential development is observed in the northeast. Between 1936 and 1973, expansion in the spread of bushy vegetation is observed around watercourse, predominantly attributed to invasive alien plant species. By 1998, part of the eastern extent (blue arrow) of this bushy vegetation is removed to

accommodate infrastructure to support dwellings but the bushy vegetation continues to expand elsewhere as observed in the southern part of the river (blue star). These dwellings east of the river are set up by 2003. New areas of development in the catchment of the Skaapkop River and tributaries have occurred, and existing areas of development have expanded. The latter mostly due to informal housing extensions to formal low-cost housing areas. This has had an effect on vegetation and riparian systems in the landscape which in turn affect the occurrence and health of native fauna.

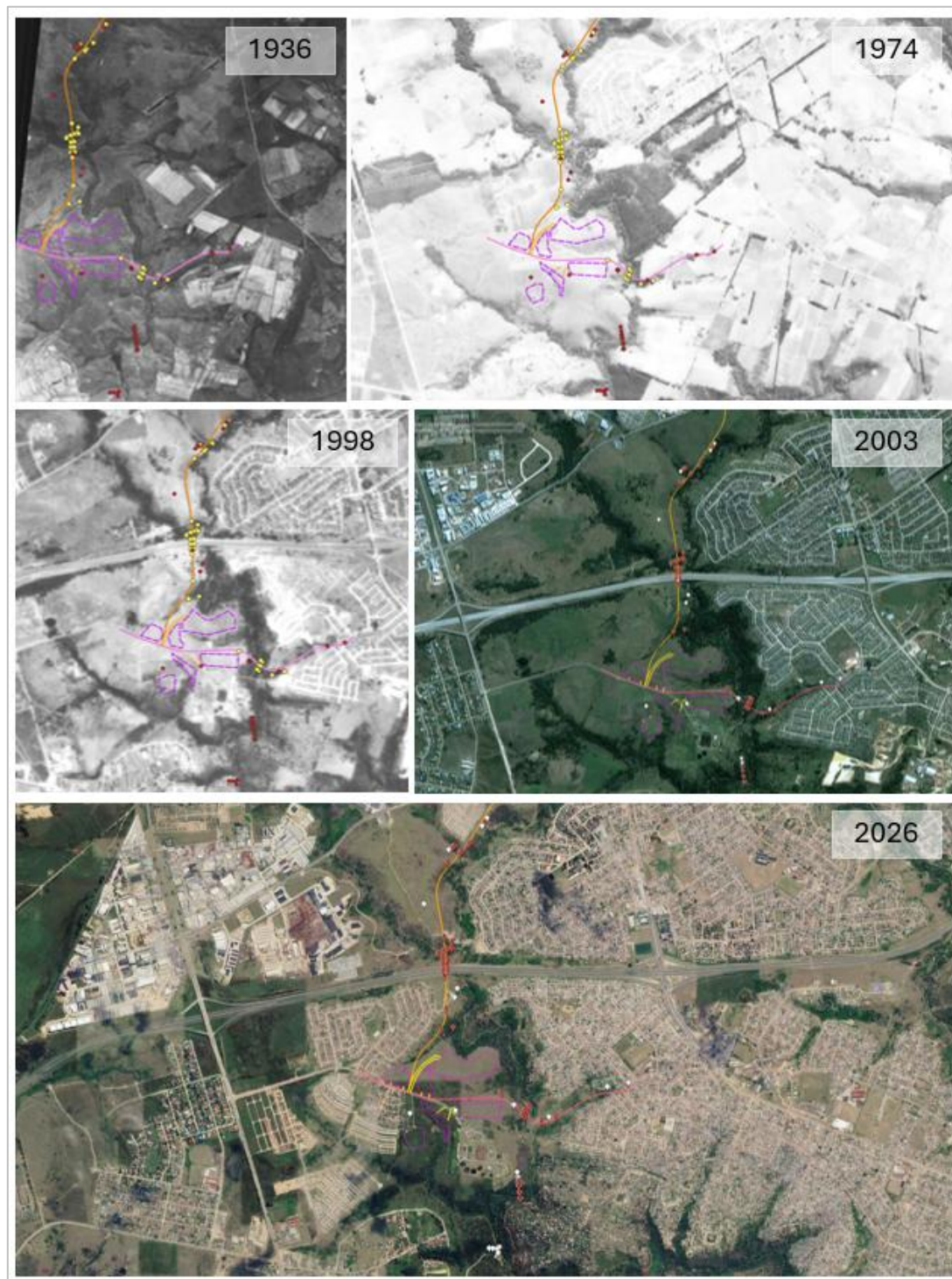


Figure 8: Imagery of the project area to show change in vegetation, riparian systems, and land cover over the past 80 years.

3.4 Species of Conservation Concern

In addition to the SCC highlighted by the DFFE screening tool (Table 1), the following public resources were consulted to expand the list of possible SCC for the site and its immediate surroundings:

1. [iNaturalist](#) (all taxa) within 3 km of the project area
2. Virtual Museum for herpetofauna, mammals and invertebrate taxa within the Quarter Degree Squares (QDS) 3322CD and 3422AB: DungBeetleMAP, FrogMAP, LacewingMAP, LepiMAP, MammalMAP, OdonataMAP, ReptileMAP, ScorpionMAP, SpiderMAP (correct as of March 2025).
3. South African Bird Atlas Project (SABAP2) for pentad 3355_2225 and 3400_2225.

Some SCC reported on the platforms were highly unlikely to occur at the site given either clearly unsuitable habitat or being deemed a vagrant/transient animal. For example, species that are fully adapted to marine environments would not occur at the site. For the purposes of this report these animals were excluded from further assessment (see also Section 4.2 and Appendix 1 for additional information).

The combined list of SCC (from DFFE Screening Tool and public resources) possibly occurring within the project area, along with their habitat, breeding, and feeding requirements are listed in Table 3. The information for each SCC presented in Table 3 stems largely from the online [Endangered Wildlife Trust Red List](#) (updated in 2025) for mammals, the [Regional Red Data Book of Birds of South Africa, Lesotho, and Eswatini 2025](#) released by BirdLife South Africa in June 2025 for avian species, the Conservation Assessments of Butterflies as published in the journal [Metamorphosis](#) in December 2020, and the [SANBI Red List of South African Species](#) for all other species in addition to a few key resources for each taxon:

1. Avifauna:
 - Roberts Birds of Southern Africa VII (Roberts, et al. 2005)
2. Mammals:
 - A Field Guide to Animal Tracks of Southern Africa (Liebenberg 2020)
 - The Mammals of the Southern African Subregion (Skinner 2005)
3. Invertebrates:
 - Field guide to the insects of South Africa (Picker, Griffiths and Weaving 2019)
 - Field guide to the butterflies of South Africa (Woodhall 2005)
4. Amphibians:
 - A complete guide to the frogs of Southern Africa (Du Preez and Carruthers 2015))

Table 3. Summary of habitat, breeding and feeding requirements for animal SCC potentially occurring in the project area.

Species	Red list status	Habitat	Breeding	Feeding
AMPHIBIANS				
<i>Africalus knysnae</i> Knysna Leaf-Folding Frog	Endangered	Typically inhabit endorheic (inward draining) wetlands with shallow water (< 50cm), high clarity, and sufficient vegetation suitable for breeding (De Lange & Du Preez, 2018). No streaming or running water was recorded at any of the sites where they have been found. The frog is associated with vegetation it can use for breeding which includes indigenous and exotic species. For example, slender knotweed (<i>Persicaria decipiens</i>) and kikuyu grass (<i>Cenchrus clandestinus</i>). It requires diverse plant species, including shrubs, grasses, and ferns providing shelter and breeding sites (De Lange & Du Preez, 2018). Its extent of occurrence (EOO) is 816 km ² , and its area of occupancy (AOO) is 27 km ² .	Females lay eggs on leaves which are folded and sealed by males, creating a protected environment (Du Preez & Carruthers, 2017). Breeding occurs during warmer wetter months such as September to November (De Lange, 2019). Breeding takes place near deeper parts of the waterbody, but still close to the waters' edge.	The Knysna Leaf-folding Frog is an insectivorous amphibian feeding on small invertebrates found in its habitat (e.g. insects and spiders). Foraging behaviour includes actively searching for prey on the forest/fynbos floor and in the leaf litter. The frog uses its sticky projectile tongue to capture and quickly ingest prey. It is primarily active at night, relying on its vision to locate and capture prey in the darkness.
AVIFAUNA				
<i>Circus maurus</i> Black Harrier	Endangered (BLSA + SANBI)	In Western Cape, mostly found in Fynbos, especially montane Fynbos and Strandveld. Less common in dry restios and renosterveld. Elsewhere, occurs in dry grassland, Karoo scrub, crop fields (wheat), and grasslands (sometimes >3000m elevation). Many move from fynbos to Karoo and grasslands during the winter, likely to follow rodent numbers (e.g. capitalise on late summer litter of Sloggett's Ice Rats in Free State and Lesotho). Birds move away following fires and do not return for several years. Global EOO is 1 340 000 km ² ; Regional AOO is 73 176 km ² .	Mainly monogamous but some polygamy observed. Mate fidelity is low. Usually a territorial solitary nester but in Western Cape some semi-colonial nesting is observed with less territorial behaviour. Nest is a small structure of grass, stems, and small twigs. Usually on or just above ground, in rank marsh grasses or near Fynbos bushes, reeds, and sedges. Nests most often in marshes or next to small streams, but also on damp soil or dry ground. Nest areas are reused in successive years. There is one observation of nest site used for 26 years. Lay dates are from mid-May to mid-December with a peak in mid-August to end of September. It is,	Specialist predator of mice and birds. Predominantly rodents (vlei rats, mice) eaten by birds in fynbos areas and small birds dominate diet of birds in mountain areas. Also takes reptiles and frogs. Insects are eaten but to a lesser extent. Sometimes caches prey. Forages most actively on blustery days (windy and rainy), hovers 1- 3m above vegetation with buoyant flight. Flashes into vegetation, hits prey hard and eats on ground. Perch hunting rare.

Species	Red list status	Habitat	Breeding	Feeding
			however, noteworthy that laying occurs relatively earlier under rainier conditions, particularly when rain was more intense in autumn, winter, and spring, and when summers preceding laying were wetter. Birds in coastal regions have been shown to have earlier lay dates than those located in mountain regions and to lay over a more extended period (up to two months earlier and one month later than in the interior-mountain regions) (Garcia-Heras et al., 2016)	
<i>Polemaetus bellicosus</i> Martial Eagle	Endangered (BLSA + SANBI)	Savanna, Karoo shrubland, and semi desert. Can occur in open farmland with clumps of trees. Rare in mountainous and forest areas. The presence of electricity pylons has increased distribution in the Karoo (Doherty, 2023). Global EOO is 26 000 000 km ² ; Regional AOO is 824 792 km ² .	Monogamous with pair bond lasting several seasons. Solitary nester. Nest is a substantial platform of sticks (up to 1.5m long and 3cm thick) on tall trees or pylons. Nest tree usually tallest in vicinity, and nest placed in a large fork below the canopy. Rarely uses rocky outcrops. 1 egg laid, incubation 48-53 days predominantly by the female bird.	Mainly small mammals like hare, jackal, small antelope, mongoose, small baboons, but also small stock animals, birds (especially gamebirds) and reptiles (especially monitor lizards). Usually hunts on the wing by soaring high and attacking in long slanting stoop. Surprises prey by using available cover. Occasionally hunts from perch, especially at waterholes or along game trails. Prey killed by impact or strangulation and taken to a high perch to eat.
<i>Afrotis afra</i> Southern Black Korhaan	Vulnerable (BLSA + SANBI)	Renosterveld, strandveld, and succulent karoo shrublands. Rare in agricultural fields. Largely confined to areas of natural vegetation. Favours renosterveld but can tolerate dense vegetation provided there is open space between shrubs. Endemic to South Africa, being confined to the winter- and mixed winter-summer rainfall areas of the Albany Thicket, Fynbos and Succulent Karoo biomes, and the southern extreme of the Nama Karoo biome, in the Cape provinces.	Polygynous, no evidence of permanent pair-bonds. Solitary nester. Males display regularly and noisily at regularly used sites. Egg is laid on the ground where it conceals female incubating under shrubs. Laying dates August to November, incubation only by the female.	Forages by walking and pecking close to ground. Diet includes insects, small reptiles, and plant material (green shoots). Eats invasive <i>Acacia</i> seeds possibly aiding their dispersal.

Species	Red list status	Habitat	Breeding	Feeding
		Primary threat to the species is habitat loss and degradation due to cultivation. Susceptible to powerline collisions. Global EOO is 1 509 628 km ² .		
<i>Anthropoides paradiseus</i> Blue Crane	Vulnerable (BLSA) Near threatened (SANBI)	Open Grassland, Grassland-Karoo mosaic, and wetlands. Habitats with >300mm per year annual rainfall. Adapted to croplands and pastures and tolerant of intense grazing or burnt grasslands. Global EOO is 1 890 000 km ² ; Regional AOO is 388 260 km ² .	Monogamous, solitary nester. Nests on wet ground (on a pad of vegetation) or dry ground (small layer of stones, dung, and vegetation). Often reuses the same nesting site for several years.	Pecking and digging with bill. Omnivorous, feeds on small bulbs, seeds, roots, insects, crabs, amphibians, fish, and small mammals. Eats crops (maize, lucerne, wheat) and sometimes noted as causing damage but also eats insect pests. Commonly feeds at small stock feedlots.
<i>Aquila verreauxii</i> Verreaux's Eagle	Vulnerable (BLSA + SANBI)	Hilly and mountainous regions with cliffs. Mostly active at dawn and dusk, then roosting/ resting in shade during the heat of the day. Global EOO is 21 600 000 km ² ; AOO is 619 504 km ² .	Monogamous, solitary nester, and territorial. Territories can contain up to 5 nest sites, although one is usually favoured. Typically nests on cliffs, often in an overhung crevice or in a small cave, and sometimes on an open ledge. Very rare for a nest to be in trees. Nest is a large platform of sticks with a cup lined with green leaves. Old nests can be 2.5m in diameter and 4m high. Laying dates are between April and July. Usually lays 1 or 2 eggs. Incubation lasts between 44 and 48 days.	Preys on small mammals mostly, with main prey being rock hyraxes (<i>Procavia capensis</i>) but will also take small antelope, gamebirds, hares, monkeys and small stock (young goats, sheep). Hunts aerially or from a perch, often in pairs, and takes most prey on the ground. Sometimes uses trees or cliff faces for cover. Hunting usually in early morning or late afternoon.
<i>Bradypterus sylvaticus</i> Knysna Warbler	Near Threatened (BLSA) Vulnerable (SANBI)	Inhabits dense understorey vegetation along riverbanks in fynbos forest patches, riverine woodland, and afro-montane forest and has even adapted to thickets of non-native brambles (e.g. <i>Rubus</i>). Global EOO 451 252 km ² ; Regional AOO is 18 228 km ² .	Breeds from August and December coinciding with the greatest abundance of invertebrate species.	Forages mostly on the ground, creeping through dense, matted vegetation and scratching in humus. Eats mostly grasshoppers, insect larvae, spiders, slugs, and worms
<i>Circus ranivorus</i> African Marsh Harrier	Vulnerable (BLSA) Endangered (SANBI)	Considered a waterbird. Roosts on taller trees around wetland edges from where it has a good vantage point. Can adapt to novel wetland habitats such as wastewater treatment works. Global EOO is 9 470 000 km ² ; Regional AOO is 288 888 km ² .	Breeding occurs between September and December. Egg-laying is from August to November in South Africa. Nests are made of grass, reed stems, or sticks in reedbeds, short sedge areas, or in trees along the	Dietary assessment (Simmons et al., 1991) of pellets and prey deliveries to nests includes birds, frogs, fish, eggs, and small mammals (<i>Rhabdomys</i> , <i>Otomys</i> , and shrews). Hunts primarily in wetland habitats using various flight

Species	Red list status	Habitat	Breeding	Feeding
			water's edge. The same nest is often reused by the same pair in following years.	methods including soaring, hovering, and low flight over wetlands and along the water's edge. May hunt in open grasslands or pastures near wetland areas.
<i>Neotis denhami</i> Denham's Bustard	Vulnerable (BLSA + SANBI)	Inhabits a mosaic of cultivated pastures, agricultural croplands, and natural vegetation, with seasonal variation in their preferences (Allan, 2002). Cultivated pastures are favoured habitat during winter in the southern Cape (Allan, 2002). Harvested cereal crop fields (stubble fields) are favoured, but ploughed fields and fields with growing cereal crops are avoided (Allan, 2002). Primarily inhabits open grasslands and African savannas (Allan, 2002). Being large-bodied with low flight manoeuvrability also leads to preference for open habitat. Preference for grasslands with a mix of short and tall grasses, and good visibility for foraging. Proximity to water sources, such as rivers or wetlands, is important for drinking and potential foraging (Allan, 2002). Avoids dense forests and habitats with high human disturbance. Global EOO is 20 700 000 km ² ; Regional AOO is 106 736 km ² .	Male courtship displays occur between August and January, but mainly in September and October (Allan, 2002). Eggs are laid in September and October, with unfledged young present between September and January (Allan, 2002). Preference for natural vegetation over pastures during summer breeding months. Larger bird groupings occur in winter, while in summer smaller groupings or individual birds occur. Nesting sites are concealed in open grasslands, often near vegetation or shrubs. Females construct shallow ground nests lined with grass or plant materials. Clutches consist of 1-3 eggs, incubated primarily by the female. Incubation lasts around 21-24 days.	Ground-dwelling bird that forages in open grasslands and savannas (Tarboton, 1989). Diet is omnivorous including insects, seeds, fruit, and vegetation. Grasshoppers, beetles, and termites are important insect prey, especially in the breeding season (Allan, 2002). Feeding technique is probing and pecking the ground with their long bills. Opportunistically feed on grasshopper swarms.
<i>Sagittarius serpentarius</i> Secretary bird	Vulnerable (BLSA + SANBI)	Grassland, open savanna, and Karoo shrubland with scattered trees. Can occupy other short-grass areas. Absent from rocky hills and dense woodlands. In Serengeti National Park, the SCC prefer flat environments with relatively more seasonal rivers and an annual precipitation of <900 mm. Abundance decreased in grasslands with low vegetation cover and where open grassed woodland coverage was >20%	Monogamous and solitary nesting. Territorial with home ranges usually 50-60 km ² around nests, actively defends against conspecifics. Nest is a large flat platform on top of thorny trees (<i>Senegalia</i> or <i>Vachellia</i> spp.) or black wattle (<i>Acacia mearnsii</i>). Nests can be reused in successive years. 1-3 eggs laid, incubation 40-46 days.	Anything it can overpower: insects, reptiles, birds, small mammals. Attracted to recently burnt areas for prey, but does not eat carrion. Most prey caught on ground with bill and swallowed whole. Larger prey killed with downward blows of feet and torn up before swallowing.

Species	Red list status	Habitat	Breeding	Feeding
		(Romani et al. 2025). Global EOO is 23 200 000 km ² ; Regional AOO is 866 956 km ² .		
<i>Sarothrura affinis</i> Striped Flufftail	Vulnerable (BLSA + SANBI)	Dry, upland grasslands. Montane grassland and fynbos. Only rarely enters wetlands/marshes. Alongside streams in grassland habitats. Key structural elements for habitat include dense cover with open ground for foraging. Also found in sites with bracken fern, brambles, and woody vegetation (<i>Protea</i> spp., <i>Buddleja</i> spp.) or close to forest edges. In the Western Cape, found in mesic mountain fynbos with fountain bush and mountain daisy species (<i>Psoralea</i> and <i>Osmitopsis</i>). Can occur on croplands (i.e. millet, lucern). Loss of grassland, too frequent burning, and overgrazing is major threats to habitat in South Africa. Global EOO is 4 280 000 km ² ; Regional AOO is 8694 – 8770/ 7272 – 33 140 km ² .	Monogamous, pair bond likely permanent. Nest is a bowl of dried grass that is built into a tuft of grass/sedge. Surrounding vegetation sometimes used to create a woven canopy. Laying dates in Western Cape is in September. Incubation is at least 15 days.	Eats mainly insects (adult and larvae), but diet also includes earthworms, spiders, and grass/sedge seeds. Forages throughout the day, searching for food through open patches of dry vegetation and occasionally on damp soils/shallow water.
<i>Stephanoaetus coronatus</i> African Crowned Eagle	Vulnerable (BLSA + SANBI)	Forest (including gallery forest), dense woodlands, and forested gorges in Savannas and Grasslands. Also in <i>Eucalyptus</i> and pine plantations. Perches for long periods, resting in canopy. Sometimes soars high over territory, then descends vertically to perch. Manoeuvres agilely through thick forest, can take off vertically from forest floor. Forest specialist, generally nesting in remnant forests or plantations in the urban mosaic landscape. Global EOO is 3 380 000 km ² ; Regional AOO is 372 035 km ² .	Monogamous, possibly long-term pair bond. Territorial (at least 10 km ²), solitary nester. Tallest trees used to build large stick platform nest (sticks/branches up to 1.5m long, 3cm thick). Nest copiously lined with beechwood (<i>Faurea saligna</i>), pine or <i>Eucalyptus</i> leaves/ needles. Nest reused and added to in consecutive years, can reach up 2-3m in diameter, 3m high. Nest trees often at the base of a cliff/ ravine or at the edge of plantation. Nest trees are usually White Stinkwood (<i>Celtis africana</i>), Yellowwoods (<i>Podocarpus</i> spp.), Cabbage tree (<i>Cussonia spicata</i>) but also <i>Eucalytus</i> and pine species. Incubation 49 to 51 days.	Predominantly feeds on mammals such as hyrax, antelope, and primates. Will also take porcupine, hares, mongoose, sometimes domestic stock and cats/ dogs. Avian prey includes Hadedda Ibis, Egyptian Geese and Domestic Chickens. Reptile prey mainly Monitor Lizards. Most prey taken on ground but occasionally crashes into dense foliage in pursuit. Frequently still-hunts (stalks prey) and hunts from concealed perches above waterholes in evening waiting for antelope to drink. Pair sometimes hunt monkeys cooperatively. Prey struck with downward blow of open talon, hind claw penetrates the skull killing

Species	Red list status	Habitat	Breeding	Feeding
				instantly. Large prey that cannot be lifted are partly eaten and dismembered on the ground and then cached in trees.
<i>Anas erythrorhyncha</i> Red-billed teal	Near Threatened (BLSA)	Mostly inland wetlands, both natural and artificial. Breeds at shallow ephemeral pans and dams, and shallow bays of larger ones, with fringing emergent vegetation and adjacent grassland. In dry season, assembles on large water bodies to moult and form pairs. Global EOO 15 400 000 km ² .	In Free State when breeding, prefers grassy pans covered mainly by lovegrasses (<i>Eragrostis</i> spp) or swamp grass (<i>Leptochloa fusca</i>).	Density correlated with food abundance. Known to eat seeds, plant matter, and invertebrates such as amphipoda, dragonfly larvae, adult insects, and molluscs. Feeds in harvested fields on spilled maize, wheat and sunflower seeds. Sometimes gathers in wetlands close to grain fields. Eats lucerne, strips seeds from grass in dry grassland, and eats worms, tadpoles, and fish.
<i>Anas undulata</i> Yellow-billed Duck	Near Threatened (BLSA)	Open waters of estuaries, sluggish and still waters of rivers and streams, lakes, endorheic pans, swamps, marshes, and man-made impoundments, including irrigation dams and sewerage works. Avoids saline and highly acidic water bodies, as well as fast-flowing water. Global EOO 14 000 000 km ² ; Regional AOO is 483 000 km ² .	Nests are a shallow depression in the ground lined with fine grass or waterweeds, usually with down lining added at the start of egg-laying, builds up to 30-55mm layer as incubation progresses. Usually ca. 0.25-1.04m diameter, 70-150mm deep with a cup. Smallest in dry situations, largest at waterlogged sites. Among rushes, reeds, dense grass, and sedges, often within dense patch of vegetation (under thorny bush if available), and usually screened from above; rarely in exposed sites. Sometimes has a tunnel from nest through surrounding vegetation. Usually <20m from water. Lays June to January in the Western Cape (peak June to October). Incubation period up to 29 days, ducklings first flight at 68 days.	Grazes new growth of aquatic plants. Majority of the diet is plant matter (such as <i>Potamogeton pectinatus</i>) with 17% being animal matter (mainly chironomid larvae and mayflies). Juveniles eat sedges (<i>Eleocharis</i> spp) and oxygen weed (<i>Lagorosiphon</i> spp) and a wider range of animal species including water beetle (dystiscid) larvae, grasshoppers, and snails (<i>Bulinus</i> spp).
<i>Anhinga rufa</i> African Darter	Near Threatened (BLSA)	Still and slow-moving freshwater bodies with open water. Scarce on fast-flowing rivers and in areas with dense floating vegetation.	Little is known about breeding biology--most information is inferred from Australasian Darter (<i>Anhinga novaehollandiae</i>). Nest is	Forages singly in mid-water as well as along bottom usually in water up to 6m deep. Uses stealth rather than pursuit

Species	Red list status	Habitat	Breeding	Feeding
		Prefers areas with dead trees, rocks, or banks where it can rest after feeding. Typically avoids marine habitats, but forages in estuaries and coastal lagoons; very rarely in open sea. Global EOO is 35 700 000 km ² ; Regional AOO is 253 950 km ² .	an untidy platform of sticks or dead reeds with a shallow cup lined with grass. Built in tree fork, often over water or on island; also on a large reedbed. Usually builds new nest each breeding season. Laying dates in north-eastern parts of South Africa are year-round and in the south-eastern parts is confined to peaks in October to December. Breeding in the Western Cape peaks August to October. Incubation period is 21-27 but most commonly 22 days. Chicks are fully fledged at 7 weeks.	to catch prey. Spears prey with beak slightly open. Prey occasionally stolen from other birds. At Lake Kariba, Zimbabwe, the diet was dominated by cichlids (Southern Mouth-brooder, Zambezi River Bream, Kariba Tilapia, and Redbreast Tilapia) Astriped Robber, Tigerfish, Zambezi Parrotfish. Diet in KZN is mainly Chubby-head Barb, Brown Trout, and frogs.
<i>Crithagra leucoptera</i> Protea Canary	Near Threatened (BLSA + SANBI)	Mountain fynbos with scattered large proteas. Also along edges of forest and scrub along rivers. Can occur along Karoo fringes with protea species. Locally nomadic, responding to flowering, fruiting, and fire patterns in landscape. Global EOO is 158 323 km ² ; Regional AOO is 21 420 km ² .	Monogamous, solitary nester. Nest lined with <i>Helichrysum</i> stems and leaves forming a flimsy framework, then thickly lined with <i>Protea</i> leaves. Nest 2-4 m above ground in forked branch inside canopy of <i>Protea</i> bush. Eggs laid in August to October; Incubation 17 days.	Eats seeds of <i>Protea</i> and restios but also foliage, flowers, and nectar from a variety of species. Forages mainly in the canopy of trees and shrubs but also on ground under <i>Protea</i> bushes. Favours large seeds of <i>Protea</i> spp.
<i>Netta erythrophthalma</i> Southern Pochard	Near Threatened (BLSA)	Prefers fairly deep, clear, seasonal and permanent freshwater wetlands with emergent vegetation (including floodplains). Moulting flocks keep to open water, or close to stands of emergent vegetation; solitary birds tend to use emergent cover. Global EOO is 60 800 000 km ² ; Regional AOO is 185 025 km ² .	Nests are usually in emergent vegetation over water or a scrape in thick grass on an island or embankment less than 20m from water. Usually well hidden. Nest is a broad bowl 300-400mm across. Adjacent stems are pulled over the nest to form a canopy. Laying occurs from June to March with most laying happening August to November in the Western Cape.	Feeds by day and night mostly by diving. Consumes parts of waterlilies but other seeds and fruits make up most of the diet. Rarely takes insects and gastropods.
<i>Nycticorax nycticorax</i> Black-crowned Night Heron	Near Threatened (BLSA)	Well-vegetated and slow-moving waters, including swamps, marshes, estuaries, lakes, rivers and mangroves; also dams and sewage ponds. Roosts in trees and reedbeds. Global EOO is 248 000 000 km ² ; Regional AOO is 501 212 km ² .	Laying in the Western Cape predominantly August to October. Nest is a flimsy platform of sticks and reeds with an outside diameter of 250 to 350mm and a height of 100mm. Usually in a reedbed, less often in a tree or bush over water.	Nocturnal or crepuscular forager. Eats fish, amphibians, reptiles, birds up to the size of a Laughing Dove, small mammals, insects, molluscs, and spiders. Also eats eggs and chicks of birds such as Western Cattle Egrets.
<i>Oxyura maccoa</i> Maccoa Duck	Vulnerable (BLSA)	Deep inland waterbodies with emergent vegetation. Prefers permanent wetlands but	Breeding has been documented in farm dams, but it relies on emergent vegetation	Feeds by diving and sifts through bottom muds for small invertebrates

Species	Red list status	Habitat	Breeding	Feeding
	Near Threatened (SANBI) Endangered (IUCN)	also uses farm dams with rich benthic invertebrate communities. Almost exclusively aquatic, coming onto land only occasionally to preen and sleep. Global EOO is 8 300 000 km ² ; Regional AOO is 159 660 km ² .	(rushes and sedges) and good feeding habitat. Polygynous, with no pair bond. Nest built by female in emergent reeds/sedges (<i>Phragmites</i> , <i>Typha</i> , and <i>Cyperaceae</i> spp.) in deep water. Nests sometimes concealed by adjacent vegetation pulled downwards to form a partial dome. Laying dates in the Western Cape: July to March. Incubation is 25-27 days. The SCC is a facultative nest parasite. Host species include Fulvous Whistling Duck, Egyptian Goose, Blue-billed Teal, and Red-knobbed Coot.	including midge larvae, ostracods, gastropods, <i>Daphnia</i> spp, seeds, and roots.
<i>Spatula smithii</i> Cape Shoveler	Near Threatened (BLSA)	Mainly shallow, plankton-rich freshwater wetlands in the Western Cape, including sewerage works, but also tidal estuaries, saline lagoons, and saltpans. On South African highveld, mainly present at shallow pans and dams on open grassland, favouring saline pans. Also present in shallow bays and the upper reaches of large dams. In the Free State, favours pans covered or partially covered with swamp grass (<i>Leptochloa fusca</i>). Global EOO is 3 380 000 km ² ; Regional AOO is 372 035 km ² .	Availability of suitable food probably the main factor in selection of breeding habitat, with nest cover less important. In Western Cape most laying occurs July to August (63%) although laying happens year-round. In the Western Cape, nests are laid on islands, in pasture or natural veld adjacent to wetland with scant overhead cover. Nesting mostly occurs on dry ground.	Usually forages in open, eutrophic waters. Frequently feeds commensally with Little Grebe in the Western Cape. In the Western Cape eats predominantly (70%) animal matter such as snails, insects, crustaceans, and platanna tadpoles. Plants eaten are sago pondweed (<i>Potamogeton pectinatus</i>), achenes, leaves and stems of pondweed, and other plants.
<i>Thalassornis leuconotus</i> White-backed Duck	Near Threatened (BLSA)	Pans, open vleis, small farm dams, backwaters of larger dams and other artificial water bodies with clear water and stands of emergent and floating plants; mainly in fynbos, grassland, and savanna biomes.	Preferred breeding habitat is ephemeral pans which, after successive years of high rainfall, have stable water levels and isolated stands of sedges, rushes, or reeds, and are well covered with aquatic grasses. In Zimbabwe, uses small well-vegetated farm dams on the central plateau.	Forages mostly by diving to bottom muds in open water 30-180cm deep. Feeding at surface unusual. Eats primarily seeds of aquatic herbs such as water lillies, knotweed (<i>Persicaria limbata</i>) and sometimes the vegetative parts of water lillies. Seeds of swamp grass (<i>Paspalidium geminatum</i>) and dicotyledonous seeds are consumed as well choronomid larvae.
<i>Buteo trizonatus</i> Forest Buzzard	Near Threatened	Afromontane forests and plantations (mainly Pine, but also <i>Eucalyptus</i>). Generally	Monogamous, territorial, solitary nester. Nest is a platform of sticks with a cup-lined	Forages along forest edges and within forests (also in plantations). Hunts

Species	Red list status	Habitat	Breeding	Feeding
	(BLSA) Least concern (SANBI) Near threatened (IUCN)	unobtrusive, perching on large branches partially concealed under canopy, sometimes perching in the open at the edge of forests. Global EOO is 179 000 km ² ; Regional AOO is 56 460 km ² .	with green leaves. Nests in plantations are smaller than in native forests. Laying dates from August to November. Breeding is confined to the Western Cape and Eastern Cape Provinces.	mainly from perch. Diet consists of small mammals (mice and moles), small birds, snakes, lizards, frogs, and invertebrates.
TERRESTRIAL INVERTEBRATES				
<i>Thestor barbatus</i> Bearded Skolly	Critically Endangered	Range restricted and endemic to Nama Karoo and Western Cape. Only present in one location in Paardepoort mountain range, north of George. Rocky terrain on the higher slopes of mountains. Threatened by alien tree encroachment (pine and <i>Hakea</i>). Vegetation types: FFs18 North Outeniqua Sandstone Fynbos. EOO 4 km ² , AOO 4 km ² .	Single brood in December.	Little is known.
<i>Aloeides trimeni southeyae</i> Mossel Bay Brown Russet Butterfly	Endangered	Restricted range endemic to the southern coastal region in the Western Cape. Three widely separated (disjunct) populations between Albertinia in the west and Hartenbos in the east. The species occupies grassy fynbos near Mossel Bay. Gently north-facing slopes or flat lands, sparsely covered by low shrubs with bare ground in between. Vegetation types: FFs15 (North Langeberg Sandstone Fynbos), FRs14 (Mossel Bay Shale Renosterveld). EOO of 85 km ² and AOO of 24 km ² .	Two broods, September to December (peak in October) and January to April (peak in February).	Larval food includes <i>Aspalathus</i> spp. and <i>Hermannia depressa</i> .
<i>Aneuryphymus montanus</i> Yellow-winged Agile Grasshopper	Vulnerable	Very low area of occupancy between 100 and 1000 km ² . Threatened by declining habitat due to invasion by aliens and habitat transformation. Strong association with sclerophyllous fynbos vegetation on the southern slopes of the Outeniqua mountains post-fire. Threats to the species include habitat transformation and invasion by alien	Not known.	Not known.

Species	Red list status	Habitat	Breeding	Feeding
		plants. EOO is ca 170 000 km ² ; AOO is probably between 100 and 1000 km ² .		
<i>Aloeides pallida littoralis</i> Knysna Giant Russet Butterfly	Near Threatened	Endemic taxon to the Western Cape Province. Relatively flat terrain near the coast, coastal Fynbos. Vegetation Types: AT36 Goukamma Dune Thicket, AT40 Hartenbos Dune Thicket, FFd10 Knysna Sand Fynbos, FFd6 Hangklip Sand Fynbos, FFd9 Albertinia Sand Fynbos, FFf1 Elim Ferricrete Fynbos, FFG5 Garden Route Granite Fynbos, FFh5 Cape Winelands Shale Fynbos, FFh9 Garden Route Shale Fynbos, FF11 Agulhas Limestone Fynbos, FFs11 Kogelberg Sandstone Fynbos, FFs12 Overberg Sandstone Fynbos, FFs19 South Outeniqua Sandstone Fynbos, FS9 Groot Brak Dune Strandveld, (AT40 Hartenbos Dune Thicket), (FFg5 Garden Route Granite Fynbos).	Little is known, but <i>Lepisiota capensis</i> ants are hosts for subspecies <i>A. p. grandis</i> .	Little is known, but larval food for the subspecies <i>A. p. pallida</i> and <i>A. p. jonathani</i> feed on <i>Aspalathus</i> species. The larvae of subspecies <i>A. p. grandis</i> are fed by trophallaxis by <i>Lepisiota capensis</i> ants and later feed on these ants' eggs.
<i>Ceratogomphus triceraticus</i> Cape Thorntail Dragonfly	Near Threatened	Wide range throughout the Western Cape. Pools in streams, and occasionally in reservoirs. Rocky, shallow rivers, with deposition pools, and possibly in farm dams. Usually in fairly open or hilly country side. Main threat is invasive alien trees, loss of habitat, water pollution, and to lesser extent agriculture. Clearing of alien trees greatly benefits species. Its extent of occurrence is over 68,000 km ² and area of occupancy is less than 2,000 km ² .	Not known.	Little is known, but dragonflies are insectivorous.
<i>Ecchlorolestes nylephtha</i> Queen Malachite	Near Threatened	Known from streams near Storms River and in the Tsitsikamma Forest. Endemic to South Africa. Requires a microhabitat of small, fern-fringed streams in the deep shade of the forest. Flight period is early-late summer (November to February; Samways and Grant,	Little known, but congeners typically lay eggs on tender green shoots of vegetation overhanging streams	Little is known, but members of the order Odonata are insectivorous.

Species	Red list status	Habitat	Breeding	Feeding
		2007) but have been seen on wing in April. Range of around 400 km ² .		
MAMMALS				
<i>Chlorotalpa duthieae</i> Duthie's Golden Mole	Vulnerable	Occur on alluvial sands and sandy loams in southern Cape Afrotropical forests (Bronner, 2014). Preference for forest vegetation over fynbos. Narrow coastal band 275km long between Wilderness and Port Elizabeth with fairly disjunct populations. Can occur in gardens and pastures adjoining forests. Mainly active at night. Although the observed area of occupancy (AOO) is 144 km ² (assuming a grid cell area of 16 km ²), satisfying one of the criteria for Endangered status, the estimated extent of occurrence is nearly 14 000 km ² .	Little is known but a female was recorded with a litter of two young in November (Bronner, 2014).	Shallow subsurface foraging tunnels radiate outwards from beneath the roots of trees. Forages at night in tunnels and through the leaf litter. Diet includes earthworms.
Sensitive Species 8	Vulnerable	Specialised habitat requirements within a home range of approximately 0.75 ha (Skinner & Chimimba, 2005). Strong habitat preference for dense vegetation with good undergrowth providing good cover in which to retreat. Forest, thicket, dense coastal bush, independent of water. Can inhabit forest edges and transitional zones. Requires diverse plant community with a variety of tree and shrub species. Can adapt to fragmented habitat given sufficient cover and food availability. Actively avoids open grasslands, and areas with human disturbance. The estimated area of occupancy (AOO) ranges from 1 415 – 2 858 km ² , depending on whether we include only currently occupied forests or all potentially viable forests within the EOO. Using forest clusters that fall within this dispersal distance as proxies for subpopulations, the largest cluster is	This species can breed throughout the year. Males establish territories and exhibit aggressive behaviours towards other males as well as to attract females.	Highly selective feeders, often feeding on food below troops of monkeys or frugivorous birds which drop lots of material. Preference for fruit, but also fallen leaves, flowers, and insects. Seldom actively browse. Active in the early morning and late afternoon, foraging for around 8 hours a day within their territory.

Species	Red list status	Habitat	Breeding	Feeding
		estimated to be 314 – 687 km ² , which yields 785 – 12 023 mature individuals.		
<i>Amblysomus corriae</i> Fynbos Golden Mole	Near Threatened	Sandy soils and soft loams in mountain fynbos, grassy fynbos and renosterveld of the south-west Cape. Also afromontane forest and southern African moist savanna along the southern Cape coast. Favours richer and wetter soils (Broom, 1907) preferring forest fringes and associated fynbos. Thrives in gardens, cultivated lands, golf courses, and livestock paddocks. Present also in exotic plantations at lower densities (Bronner, 2013). Their extent of occurrence is over 20 000 km ² , they have only been confirmed at 16 locations, with an area of occupancy estimated at less than 500 km ² .	Fynbos Golden Moles probably breed aseasonally because pregnant females have been captured in August, May, and December. Mean litter size is two; young are altricial and hairless at birth.	Feeds mainly on earthworms and insects (Skinner & Chimimba, 2005).
<i>Poecilogale albinucha</i> African Striped Weasel	Near Threatened	Rare in range and easily overlooked, predominantly nocturnal and well adapted to subterranean lifestyle. Most abundant in savanna and grasslands, particularly with rainfall > 600mm per year. But habitat tolerance is very broad, found in lowland rainforest, semi-desert grassland, fynbos (with dense grass) and pine plantations (Child et al., 2016). AOO estimated as 50 518 km area of occupancy (AOO), which we estimated as 50,518 km ² .	Breeding season is during spring and summer months in southern Africa. Usually produces only one litter per season which comprises of 1-3 pups. Pups are fully grown at 20 weeks.	Small mammal specialist, up to own body weight in size, but occasionally takes birds also. Has a fast metabolism and requires an abundance of prey in territory (Child et al., 2016). Considered to have very close association with mole-rats, likely as a food source but also for habitat preference, especially in western, drier sections of its range (Child et al., 2016).

4. FIELD ASSESSMENT

4.1 Methods

Following the Species Environmental Assessment Guidelines (SANBI 2020) and Table 3, taxa-specific sampling techniques were conducted in habitats where SCC were likely to occur. Taxa-specific sampling was interspersed with a meander across the project area to collect additional opportunistic data for all fauna and inspect all habitat types (Table 4).

Table 4. Sampling techniques conducted for potential SCC occurring within the project area.

Taxa	Field methods	Platform where observations are reported
Avifauna	- Meander* across site for direct observations.	Birdlasser (list)
Mammals	- Meander* across site for direct observations, tracks, scats, and signs.	iNaturalist (photos)
Amphibia	- Meander* across site for direct observations. - Active searching.	iNaturalist (photos)
Invertebrates	- Meander* across site for direct observations. - Active searching. - Sweep netting.	iNaturalist (photos)

* Meandering involved slow walking across the site through various habitat types and key landscape features. Active observations took place for all fauna throughout this walk which was then supplemented by taxa specific sampling methods in habitats deemed most suitable for SCC.

4.2 Assumptions and Limitations

1. While the public platforms mentioned in Section 3.4 are excellent sources of additional information for animal species occurring within an area, these results require some expert interpretation to determine which of the SCC are relevant to include in the faunal assessment of the project area. For example, the coarse spatial scale of reporting within the Virtual Museum platforms (Quarter Degree Square level (27km x 27km) or SABAP2 pentad level (9km x 7 km)) can result in species records from habitats quite different to those present on site. Additionally, these platforms include sightings of vagrant or transient animals upon which an assessment cannot reasonably be based. Expert interpretation is therefore applied to the full list of SCC identified by the various public platforms (see Appendix 1) and some species are then excluded from further assessment due to the project area clearly lacking suitable habitat or the species clearly representing a vagrant or transient animal outside its normal range. The SCC assessed in this report therefore represent those which may reasonably occur on site. However, there is always the possibility that some SCC (although highly unlikely to occur on site) are overlooked in this process.
2. Several of the borehole and test-pit locations were visited during the site assessment in March 2026, but not all of them. This is because the methods to access and execute these activities are largely the same, with minimal variation in site specific differences. Mitigation measures recommended were based on range of different sites assessed and extrapolated to sites that were not investigated directly. Almost every location of a test pit or borehole has been previously visited during a site visit for the Site Sensitivity Verification which was undertaken on 4 December 2024. It was therefore deemed unnecessary to visit each point for assessment.

3. One field visit took place to the specific sites for the present faunal assessment on 26 March 2026 with an additional field visit having taken place for the Rand Street Road Extension on 4 December 2024 covering the general area for the initial Site Sensitivity Verification. The detectability of animal species increases with more visits. This assessment therefore only represents a “snap-shot” in time and it is possible that SCC occurring on site were not observed during the visit. These results should therefore be interpreted with this in mind and not be treated as an exhaustive list of species occurring on site.
4. Site visits took place during daylight hours so the likelihood of encountering nocturnal species was limited.
5. The site visit coincided with late autumn. This may be of consequence for some species showing seasonal variation in breeding and activity patterns.
6. Evidence of animals in the form of tracks, scats, calls, and signs always brings with it a level of uncertainty, but best efforts were made in this regard, and uncertainties are highlighted in the report.

4.3 Site Inspection Details

One field visit took place to the specific sites for the present faunal assessment on 26 March 2026 with an additional field visit having taken place for the Rand Street Road Extension on 4 December 2024 covering the general area. These visits happened together with the aquatic and botanical specialists from Confluent Environmental. The weather was warm with little wind: suitable conditions for catching invertebrates using sweep netting. The most prominent habitat is transformed grassy fields (the entirety of the stockpile and haul road area) with bushy vegetation containing some native plants along valley/ river (Figure 9). Disturbances such as invasive plants, use by humans (grazing, throughfare, dumping, etc) and littering reduce the utility of these habitats for native fauna which would typically occur in the vegetation type as described in the National Vegetation Map. An effort was made to cover most of the project area with the meander and to conduct taxa specific sampling techniques across a range of suitable habitats for potential SCC (Figure 10).

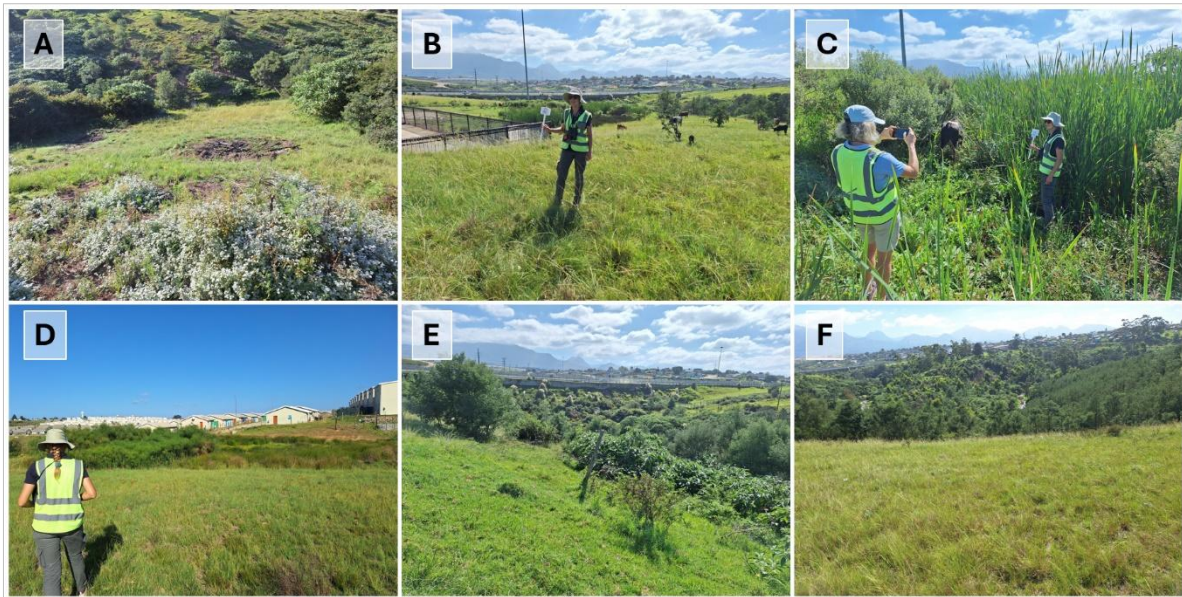


Figure 9. Habitat types identified within the stockpile, test pit, and borehole sites with A) showing the area in which a test pit is proposed with bushy vegetation in the foreground where golden mole evidence was found; B) a test pit site located in the transformed field habitat; C) a test pit site located in an artificial wetland area; D) a wetland area situated outside of the proposed stockpile area shown in the foreground; E) dense invasive alien plant species in the watercourse just south of the N2 shown in the background and; F) part of the stockpile area (foreground) sloping towards the invaded watercourse (background), which is referred to in the Aquatic Specialist's Report.

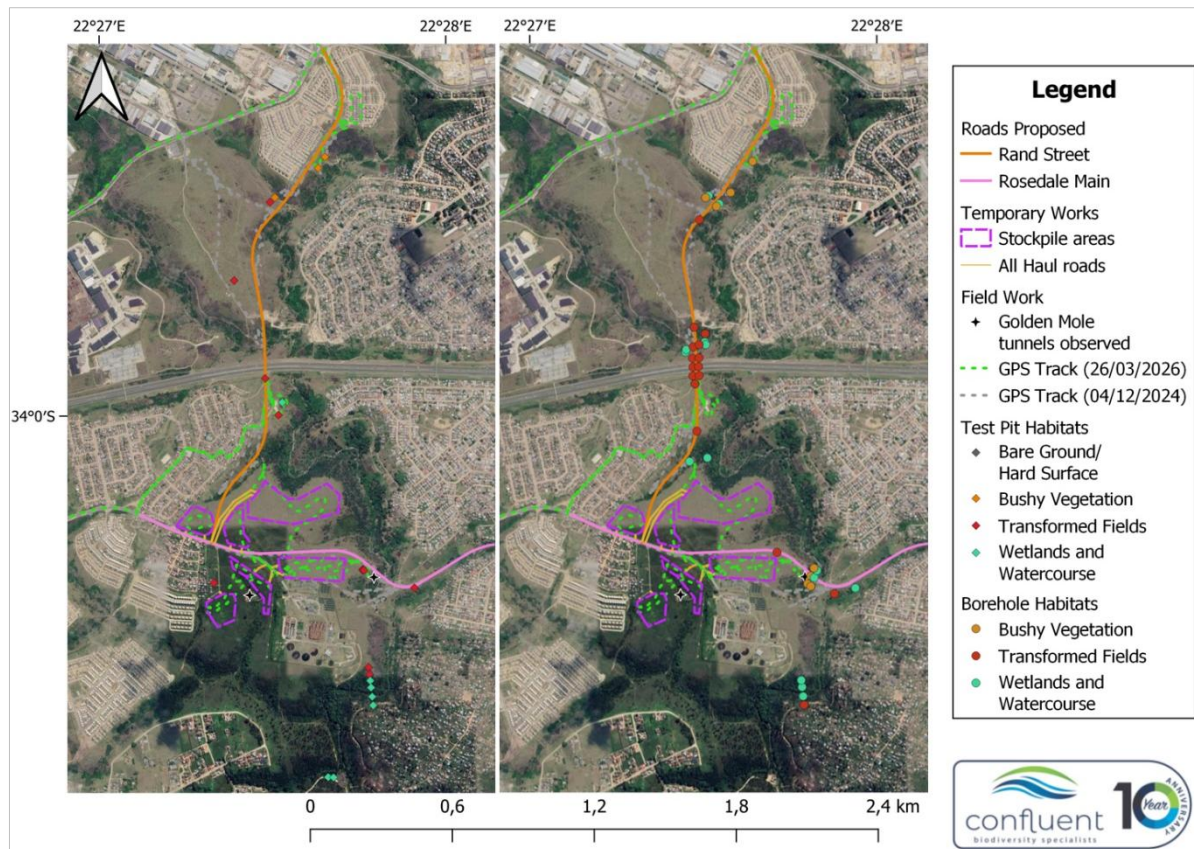


Figure 10. GPS track for field visits conducted on 26 March 2026 and 4 December 2024 as well as locations with evidence of SCC and planned stockpile sites, test pits (map on the right), and boreholes (map on the left).

4.4 Results

4.4.1 Avifauna

No SCC was encountered during the site visit. Opportunistic sightings were noted throughout the meander and nests/roosting sites were searched for in suspected habitat. Diversity of birds was low with a total of 8 bird species identified during the site visit on 26 March 2026. Large groups of both Black-winged Lapwing (*Vanellus melanopterus*) and Western Cattle-Egret (*Ardea ibis*) were observed in association with stockpile areas and cattle respectively (see Figure 11; See Appendix 2 for full list of birds observed at the site). Rodent paths were observed at the site which may indicate that the area presents suitable foraging for raptors that hunt on wing or on the ground.

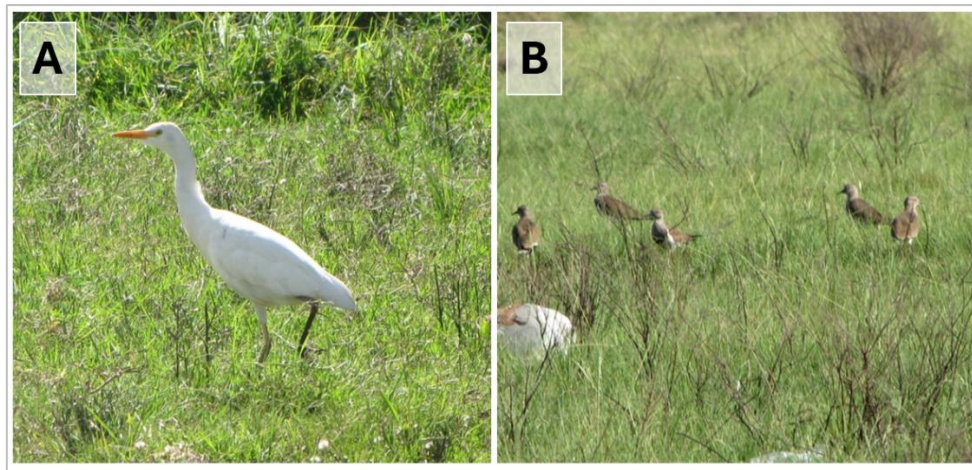


Figure 11. Some non-SCC avifauna observed in high numbers during the site visit namely (A.) Western Cattle-Egret (*Ardea ibis*) and (B.) Black-winged Lapwing (*Vanellus melanopterus*).

4.4.2 Mammals

There was evidence of sub-surface tunnelling by golden moles (Chrysochloridae) found close to the riverine areas of the Skaapkop River near Thembaletu which falls outside of the stockpile sites but within the proposed 5mx5m (according to the Geotechnical report) test pit/ borehole sites (Figure 12). Species cannot be determined based on a visual or digital inspection of the tunnels, but environmental DNA taken from tunnels in around George by Confluent Environmental has revealed that Fynbos Golden Mole (*Amblysomus corriae*; Near Threatened) rather than Duthie's Golden Mole (*Chlorotalpa duthieae*; Vulnerable) occurs in similar areas (viz areas that were historically fynbos but have been transformed over decades through disturbance). This is doubly confirmed by the habitat in which these tunnels occur which could be characterised as bushy vegetation rather than forest habitat in which Duthie's Golden Mole typically lives.



Figure 12. Evidence of Golden Mole (Chrysochloridae) foraging tunnel shown to be 3cm wide.

Agricultural species such as Domestic Cattle (*Bos taurus*), Domestic sheep (*Ovis aries aries*) and Domestic Goat (*Capra hircus*) were observed in moderate numbers along with Domestic Dog (*Canis familiaris*). Droppings suspected of belonging to Cape Grey Mongoose (*Herpestes*

pulverulentus; Figure 13), Genet (*Genetta* sp; a midden observed along the river shown in Figure 13), and Bushpig (*Potamochoerus larvatus*) were observed. Evidence of foraging suspected to be Cape Porcupine (*Hystrix africaeaustralis*; Figure 13) and mole hills for African Molerats (Bathygeridae) were also observed. Rodent (Rodentia) paths were observed in the stockpile areas which may provide foraging resources to raptor SCC (Figure 13).

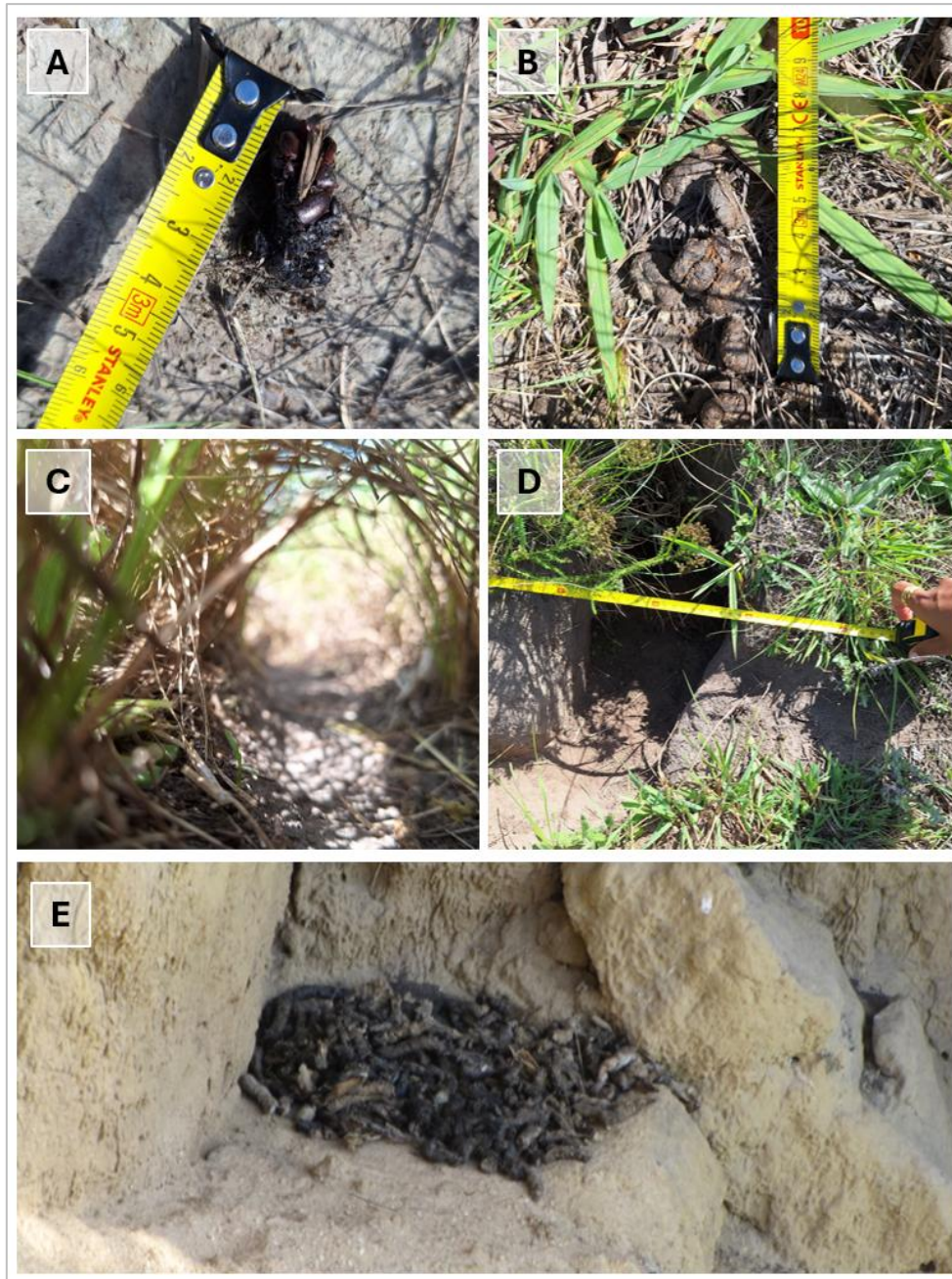


Figure 13. Evidence of mammal species identified during site visits namely (A.) Cape Grey Mongoose (*Herpestes pulverulentus*) scat with insect wings and exoskeleton; (B.) Suspected Bushpig (*Potamochoerus larvatus*) scat; (C.) Rodent (Rodentia) tunnels; (D.) Digging attributed to Cape Porcupine (*Hystrix africaeaustralis*) and; (E.) suspected Genet (*Genetta*) scat.

4.4.3 Terrestrial Invertebrates

No SCC were found during the site inspections. Fourteen species of invertebrates were observed. Termite mounds were observed suspected of housing Snouted Harvester Termite (*Trinervitermes trinervoides*) at the site. Robber flies (Asilidae) and other flies (Diptera) were abundant due to the presence of livestock at the proposed stockpile sites. The polluted state of the river at the site makes it unlikely to host dragonflies and damselflies highlighted as SCC: water is a critical resource for the breeding and larval phases of this order. The most frequently observed order was butterflies and moths (Lepidoptera) with eight species observed (Figure 14). Plant species in the genus *Aspalathus*, suitable hosts for butterfly SCC Endangered Mossel Bay Brown Russet Butterfly (*Aloeides trimeni southeyae*) were observed in bushy vegetation. *Aspalathus* is also suspected to be a suitable host plant for larvae of Near Threatened Knysna Giant Russet Butterfly (*Aloeides pallida littoralis*) since other subspecies of *Aloeides pallida* are known to use *Aspalathus* and Cape Sugar Ants (*Lepisiota capensis*) during their larval phase.

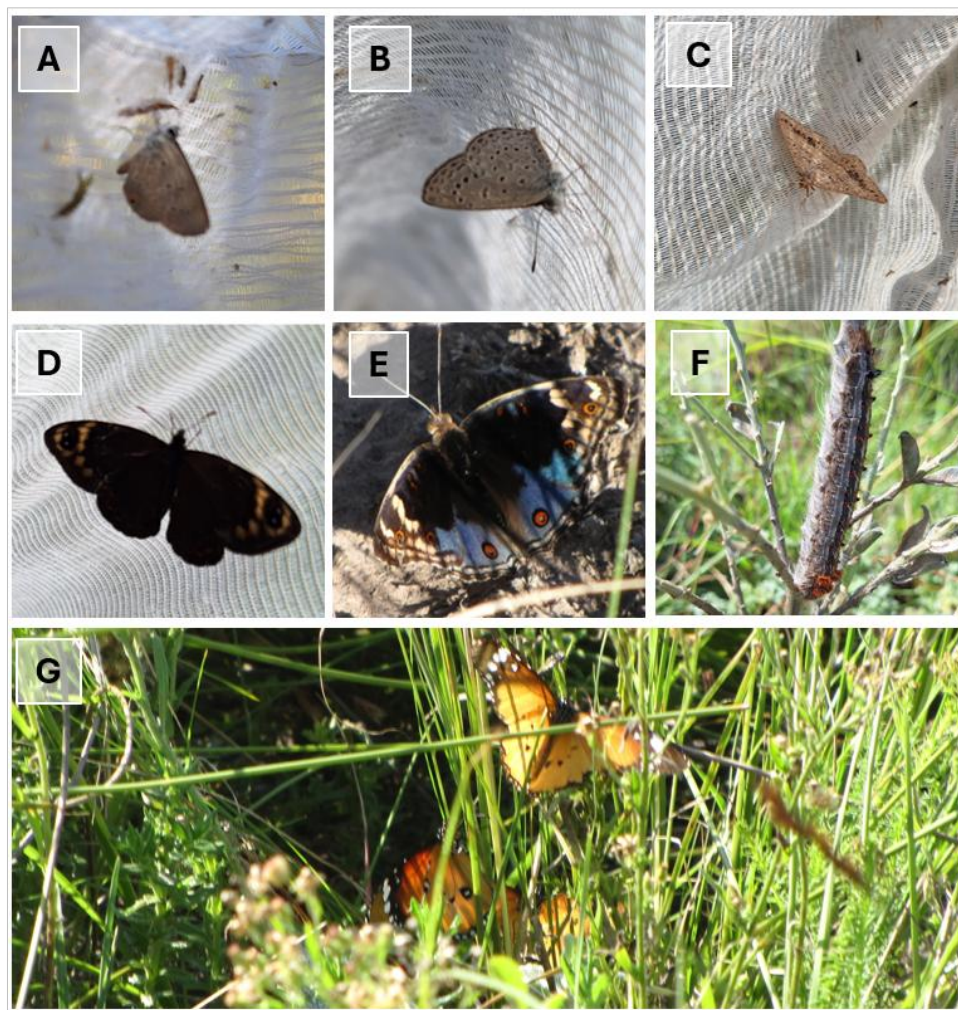


Figure 14. Some butterflies and moths photographed during the site inspections namely (A.) Cupreous Ash Blue (*Eicochrysops messapus messapus*); (B.) African Grass Blue (*Zizeeria knysna*); (C.) Oblique Peacock (*Chiasmia simplicilinea*); (D.) Western Cape Autumn Widow (*Dira clytus clytus*);

(E.) African Blue Pansy (*Junonia orithya madagascariensis*); (F.) Crested Nadiasa (*Streblote cristata*) caterpillar and; (G.) African Plain Tiger (*Danaus chrysippus orientis*)

4.4.4 Amphibians

No amphibians were observed or heard on the site, which is not surprising given the polluted state of the waterbodies/ watercourses present. Habitat for the frog SCC is characterised as endorheic wetlands with standing shallow water, high clarity, and sufficient vegetation suitable for breeding. No streaming or running water was recorded at any of the sites where they have been found. Where wetlands are available, none have standing water of high clarity and good quality. All wetlands are valley-bottom rather than inward draining depression wetlands required by the SCC. Consequently, there is no suitable habitat for amphibian SCC although it is noted that the plants required to support the breeding needs of the amphibian SCC are common and present. No frogs were observed at all, which is further proof of poor water quality as the presence of frogs is an indicator of good water quality.

4.4.5 Reptiles

No reptile SCC were highlighted for this site by the DFFE Screening Tool or any of the public platforms. As such, no targeted sampling took place for this group, and no opportunistic sightings were made.

4.4.6 Likelihood of Occurrence for SCC

Following the terrestrial fauna surveys and site inspection, the possible SCC occurring in the project area were evaluated according to their likelihood of occurrence. It is always possible that a species assessed as having a low probability of occurrence can still occur on the site, especially species which are listed as having a low likelihood of detection, and therefore this table should only be used as a guideline. All information provided as reasons is taken from the conservation assessment of the SCC, known distribution records, and observation records. Citations and references (see reference list) are provided where that is not the case.

Table 5: Likelihood table for faunal SCC suspected to occur within the project area.

Species	Red list status	Evidence observed	Suitable habitat	Likelihood of occurrence	Reason
AMPHIBIANS					
<i>Afrivalus knysnae</i> Knysna Leaf-Folding Frog	Endangered	No	No	Low	Wetlands are available at the borehole and test pit sites in proximity to the river. Suitable plant species are present to support its breeding. It is, however, noted that the watercourse and its surrounding landscape are polluted and invaded. This compromises habitat quality and is very likely to be a deterrent for amphibians as this taxon is sensitive to water quality, often serving as an indicator species for good quality water.
AVIFAUNA					
<i>Circus maurus</i> Black Harrier	Endangered (BLSA + SANBI)	No	No	Low	Given the level of anthropogenic disturbance at the site, it is not considered suitable habitat for the SCC despite wetland habitat being present.
<i>Polemaetus bellicosus</i> Martial Eagle	Endangered (BLSA + SANBI)	No	No	Very Low	No suitable habitat is present to support the SCC. In the stockpile area, electricity pylons represent the tallest infrastructure but no nests, pellets, or excrement was found. No cover is available for the SCC to use when hunting as cover.
<i>Afrotis afra</i> Southern Black Korhaan	Vulnerable (BLSA + SANBI)	No	No	Very Low	The vegetation within the project area is not suitable to support the species.
<i>Anthropoides paradiseus</i> Blue Crane	Vulnerable (BLSA) Near threatened (SANBI)	No	No	Low	Nesting is not likely due to the high possibility of human disturbance of nesting sites since the sites are used as throughfare, for cattle grazing, and has roaming domestic dogs.
<i>Aquila verreauxii</i> Verreaux's Eagle	Vulnerable (BLSA + SANBI)	No	No	Very Low	Habitat and topography are not suitable to host the species nor does the site characterise suitable hunting ground for the species.
<i>Bradypterus sylvaticus</i> Knysna Warbler	Near Threatened (BLSA) Vulnerable (SANBI)	No	Yes	Medium	Dense vegetation is present at the site in the form of invaded fynbos remnants which might be used by the species at some test pit and borehole sites. However, due to the small disturbance footprint of the proposed activity and the adaptability of this SCC, this is not expected to have a big effect on the species.
<i>Circus ranivorus</i> African Marsh Harrier	Vulnerable (BLSA) Endangered (SANBI)	No	No	Low	The project area could be used as hunting grounds, but this is true of the entirety of the river and transformed fields. For taxa with high mobility such as birds, especially raptors, this is a negligible effect and there are replacements in the landscape for this function.
<i>Neotis denhami</i> Denham's Bustard	Vulnerable (BLSA + SANBI)	No	Maybe	Low	Although the habitats available at the site are not the preferred habitat of the SCC, it may be marginally suitable. This is true of a number of places in the landscape. The amount of human disturbance at the site does not lend itself to the needs of the SCC.
<i>Sagittarius serpentarius</i> Secretarybird	Vulnerable (BLSA + SANBI)	No	Maybe	Low	Description of habitat is suitable but the level of disturbance in the area does not lend itself toward being able to support the breeding needs of the SCC. Additionally, the SCC has not been observed in close proximity to the present sites.

Species	Red list status	Evidence observed	Suitable habitat	Likelihood of occurrence	Reason
<i>Sarothrura affinis</i> Striped Flufftail	Vulnerable (BLSA + SANBI)	No	No	Very Low	The SCC has a preference for montane grassland and fynbos which does not characterise this habitat. It is rarely found in wetlands but is found along streams. Given the degraded state of the watercourse this species is not anticipated to occur. The closest his SCC has been observed is within the montane areas north of George.
<i>Stephanoaetus coronatus</i> African Crowned Eagle	Vulnerable (BLSA + SANBI)	No	No	Very Low	No forest environments are present at the sites therefore the species has a very low likelihood of occurrence.
<i>Anas erythrorhyncha</i> Red-billed teal	Near Threatened (BLSA)	No	No	Very Low	Where wetlands and waterbodies were present, very little standing water was observed, a condition necessary to support this species.
<i>Anas undulata</i> Yellow-billed Duck	Near Threatened (BLSA)	No	No	Very Low	Where wetlands and waterbodies were present, very little standing water was observed, a condition necessary to support this species.
<i>Anhinga rufa</i> African Darter	Near Threatened (BLSA)	No	No	Very Low	The river has little open water, which is the habitat this SCC uses.
<i>Crithagra leucoptera</i> Protea Canary	Near Threatened (BLSA + SANBI)	No	No	Very Low	Vegetation at the site cannot be characterised as mountain fynbos and suitable forage provided by mountain fynbos is not available.
<i>Netta erythrophthalma</i> Southern Pochard	Near Threatened (BLSA)	No	No	Very Low	No habitat in the form of deep water wetlands are present at the sites.
<i>Nycticorax nycticorax</i> Black-crowned Night Heron	Near Threatened (BLSA)	No	Yes	Medium	The habitat fits the needs of the SCC. Additionally, the SCC is a generalist feeder, so prey species are available.
<i>Oxyura maccoa</i> Maccoa Duck	Vulnerable (BLSA) Near Threatened (SANBI) Endangered (IUCN)	No	No	Low	No suitable waterbodies are available at the proposed sites to support the SCC.
<i>Spatula smithii</i> Cape Shoveler	Near Threatened (BLSA)	No	No	Low	The SCC is more likely to use the close by wastewater treatment works for their activities rather than any habitats at the proposed sites.
<i>Thalassornis leuconotus</i> White-backed Duck	Near Threatened (BLSA)	No	Maybe	Low	Habitat may be marginally suitable, but water level is low and not stable, that is, the area is unsuitable for breeding.
<i>Buteo trizonatus</i> Forest Buzzard	Near Threatened (BLSA) Least concern (SANBI) Near threatened (IUCN)	No	No	Very Low	No forest environments are present at the sites therefore the species has a very low likelihood of occurrence or direct dependence on this habitat.
TERRESTRIAL INVERTEBRATES					

Species	Red list status	Evidence observed	Suitable habitat	Likelihood of occurrence	Reason
<i>Thestor barbatus</i> Bearded Skolly	Critically Endangered	No	No	Very Low	The SCC is not known from this location and has a preference for rocky terrain north of George.
<i>Aloeides trimeni southeyae</i> Mossel Bay Brown Russet Butterfly	Endangered	No	No	Very Low	Vegetation type as mapped in the National Vegetation Map is not present. Additionally, the species is only known from as far east as Hartenbos.
<i>Aneuryphymus montanus</i> Yellow-winged Agile Grasshopper	Vulnerable	No	No	Very Low	Associated with sclerophyllous fynbos vegetation on the southern slopes of the Outeniqua mountains post-fire, a habitat that is not present at the site.
<i>Aloeides pallida littoralis</i> Knysna Giant Russet Butterfly	Near Threatened	No	Maybe	Medium	Although the ant species associated with the SCC was not observed, it is common and can be assumed present. <i>Aspalathus</i> species were found in bushy vegetation close to watercourses.
<i>Ceratogomphus triceraticus</i> Cape Thorntail Dragonfly	Near Threatened	No	No	Low	Major threats to the SCC such as invasive alien trees, water pollution, and agriculture are present at the site. The SCC is therefore deemed unlikely to be present.
<i>Ecchlorolestes nylephtha</i> Queen Malachite	Near Threatened	No	No	Very Low	The sites are outside of the typical range for the SCC, that is, the area is far west of Tsitsikamma and Storms River.
MAMMALS					
<i>Chlorotalpa duthieae</i> Duthie's Golden Mole	Vulnerable	Yes	Maybe	Confirmed	Subsurface tunnelling observed at the site is consistent with Golden Mole (Chrysochloridae). Although this SCC is not expected to be the one present based on the habitats available the precautionary principle is applied and the species is confirmed present.
Sensitive Species 8	Vulnerable	No	No	Very Low	The SCC is sensitive to human disturbance and requires dense vegetation to use as habitat.
<i>Amblysomus corriae</i> Fynbos Golden Mole	Near Threatened	Yes	Yes	Confirmed	Subsurface tunnelling observed at the site is consistent with Golden Mole (Chrysochloridae). This SCC is expected to be the one present based on the habitats available and genetic work conducted in George on eDNA taken from Golden Mole tunnels.
<i>Poecilogale albinucha</i> African Striped Weasel	Near Threatened	No	No	Low	The habitat cannot be described as fynbos with dense grass and is therefore not suitable habitat for the SCC.

5. SITE SENSITIVITY VERIFICATION

After the site visit and fauna surveys, it is determined that the site sensitivity for the terrestrial animal theme is **HIGH** for test pit and borehole areas as well as stockpile areas. This agrees with the high sensitivity highlighted by the DFFE Screening tool for most of the property.

Based on the information in this report during the desktop and field assessment, the following reasons support this finding:

- The discovery of golden mole foraging tunnels confirms the presence of Near Threatened Fynbos Golden Mole (*Amblysomus corriae*; more likely to be present) or Vulnerable Duthie's Golden Mole (*Chlorotalpa duthieae*; less likely to be present) or both thereby resulting in the HIGH sensitivity rating across the site where golden mole tunnels were found.
- The medium likelihood of occurrence of Near Threatened Knysna Warbler (*Bradypterus sylvaticus*), Black-crowned Night Heron (*Nycticorax nycticorax*), and Knysna Giant Russet Butterfly (*Aloeides pallida littoralis*).
- Animals are dependent on botanical and aquatic resources for habitat, breeding, and feeding purposes. The gradient of the stockpile area in parts has the potential to negatively affect aquatic environments (see the Aquatic Specialist's report) which may potentially cause harm to faunal SCC that rely on the river and its associated vegetation.

As per the Published Government Notice No. 1150, Government Gazette 43855 (30 October 2020), the **HIGH** sensitivity of the site requires a Terrestrial Animal Species Specialist Assessment to be conducted.

6. SITE ECOLOGICAL IMPORTANCE

The Site Ecological Importance (SEI) is determined for habitats within the property, taking associated fauna SCC into account.

SEI is a function of biodiversity importance (BI) and receptor resilience (RR) such that: $SEI = BI + RR$. BI is further defined as a function of conservation importance (CI) and habitat functional integrity (FI), with $BI = CI + FI$, and is determined by means of a matrix. SEI can therefore be fully understood as $SEI = (CI + FI) + RR$, where:

Conservation Importance (CI): The importance of a site for supporting biodiversity features of conservation concern present.

Functional Integrity (FI): A measure of the ecological condition of the impact receptor (i.e., habitat type) as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.

Receptor Resilience (RR): The intrinsic capacity of the receptor (i.e., habitat type or SCC) to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.

The SEI is derived for each habitat type or SCC within a project site by making use of two matrixes: first to calculate the BI and then the SEI. These matrices and further details can be found in Appendix 3.

Table 6 provides the SEI calculations for each habitat type and Figure 15 illustrates the SEI results for the property. It is important to note that the SEI reported here is specific to the proposed development and associated activities of this report and can only be used to compare multiple layouts and/or locations for the development.

Table 6. Site Ecological Importance assessment for Rand Street Stockpiles, Haul Roads, and Geotechnical features. Conservation status for SCC is abbreviated to indicate Critically Rare/Endangered (CR), Endangered (EN), Vulnerable (VU), or Near Threatened (NT). When relevant, the extent of occurrence (EOO) is indicated as part of the justification for the conservation importance (CI) metric.

Habitat and associated SCC	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance
Bushy Vegetation (Boreholes and Test Pits) <u>SCC:</u> <i>Bradypterus sylvaticus</i> (VU) <i>Aloeides pallida littoralis</i> (NT) <i>Chlorotalpa duthieae</i> (VU) <i>Amblysomus corriae</i> (NT)	HIGH <i>C. duthieae</i> is classified as Vulnerable and is likely to occur when the precautionary principle is applied. EOO is 14 000 km ² . <i>B. sylvaticus</i> is also Vulnerable and is likely to occur (EOO is 451 252 km ²).	MEDIUM “Narrow corridors of good habitat connectivity or larger areas of poor connectivity” applies to <i>A. p. littoralis</i> as it has limited dispersal ability.	MEDIUM	HIGH Given the nature of the proposed disturbance, the fauna given are likely to persist despite the activity given that it has a small footprint and is short-lived.	LOW BI: MEDIUM RR: HIGH
Wetlands and Watercourse (Boreholes and Test Pits) <u>SCC:</u> <i>Nycticorax nycticorax</i> (NT)	MEDIUM Confirmed or highly likely occurrence of NT species.	MEDIUM Good habitat connectivity. Multiple negative impacts are present such as invasive species, pollution, and cattle. Rehabilitation potential is moderate as the flow of the river may be an invasive pathway.	MEDIUM	HIGH The invasive species present in this habitat unit aids its recovery to the same invaded state. Graminoids are dominant and recolonise well post-disturbance.	LOW BI: MEDIUM RR: HIGH
Transformed Fields (Stockpile Areas and Haul Roads) <u>SCC:</u> None	VERY LOW No confirmed or highly likely populations of SCC. Habitat is transformed and not considered natural.	LOW Major impacts exist: these areas are heavily grazed and used as throughfare by humans due to proximity to communities. Rehabilitation to the mapped vegetation type is not likely.	VERY LOW	VERY HIGH Recovery to a transformed state is likely, especially since the habitat does not contain woody species (which might take time to grow) at all.	VERY LOW BI: VERY LOW RR: VERY HIGH
Bare Ground/ Hard Surfaces (Boreholes only) <u>SCC:</u> None	VERY LOW No confirmed or highly likely populations of SCC. Habitat is transformed and not considered natural.	LOW Major impacts exist such as continuous use as throughfare and/or built and maintained surfaces. Rehabilitation to the mapped vegetation type is not likely.	VERY LOW	VERY HIGH Recovery to this state is likely, as it is continuously maintained by the continuing activity (bare ground) and to maintain its utility (hard surfaces).	VERY LOW BI: VERY LOW RR: VERY HIGH



Figure 15. Site Ecological Importance map with regards to fauna for stockpile and geotechnical sites.

Most of the area has a **LOW** SEI rating with regards to terrestrial fauna (Figure. 15, Table. 7). According to the guidelines for interpreting SEI ratings in terms of development (Table 7, (SANBI 2020)), minimisation and restoration is required after medium to high impact development (which are allowed). The present application deals with very localized medium impact activity in terms of the boreholes and test pits and medium impact activity as it pertains to haul roads and stockpile areas. Both of these are allowed in low SEI areas however; it is imperative that mitigation measures provided in the present report are strictly adhered to minimize negative impacts on the faunal community and reduce the amount of natural habitat lost.

Table 7. Guidelines for interpreting Site Ecological Importance for proposed developments (SANBI 2020).

Site ecological importance	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. 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.

7. PROJECT AREA OF INFLUENCE

The proposed development has a very low potential to have large impacts outside of the development footprint. Noise may be increased at the site during the construction and operation phases, but the geographical extent of this is negligible given the context of the activity (that is, close to occupied dwellings). Noise may be increased at the site during the establishment of the test pits and boreholes (considered the construction phase) and stockpiles will generate noise and disturbance when they are in use (considered the operational phase in this report).

8. IMPACT ASSESSMENT

This impact assessment is based on the SDP available at the time of writing this report and will need to be reassessed if this changes in the future. The impact assessment considers the establishment of stockpile areas, associated haul roads, test pits and boreholes to support the Rand and Rosedale Street Extension.

The impacts and associated mitigation measures for each development phase are discussed in the following sections. For ease of reference, an Environmental Compliance Officer (ECO) checklist is provided in Appendix 4 to ensure that all mitigation measures are easily monitored during the various construction-related phases of development.

Impacts (pre- and post-mitigation) are evaluated for the SDP with the methods explained in Appendix 5.

8.1 Mitigation Hierarchy

The principles of the mitigation hierarchy (Ekstrom et al., 2015; Mitigation hierarchy guideline draft February 2023) are applied during an impact assessment. Potential impacts on biodiversity are preferentially managed through preventative, rather than remedial, measures (Figure 16). This is achieved by suggesting avoidance or minimization methods wherever possible. Successive steps in the hierarchy should only be considered once the previous step has been exhausted. Avoidance of negative impacts is a priority. If the impacts of a development cannot be adequately managed through the preventative measures of avoidance and minimization, then restoration and, as a last resort, offsets, or compensation are considered.

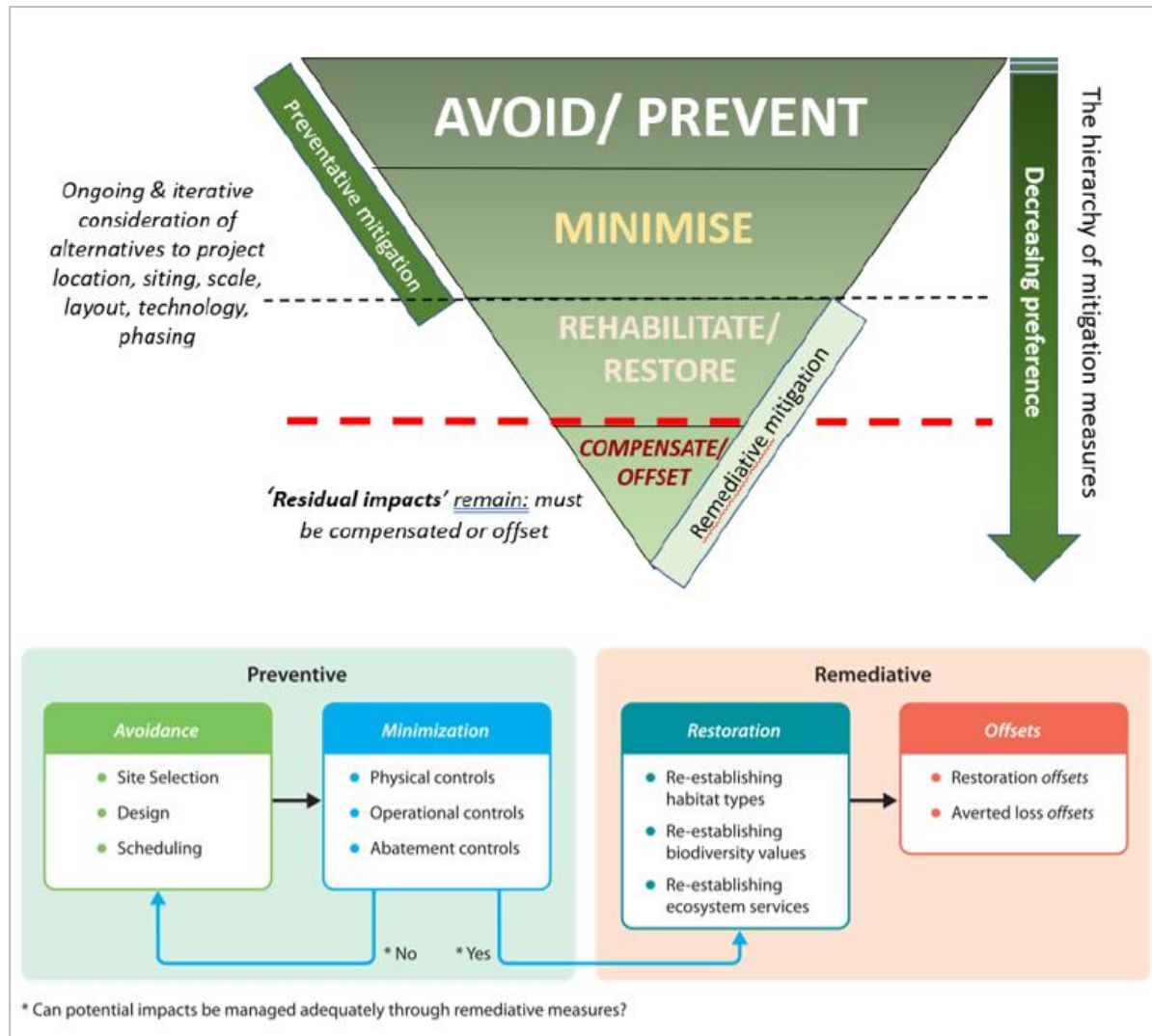


Figure 16. The iterative process of minimising predicted impacts on biodiversity and ecosystem services, as described in the mitigation hierarchy (Ekstrom et al., 2015; Mitigation hierarchy guideline draft, February 2023).

8.2 Current Impacts and No-Go Development Option

Description: Most of the project area has been subject to changes in vegetation and subsequently habitats available for fauna. The proposed road connection between Thembaletu and Pacaltsdorp has been planned by the municipality for an extended period due to heavy traffic congestion and limited connections on existing roads. The road project is contingent on approval of the stockpiling areas and geotechnical investigations. Six major current impacts are present at this site in the No-Go development scenario namely:

- Moderate levels of invasive alien plant infestations.
- Presence of free-roaming pets (domestic dogs and cats) and livestock.
- Heavy grazing

- Pollution, littering and dumping, especially in the watercourse
- Human disturbance
- Heavy traffic congestion and limited connections on existing roads

Consequences of impacts

- Alien and invasive plants reduce the amount of habitat available to native fauna, especially those with specialised requirements such as SCC.
- Domestic animals causing death/harm to wildlife and vice versa.
- Intentional harm or death of perceived problem or pest animals due to their negative effects on people (or pets)
- Transformation of natural vegetation due to grazing
- Disturbance caused by thoroughfare of pedestrians

Impact Assessment:

As the implementation of the mitigation measures is unlikely and unreasonable to expect, the impact before and after mitigation is largely unchanged. With mitigation, **Probability** changes from “Certain/ definite” to “Almost certain/ Highly probable”, a reduction in likelihood of the impact occurring although not in the overall significance of the impact.

	Without Mitigation	With Mitigation
Duration	Permanent	Permanent
Extent	Limited	Limited
Intensity	High	High
Probability	Certain / definite	Almost certain / Highly probable
Confidence	High	High
Reversibility	Medium	Medium
Irreplaceability	Medium	Medium
Significance	Moderate - negative	Moderate - negative

Mitigation Measures:

1. It is recommended that an alien plant management plan be developed for the Skaapkop River and tributaries. A water pollution control plan is also recommended but the point below is kept in mind.
2. As a mitigation measure for the present application, it is unreasonable to assume that either of these mitigation measures would be implemented by private citizens who largely act in their own capacity at the site as it is open access, and owned by the municipality. The municipality have several existing and proposed residential development projects in the catchment, and, as the landowner, are ultimately responsible for the sustainable management of natural resources on their property.

Reducing access by means of fencing would not act as a deterrent as the area is used for grazing and as throughfare.

8.3 Layout and Design phase

Prevention of habitat loss for SCC requires careful site selection for proposed development. Habitat loss in the bushy vegetation and potential negative effects on fauna using the river can mostly be reduced on the site through changes in footprints for stockpile areas. The placement of stockpile sites can have negative effects on the health of fauna using the watercourse, wetlands, and other associated riverine habitats downstream due to the slope of the stockpile areas potentially depositing debris into the river. The adjusted stockpile areas that were reduced to accommodate watercourse buffers were recommended by the Aquatic Specialist (Figure 17) and adopted by the municipality (Figure 18). Given that these reductions have the added benefit of protecting habitat for fauna they are further endorsed in this report.

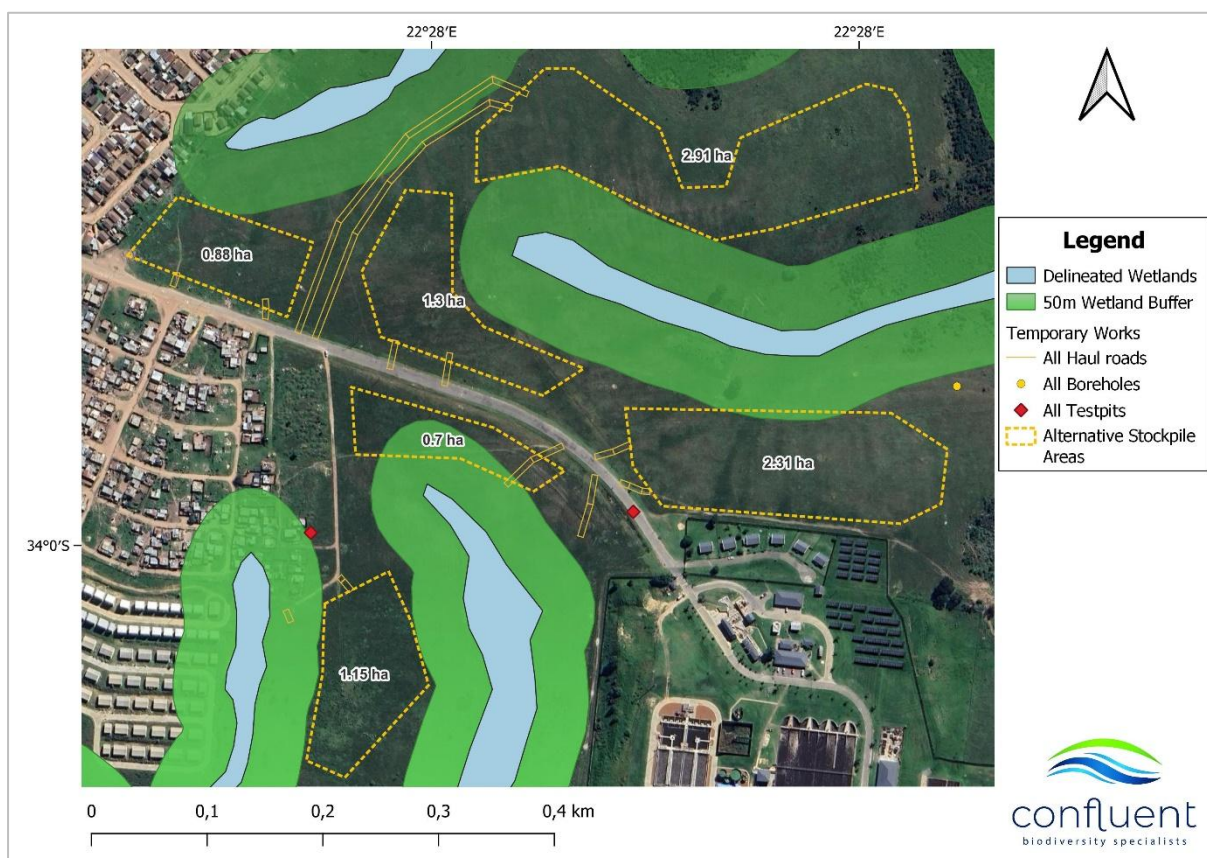


Figure 17. Alternative Stockpile sites as recommended by the Aquatic Specialist's Report (J. Dabrowski — Confluent Environmental).

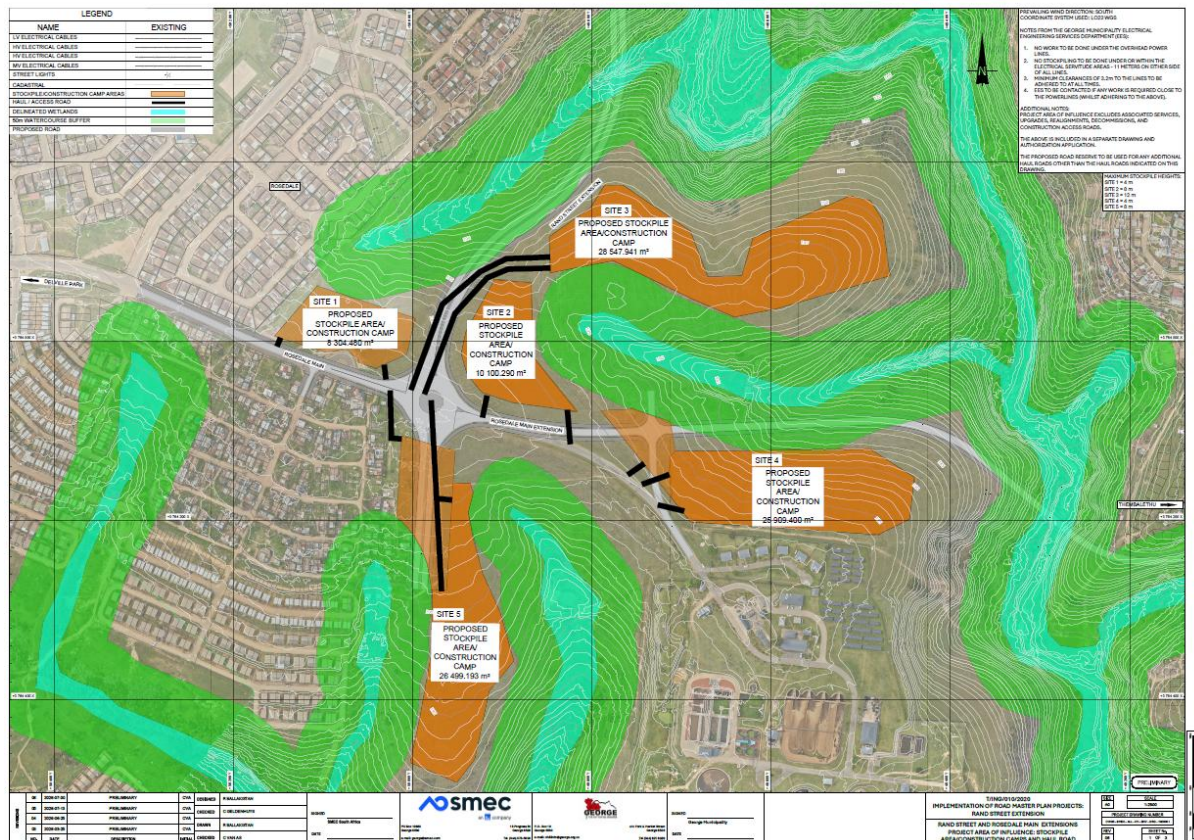


Figure 18. Updated stockpile area and haul roads provided by SMEC following adjustment to recommendations by the aquatic specialist.

8.4 Construction Phase Impacts: Test Pit and Borehole Areas

The construction phase for the test pits and boreholes will have the highest impacts on fauna species due to increased moving vehicles, noise, and habitat destruction associated with the proposed activities. An Environmental Control Officer (ECO) must be appointed for the duration of the phase to monitor and report back on implementation of the mitigation measures. The ECO must be present on site at the start of construction, and twice a week thereafter during the establishment/ construction phase.

8.4.1 Disturbance and deterrence of bird SCC possibly breeding at the site due to the activities associated with establishment of test pits and boreholes.

Description: The faunal assessment indicates both Black-crowned Night Heron and Knysna Warbler as having a medium likelihood of occurrence. Since these SCC are highly mobile and the habitats outlined in the present study are not scarce, mitigation measure are provided to ensure the more sedentary life stages of the SCC are not negatively affected by establishment of test pits and boreholes.

Consequences of impact:

- Construction related activity can result in nest trees/bushes being damaged and lost reducing local populations size of the SCC.

- If deterred from the area (temporarily or permanently), the SCC may not be able to find suitable alternative breeding habitat and skip a breeding season(s). This has negative consequence for the population growth and stability of an endangered species.

Impact Assessment:

Duration of the impact on the avifauna will be as long as construction occurs. **Extent** is also not altered before and after mitigation. **Intensity** and **probability** of the impact, however, is reduced by the mitigation measures proposed.

	Without Mitigation	With Mitigation
Duration	Medium term	Medium term
Extent	Limited	Limited
Intensity	High	Very low
Probability	Likely	Rare / improbable
Confidence	Medium	Medium
Reversibility	High	High
Irreplaceability	Medium	Medium
Significance	Minor - negative	Negligible - negative

Mitigation measures:

1. Primarily along access routes and at each geotechnical site, active searching for nests and nestlings are to be conducted by the ECO for avifaunal SCC in their laying season (August to October for Black-crowned Night Heron and August to December for Knysna Warbler) in suitable habitat. Should no work take place during these seasons, adherence to this recommendation is not necessary.
2. Should nests be found and positively identified as/ suspected of being the avian SCC construction of boreholes and test pits are to cease at that location until after fledging has occurred and the nest has been abandoned following which they may continue.
3. The ECO is to walk and mark a preferred path to the test pits and boreholes prior to clearing of vegetation. Paths through dense vegetation are to be hand cut. If a nest is encountered, work on that pathway is to cease and an alternative route must be chosen by the ECO. If no alternative route exists, then work on that route must cease until fledging has occurred and the nest has been abandoned following which, work may continue.

8.4.2 *Detrimental loss of habitat for fauna within and outside of the footprint of the geotechnical investigation sites.*

Description: Access, vegetation clearance and soil disturbance will result in some loss of habitat space in the landscape, whether temporary or permanent. This includes access paths as well as the 5x5m cleared area for test pit and borehole sites. This is especially relevant for Golden Moles, an SCC confirmed to occur at the site.

Consequences of impact:

- Temporary disturbance of suitable habitat for fauna SCC to live, forage, and breed.

- Loss of species with which SCC have obligatory relationships (i.e. host plants and ants for butterfly larvae).

Impact Assessment:

Since the mitigation measures include guidelines on rehabilitation of vegetation for the benefit of fauna, **duration** is ameliorated. Management of the impacts outside of the footprint of the development reduces the **extent** of habitat reduction. With the micro-siting mitigation, natural functions of Golden Mole SCC are preserved, reducing the **intensity** of the impact.

	Without Mitigation	With Mitigation
Duration	Permanent	Medium term
Extent	Limited	Very limited
Intensity	High	Very low
Probability	Almost certain / Highly probable	Unlikely
Confidence	Medium	Medium
Reversibility	Medium	High
Irreplaceability	Low	Low
Significance	Moderate - negative	Negligible - negative

Mitigation measures:

1. A change in position through micro-siting of test pits and boreholes is necessary where evidence of Golden Moles is confirmed by the ECO. Active tunnels must be avoided. This should be feasible in almost all cases as tunnels observed were not densely clustered.
2. Protection and reuse of topsoil of test pits can be critical for the success of rehabilitation of vegetation following construction/ establishment processes in the bushy vegetation areas as some native vegetation may be present here. Topsoil may contain a valuable seedbank of indigenous plants that regenerate after the soil is replaced. Topsoil removed during establishment should be treated with care (not mixed with subsoils and replaced at the surface). This is already outlined in the geotechnical method statement for the present activity but is reiterated here

8.4.3 *Habitat and fauna negatively affected by the management of the construction site (i.e., staff, equipment, etc).*

Description: The management of materials and staff on the site is also an important impact of development. If managed properly, many accidents and unanticipated negative impacts on fauna and the surrounding environment can be avoided.

Consequences:

- Loss of habitat or harm to fauna outside of designated construction areas.
- Litter and pollution of natural environment.
- Potential health and safety hazards (for staff and fauna) on the site and in the surrounding environment.

Impact Assessment:

As the mitigation on layout and littering/ contamination apply to impacts outside of the project area, **extent** is reduced post-mitigation. Mitigation measures surrounding littering, waste, and management of the excavation sites in particular reduce the **intensity** of the impact. Having any recommendations for good management on site generally reduces the **probability** of the present impact.

	Without Mitigation	With Mitigation
Duration	Medium term	Medium term
Extent	Limited	Very limited
Intensity	Moderate	Negligible
Probability	Almost certain / Highly probable	Rare / improbable
Confidence	Medium	Medium
Reversibility	Medium	Low
Irreplaceability	Low	Low
Significance	Minor - negative	Negligible - negative

Mitigation measures:

1. All new staff must be briefed about the layout of the works and must be made aware of the no-go areas as the surrounding environment is sensitive and must not be disturbed. Staff must be made aware of what all fauna SCC look like and informed to report all fauna encountered on site to the ECO. This should form part of a site induction at which the ECO must be present.
2. No littering, waste dumping, or burning is allowed on the site or in the surrounding environment. All waste is to be collected in designated bins with lids that can be secured or stored in a secure area when construction is not taking place (evenings, weekends, holidays, etc.) to prevent interference by animals. All waste is to be transported to a registered waste disposal facility off site.
3. Should excavations be left open overnight, they are to be appropriately fenced (e.g. construction shade net fencing) to prevent animals falling into the hole.
4. Any small items or building materials which can be carried away by medium-large animals should be safely stored in containers or locked away in a designated area to prevent interference from animals, causing possible harm to them and preventing them from removing such items from site.
5. Construction should take place during daylight hours so that the site can be adequately monitored for fauna during work hours, and to minimise the use of permanent artificial lighting at night which attracts many animal species (predominantly insects and associated predators) and subjects them to the risks of construction. The exception to this is lighting for security purposes at construction camps overnight which should be motion triggered as a preference.

8.4.4 Harm/Death of fauna, particularly invertebrates and soil dwelling mammal SCC, due to construction related activities.

Description: Fauna may occur on site and be killed or seriously harmed during works. Cryptic and ground-dwelling species, like the golden mole SCC, are difficult to detect and are limited in their mobility rendering them vulnerable to earthmoving activities. The golden mole SCC depends on the bushy vegetation habitat and siltier soils designated as low SEI. This SCC is highly adaptable to modified environments but impacts on individuals and the population must be kept to a minimum.

Consequences of impact:

- Loss of threatened species.
- Loss of genetic diversity from remaining fauna populations.
- General loss of biodiversity.

Impact Assessment:

Micrositing of test pits and boreholes in the area where Golden Mole SCC are likely to occur reduces the damage the development does to the natural functions of the SCC in its environment and therefore the **intensity** of the present impact. This holds for the recommendations included on common fauna as well. The likelihood that fauna may come to harm due to the development shows a reduction in **probability**, with the mitigation measures aiming to protect not only SCC but also common fauna that may occur within the project area.

	Without Mitigation	With Mitigation
Duration	Medium term	Medium term
Extent	Very limited	Very limited
Intensity	High	Very low
Probability	Likely	Unlikely
Confidence	Medium	Medium
Reversibility	Medium	Medium
Irreplaceability	Medium	Low
Significance	Minor - negative	Negligible - negative

Mitigation measures:

1. Micrositing of test pits and boreholes to avoid areas where active Golden Mole tunnels were found is recommended. This would involve moving the test pit / borehole 50cm to avoid tunnels, which is unlikely to influence the findings of the geotechnical investigations.
2. Should signs of fauna with limited mobility or an SCC be found within the demarcated area (e.g. a snake in a test pit), a search and rescue operation should be undertaken to relocate fauna to a suitable location in similar habitat nearby. The ECO or an experienced animal handler should be contacted to undertake this at the commencement or re-commencement of establishment of boreholes/test pits. Pictures / videos must be provided, and the ECO must be informed.
3. No works may commence until the ECO is satisfied that all fauna with limited mobility and/or SCC have been successfully removed from the demarcated footprint area.

4. At any point during construction of boreholes and test pits, if an animal with limited mobility is observed on site, this should be reported to the ECO and construction temporarily halted. Procedures outlined in Box. 1 must be followed for all fauna encounters.

Box 1: Best practice principles for ALL fauna encounters during construction or operational phases of projects

If any animals are seen on site, a photo or a video should be taken if possible (to assist in identification) and all fauna encountered on site should be reported to the ECO immediately. This is particularly important when:

- An animal is harmed or compromised in any way during construction.
- Ground-dwelling animals their nests or eggs are unearthed during earthworks (e.g. moles, tortoise eggs, terrapins/frogs estivating).
- An animal with limited mobility is found (e.g. tortoises, moles, chameleons).
- Any potentially dangerous animal is encountered. This includes any potentially venomous animal (e.g. snakes, scorpions) or any medium-large animal that has become cornered in an enclosed area such that it cannot escape (e.g. porcupines, monkeys, baboons, antelope). It is critical in the case of snakes/ scorpions to get pictures/videos to aid in identification and appropriate treatment of anyone needing medical assistance.
- Any animal that shows a reluctance to escape or move away from the construction site thereby increasing its exposure to harm or increasing the risk of injuring people on site.

The ECO should provide guidance or assistance to get all animals to safety, treating any injured animals, and issuing instructions on when to continue with construction (once they are satisfied that all animals have been removed from site) or put additional mitigation measures in place to protect animals on the site from harm.

For any injured animals or animals to be removed from site (domestic or wild):

A local SPCA or animal welfare society can collect and treat most animals and should be the first point of call for assistance. If they cannot directly assist, they will revert and notify the relevant authorities/vets.

For any assistance with snake removals/relocations, identifications, or bite treatment contact the African Snakebite Institute. The contact details of a suitably qualified snake handler are provided at the following link: <https://snakeremoval.co.za/george>. Also available are the following emergency contacts.

SNAKEBITE EMERGENCIES:

Poisons Information Helpline	+27 861 555 777
Dr Jenna Taylor	+27 83 631 4816
Dr Christoff Bell	+27 73 174 0199
Johan Marais	+27 82 494 2039
Jason Seale	+27 82 781 8498
Arno Naude	+27 83 739 9303
Dr PJC Buys	+26 481 127 5109 (Namibia)

GET THE FREE APP:



(Scan this code with your phone's camera.)

8.5 Conclusion of Construction Phase

The conclusion of any project is an essential but often overlooked aspect of projects. This relates primarily to the cleaning up of the site once construction has concluded to reduce residual impacts at the site.

1. Construction sites must be cleared of all waste material, rubble, and debris associated with the construction phase at regular intervals during, and at the conclusion of the construction phase.

8.6 Operational Phase Impacts: Test Pit and Borehole Areas

The operational phase is unlikely to incur impacts on fauna if appropriate procedure is followed. Persons conducting water chemistry and water table monitoring are to **replace covers for boreholes** after testing is concluded to prevent animals from falling in. Sites are to be accessed on foot where an existing vehicle track is not available.

8.7 Decommissioning Phase: Stockpile Area and Test Pits

Stockpiles and haul roads are not intended to exist after the Rand Street Extension project is concluded. This area will therefore undergo a decommissioning process to restore the area to the transformed vegetation it currently is or to the habitat that ought to occupy this area according to the most recent National Vegetation Map. The Aquatic Specialist's Report outlines the method this should follow if the latter applies. Since native fauna are likely to colonise the vegetation that is reintroduced, it is recommended that vegetation be selected to facilitate this (that is, native plants rather than exotic or alien ones). This also serves the purpose of preventing invasive alien plant infestation of the recently disturbed stockpile site.

Test pits are to be filled on the day they are established and protocols outlined in the Geotechnical Report ensures that topsoil is to be preserved and replaced after test pits are decommissioned.

9. DISCUSSION AND CONCLUSION

In the last two decades new areas of development in the catchment of the Skaapkop River and tributaries has occurred, and existing areas of development have expanded. The proposed stockpile sites, however, have maintained a consistent condition typical of grazed, non-irrigated pasture that was transformed from fynbos for agriculture. Some change in vegetation extent is noted for the borehole and test pit sites which are largely occupied by bushier vegetation and wetland and/or watercourse habitat. Vegetation closest to the watercourse is typically invaded by dense stands of alien vegetation. The vegetation mapped for the area is Garden Route Granite Fynbos, of which only a few isolated species are still present in bushy vegetation habitat.

According to the WCBSP, flat areas of the project area, especially the stockpile sites, are categorised as CBA1 areas whilst the areas close to densely vegetated watercourses are CBA2. The only WCBSP reason provided relevant to the faunal theme is Bontebok Extended Distribution Range. Suitable natural habitat for Bontebok is described as renosterveld patches, grassy micro-habitat patches in fynbos areas, and strandveld. None of these habitats are

available at the site and the proposed SDP could reasonably be considered as a non-conflicting land use from the faunal perspective, were this the only consideration.

Disturbances such as invasive plants, transformation, use by humans (grazing, throughfare, dumping, etc) and pollution reduce the utility of these habitats for native fauna which would typically occur. Many common species were seen but evidence of only one SCC was observed: there were signs of sub-surface tunnelling by golden moles (Chrysochloridae) in the bushy vegetation habitat suspected of being Fynbos Golden Mole (*Amblysomus corriae*; Near Threatened) rather than Duthie's Golden Mole (*Chlorotalpa duthieae*; Vulnerable) which occurs in forest habitats rather than those present at the site. Both are marked as present per the precautionary principle.

Other SCC deemed likely to occur are confined to the bushy, riverine vegetation namely Knysna Warbler (*Bradypterus sylvaticus*) and Knysna Giant Russet Butterfly (*Aloeides pallida littoralis*). Black-crowned Night Heron (*Nycticorax nycticorax*) is however, suspected of occurring in the wetland and watercourse habitat as the species has been observed in similar environments before. As per the Published Government Notice No. 1150, Government Gazette 43855 (30 October 2020), the HIGH sensitivity of the site requires a Terrestrial Animal Species Specialist Assessment.

The bushy vegetation and wetland and watercourse habitats are given a LOW SEI which allows for medium and high impact development with minimisation and restoration required. The stockpile/ haul road area is given a VERY LOW SEI which is justified by its transformed habitat and lack of suitable habitats to support SCC. The present application deals with very localized medium impact activity and development of this kind may be approved following rehabilitation as proposed in this report.

A change in position through complete avoidance or micrositing of test pits and boreholes (where feasible) is necessary where direct evidence of Golden Moles was found. The recommendations of the Aquatic and Botanical Specialists' reports should be followed with the aim of reducing the potential for further pollution of the river and further spread of alien invasive plant species, thus protecting faunal habitats. Many additional mitigation measures are outlined and assessed for the protection of fauna and faunal habitats. The development is supported from a faunal standpoint with the proviso that all mitigation measures outlined in the present report are strictly adhered to.

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APPENDIX 1: SCC IDENTIFIED FROM PUBLIC PLATFORMS FOR THE PROJECT AREA.

SCC were included or excluded from further analysis in this report based on expert interpretation for the presence/absence of key landscape and habitat features on site. See Section 4.2 Assumptions and Limitations for more information.

Species	Common Name	Red List Status	Source	Assessed
AMPHIBIANS				
<i>Afrrixalus knysnae</i>	Knysna Leaf-Folding frog	Endangered	Screening Tool; iNaturalist	Yes
AVIFAUNA				
<i>Afrodis afra</i>	Southern Black Korhaan	Vulnerable (SANBI); Vulnerable (BLSA 2025)	iNaturalist	Yes
<i>Phalacrocorax capensis</i>	Cape Cormorant	Endangered (SANBI); Endangered (BLSA 2025)	iNaturalist	No
<i>Anas erythrorhyncha</i>	Red-billed Teal	Near Threatened (BLSA 2025)	SABAP2; iNaturalist	Yes
<i>Gyps coprotheres</i>	Cape Griffon	Endangered (SANBI); Near Threatened (BLSA 2025)	iNaturalist	No
<i>Anas undulata</i>	Yellow-billed Duck	Near Threatened (BLSA 2025)	SABAP2; iNaturalist	Yes
<i>Anhinga rufa</i>	African Darter	Near Threatened (BLSA 2025)	SABAP2; iNaturalist	Yes
<i>Aquila verreauxii</i>	Verreaux's Eagle	Vulnerable (SANBI); Vulnerable (BLSA 2025)	SABAP2	Yes
<i>Bradypterus sylvaticus</i>	Knysna Warbler	Vulnerable (SANBI); Near Threatened (BLSA 2025)	SABAP2; iNaturalist; Screening Tool	Yes
<i>Buteo trizonatus</i>	Forest Buzzard	Least concern (SANBI); Near Threatened (BLSA 2025)	SABAP2; iNaturalist	Yes
<i>Circus maurus</i>	Black Harrier	Endangered (SANBI); Endangered (BLSA 2025)	SABAP2; iNaturalist	Yes
<i>Circus ranivorus</i>	African Marsh Harrier	Endangered (SANBI); Vulnerable (BLSA 2025)	SABAP2; Screening Tool	Yes
<i>Crithagra leucoptera</i>	Protea Canary	Near threatened (SANBI); Near Threatened (BLSA 2025)	SABAP2	Yes
<i>Scopus umbretta</i>	Hamerkop	Near Threatened (BLSA 2025)	SABAP2; iNaturalist	No
<i>Grus paradisea</i>	Blue Crane	Near threatened (SANBI); Vulnerable (BLSA 2025)	SABAP2	Yes
<i>Neotis denhami</i>	Denham's bustard	Endangered (SANBI); Vulnerable (BLSA 2025)	Screening Tool	Yes
<i>Campethera notata</i>	Knysna Woodpecker	Near threatened (SANBI); Least Concern (BLSA 2025)	SABAP2; iNaturalist	No
<i>Chaetops frenatus</i>	Cape Rockjumper	Near threatened (SANBI); Near Threatened (BLSA 2025)	iNaturalist	No
<i>Netta erythrophthalma</i>	Southern Pochard	Near Threatened (BLSA 2025)	SABAP2	Yes
<i>Leptoptilos crumenifer</i>	Marabou Stork	Near threatened (SANBI); Near Threatened (BLSA 2025)	SABAP2	No
<i>Alcedo semitorquata</i>	Half-collared Kingfisher	Near threatened (SANBI); Vulnerable (BLSA 2025)	SABAP2; iNaturalist	No
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	Near Threatened (BLSA 2025)	SABAP2	Yes
<i>Oxyura maccoa</i>	Maccoa Duck	Near threatened (SANBI); Vulnerable (BLSA 2025)	SABAP2	Yes
<i>Polemaetus bellicosus</i>	Martial Eagle	Endangered (SANBI); Endangered (BLSA 2025)	SABAP2; Screening Tool	Yes
<i>Falco biarmicus</i>	Lanner Falcon	Vulnerable (SANBI); Near Threatened (BLSA 2025)	SABAP2	No
<i>Sagittarius serpentarius</i>	Secretarybird	Vulnerable (SANBI); Vulnerable (BLSA 2025)	SABAP2; iNaturalist	Yes

Species	Common Name	Red List Status	Source	Assessed
<i>Sarothrura affinis</i>	Striped Flufftail	Vulnerable (SANBI); Vulnerable (BLSA 2025)	SABAP2	Yes
<i>Spatula smithii</i>	Cape Shoveler	Near Threatened (BLSA 2025)	iNaturalist	Yes
<i>Stephanoaetus coronatus</i>	Crowned Eagle	Vulnerable (SANBI); Vulnerable (BLSA 2025)	iNaturalist; SABAP2; Screening Tool	Yes
<i>Thalassornis leuconotus</i>	White-backed Duck	Near Threatened (BLSA 2025)	SABAP2; iNaturalist	Yes
TERRESTRIAL INVERTEBRATES				
<i>Aloeides pallida littoralis</i>	Knysna Pale Copper (Knysna Giant Russet)	Near Threatened	Virtual Museum	Yes
<i>Aloeides trimeni southeyae</i>	Trimen's Copper (Mossel Bay Brown Russet)	Endangered	Virtual Museum	Yes
<i>Aneuryphymus montanus</i>	Yellow-winged Agile Grasshopper	Vulnerable	Screening Tool	Yes
<i>Ceratogomphus triceraticus</i>	Cape Thorntail	Near Threatened	Virtual Museum	Yes
<i>Ecchlorolestes nylephtha</i>	Queen Malachite	Near Threatened	Virtual Museum	Yes
<i>Thestor barbatus</i>	Bearded Skolly	Critically Endangered	iNaturalist	Yes
MAMMALS				
-	Sensitive species 8	Vulnerable (EWT 2025)	Screening Tool	Yes
<i>Pelea capreolus</i>	Vaal Rhebok	Near Threatened (EWT 2025)	Virtual Museum	No
<i>Amblysomus corriae</i>	Fynbos Golden Mole	Near Threatened (EWT 2025)	iNaturalist	Yes
<i>Chlorotalpa duthieae</i>	Duthie's Golden Mole	Vulnerable (EWT 2025)	Screening Tool	Yes
<i>Poecilogale albinucha</i>	African Striped Weasel	Near Threatened (EWT 2025)	Virtual Museum	Yes
<i>Damaliscus pygargus pygargus</i>	Bontebok	Vulnerable (EWT 2025)	Virtual Museum	No
<i>Panthera pardus</i>	Leopard	Vulnerable (EWT 2025)	iNaturalist; Virtual Museum	No

APPENDIX 2: SPECIES OBSERVED DURING SITE VISIT

SCC text in green

Order	Family	Common name	Scientific name	Notes
AVIFAUNA				
Charadriiformes	Charadriidae	Black-winged Lapwing	<i>Vanellus melanopterus</i>	
Columbiformes	Columbidae	Ring-necked Dove	<i>Streptopelia capicola</i>	
Passeriformes	Dicruridae	Fork-tailed Drongo	<i>Dicrurus adsimilis</i>	
Passeriformes	Hirundinidae	Barn Swallow	<i>Hirundo rustica</i>	
Passeriformes	Laniidae	Southern Fiscal	<i>Lanius collaris</i>	
Passeriformes	Passeridae	Cape Sparrow	<i>Passer melanurus</i>	
Passeriformes	Sturnidae	Red-winged Starling	<i>Onychognathus morio</i>	
Pelecaniformes	Ardeidae	Western Cattle-Egret	<i>Ardea ibis</i>	
TERRESTRIAL INMVERTEBRATES				
Araneae	Pisauridae	Dark Sheetwebber	<i>Euprosthenopsis pulchella</i>	
Blattodea	Termitidae	Snouted Harvester Termite	<i>Trinervitermes trinervoides</i>	Suspected from termite mounds
Coleoptera	-	Beetles	Coleoptera	Suspected of being Tenebrionidae
Coleoptera	Meloidae	CMR Blisterbeetle	<i>Hycleus oculatus</i>	
Diptera	Asilidae	Robber flies	Asilinae	
Hymenoptera	Formicidae	Spotted Sugar Ant	<i>Camponotus maculatus</i>	
Hymenoptera	Pompilidae	Spider-hunting Wasp	Pompilidae	Blue in colour, species unknown
Lepidoptera	Geometridae	Oblique Peacock	<i>Chiasmia simplicilinea</i>	
Lepidoptera	Lasiocampidae	Crested Nadiasa	<i>Streblote cristata</i>	
Lepidoptera	Lycaenidae	African Grass Blue	<i>Zizeeria knysna</i>	
Lepidoptera	Lycaenidae	Cupreous Blue	<i>Eicochrysops messapus</i>	
Lepidoptera	Nymphalidae	African Blue Pansy	<i>Junonia orithya madagascariensis</i>	
Lepidoptera	Nymphalidae	African Plain Tiger	<i>Danaus chrysippus orientis</i>	
Lepidoptera	Nymphalidae	Western Cape Autumn Widow	<i>Dira clytus clytus</i>	
Lepidoptera	Pieridae	Large Cabbage White	<i>Pieris brassicae</i>	
MAMMALS				
Afrosoricida	Chrysochloridae	Golden Moles	Chrysochloridae	Fynbos Golden Mole (<i>Amblysomus corriae</i>) suspected
Artiodactyla	Bovidae	Domestic Cattle	<i>Bos taurus</i>	
Artiodactyla	Bovidae	Domestic Goat	<i>Capra hircus</i>	
Artiodactyla	Bovidae	Domestic Sheep	<i>Ovis aries aries</i>	
Artiodactyla	Suidae	Bushpig	<i>Potamochoerus larvatus</i>	
Carnivora	Canidae	Domestic Dog	<i>Canis familiaris</i>	
Carnivora	Herpestidae	Cape Grey Mongoose	<i>Herpestes pulverulentus</i>	
Carnivora	Viverridae	Genets	<i>Genetta</i> sp.	Suspected of being Cape Genet (<i>Genetta tigrina</i>)
Rodentia	-	Rodents	Rodentia	
Rodentia	Bathyergidae	African Molerats	Bathyergidae	
Rodentia	Hystricidae	Cape Porcupine	<i>Hystrix africaeaustralis</i>	

APPENDIX 3: SITE ECOLOGICAL IMPORTANCE METHODS

The site ecological importance (SEI) is defined and calculated as highlighted as per the Species Environmental Assessment Guideline (SANBI 2020), where SEI is a function of biodiversity importance (BI) and receptor resilience (RR) such that: $SEI = BI + RR$. BI is further defined as a function of conservation importance (CI) and habitat functional integrity (FI), with $BI = CI + FI$, and is determined by means of a matrix (Table 8).

SEI can therefore be fully understood as $SEI = (CI + FI) + RR$, where:

Conservation Importance (CI): 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. *Most features included in CI are provided by the screening tool but are evaluated at a finer scale following field work at the site.

Functional Integrity (FI): A measure of the ecological condition of the impact receptor (i.e., habitat type) as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.

Receptor Resilience (RR): The intrinsic capacity of the receptor (i.e., habitat type or SCC) to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.

Table 8. Matrix to calculate the biodiversity importance (BI) of a given habitat type identified from desktop and field assessments.

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

The SEI is derived for each habitat type or SCC within a project site by making use of two matrixes: first to calculate the BI (using Table 8) and then the SEI (Table 9).

SEI is therefore specific to the proposed development and can only be compared between alternative layouts for the same proposed development, but not between developments.

Table 9. Matrix to calculate site ecological importance (SEI) of a habitat type identified from desktop and field assessments.

Site Ecological Importance		Biodiversity Importance				
		Very High	High	Medium	Low	Very Low
Receptor Resilience	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

APPENDIX 4: ENVIRONMENTAL COMPLIANCE OFFICER (ECO) CHECKLIST FOR FAUNA MITIGATION MEASURES DURING PRECONSTRUCTION, CONSTRUCTION, AND THE CONCLUSION OF CONSTRUCTION PHASES OF DEVELOPMENT.

While this checklist is designed to assist ECOs in compliance monitoring, it is a summary only and it is imperative that the details of each mitigation measure are read, fully understood and implemented as described in the text of this report. The relevant impact and full details of methods to be followed for each mitigation measure are listed in the table below.

Mitigation measure	Relevant impact; details of methods	Checklist ✓
Pre-construction phase		
Searches for nests and nestlings are to be conducted for avifaunal SCC in August to October for Black-crowned Night Heron and August to December for Knysna Warbler in suitable habitat.	See Section 8.4.1; Mitigation measures 1 and 2.	
Paths through dense vegetation are to be hand cut with the ECO present. If a nest is encountered, work on that pathway is to cease and an alternative route is to be chosen.	See Section 8.4.1; Mitigation measure 3	
Change in position through complete avoidance or micro-siting of test pits and boreholes where evidence of Golden Moles was found.	See Section 8.4.2; Mitigation measure 1. See Section 8.4.4; Mitigation measure 1	
The disturbance footprint of the stockpile area should be clearly defined and demarcated to prevent unnecessary additional damage to the surrounding environment:	See Section 8.4.2; Mitigation measure 3	
Clear signs for “no-go” areas for vehicles and personnel should be placed strategically on the site and along access roads. No-go areas are anywhere outside of the direct area of influence of the construction phase.	See Section 8.4.2; Mitigation measure 3a	
A turning area for construction vehicles should be demarcated within the stockpile area or haul road footprint.	See Section 8.4.2; Mitigation measure 3b	
Construction phase		
All new staff must be briefed about the layout of the site and must be made aware of the no-go areas as the surrounding environment is sensitive and must not be disturbed. Staff must be made aware what all SCC looks like and to report all fauna occurring on site to the ECO.	See Section 8.4.3; Mitigation measure 1	
No littering, waste dumping, or burning is allowed on the site or in the surrounding environment.	See Section 8.4.3; Mitigation measure 2	

Mitigation measure	Relevant impact; details of methods	Checklist ✓
Topsoil removed during construction, treated with care, labelled, and stored appropriately (stockpile area is recommended) for future use and rehabilitation purposes.	See Section 8.4.2; Mitigation measure 4	
Excavations should be appropriately fenced overnight and/ or over weekends to prevent animals falling into the hole.	See Section 8.4.3; Mitigation measure 3	
Any small items or building materials should be safely stored in containers or locked away in a designated area to prevent interference from animals.	See Section 8.4.3; Mitigation measure 4	
Construction should take place during daylight hours	See Section 8.4.3; Mitigation measure 5	
Should signs of fauna with limited mobility or an SCC be found within the demarcated area, a search and rescue operation should be undertaken to relocate fauna to a suitable location.	See Section 8.4.4; Mitigation measure 2	
At any point during construction or boreholes and test pits, if an animal with limited mobility is observed on site, this should be reported to the ECO and construction temporarily halted.	See Section 8.4.4; Mitigation measure 4	
Conclusion of construction phase		
Site to be cleared of all waste material, rubble, and debris associated with the construction phase at regular intervals during, and at the conclusion of the construction phase.	See Section 8.5; Mitigation measure 1.	
Revegetate bare soil areas with indigenous plants.	See Section 8.5; Mitigation measure 2.	

APPENDIX 5: IMPACT ASSESSMENT METHODS

Criteria are ascribed for each predicted impact. These include the intensity (size or degree scale), which also includes the type of impact, being either a positive or negative impact; the duration (temporal scale); and the extent (spatial scale), as well as the probability (likelihood). The methodology is quantitative, whereby professional judgement is used to identify a rating for each criterion based on a seven-point scale (Table 10) and the significance is auto-generated using a spreadsheet through application of the calculations.

For each predicted impact, certain criteria are applied to establish the likely **significance** of the impact, firstly in the case of no mitigation being applied and then with the most effective mitigation measure(s) in place.

These criteria include the **intensity** (size or degree scale), which also includes the **nature** of impact, being either a positive or negative impact; the **duration** (temporal scale); and the **extent** (spatial scale). These numerical ratings are used in an equation whereby the **consequence** of the impact can be calculated. Consequence is calculated as follows:

Consequence = type x (intensity + duration + extent)

To calculate the significance of an impact, the **probability** (or likelihood) of that impact occurring is applied to the consequence.

Significance = consequence x probability

Depending on the numerical result, the impact would fall into a significance category as negligible, minor, moderate or major, and the type would be either positive or negative.

When assessing impacts, broader considerations are also considered. These include the level of confidence in the assessment rating; the reversibility of the impact; and the irreplaceability of the resource as set out in (Table 11, Table 12, and Table 13), respectively.

Table 10. Assessment criteria for the evaluation of impacts

Criteria	Rating	Category	Description
Duration	1	Immediate	Impact will self-remedy immediately
	2	Brief	Impact will not last longer than 1 year
	3	Short term	Impact will last between 1 and 5 years
	4	Medium term	Impact will last between 5 and 10 years
	5	Long term	Impact will last between 10 and 15 years
	6	On-going	Impact will last between 15 and 20 years
	7	Permanent	Impact may be permanent, or in excess of 20 years
Extent	1	Very limited	Limited to specific isolated parts of the site
	2	Limited	Limited to the site and its immediate surroundings
	3	Local	Extending across the site and to nearby settlements
	4	Municipal area	Impacts felt at a municipal level
	5	Regional	Impacts felt at a regional level
	6	National	Impacts felt at a national level
	7	International	Impacts felt at an international level
Intensity	1	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
	2	Very low	Natural and/ or social functions and/ or processes are slightly altered
	3	Low	Natural and/ or social functions and/ or processes are somewhat altered

Criteria	Rating	Category	Description
	4	Moderate	Natural and/ or social functions and/ or processes are moderately altered
	5	High	Natural and/ or social functions and/ or processes are notably altered
	6	Very high	Natural and/ or social functions and/ or processes are majorly altered
	7	Extremely high	Natural and/ or social functions and/ or processes are severely altered
Probability	1	Highly unlikely / None	Expected never to happen
	2	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
	3	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
	4	Probable	Has occurred here or elsewhere and could therefore occur
	5	Likely	The impact may occur
	6	Almost certain / Highly probable	It is most likely that the impact will occur
	7	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur

Table 11. Definition of confidence ratings.

Category	Description
Low	Judgement is based on intuition
Medium	Determination is based on common sense and general knowledge
High	Substantive supportive data exists to verify the assessment

Table 12. Definition of reversibility ratings.

Category	Description
Low	The affected environment will not be able to recover from the impact - permanently modified
Medium	The affected environment will only recover from the impact with significant intervention
High	The affected environmental will be able to recover from the impact

Table 13. Definition of irreplaceability ratings.

Category	Description
Low	The resource is not damaged irreparably or is not scarce
Medium	The resource is damaged irreparably but is represented elsewhere