

**Terrestrial- and Aquatic
Biodiversity- as well as Plant-
and Animal Species Themes
Site Sensitivity Verification and
Compliance Statement**

**Louisvale Cemetery Expansion, Upington,
Northern Cape Province**

April 2026

Compiled for:



Compiled by:

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Plant- and Animal Species Themes Protocol Requirements (click on links for quick access)

1. General Information

1.7. The [Animal/Plant] Species Compliance Statement must be undertaken within the study area ([see section 4](#))

1.9. Where the nature of the activity is expected to have an impact on SCC beyond the boundary of the preferred site, the project areas of influence (PAOI) must be determined by the specialist in accordance with Species Environmental Assessment Guideline, and the study area must include the PAOI, as determined ([see section 4](#))

5. [Animal/Plant] Species Compliance Statement

5.1 The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Zoological/Botanical Science or Ecological Science) ([see section 11](#))

5.2 The compliance statement must:

5.2.1 be applicable to the study area ([see section 4](#))

5.2.2 confirm that the study area, is of “low” sensitivity for animal/plant species ([see section 6.4](#)) ([see section 6.3](#))

5.2.3 indicate whether or not the proposed development will have any impact on SCC ([see section 6.4](#)) ([see section 6.3](#)) ([see section 7.2](#)) ([see section 7.3](#))

5.3 The compliance statement must contain, as a minimum, the following information:

5.3.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae ([see section 11](#))

5.3.2 a signed statement of independence by the specialist ([see page ix](#))

5.3.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment ([see section 2](#))

5.3.4 a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant ([see section 3](#))

5.3.5 the mean density of observations/ number of samples sites per unit area ([see section 3](#))

5.3.6 where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr ([see section 8.3](#))

5.3.7 a description of the assumptions made and any uncertainties or gaps in knowledge or data ([see section 5](#))

5.3.8 any conditions to which the compliance statement is subjected ([see section 9](#))

Terrestrial Biodiversity Theme Protocol Additional Requirements (click on links for quick access)

4.2. The compliance statement must:

4.2.2. confirm that the site is of “low” sensitivity for terrestrial biodiversity ([see section 6.2](#))

4.2.3. indicate whether or not the proposed development will have any impact on the biodiversity feature ([see section 7.2](#))

4.3. The compliance statement must contain, as a minimum, the following information:

4.3.4. a baseline profile description of biodiversity and ecosystems of the site ([see section 7.2](#))

Aquatic Biodiversity Theme Protocol Additional Requirements (click on links for quick access)

3.2. The compliance statement must:

3.2.2. confirm that the site is of “low” sensitivity for aquatic biodiversity ([see section 6.1](#))

3.2.3. indicate whether or not the proposed development will have an impact on the aquatic features ([see section 7.1](#))

3.3. The compliance statement must contain, as a minimum, the following information:

3.3.4. a baseline profile description of biodiversity and ecosystems of the site ([see section 7.1](#))

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Abbreviations

BA	Basic Assessment
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
ESA	Ecological Support Area
HGM	Hydrogeomorphic Unit
MAP	Mean Annual Precipitation
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMA	National Environmental Management Act (Act 107 of 1998)
NFA	National Forests Act (Act 84 of 1998)
NWA	National Water Act (Act 36 of 1998)
ONA	Other Natural Area
PAOI	Project Area of Influence
PES	Present Ecological State
REC	Recommended Ecological Category
SACNASP	South African Council for Natural Scientific Professions
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SEI	Site Ecological Importance
WULA	Water Use License Application
WWTW	Wastewater Treatment Works

Declaration of Independence

I, Adriaan Johannes Hendrikus Lamprecht, declare that I:

- am the Director and Ecological Specialist of EcoFocus Consulting (Pty) Ltd
- act as an independent specialist consultant in the field of botany and ecology
- am assigned as the Ecological Specialist consultant by the Environmental Assessment Practitioner (EAP), Green Box Consulting, for the proposed development
- do not have or will not have any financial interest in the undertaking of the proposed project activity other than remuneration for work as stipulated in the terms of reference/scope of work as per the quotation provided
- confirm that remuneration for my services relating to the proposed development is not linked to approval or rejection of the project by the competent authority
- have no interest in secondary or subsequent developments as a result of the authorisation of the proposed project
- have no and will not engage in any conflicting interests in the undertaking of the activity
- undertake to disclose to the applicant and the competent authority any information that has or may have the potential to influence the decision of the competent authority
- will provide the applicant and competent authority with access to all relevant project information in my possession whether favourable or not

AJH Lamprecht



Signature

1. Introduction

The project applicant, Dawid Kruiper Local Municipality, proposes to formally expand the existing cemetery outside the township of Louisvale into a vacant portion of land directly adjacent south-east. The proposed development footprint is located approximately 400 m east of the township which in turn, is situated approximately 3 km south-east of the town Upington, Northern Cape Province.

Green Box Consulting was appointed by the applicant as the independent Environmental Assessment Practitioner (EAP), to conduct the legally required Basic Assessment (BA) process.

A site sensitivity verification must be undertaken to determine and confirm the current land use and environmental sensitivity of the proposed development footprints as identified by the DFFE National Web-Based Environmental Screening Tool. Due to the nature of potential ecological impacts posed by the proposed development to the local ecosystem and ecology, an Ecological assessment is required. This is required in order to determine the potential presence of ecologically sensitive/conservationally significant habitats, plant- and/or faunal species, which may be adversely affected by the proposed development.

Potential ecological receptor impacts posed by the proposed development to the local ecosystem and ecology (specific impact receptors), must be identified and evaluated. Impact receptor mitigation and management measures in accordance with the requirements of the National Environmental Management Act (Act 107 of 1998) Mitigation Hierarchy, must subsequently be recommended. This must be done in order to attempt to reduce/alleviate the adverse effects of identified potential ecological receptor impacts associated with the proposed development.

EcoFocus Consulting was consequently appointed by the EAP as the independent ecological specialist, to conduct the required Ecological assessment for the proposed development and to confirm/refute the environmental sensitivity of the proposed development footprints according to the relevant Biodiversity Theme Protocols. This report constitutes the Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes Site Sensitivity Verification and Compliance Statement

2. Date and Season of Ecological Site Assessment

Date: 28 September 2025

Duration: 2 hours

Season: This date forms part of the commencement summer/growing season. The area had however not received adequate initial rainfall, prior to the site visit. The seasonal timing of the assessment also did not coincide with the general flowering times of potential floral Species of Conservation Concern (SCC) and was therefore not favourable for successful identification of such species, if present. It must therefore be noted that the seasonal timing of the assessment was not favourable for successful identification of all plant species individuals. More underground bulb-plant species (geophytes) could therefore potentially be present throughout the karroid shrubland habitat, which were not necessarily visible aboveground due to the timing of the site assessment.

The seasonal timing of the assessment was favourable for successful identification of potential faunal Species of Conservation Concern (SCC), if present. The assessment also mostly coincided with the high-activity- and breeding periods of the listed Species of Conservation Concern (SCC).

3. Methodology

The methodology is implemented for the Project Area of Influence (PAOI) as per the minimum requirements of the relevant Biodiversity Theme Protocols.

Preliminary preparations conducted prior to the ecological site assessment, were as follows:

- Georeferenced spatial information was obtained of the proposed development footprints, in order to determine the potential direct and indirect impact footprint area (study area/PAOI).
- A desktop study was conducted of the most up-to-date information/data available on the relevant vegetation types, national/provincial biodiversity conservation status/significance and the potential/likely presence of watercourses/wetlands associated with the study area/PAOI.
- A desktop assessment was conducted of conservationally significant faunal and floral species which can potentially be encountered within the study area/PAOI.

Terrestrial Biodiversity- and Plant Species Themes

- The study area/PAOI was assessed on foot in a transect/Timed-meander Search (TMS) formation and with the use of a vehicle.
- Ecological sample sites were assessed in accordance with the Species Environmental Assessment Guideline (SANBI, 2020).
 - Twelve sample sites were assessed within the study area/PAOI and throughout the relevant watercourses.
 - This equates to an observation density of approximately 0.78 sample sites/ha throughout the study area/PAOI.
 - Approximately 10-15 minutes were spent within each sample site.
 - See specialist GPS track and sample sites mapping under section 4.6.
- Visual observations/identifications were made of general terrestrial botanical/vegetation habitats and their conditions as well as any ecologically sensitive/conservationally significant areas/habitats within the study area/PAOI.
- Visual observations/identifications were made of general and conservationally significant plant species encountered within the study area/PAOI.
 - Identified plant species were listed and categorised as per the Red Data Species List; Nationally Protected Tree Species List of the National Forests Act (Act 84 of 1998), Threatened or Protected Species (ToPS) List of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA ToPS, 2023), Provincially Protected species of the Northern Cape Nature Conservation Act (Act No. 9 of 2009) as well as the Invasive Species List of the National Environmental Management: Biodiversity Act (Act 10 of 2004), Alien and Invasive Species Regulations, 2014.
- The identified habitats/areas were then given an overall ecological importance rating of either very low, low, medium, high or very high based on the following qualitative criteria: present vegetation condition, ecological connectivity, -functionality and -integrity, presence of conservationally significant plant species.

Animal Species Theme

- A desktop assessment was conducted of conservationally significant faunal species which can potentially be encountered within the study area/PAOI.
 - The platform iNaturalist was used for the desktop assessment.
 - The likelihood was discussed of such faunal species utilising the identified botanical/vegetation habitats within the study area/PAOI as refuge or for breeding, foraging and/or persistence purposes.
- The study area/PAOI was assessed on foot in a transect/Timed-meander Search (TMS) formation and with the use of a vehicle.
 - See specialist GPS track and sample sites mapping under section 4.6.
- Visual observations/identifications were made of general and conservationally significant faunal species, nests, burrows, spoor, scat/droppings or any other evidence of presence encountered within the study area/PAOI, with the use of binoculars.
- Low-level invasive assessments were conducted of potentially active burrows encountered within the study area/PAOI, with the use of an endoscope camera as well as rock-turning.
- The Louisvale township is situated approximately 400 m west of the proposed development footprint. Due to the continued surrounding anthropogenic activities associated with the township, the study area exhibits a high risk of camera loss through damage or theft. No trail cameras/camera traps were therefore set up.
- No actual on-site trapping or specifically focused assessments of any faunal species was conducted.

- The **Site Ecological Importance (SEI)** of the study area/PAOI was determined and discussed as per the tables below.
 - The SEI of an area is considered to be a function of the Biodiversity Importance (BI) of the receptor (e.g. species of conservation concern, the vegetation/fauna community or habitat type present on the site) and its resilience to impacts, expressed as Receptor Resilience (RR).
 - $SEI = BI + RR$
 - BI in turn, is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor
 - $BI = CI + FI$

Table 1: Criteria for CI calculations

Conservation Importance	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global EOO of < 10 km². Any area of natural habitat of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type. Globally significant populations of congregatory species (> 10% of global population).
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km². IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. Presence of Rare species. Globally significant populations of congregatory species (> 1% but < 10% of global population).
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.
Low	No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains natural habitat with limited potential to support SCC.
Very Low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

Table 2: Criteria for FI calculations

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

Table 3: Criteria for BI calculations

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

Table 4: Criteria for RR calculations

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

Table 5: Criteria for SEI calculations

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	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

Table 6: Interpretation of SEI calculation results

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.

Aquatic Biodiversity Theme

- Significant watercourses and/or wetlands and/or other aquatic ecological features/habitats were identified, delineated and discussed as per the accepted methodology described below, if potentially found to be present within the study area/PAOI or surrounding aquatic regulated areas (100 m for watercourses and 500 m for wetlands).
 - For the purposes of this investigation a wetland was defined according to the definition in the National Water Act (Act 36 of 1998) as: “land which is transitional between terrestrial and aquatic systems, where the water table is usually at or near the surface, or the land is periodically covered with shallow water and which in normal circumstances, supports or would support vegetation typically adapted to life in saturated soil.”
 - In 2005 Department of Water Affairs and Forestry (DWAF) published a wetland delineation procedure in a guideline document titled “A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas”. These guidelines contain a number of stipulations relating to the protection of wetlands and the undertaking of wetland assessments.
 - To delineate any wetland, the following criteria is used in accordance with the Department of Water Affairs (DWA): Updated manual for identification and delineation of wetlands and riparian areas, Edition 2 September 2008.
 - The wetland delineation procedure identifies the outer edge of the temporary zone of the wetland, which marks the boundary between the wetland and adjacent terrestrial areas. This constitutes the part of the wetland that might remain flooded or saturated close to the soil surface for only a few weeks in the year, but long enough to develop anaerobic conditions and determine the nature of the plants growing in the soil.
 - The guidelines also state that the locating of the outer edge of the temporary zone must make use of four specific indicators namely:
 - terrain unit indicator
 - soil form indicator
 - soil wetness indicator
 - vegetation indicator
 - In addition, the watercourse/wetland and a protective buffer zone beginning from the outer edge of any potential wetland temporary zone, will be designated as sensitive in a sensitivity map, if found to be necessary and applicable to a specific site. The guidelines stipulate buffers to be delineated around the boundary of a wetland. An adequate protective buffer zone, beginning from the outer edge of any potential wetland temporary zone, will be implemented and designated as sensitive within which no development must be allowed to occur, if found to be necessary and applicable to a specific site.

- Georeferenced photographs were taken of any Red Data Species Listed-, nationally- or provincially protected plant species, ecologically sensitive/conservationally significant areas as well as significant watercourses and/or wetlands and/or other aquatic ecological features/habitats, if encountered within the study area/PAOI. This was done in order to indicate their specific locations in a Geographic Information System (GIS) mapping format.

The **Present Ecological State (PES)** of all significant aquatic features/habitats identified within the study area/PAOI, was determined and discussed as per the table below, by conducting a WET-Health Level 1b assessment for wetlands or the Index of Habitat Integrity assessment (IHI, 1999) for watercourses.

- The Present Ecological State (PES) refers to the current state or condition of an area in terms of all its characteristics and reflects the change to the area from its reference condition. The value gives an indication of the alterations that have occurred in the ecosystem.

Table 7: Criteria for PES calculations

PES Category	Score	Description
A	0 – 0.9 > 90 - 100%	Unmodified , natural and pristine.
B	1 – 1.9 > 80 - 90%	Largely natural . A small change in natural habitats and biota may have taken place but the ecosystem functionality has remained essentially unchanged.
C	2 – 3.9 > 60 - 80%	Moderately modified . Moderate loss and transformation of natural habitat and biota have occurred, but the basic ecosystem functionality has still remained predominantly unchanged.
D	4 – 5.9 > 40 - 60%	Largely modified . A significant loss of natural habitat, biota and subsequent basic ecosystem functionality has occurred.
E	6 – 7.9 > 20 - 40%	Seriously modified . The loss of natural habitat, biota and basic ecosystem functionality is extensive.
F	8 – 10 0 - 20%	Critically/Extremely modified . Transformation has reached a critical level and the ecosystem has been modified completely with a virtually complete loss of natural habitat and biota. The basic ecosystem functionality has virtually been destroyed and the transformation is irreversible.

The **Ecological Importance and Sensitivity (EIS)** of all significant aquatic features/habitats identified within the study area/PAOI, was determined and discussed as per the table below, by conducting a WET-EcoServices assessment for wetlands or rapid EIS for watercourses.

- The Ecological Importance and Sensitivity (EIS) of an area is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales. Both abiotic and biotic components of the system are taken into consideration. Sensitivity refers to the system's ability to resist disturbance and its capability to recover from disturbance, once it has occurred.

Table 8: Criteria for EIS calculations

EIS Category	Score	Description
D	≤ 1.0	Low/Marginal. Not ecologically important and/or sensitive on any scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.
C	1.1 - 2	Moderate. Ecologically important and sensitive on local or possibly provincial scale. Biodiversity is still relatively ubiquitous and not usually sensitive to habitat modifications.
B	2.1 - 3	High. Ecologically important and sensitive on provincial or possibly national scale. Biodiversity is relatively unique and may be sensitive to habitat modifications.
A	3.1 - 4	Very High. Ecologically important and sensitive on national and possibly international scale. Biodiversity is very unique and sensitive to habitat modifications.

The **Recommended Ecological Category (REC)** of all significant aquatic features/habitats identified within the study area/PAOI, was determined and discussed as per the table below.

- The Recommended Ecological Category (REC) of an area is an expression of the ecological category, within which it is recommended for a water resource to be managed. In the event of a high EIS value, the management objective should constitute improvement of the water resource condition. In the event of a medium or low EIS value, the management objective should constitute maintenance of the current water resource condition. The PES value however also bears relevance in determining a feasible REC value.

Table 9: Criteria for REC calculations

PES Category	EIS Category			
	Very High	High	Moderate	Low
A	A - Maintain	A - Maintain	A - Maintain	A - Maintain
B	A - Improve	A/B - Improve	B - Maintain	B - Maintain
C	B - Improve	B/C - Improve	C - Maintain	C - Maintain
D	C - Improve	C/A - Improve	D - Maintain	D - Maintain
E	D - Improve	D - Improve	D - Improve	D - Improve
F	D - Improve	D - Improve	D - Improve	D - Improve

Potential ecological receptor impacts posed by the proposed development to the local ecosystem and ecology (specific impact receptors), were identified and evaluated. Impact receptor mitigation and management measures in accordance with the requirements of the National Environmental Management Act (Act 107 of 1998) Mitigation Hierarchy, are subsequently recommended, in order to attempt to reduce/alleviate the adverse effects of identified potential ecological receptor impacts.

4. Study Area/Project Area of Influence (PAOI)

4.1. Study Area/PAOI Determination

The significant direct potential ecological receptor impacts posed by the proposed development to the local ecosystem and ecology (specific impact receptors), will mostly be restricted to the proposed development footprint. The nature of the development activities is therefore not expected to have a direct impact on potential Species of Conservation Concern (SCC) or habitats significantly beyond the boundaries of the proposed development footprint.

Indirect low-level potential ecological receptor impacts posed by the proposed development, will mainly consist of slight fugitive dust and noise generation, emissions and fallout along with potential limited erosion and associated dirty surface water runoff into the areas directly surrounding the footprint. Alteration/impeding and contamination of the sources/drivers and flow regimes of identified watercourses (volumes and peak flow) could also pose a low to moderate long-term direct potential ecological receptor impact for the local surrounding landscape, which will increase the study area/PAOI. Contamination of soil and groundwater resources by embalment chemicals and corpse decomposition at the proposed cemetery, could also pose significant long-term direct potential ecological receptor impacts for the local surrounding landscape, which will increase the study area/PAOI. Fragmentation of local and broader ecological connectivity, -functionality and -integrity could furthermore also pose a slight long-term direct potential ecological receptor impact for the local surrounding landscape during the operational phase, which will increase the study area/PAOI.

If unmitigated, the significant potential long-term ecological receptor impacts identified for the proposed development, could potentially add low to moderate impact. It is however the opinion of the specialist, by application of the NEMA Mitigation Hierarchy, that all the identified potential ecological receptor impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels, by implementation of the recommended mitigation measures (see section 8.3). It is therefore not anticipated that the proposed development will add any significant residual ecological receptor impacts to the surrounding environment, if all recommended mitigation measures as per this ecological report (see section 8.3) are adequately implemented and managed, for both the construction- and subsequent operational phases of the proposed development.

The PAOI will therefore merely constitute a maximum 50 m area surrounding the proposed development footprint.

4.2. Study Area/PAOI Description

The proposed development footprint constitutes a single footprint area of approximately 8.19 ha in size, while the study area/PAOI furthermore constitutes a slightly increased surrounding single footprint area of approximately 15.3 ha in size.

The original proposed development footprint was proactively revised after the initial site sensitivity verification, based on the recommended buffer zone associated with the single second-order non-perennial watercourse (significant ephemeral stream) which flows past the proposed development footprint within 100 m to the east (see sections 7.1 & 8.3).

The proposed development footprint is situated on the Remaining Extent of Erf 1037 Louisvale Road. The study area/PAOI is located approximately 400 m east of the Louisvale township which in turn, is situated approximately 3 km south-east of the town Upington, Northern Cape Province. The study area/PAOI forms part of the Dawid Kruiper Local Municipality which in turn, forms part of the ZF Mgcawu District Municipality. According to the information received from the EAP, the proposed development footprint falls outside the municipal urban edge. Access to the study area/PAOI is obtained by way of N10 National Highway and subsequent dirt roads.

See locality map below (see A3 sized map in the Appendices: Appendix 1).

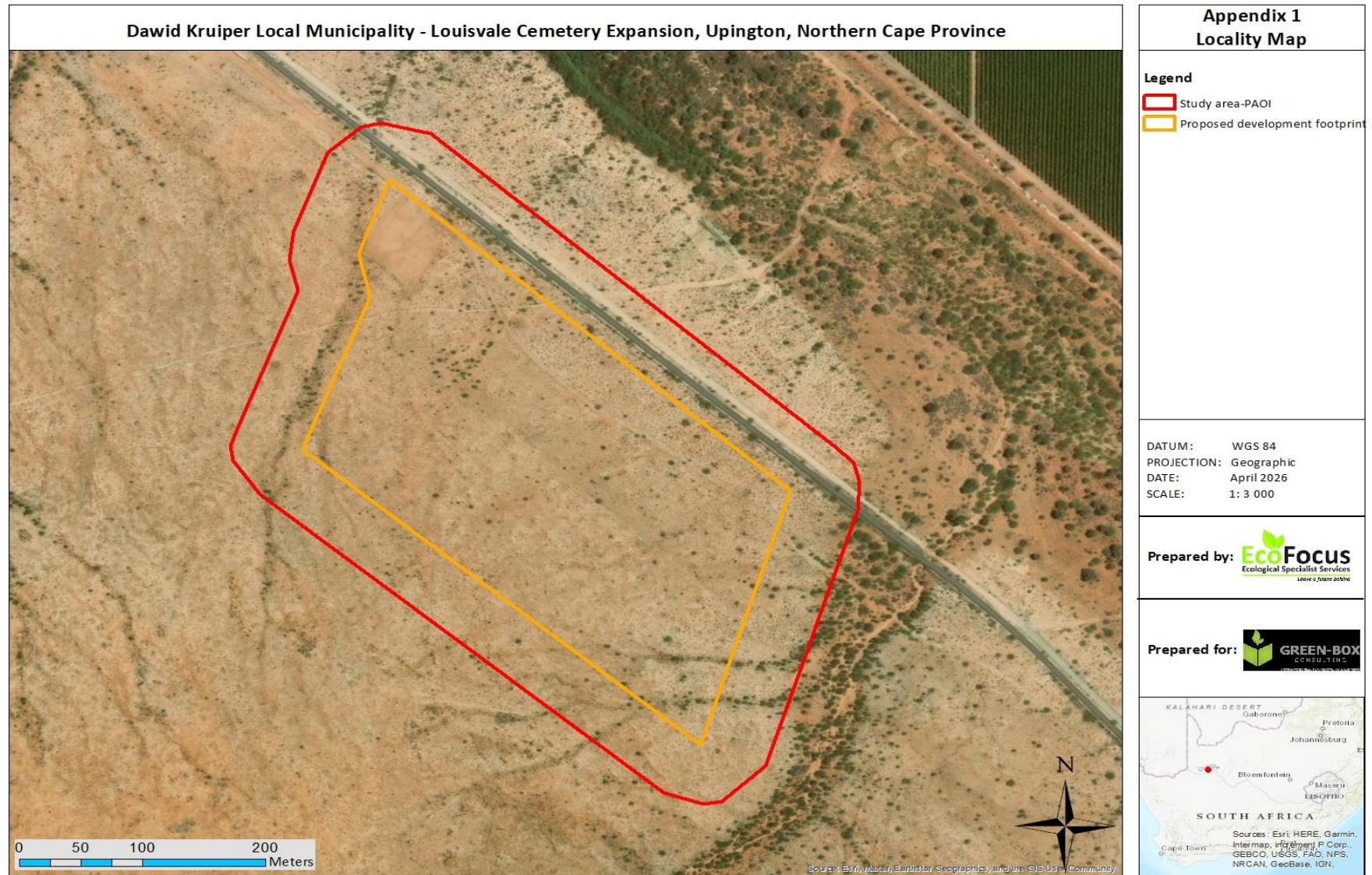


Figure 1: Locality map illustrating the proposed development footprint and study area/PAOI

4.3. Climate

The rainfall of the region peaks during the summer months and the Mean Annual Precipitation (MAP) of the area is approximately 180 mm (www.climate-data.org). The maximum average monthly temperature is approximately 26.2°C in the summer months while the minimum average monthly temperature is approximately 11.5°C during the winter (www.climate-data.org). Maximum daily temperatures can reach up to 34.6°C in the summer months and dip to as low as 2.5°C during the winter (www.climate-data.org).

4.4. Geology and Soils

According to Mucina & Rutherford (2006) the geology of the landscape and associated vegetation type can be described as the following:

Cenozoic Kalahari Group sands and small patches also on calcrete outcrops and screes on scarps of intermitted rivers. The vegetation type is mostly covered by recent (Quaternary) alluvium and calcrete. Soils are deep red-yellow apedal, freely drained with a high base status.

4.5. Vegetation Type and Provincial Biodiversity Status

4.5.1. Vegetation Type

According to SANBI (2006-2024), the entire study area falls within the Bushmanland Arid Grassland vegetation type (Nkb 3), which is mainly characterised by extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland and mostly dominated by white grasses such as *Stipagrostis* species. The vegetation type has the characteristics of semi desert (SANBI, 2006-2024).

‘Ground truthing’ conducted during the site assessment however suggests that the study area rather falls within the Kalahari Karroid Shrubland vegetation type (Nkb5) (SANBI, 2006-2024). This statement is mainly based on soil characteristics and landscape topography as well as vegetation structure and species composition. This vegetation type is characterised by low karroid shrubland on flat, gravel plains (SANBI, 2006-2024). Karoo related elements start to meet northern floristic features indicating transitional zone (SANBI, 2006-2024). Both of these vegetation types are classified as Least Concerned (Monyeki & Skowno, 2025).

4.5.2. Provincial Biodiversity Status

The majority of the study area is categorised as Other Natural Area (ONA), while the northern and eastern portions are categorised as Degraded land, according to the Northern Cape Biodiversity Spatial Plan 2024 (Oosthuysen *et al.*, 2024), which sets out biodiversity priority areas in the province.

See vegetation type-, provincial biodiversity status- and specialist GPS track maps below (see A3 sized maps in the Appendices: Appendix 2, 3 & 4).

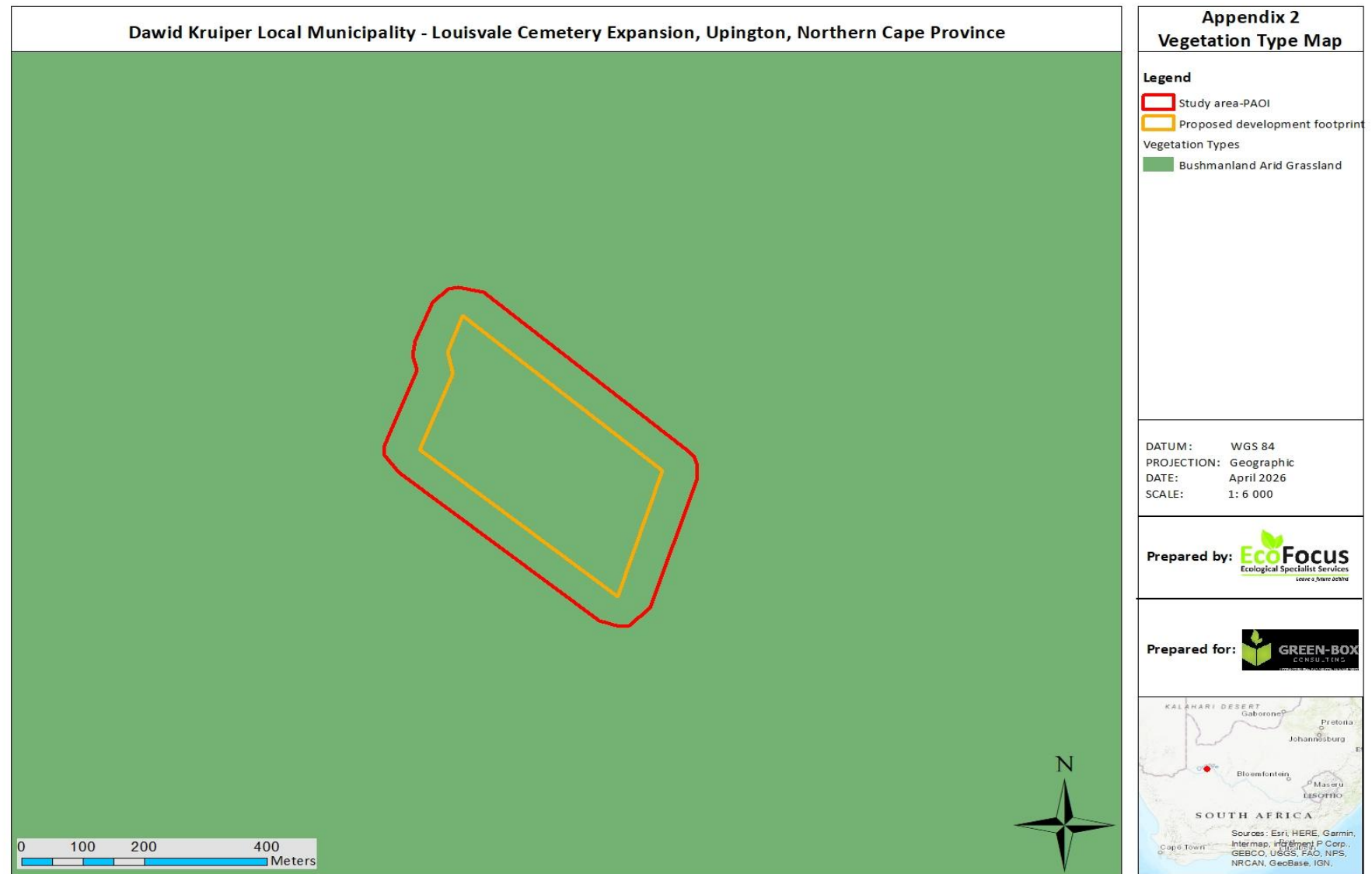


Figure 2: Vegetation type map illustrating the vegetation type associated with the study area

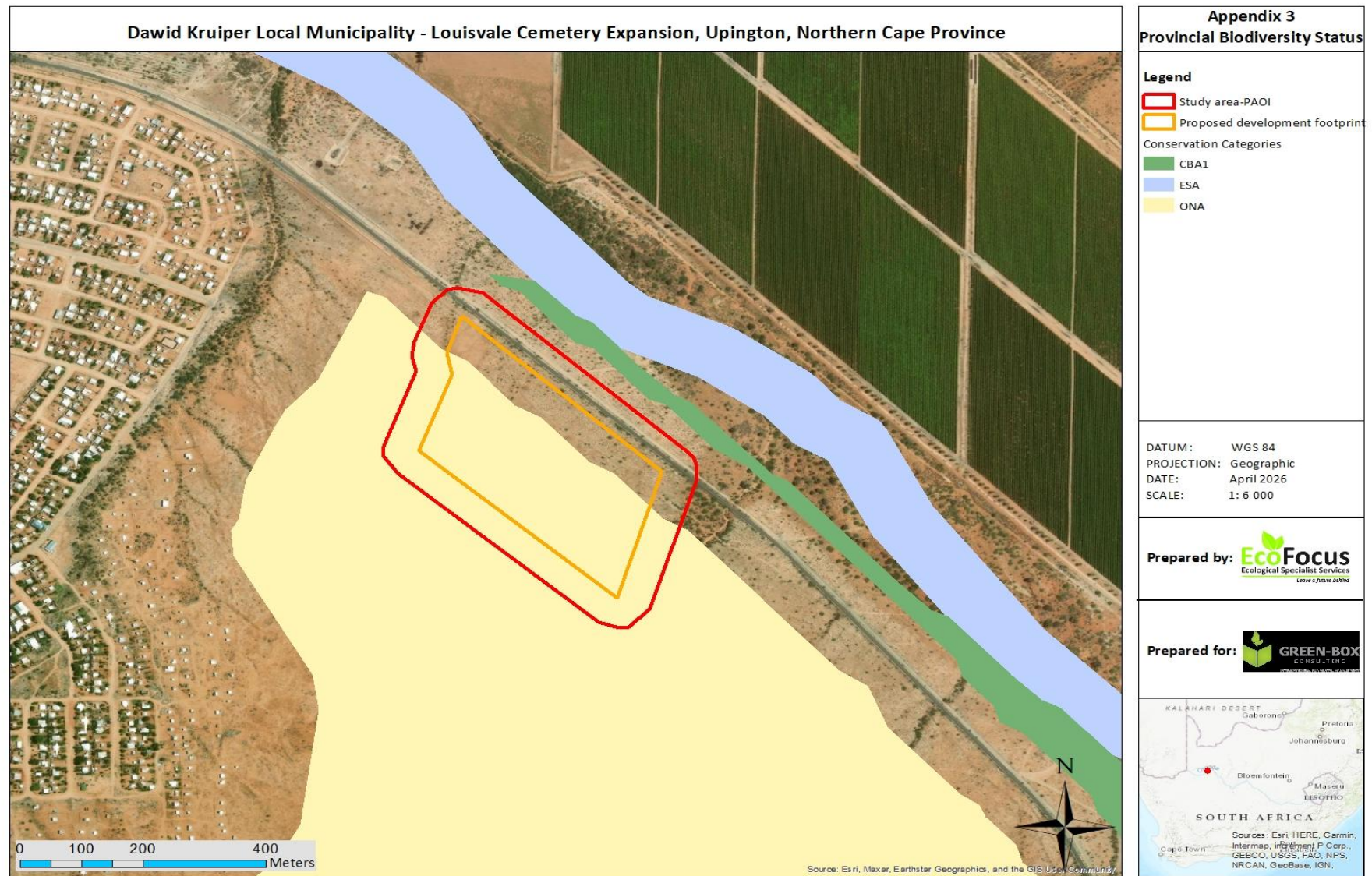


Figure 3: Provincial biodiversity status map illustrating the provincial biodiversity statuses/categories associated with the study area

4.6. Specialist GPS Track and Ecological Sample Sites Map

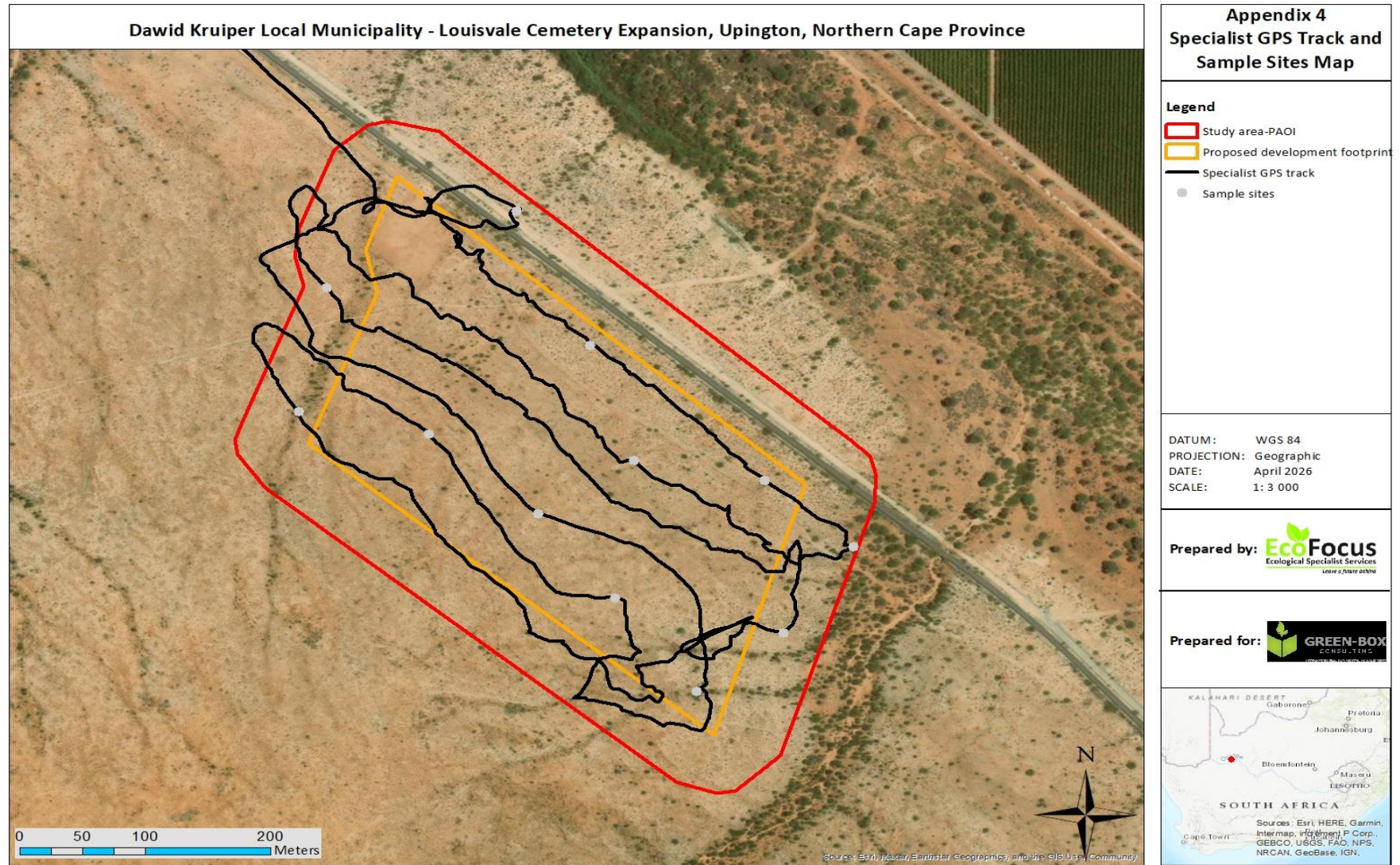


Figure 4: Specialist GPS track and ecological sample sites map illustrating the assessment route used by the specialist

5. Assumptions, Uncertainties and Gaps in Knowledge

Various assumptions need to be made during the assessment process, at the hand of the relevant specialist. It is assumed that:

- all relevant project information provided to the ecological specialist by the EAP, was correct and valid at the time that it was provided.
- the study area as provided by the EAP, is correct and will not be significantly deviated from, as this was the only area assessed.
- strategic level investigations undertaken by the applicant prior to the commencement of the Environmental Impact Assessment/Basic Assessment process, determined that the study area represents a potentially suitable and technically acceptable location.
- the public, local communities, relevant organs of state and surrounding landowners will receive a sufficient reoccurring opportunity to participate and comment on the proposed development during the Environmental Impact Assessment/Basic Assessment process, through the provision of adequately facilitated public participation interventions and timeframes as stipulated in the NEMA: EIA Regulations, 2014.
- the need and desirability of the proposed development is based on strategic national, provincial and local plans and policies, which reflect the interests of both statutory and public viewpoints.
- it is assumed that strategic level decision making by the relevant authorities will be conducted through cooperative governance principles, with the consideration of environmentally sustainable and responsible development principles underpinning all decision making.

Given that an EIA/BA involves prediction, the uncertainty factor forms part of the assessment process. Two types of uncertainty are associated with the EIA/BA process, namely process-related and prediction-related.

- uncertainty of prediction is critical at the data collection phase as observations, recommendations and conclusions are made, solely based on professional specialist opinion. Final certainty will only be obtained upon actual implementation of the proposed development. Adequate research, specialist experience and expertise should however minimise this uncertainty.
- the EIA/BA process is a project-level framework and the specialists are limited to assessing the anticipated environmental impacts, associated with the construction- and subsequent operational phases of the proposed development.
- uncertainty of relevant decision making relates to the interpretation of provided information by relevant authorities during the EIA/BA process. Continual two-way communication and coordination between EAP's and relevant authorities should however decrease the uncertainty of subjective interpretation. The importance of widespread/comprehensive consultation towards minimising the risk/possibility of omitting significant information and impacts is further stressed. The use of quantitative impact significance rating formulas (as utilised in this document) can further standardise the objective interpretation of results and limit the occurrence and scale of uncertainty and subjectivity.
- the principle of human nature provides for uncertainties and unpredictability with regards to the socio-economic impacts of the proposed developments and the subsequent public reaction/opinion, which will be received during the Public Participation Process (PPP).

Gaps in knowledge as well as assessment qualifications and restrictions can be attributed to:

- The ecological assessment process was undertaken prior to the availing of certain information, which would only be derived from the final development design and layout. The design layout for the proposed development, had not been finalised yet at the time of the site assessment.
- The seasonal timing of the assessment did not coincide with the general flowering times of potential floral Species of Conservation Concern (SCC) and was therefore not favourable for successful identification of such species, if present. It must therefore be noted that the seasonal timing of the assessment was not favourable for successful identification of all plant species individuals. More underground bulb-plant species (geophytes) could therefore potentially be present throughout the karroid shrubland habitat, which were not necessarily visible aboveground due to the timing of the site assessment.
- The seasonal timing of the assessment was favourable for successful identification of potential faunal Species of Conservation Concern (SCC), if present. The assessment also mostly coincided with the high-activity- and breeding periods of the listed Species of Conservation Concern (SCC).
- The assessment was restricted to the commencement of the summer/growing season. The area had however not received adequate initial rainfall, prior to the site visit. It is therefore considered necessary to perform an additional summer/growing season survey. It is recommended that an additional ecological walkthrough as well as a faunal and floral search, rescue and relocation exercise be conducted for the study area, during the flowering period of underground bulb-plant species (geophytes), prior to the commencement of construction activities. This will ensure that no faunal and floral Species of Conservation Concern (SCC) or any other conservationally significant species have potentially been omitted or will be destroyed/killed.
- The Louisvale township is situated approximately 400 m west of the proposed development footprint. Due to the continued surrounding anthropogenic activities associated with the township, the study area exhibits a high risk of camera loss through damage or theft. No trail cameras/camera traps were therefore set up.
- Limited faunal species which are expected to occur throughout the local and broader landscape, are inconspicuous and have very low detection probabilities.

- Merely limited existing residential and commercial transformation associated with the Louisvale township as well as historical and currently active agricultural cropland cultivation transformation solely concentrated along the length of the Orange River, is evident throughout the local and broader surrounding landscape. The extensive local and broader landscape surrounding the study area however mainly constitutes a vast, relatively homogenous, continuous undeveloped natural landscape. The size of the study area is therefore negligible relative to the surrounding natural landscape.
- The potential for future similar developments in the same geographical area, which could lead to further cumulative impacts, cannot be meaningfully anticipated. It is however unlikely that further similar cemetery expansion and subsequent transformation would take place throughout the local area, over time.

Disclaimer: EcoFocus Consulting is an independent ecological specialist company. All information and recommendations as per this report are therefore provided in a fair and unbiased/objective manner and are solely based on qualitative data gathered as well as professional specialist observation and opinion. The study is based on assessment techniques and investigations which are limited by time and budgetary constraints typically applicable to the type and level of survey undertaken. EcoFocus Consulting therefore reserves the right to modify aspects of the project deliverables if and when new/additional information may become available, be it from research, identifications or further work in the applicable field of practice or pertaining to this study.

EcoFocus Consulting exercises all reasonable skill, care and diligence in the provision of services. EcoFocus Consulting will however accept no liability or consequential liability for the use of the provided project deliverables (in part or in whole) and any information or material contained therein. The applicant, including its agents, by receiving these deliverables indemnifies EcoFocus Consulting (including its members, employees and sub-consultants) against any actions, claims, demands, losses, liabilities, costs, damages and expenses arising directly or indirectly from or in connection with services rendered, directly or indirectly by EcoFocus Consulting.

6. Site Sensitivity Verification

6.1. Aquatic Biodiversity Theme

According to the DFFE National Web-Based Environmental Screening Tool Report, the Aquatic Biodiversity Theme of the study area is rated as being of 'low' sensitivity.

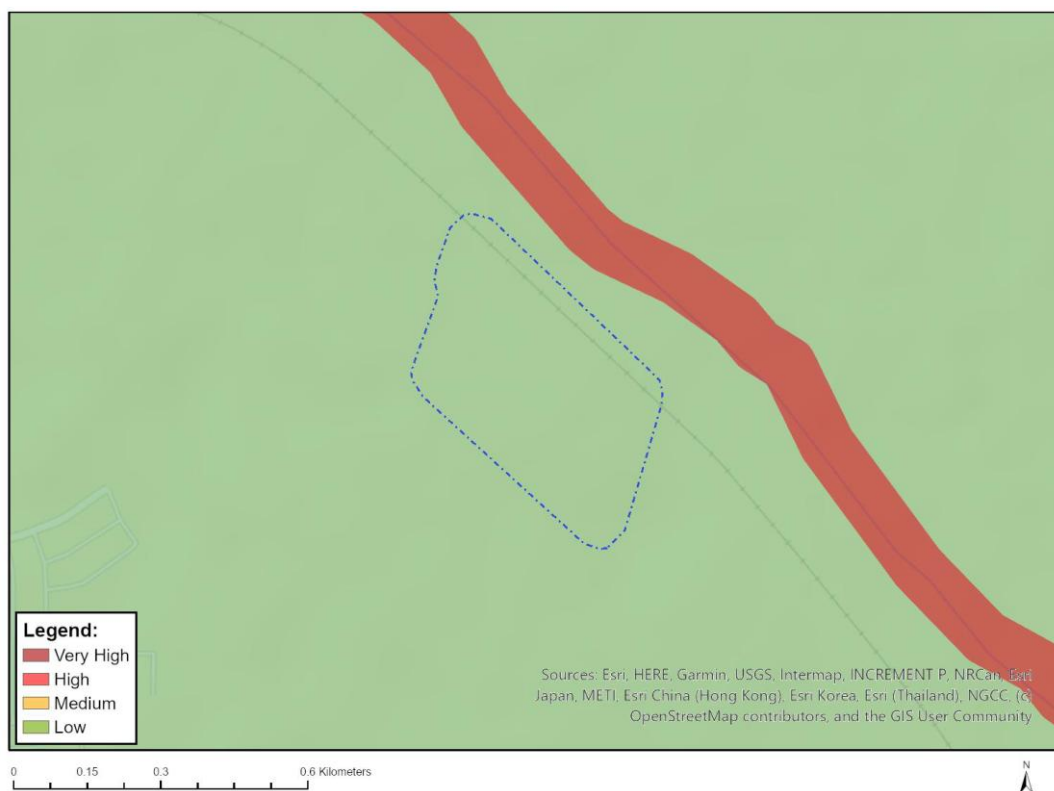


Figure 5: Aquatic Biodiversity Theme Sensitivity as per the DFFE National Web-Based Environmental Screening Tool Report

'Ground truthing' conducted during the site assessment, determined that two directly adjacent first-order non-perennial watercourses (very small ephemeral preferential water flow paths/drainage lines) commence within- and traverse the most southerly corner of the proposed development footprint. Two more first-order non-perennial watercourses (small and very small ephemeral preferential water flow paths/drainage lines) also flow past the proposed development footprint within 100 m to the north and west. A single second-order non-perennial watercourse (significant ephemeral stream) furthermore also flows past the proposed development footprint within 100 m to the east.

According to the National Freshwater Ecosystem Priority Areas Database (NFEPA, 2011), the portion of the D73E - 3091 Sub Quaternary Reach (SQR) associated with the study area, does not fall within any Freshwater Ecosystem Priority Area (FEPA), Fish Support Area, -Sanctuary, -Corridor or -Rehabilitation Area. No populations of conservationally significant threatened fish species have been recorded throughout the study area or local downstream region or are expected to specifically/exclusively rely on the study area as refuge or for breeding, foraging and/or persistence purposes.

These factors significantly reduce the aquatic conservational significance/value of the area. The study area however falls within an Upstream Management Area, which slightly increases the aquatic conservational significance/value of the area. The size of the proposed development footprint is however minute relative to the Upstream Management Area and is situated a significant distance upslope of the associated Orange River (>3.5 km). Substantial natural buffering is therefore present throughout the Upstream Management Area downslope of the proposed development footprint, before reaching the River.

If unmitigated, it is consequently anticipated that the proposed development could potentially merely pose a slight risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area by impacting on the continued ecological connectivity, -functionality and -integrity of the local watershed and broader sub-quaternary surface water catchment and drainage area and consequently impacting the Upstream Management Area.

If adequate mitigation measures are however implemented for the construction- and subsequent operational phases (see section 8.3), it is not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area. It will also not significantly impact on any local aquatic ecological features (watercourses or wetlands) or the continued ecological connectivity, - functionality and -integrity of the local watershed and broader sub-quaternary surface water catchment and drainage area. Mitigation measures must therefore focus on ensuring that the natural flow regimes of the significant ephemeral stream, flow paths/drainage lines and Upstream Management Area are as far as practicably possible/feasible, not significantly and/or permanently contaminated or impacted by the proposed development.

The original proposed development footprint was proactively revised after the initial site sensitivity verification, based on the recommended buffer zone associated with the single second-order non-perennial watercourse (significant ephemeral stream) which flows past the proposed development footprint within 100 m to the east (see sections 7.1 & 8.3).

Based on the outcomes and results of the site assessment, the specialist is therefore in agreement with the DFFE National Web-Based Environmental Screening Tool Report's classification of a 'low' Aquatic Biodiversity Theme sensitivity rating for the study area. Merely a Compliance Statement is therefore required for the Aquatic Biodiversity Theme in order to inform the Basic Assessment (BA) process associated with the proposed development.

6.2. Terrestrial Biodiversity Theme

According to the DFFE National Web-Based Environmental Screening Tool Report, the Terrestrial Biodiversity Theme of the study area is rated as being of 'low' sensitivity.



Figure 6: Terrestrial Biodiversity Theme Sensitivity as per the DFFE National Web-Based Environmental Screening Tool Report

Due to the undeveloped yet slight to moderately disturbed ecological state of the study area, the area is reasonably representative/reminiscent of the natural subclimax state of the relevant Least Concerned Kalahari Karroid Shrubland vegetation type (Nkb5). The area however does not house any locally distinct or conservationally important habitat features or plant species communities or - populations associated with this vegetation type. The extensive local and broader landscape surrounding the study area furthermore also mainly constitutes a vast, relatively homogenous, continuous undeveloped natural landscape. The size of the study area is therefore negligible relative to the surrounding natural landscape. These factors significantly reduce the terrestrial biodiversity conservational significance/value of the area.

Based on the outcomes and results of the site assessment, the specialist is therefore in agreement with the DFFE National Web-Based Environmental Screening Tool Report's classification of a 'low' Terrestrial Biodiversity Theme sensitivity rating for the study area. Merely a Compliance Statement is therefore required for the Terrestrial Biodiversity Theme in order to inform the Basic Assessment (BA) process associated with the proposed development.

6.3. Plant Species Theme

According to the DFFE National Web-Based Environmental Screening Tool Report, the Plant Species Theme of the study area is rated as being of 'low' sensitivity.



Figure 7: Plant Species Theme Sensitivity as per the DFFE National Web-Based Environmental Screening Tool Report

Individuals/clusters of the provincially protected species *Adenium oleifolium* (< 10 individuals), *Aloe claviflora* (< 10 clusters) and *A hereroensis* (< 5 individuals) were found to be sparsely present throughout the study area.

Ten small woody shrub individuals of the provincially protected species *Boscia foetida* as well as seven small tree individuals ($\leq 2\text{m}$ in height) of the nationally protected tree species *Boscia albitrunca* were furthermore also found to be present throughout the study area. Two of the latter species individuals are however situated outside the proposed development footprint.

Apart from these species, no Red Data Listed-, other nationally protected tree- or other provincially protected plant species or any other floral Species of Conservation Concern (SCC), were found to be present throughout the study area, during the site assessment. An extensive search yielded no findings. The seasonal timing of the assessment however did not coincide with the general flowering times of potential floral Species of Conservation Concern (SCC) and was therefore not favourable for successful identification of such species, if present. More underground bulb-plant species (geophytes) could therefore potentially be present throughout the karroid shrubland habitat, which were not necessarily visible aboveground due to the timing of the site assessment. Due to the undeveloped yet slight to moderately disturbed ecological state of the study area, the presence of individuals of such species is therefore possible but unlikely.

Due to the undeveloped yet slight to moderately disturbed ecological state of the study area, the area is reasonably representative/reminiscent of the natural subclimax state of the relevant Least Concerned Kalahari Karroid Shrubland vegetation type (Nkb5). The area however does not house any locally distinct or conservationally important habitat features or plant species communities or -populations associated with this vegetation type. The extensive local and broader landscape surrounding the study area furthermore also mainly constitutes a vast, relatively homogenous, continuous undeveloped natural landscape. The size of the study area is therefore negligible relative to the surrounding natural landscape. These factors significantly reduce the plant species conservational significance/value of the area.

Based on the outcomes and results of the site assessment, the specialist is therefore in agreement with the DFFE National Web-Based Environmental Screening Tool Report's classification of a 'low' Plant Species Theme sensitivity rating for the study area. Merely a Compliance Statement is therefore required for the Plant Species Theme in order to inform the Basic Assessment (BA) process associated with the proposed development.

6.4. Animal Species Theme

According to the DFFE National Web-Based Environmental Screening Tool Report, the Animal Species Theme of virtually the entire study area is rated as being of 'high' sensitivity, while merely the small most easterly corner of the study area is rated as being of 'medium' sensitivity.

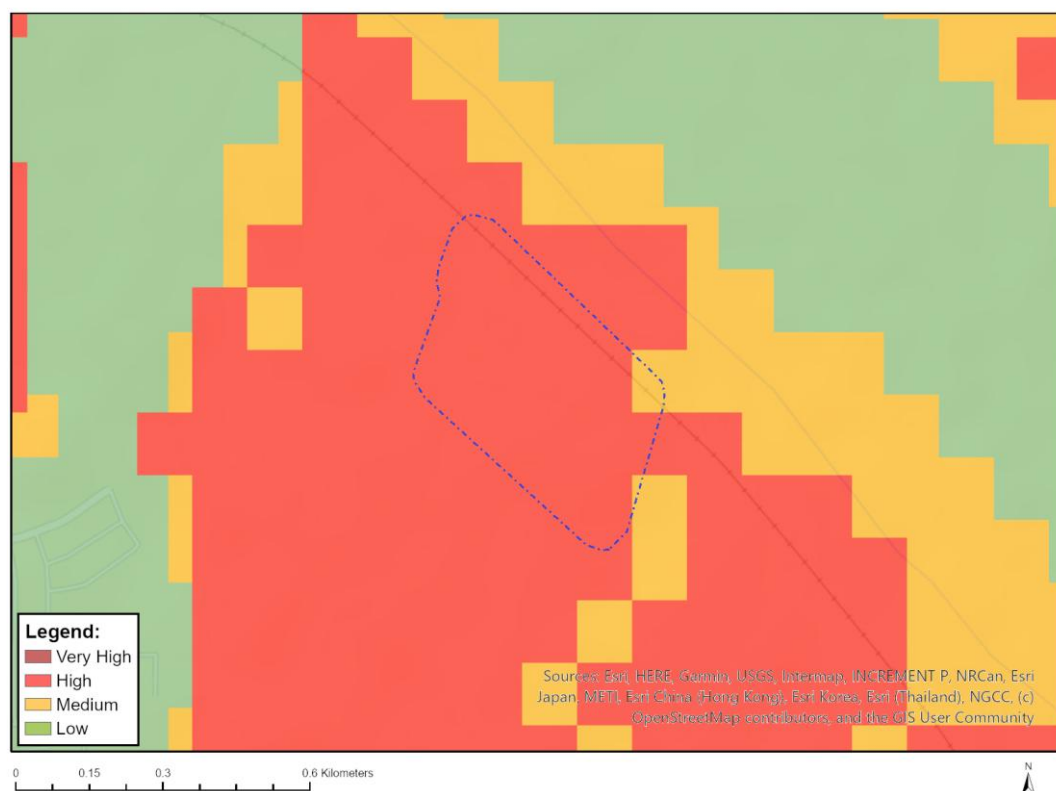


Figure 8: Animal Species Theme Sensitivity as per the DFFE National Web-Based Environmental Screening Tool Report

These sensitivity ratings are for the likely (high rating) and potential (medium rating) presences of the following specific faunal Species of Conservation Concern (SCC):

Table 10: List of faunal Species of Conservation Concern (SCC) for the study area as per the DFFE National Web-Based Environmental Screening Tool Report (species are listed based on decreasing threatened status)

High Sensitivity Rating					
Taxonomic Family	Scientific Name	Common Name	Red List Categories	Habitat Requirements	Probability of Occurrence
Falconidae	<i>Falco biarmicus</i>	Lanner falcon	Nationally Vulnerable	Favours open grassland, cleared woodlands and agricultural areas. Breeding pairs tend to favour cliffs as nesting and roosting sites. They will however also use alternative structures such as trees, pylons and buildings.	Low: No individuals, nests or any other evidence associated with the presence of this species was observed throughout the study area or specifically within the area rated as being of 'high' sensitivity, during the site assessment. An extensive search yielded no sightings/findings. Due to the lack of suitable nesting infrastructure along with the continued surrounding anthropogenic activities associated with the township, the presence of individuals or nesting sites of this species is therefore highly unlikely/improbable and it is highly unlikely/improbable that the area would specifically/exclusively be relied upon by this species as refuge or for breeding, foraging and/or persistence purposes. It is anticipated that this species would rather prefer to utilise the surrounding undeveloped natural shrubland- and riparian woodland habitats further away from the township and associated anthropogenic activities.

Medium Sensitivity Rating					
Taxonomic Family	Scientific Name	Common Name	Red List Categories	Habitat Requirements	Probability of Occurrence
Otididae	<i>Neotis ludwigii</i>	Ludwig's bustard	Globally/Nationally Endangered	Inhabits open lowland and upland plains with grass and light thornbush, sandy open shrub veld and semi-desert. The eggs are laid directly onto bare ground and nests mainly constitute shallow scrapes in the ground, which are occasionally ringed by pebbles.	Low: No individuals, nests or any other evidence associated with the presence of this species was observed throughout the study area, during the site assessment. An extensive search yielded no sightings/findings. Although no individuals or nests of this species were observed during the site assessment, the karroid shrubland associated with the study area provides a degree of reasonably suitable habitat for its potential occurrence. Due to the continued surrounding anthropogenic activities associated with the township, the presence of individuals or nesting sites of this species is however unlikely and it is unlikely that the area would specifically/exclusively be relied upon by this species as refuge or for breeding, foraging and/or persistence purposes. It is anticipated that this species would rather prefer to utilise the surrounding undeveloped natural shrubland- and riparian woodland habitats further away from the township and associated anthropogenic activities.

No individuals, nests, burrows, spoor, scat/droppings or any other evidence associated with the presence of any faunal Species of Conservation Significance (SCC) was observed throughout the study area, during the site assessment. An extensive search yielded no sightings/findings.

Due to the extensive and dense woody component associated with the significant ephemeral stream (legally declared alien invasive species infestation), the stream habitat is visibly extensively utilised by various common/general bird-, amphibian- and other faunal species.

The slight to moderately disturbed ephemeral preferential water flow paths/drainage lines habitats are not specifically/exclusively relied upon by any common/general aquatic bird-, amphibian- and other aquatic faunal species.

Due to the undeveloped yet slight to moderately disturbed ecological state of the study area along with the continued surrounding anthropogenic activities associated with the township, the presence of nesting or burrowing sites of such species is therefore highly unlikely/improbable and it is highly unlikely/improbable that the area would specifically/exclusively be relied upon by any such species as refuge or for breeding, foraging and/or persistence purposes. It is anticipated that such species would rather prefer to utilise the surrounding undeveloped natural karroid shrubland habitat further away from the township and associated anthropogenic activities. The mobility of faunal/avifaunal species allows for individuals to simply leave an area where disturbance is taking place and relocate to surrounding similar, adequate areas. These factors significantly reduce the animal species conservational significance/value of the area.

Based on the outcomes and results of the site assessment, the specialist is therefore not in agreement with the DFFE National Web-Based Environmental Screening Tool Report's classification of 'medium and high' Animal Species Theme sensitivity ratings for the study area but rather concludes that the study area is rated as being of 'low' sensitivity. Merely a Compliance Statement is therefore required for the Animal Species Theme in order to inform the Basic Assessment (BA) process associated with the proposed development.

See site sensitivity verification map below (see A3 sized map in the Appendices: Appendix 5).

6.5. Site Sensitivity Verification Map

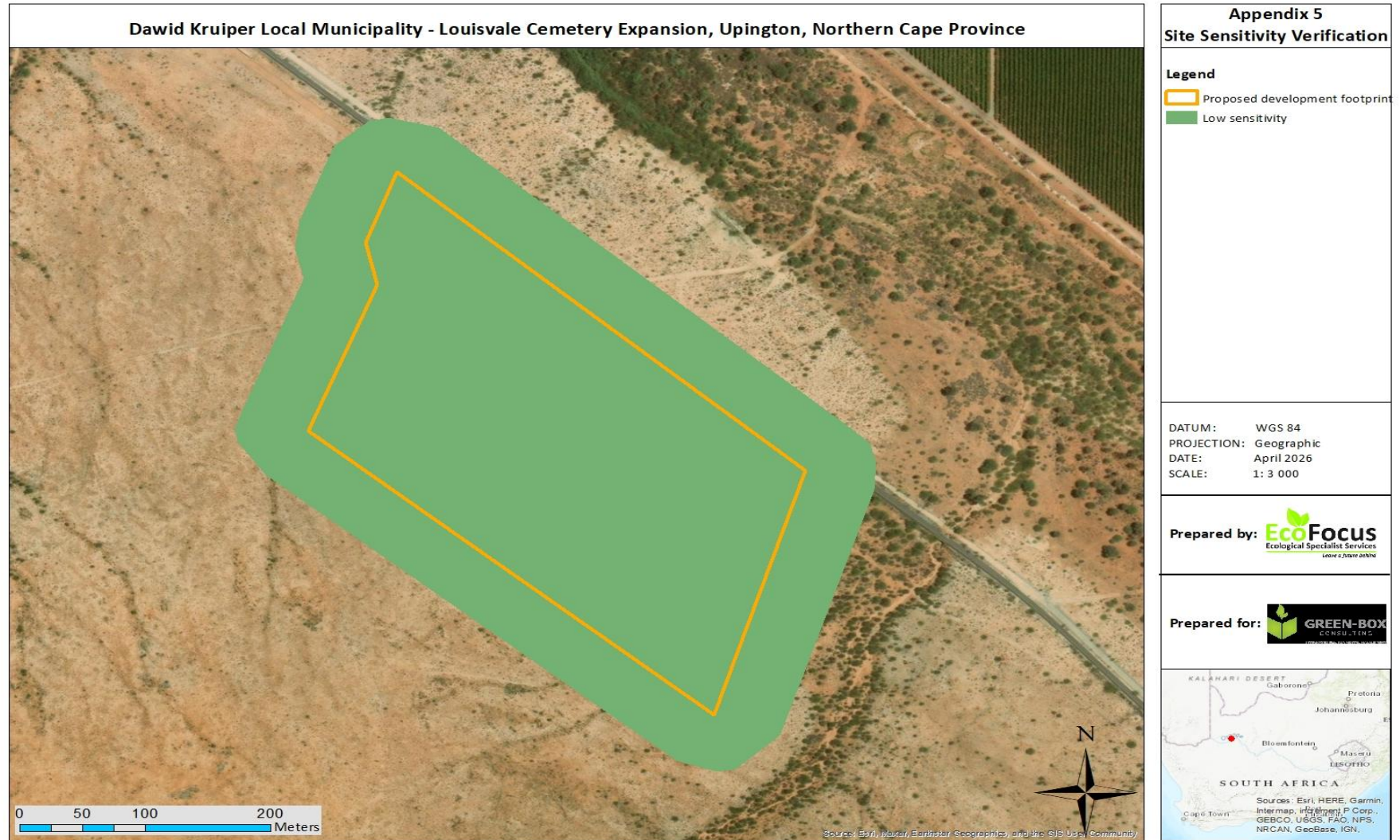


Figure 9: Site sensitivity verification map illustrating the combined sensitivities of the Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes associated with the study area

7. Compliance Statement

7.1. Aquatic Biodiversity Theme

7.1.1. Water Catchment and Drainage

The study area falls within the Lower Orange Water Management Area (WMA 14) and the associated D73E quaternary surface water catchment and drainage area. It is furthermore situated in the D73E - 3091 Sub Quaternary Reach (SQR), within the Nama Karoo Ecoregion (26). The study area generally slopes slightly towards the north and north-east.

7.1.2. Watercourse Baseline Information

According to the available desktop water catchment and drainage data of the latest South African National Biodiversity Assessment of 2018 (Van Deventer *et al.*, 2019) and National Wetland Map 6 (SANBI, 2024), there are no significant natural perennial watercourses, -wetlands or -salt pans of which the regulated areas fall within the proposed development footprint. Merely a single non-perennial watercourse traverses the most southerly corner of the proposed development footprint, while a second non-perennial watercourse also flows past the proposed development footprint within 100 m to the east (Van Deventer *et al.*, 2019 & SANBI, 2024).

‘Ground truthing’ conducted during the site assessment, however determined that two directly adjacent first-order non-perennial watercourses (very small ephemeral preferential water flow paths/drainage lines) rather commence within- and traverse the most southerly corner of the proposed development footprint. Two more first-order non-perennial watercourses (small and very small ephemeral preferential water flow paths/drainage lines) also flow past the proposed development footprint directly adjacent north and west. A single second-order non-perennial watercourse (significant ephemeral stream) furthermore also flows past the proposed development footprint within 100 m to the east.

According to the National Freshwater Ecosystem Priority Areas Database (NFEPA, 2011), the portion of the D73E - 3091 Sub Quaternary Reach (SQR) associated with the study area, does not fall within any Freshwater Ecosystem Priority Area (FEPA), Fish Support Area, -Sanctuary, -Corridor or -Rehabilitation Area. No populations of conservationally significant threatened fish species have been recorded throughout the study area or local downstream region or are expected to specifically/exclusively rely on the study area as refuge or for breeding, foraging and/or persistence purposes.

These factors significantly reduce the aquatic conservational significance/value of the area. The study area however falls within an Upstream Management Area, which slightly increases the aquatic conservational significance/value of the area. The size of the proposed development footprint is however minute relative to the Upstream Management Area and is situated a significant distance upslope of the associated Orange River (>3.5 km). Substantial natural buffering is therefore present throughout the Upstream Management Area downslope of the proposed development footprint, before reaching the River.

If unmitigated, it is consequently anticipated that the proposed development could potentially merely pose a slight risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area by impacting on the continued ecological connectivity, -functionality and -integrity of the local watershed and broader sub-quaternary surface water catchment and drainage area and consequently impacting the Upstream Management Area.

If adequate mitigation measures are however implemented for the construction- and subsequent operational phases (see section 8.3), it is not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area. It will also not significantly impact on any local aquatic ecological features (watercourses or wetlands) or the continued ecological connectivity, -functionality and -integrity of the local watershed and broader sub-quaternary surface water catchment and drainage area. Mitigation measures must therefore focus on ensuring that the natural flow regimes of the significant ephemeral stream, flow paths/drainage lines and Upstream Management Area are as far as practicably possible/feasible, not significantly and/or permanently contaminated or impacted by the proposed development.

See Van Deventer *et al.*, 2019 and SANBI, 2024 desktop water catchment and drainage data map below (see A3 sized map in the Appendices: Appendix 6).

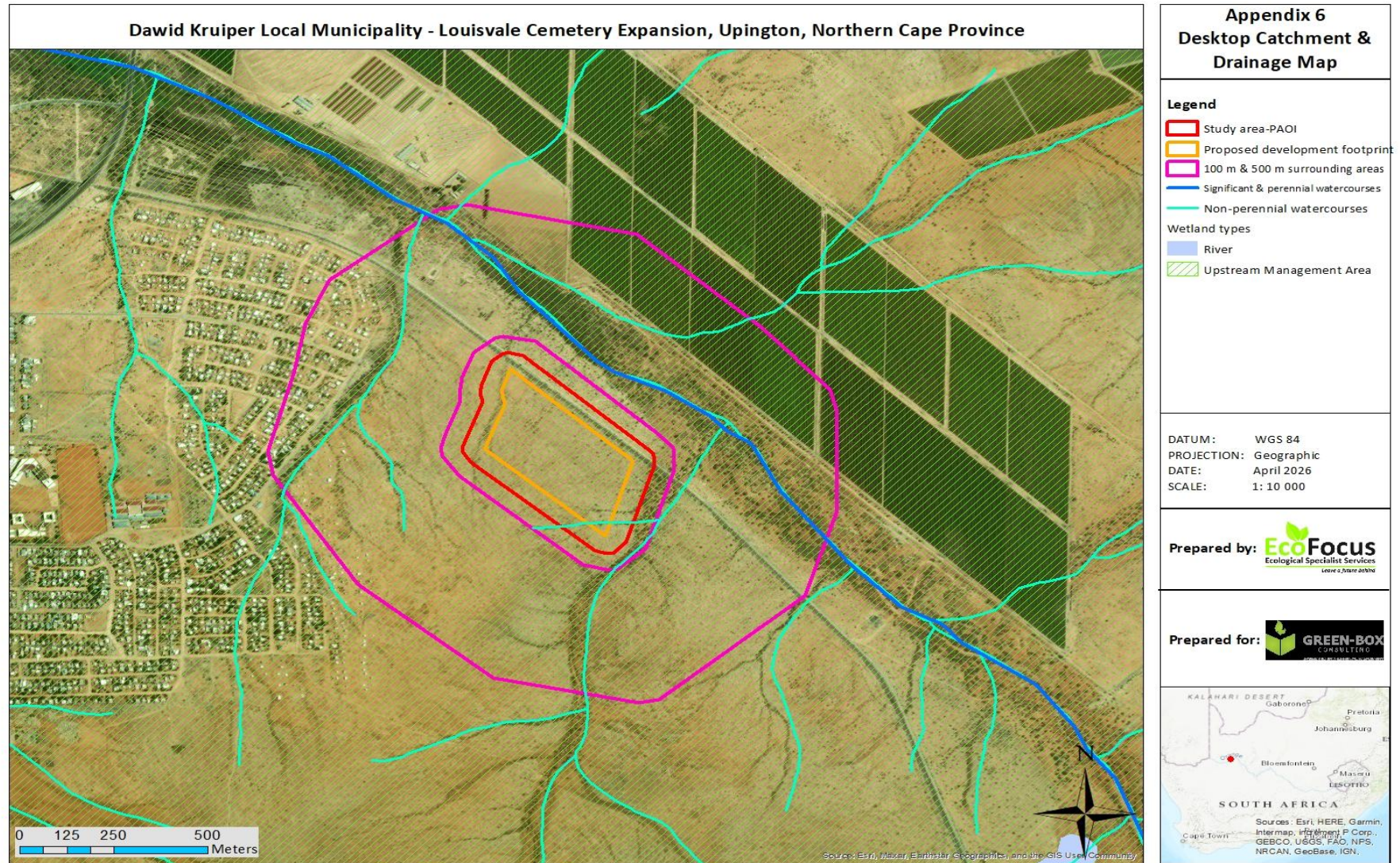


Figure 10: Van Deventer *et al.*, 2019 and SANBI, 2024 desktop water catchment and drainage data map illustrating the main watercourses and wetlands/pans as well as the Upstream Management Area associated with the study area

7.1.3. Significant Stream

A single second-order non-perennial watercourse (significant ephemeral stream) flows past the proposed development footprint within 100 m to the east and continues in a northerly direction.

7.1.3.1. Sources/Drivers

The sources/headwaters of the stream are located approximately 3 km south of the study area. The stream possesses a small to moderately sized upstream surface water catchment area and consequently assists with channelling low to moderate volumes of temporary surface water runoff during seasonal rainfall events.

7.1.3.2. Habitat

The stream possesses a distinct broad ephemerally active streamflow channel of which the bed houses exposed rocky/calcrete sheets in certain areas. Due to the ephemerality and associated lack of continuous natural surface water flow through the local area, the stream possesses no ecologically distinct or important semi-aquatic/riparian habitat or any significant variation in vegetation species composition or -structure, relative to the surrounding terrestrial karroid shrubland landscape. It is however extensively and densely infested and overwhelmingly dominated by small to medium sized woody tree- and shrub individuals of the legally declared alien invasive species *Neltuma glandulosa* (Category 3 in the Northern Cape Province) within the channel and along its edges/banks (100 m surrounding regulated area as no 1:100-year floodline delineation or riparian habitat is available).

No hydrophytic/obligate- or facultative aquatic grass-, reed-, sedge- or rush species were found to be present throughout the stream, during the site assessment.

No Red Data Listed-, nationally protected tree- or provincially protected aquatic plant species or any other aquatic floral Species of Conservation Concern (SCC), were found to be present throughout the stream, during the site assessment.

The stream habitat is in a moderate to highly disturbed and degraded pioneer ecological state. This disturbance and degradation is mainly as a result of the dense legally declared alien invasive species infestation along with moderate historical and continued long-term overgrazing by livestock from the local community, which is extensively evident throughout the local and broader landscape. Due to the extensive and dense woody component associated with the stream (legally declared alien invasive species infestation), the stream habitat is visibly extensively utilised by various common/general bird-, amphibian- and other faunal species.

It is therefore evident from a hydrological- and aquatic faunal/floral biodiversity perspective, that the significant ephemeral stream associated with the study area constitutes a low to moderate importance component of the local watershed and broader sub-quaternary surface water catchment and drainage area as well as the aquatic faunal/floral ecology of the area. The stream therefore possesses low-moderate overall long-term aquatic ecological/conservational value/significance. It is consequently deemed important that the stream be adequately buffered out of the proposed development footprint in order to ensure that its natural flow regime is not significantly and/or permanently contaminated or impacted by the proposed development.



Figure 11: Two images illustrating the presence of the single second-order non-perennial watercourse (significant ephemeral stream) associated with the study area; the extensive and dense infestation of the legally declared alien invasive species *Neltuma glandulosa* (Category 3 in the Northern Cape Province) is visibly evident (red arrows indicate the water flow direction)

7.1.3.3. Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) & Recommended Ecological Category (EIS)

See section 3 for the methodology outlining the criteria for categorisation of Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) & Recommended Ecological Category (REC).

The **Present Ecological State (PES)** of the single second-order non-perennial watercourse (significant ephemeral stream) is classified as **Class C** as it is moderately modified. Moderate loss and transformation of natural habitat and biota have occurred mainly as a result of the dense legally declared alien invasive species infestation along with moderate historical and continued long-term overgrazing by livestock from the local community, which is extensively evident throughout the local and broader landscape. The basic ecosystem functionality has however remained predominantly unchanged.

The **Ecological Importance and Sensitivity (EIS)** of the single second-order non-perennial watercourse (significant ephemeral stream) is classified as **Class D (Low/Marginal)** as it is viewed as being ecologically important and/or sensitive on local scale. It is consequently viewed as being of low-moderate overall long-term aquatic ecological/conservational value/significance for the continued ecological connectivity, -functionality and -integrity persistence of the local watershed and broader sub-quaternary surface water catchment and drainage area in support of the surrounding ecosystem as well as the aquatic faunal/floral ecology of the area.

The **Recommended Ecological Category (REC)** of the single second-order non-perennial watercourse (significant ephemeral stream) is classified as **Class C - Maintain**. It is consequently deemed important that the stream be adequately buffered out of the proposed development footprint in order to ensure that its natural flow regime is not significantly and/or permanently contaminated or impacted by the proposed development.

7.1.4. Preferential Water Flow Paths/Drainage Lines

Two directly adjacent first-order non-perennial watercourses (very small ephemeral preferential water flow paths/drainage lines) commence within- and traverse the most southerly corner of the proposed development footprint. These flow paths/drainage lines continue in a north-easterly direction and virtually immediately discharge into the second-order non-perennial watercourse (significant ephemeral stream) which flows past the proposed development footprint within 100 m to the east (see section 7.1.3).

Two more first-order non-perennial watercourses (small and very small ephemeral preferential water flow paths/drainage lines) also flow past the proposed development footprint directly adjacent north and west and continue in a northerly direction.

7.1.4.1. Sources/Drivers

The sources/headwaters of the flow paths/drainage lines are located < 400 m south of the study area. The flow paths/drainage lines possess very small and limited upstream surface water catchment areas and consequently merely assist with channelling very low volumes of temporary surface water runoff during seasonal rainfall events.

7.1.4.2. Habitat

The flow paths/drainage lines possess shallow but distinct very narrow ephemerally active streamflow channels of which the beds house exposed rocky/calcrete sheets in certain areas. Similar to the significant ephemeral stream (see section 7.1.3), due to the ephemerality and associated lack of continuous natural surface water flow through the local area, the flow paths/drainage lines possess no ecologically distinct or important semi-aquatic/riparian habitat or any significant variation in vegetation species composition or -structure, relative to the surrounding terrestrial karroid shrubland landscape. They merely house slightly increased density representations of woody shrub species within the channels and along their edges/banks, relative to the surrounding terrestrial karroid shrubland landscape (100 m surrounding regulated area as no 1:100-year floodline delineation or riparian habitat is available).

The woody layer is mainly dominated by small to medium sized shrub individuals of the woody species *Senegalia mellifera* as well as *Rhigozum trichotomum*, while the legally declared alien invasive species *Neltuma glandulosa* (Category 3 in the Northern Cape Province) was also found to be present but to a lesser extent. The karroid shrub species *Phaeoptilum spinosum* and *Zygophyllum decumbens* were merely found to be sparsely present. The grass species *Aristida spp.*, *Enneapogon scoparius* and *Stipagrostis spp.* are moderately present within the channels.

No hydrophytic/obligate- or facultative aquatic grass-, reed-, sedge- or rush species were found to be present throughout the flow paths/drainage lines, during the site assessment.

No Red Data Listed-, nationally protected tree- or provincially protected aquatic plant species or any other aquatic floral Species of Conservation Concern (SCC), were found to be present throughout the flow paths/drainage lines, during the site assessment.

The flow paths/drainage lines habitats are in a slight to moderately disturbed subclimax ecological state. This disturbance is mainly as a result of moderate historical and continued long-term overgrazing by livestock from the local community, which is extensively evident throughout the local and broader landscape. The flow paths/drainage lines habitats are not specifically/exclusively relied upon by any common/general aquatic bird-, amphibian- and other aquatic faunal species.

It is therefore evident from a hydrological- and aquatic faunal/floral biodiversity perspective, that the small and very small ephemeral preferential water flow paths/drainage lines associated with the study area do not constitute important components of the local watershed and broader sub-quaternary surface water catchment and drainage area or the aquatic faunal/floral ecology of the area. The flow paths/drainage lines therefore possess very low, if any overall long-term aquatic ecological/conservational value/significance. It is consequently not deemed necessary for these flow paths/drainage lines to be buffered out of the proposed development footprint from a hydrological- or aquatic biodiversity perspective. It is however still recommended that the natural flow regime of the flow path/drainage line situated directly adjacent west of the proposed development footprint, should not be significantly and/or permanently contaminated or impacted by the proposed development, if practicably possible/feasible.



Figure 12: Three images illustrating examples of the first-order non-perennial watercourses (small and very small ephemeral preferential water flow paths/drainage lines) associated with the study area; the slightly increased density woody shrub species representations within the channels and along their edges/banks is visibly evident (red arrows indicate the water flow direction)

7.1.4.3. Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) & Recommended Ecological Category (EIS)

See section 3 for the methodology outlining the criteria for categorisation of Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) & Recommended Ecological Category (REC).

Due to the small and very small sizes and ephemeral natures of the preferential water flow paths/drainage lines, it is the opinion of the specialist that PES, EIS or REC determinations are not applicable.

7.2. Terrestrial Biodiversity and Plant Species Themes

7.2.1. Current Existing Vegetation and Site Description

Virtually the entire study area is currently undeveloped, while merely the small existing cemetery is situated within the northern corner of the proposed development footprint. The undeveloped majority portion constitutes a terrestrial karroid shrubland habitat with merely a very sparse low-growing grass layer. Bare soils are therefore extensively evident. The area is mainly underlain by a shallow low permeability calcrete layer with isolated surface outcrops in certain portions.

The study area is traversed by a few footpaths that are used for daily commuting by the local community. Domestic waste/garbage dumping is also sparsely evident throughout the area. Moderate historical and continued long-term overgrazing by livestock from the local community, is furthermore also extensively evident.

Such continued anthropogenic activities tend to cause an ecological 'edge effect', which negatively impacts on the urban/rural development interface area and subsequently on the ecological integrity of the surrounding undeveloped areas, by expanding the negative anthropogenic footprint. The karroid shrubland habitat is therefore in a slight to moderately disturbed subclimax ecological state.

The karroid shrubland habitat is mainly dominated by the species *Caroxylon aphyllum*, while the species *Hertia pallens*, *Pogonospermum genistifolium* and *Zygophyllum decumbens* are also well-represented. The species *Aptosimum lineare*, *A. procumbens*, *A. spinescens*, *Asparagus striatus*, *Galena africana*, *Leucosphaera bainesii*, *Phaeoptilum spinosum* and *Rhigozum trichotomum* were also found to be present but to a lesser extent.

The very sparse low-growing grass layer mainly consists of a representative mixture of the robust/resilient Increaser 2 type grass species *Schmidtia pappophoroides* and *Enneapogon desvauxii* (Van Oudtshoorn, 2022), while the species *Aristida spp.*, *Enneapogon scoparius*, *Eragrostis lehmanniana*, *E. nindensis* and *Stipagrostis spp.* were also found to be present but to a lesser extent.

A diverse forb- or succulent layer was not evident throughout the karroid shrubland habitat, during the site assessment. This is most likely as a result of the disturbed ecological state of the study area together with the timing of the assessment. The forb species *Acanthopsis disperma*, *A hoffmannseggiana*, *Albuca* sp. *Barleria macrostegia*, *Blepharis mitrata*, *Geigeria ornativa*, *Kleinia longiflora*, *Sesamum triphyllum* and *Tetraena simplex* were all found to be moderately present. Individuals/clusters of the provincially protected species *Adenium oleifolium* (< 10 individuals), *Aloe claviflora* (< 10 clusters) and *A hereroensis* (< 5 individuals) were also found to be sparsely present throughout the study area.

Small to medium sized woody shrub individuals of the species *Senegalia mellifera* were found to be moderately present, while individuals of the species *Parkinsonia africana* and the legally declared alien invasive species *Neltuma glandulosa* (Category 3 in the Northern Cape Province) were merely found to be sporadically present throughout the study area. Ten small woody shrub individuals of the provincially protected species *Boscia foetida* as well as seven small tree individuals (≤ 2 m in height) of the nationally protected tree species *Boscia albitrunca* were furthermore also found to be present throughout the study area. Two of the latter species individuals are however situated outside the proposed development footprint.



Figure 13: Three images illustrating examples of the slight to moderately disturbed terrestrial karroid shrubland habitat at the sample sites associated with the study area; the very sparse low-growing grass layer as well as the moderate presence of the woody shrub species *Senegalia mellifera* is visibly evident



Figure 14: Image illustrating the presence of the small existing cemetery within the northern corner of the proposed development footprint

7.2.2. Species of Conservation Concern (SCC)

The following threatened floral species are indicated by the platform iNaturalist as well as through past experience and extensive knowledge of the area, as having a realistic chance/possibility of potentially/likely occurring throughout the local and broader landscape into which the study area falls:

Table 11: List of threatened floral species which can realistically potentially/likely occur throughout the study area (species are listed based on decreasing threatened status)

Taxonomic Family	Scientific Name	Common Name	Red List Categories	Habitat Requirements	Probability of Occurrence
Fabaceae	<i>Vachellia erioloba</i>	Camel thorn tree	Nationally Protected	Kalahari Karroid Shrubland vegetation type (Nkb5)	Low: No individuals or any other evidence associated with the presence of these species were found to be present throughout the study area, during the site assessment. An extensive search yielded no findings. The seasonal timing of the assessment however did not coincide with the general flowering times of potential floral Species of Conservation Concern (SCC) and was therefore not favourable for successful identification of such species, if present. More underground bulb-plant species (geophytes) could therefore potentially be present throughout the karroid shrubland habitat, which were not necessarily visible aboveground due to the timing of the site assessment. Due to the undeveloped yet slight to moderately disturbed ecological state of the study area, the presence of individuals of such species is therefore possible but unlikely.
Euphorbiaceae	<i>Euphorbia spp.</i>	Melkbos	Provincially Protected		
Apocynaceae	<i>Hoodia gordonii</i>	Ghaap	Provincially Specially Protected		
Aizoaceae	<i>Mesembryanthemum spp.</i>	Ice plant	Provincially Protected		
Apocynaceae	<i>Orbea spp.</i>	Carrion flower	Provincially Protected		
Apocynaceae	<i>Stapelia spp.</i>	Carrion flower	Provincially Protected		
	Various other succulent forb species				

Individuals/clusters of the provincially protected species *Adenium oleifolium* (< 10 individuals), *Aloe claviflora* (< 10 clusters) and *A hereroensis* (< 5 individuals) were found to be sparsely present throughout the study area.

Ten small woody shrub individuals of the provincially protected species *Boscia foetida* as well as seven small tree individuals ($\leq 2\text{m}$ in height) of the nationally protected tree species *Boscia albitrunca* were furthermore also found to be present throughout the study area. Two of the latter species individuals are however situated outside the proposed development footprint.

Apart from these species, no Red Data Listed-, other nationally protected tree- or other provincially protected plant species or any other floral Species of Conservation Concern (SCC), were found to be present throughout the study area, during the site assessment. An extensive search yielded no findings. The seasonal timing of the assessment however did not coincide with the general flowering times of potential floral Species of Conservation Concern (SCC) and was therefore not favourable for successful identification of such species, if present. More underground bulb-plant species (geophytes) could therefore potentially be present throughout the karroid shrubland habitat, which were not necessarily visible aboveground due to the timing of the site assessment. Due to the undeveloped yet slight to moderately disturbed ecological state of the study area, the presence of individuals of such species is therefore possible but unlikely.

Due to the undeveloped yet slight to moderately disturbed ecological state of the study area, the area is reasonably representative/reminiscent of the natural subclimax state of the relevant Least Concerned Kalahari Karroid Shrubland vegetation type (NKb5). The area however does not house any locally distinct or conservationally important habitat features or plant species communities or -populations associated with this vegetation type. The extensive local and broader landscape surrounding the study area furthermore also mainly constitutes a vast, relatively homogenous, continuous undeveloped natural landscape. The size of the study area is therefore negligible relative to the surrounding natural landscape.

These factors significantly reduce the terrestrial biodiversity- and plant species conservational significance/value of the area. It is therefore evident from a floral biodiversity perspective, that the study area does not constitute an important component of the floral ecology of the area. It is consequently not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial terrestrial conservation- and persistence targets of the area or significantly impact on floral communities or the continued ecological connectivity, -connectivity, -functionality and -integrity of the local and broader surrounding landscape.

7.2.3. Plant Species List for the Study area

Table 12: Plant species list for Study Area (Nationally protected species highlighted in orange; provincially protected species highlighted in yellow; legally declared alien invasive species highlighted in pink)

Graminoids	Forbs & Succulents	Woody/Karroid Shrubs & Trees
<i>Aristida spp.</i>	<i>Acanthopsis disperma</i>	<i>Aptosimum lineare</i>
<i>Enneapogon desvauxii</i>	<i>Acanthopsis hoffmannseggiana</i>	<i>Aptosimum procumbens</i>
<i>Enneapogon scoparius</i>	<i>Adenium oleifolium</i>	<i>Aptosimum spinescens</i>
<i>Eragrostis lehmanniana</i>	<i>Aloe claviflora</i>	<i>Asparagus striatus</i>
<i>Eragrostis nindensis</i>	<i>Aloe hereroensis</i>	<i>Boscia albitrunca</i>
<i>Schmidtia pappophoroides</i>	<i>Albuca sp.</i>	<i>Boscia foetida</i>
<i>Stipagrostis spp.</i>	<i>Barleria macrostegia</i>	<i>Caroxylon aphyllum</i>
-	<i>Blepharis mitrata</i>	<i>Galena africana</i>
-	<i>Geigeria ornativa</i>	<i>Hertia pallens</i>
-	<i>Kleinia longiflora</i>	<i>Leucosphaera bainesii</i>
-	<i>Sesamum triphyllum</i>	<i>Neltuma glandulosa</i>
-	<i>Tetraena simplex</i>	<i>Parkinsonia africana</i>
-	-	<i>Phaeoptilum spinosum</i>
-	-	<i>Pogonospermum genistifolium</i>
-	-	<i>Rhigozum trichotomum</i>
-	-	<i>Senegalia mellifera</i>
-	-	<i>Zygophyllum decumbens</i>

7.2.4. Ecological Drivers, Functions, Processes and Corridors

The main ecological drivers, functions and processes which influence and maintain the surrounding portions of undeveloped natural karroid shrubland habitat include rainfall patterns, natural fire/burning regimes, faunal/floral community movement/migration and dispersal (landscape connectivity) and climate change.

The study area is rated as possessing **Low** overall long-term ecological/conservational value/significance. Merely limited existing residential and commercial transformation associated with the Louisvale township as well as historical and currently active agricultural cropland cultivation transformation solely concentrated along the length of the Orange River, is evident throughout the local and broader surrounding landscape. The extensive local and broader landscape surrounding the study area however mainly constitutes a vast, relatively homogenous, continuous undeveloped natural landscape. The size of the study area is therefore negligible relative to the surrounding natural landscape.

The size of the proposed development footprint is also minute relative to the Upstream Management Area and is situated a significant distance upslope of the associated Orange River (>3.5 km). Substantial natural buffering is therefore present throughout the Upstream Management Area downslope of the proposed development footprint, before reaching the River.

If adequate mitigation measures are implemented for the construction- and subsequent operational phases (see section 8.3), it is not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area. It will also not significantly impact on any local aquatic ecological features (watercourses or wetlands) or the continued ecological connectivity, -functionality and -integrity of the local watershed and broader sub-quaternary surface water catchment and drainage area. Mitigation measures must therefore focus on ensuring that the natural flow regimes of the significant ephemeral stream, flow paths/drainage lines and Upstream Management Area are as far as practicably possible/feasible, not significantly and/or permanently contaminated or impacted by the proposed development.

The negligible relative size of the proposed development footprint will also not significantly impact on the natural fire/burning regimes or result in any significant habitat fragmentation of the undisturbed surrounding undeveloped natural karroid shrubland habitat. It will therefore not pose any significant direct or indirect impact to the ecological connectivity, -connectivity, -functionality and -integrity of the local and broader surrounding landscape or Species of Conservation Concern (SCC) habitats and movement/migration/dispersal.

It is consequently not anticipated that the proposed development would pose any significant risk or impact on the main ecological drivers, functions and processes of the local surrounding landscape.

7.2.5. Critical Biodiversity Areas (CBA), Ecological Support Areas (ESA), Protected Areas, Strategic Water Source Areas (SWSA) and Indigenous Forests

Not applicable as there are none of these elements within- or associated with the study area.

7.2.6. Freshwater Ecosystem Priority Areas (FEPA)

As per section 7.1.2, the portion of the D73E - 3091 Sub Quaternary Reach (SQR) associated with the study area, does not fall within any Freshwater Ecosystem Priority Area (FEPA), Fish Support Area, -Sanctuary, -Corridor or -Rehabilitation Area. No populations of conservationally significant threatened fish species have been recorded throughout the study area or local downstream region or are expected to specifically/exclusively rely on the study area as refuge or for breeding, foraging and/or persistence purposes.

These factors significantly reduce the aquatic conservational significance/value of the area. The study area however falls within an Upstream Management Area, which slightly increases the aquatic conservational significance/value of the area. The size of the proposed development footprint is however minute relative to the Upstream Management Area and is situated a significant distance upslope of the associated Orange River (>3.5 km). Substantial natural buffering is therefore present throughout the Upstream Management Area downslope of the proposed development footprint, before reaching the River.

If unmitigated, it is consequently anticipated that the proposed development could potentially merely pose a slight risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area by impacting on the continued ecological connectivity, -functionality and -integrity of the local watershed and broader sub-quaternary surface water catchment and drainage area and consequently impacting the Upstream Management Area.

If adequate mitigation measures are however implemented for the construction- and subsequent operational phases (see section 8.3), it is not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area. It will also not significantly impact on any local aquatic ecological features (watercourses or wetlands) or the continued ecological connectivity, -functionality and -integrity of the local watershed and broader sub-quaternary surface water catchment and drainage area. Mitigation measures must therefore focus on ensuring that the natural flow regimes of the significant ephemeral stream, flow paths/drainage lines and Upstream Management Area are as far as practicably possible/feasible, not significantly and/or permanently contaminated or impacted by the proposed development.

7.3. Animal Species Theme

7.3.1. Species of Conservation Concern (SCC)

7.3.1.1. Mammals

The following threatened mammalian species (excluding those under section 6.4) are indicated by the platform iNaturalist as having been previously identified in the local area and therefore have a realistic chance/possibility of potentially/likely occurring throughout the local and broader landscape into which the study area falls:

Table 13: List of mammalian Species of Conservation Concern (SCC) which can realistically potentially/likely occur throughout the study area (species are listed based on decreasing threatened status)

Taxonomic Family	Scientific Name	Common Name	Red List Categories	Habitat Requirements	Probability of Occurrence
Felidae	<i>Felis nigripes</i>	Black-footed Cat	Globally/Nationally Vulnerable & ToPS Protected	Inhabits dry, open savannah, grasslands and Karoo semi-deserts with sparse shrub and tree cover with a mean annual rainfall of between 100 to 500 mm. It is endemic to the dry grassland or dwarf shrub, and savanna of the Karoo and Kalahari in southern Africa. During the day it uses termite mounds or unoccupied burrows of springhare (<i>Pedetes capensis</i>), aardvark (<i>Orycteropus afer</i>), and Cape porcupine (<i>Hystrix africaeaustralis</i>). Additionally, it often uses occupied dens of aardwolf (<i>Proteles cristatus</i>). It has a strong preference for open dens that are surrounded by short grasses and where there is high abundance of rodents or ground roosting birds.	Low: No individuals, burrows, spoor, scat/droppings or any other evidence associated with the presence of these two species was observed throughout the study area, during the site assessment. An extensive search yielded no sightings/findings. This is however a very contact-shy and disturbance-sensitive species with low detection probability. Due to the undeveloped yet slight to moderately disturbed ecological state of the study area along with the continued surrounding anthropogenic activities associated with the township, the presence of individuals or burrowing sites of this species is therefore highly unlikely/improbable and it is highly

					unlikely/improbable that the area would specifically/exclusively be relied upon by this species as refuge or for breeding, foraging and/or persistence purposes. It is anticipated that this species would rather prefer to utilise the surrounding undeveloped natural karroid shrubland habitat further away from the township and associated anthropogenic activities.
Otididae	<i>Hydrictis maculicollis</i>	Spotted-necked otter	Globally Near Threatened/Nationally Vulnerable	Perennial habitat/watercourses. aquatic	Low. No individuals, spoor, scat/droppings or any other evidence associated with the presence of these two species was observed throughout the study area, during the site assessment. Due to the lack of suitable perennial aquatic habitat/watercourses throughout- or in immediate proximity to the study area required by these two species, the realistic chance/possibility of this species potentially occurring throughout the study area is highly unlikely/improbable. It is anticipated that these two species would rather prefer to utilise the less disturbed perennial aquatic habitat provided by the Orange River further to the west.
Mustelidae	<i>Aonyx capensis</i>	Cape Clawless Otter	Globally/Nationally Near Threatened		

Orycteropodidae	<i>Orycteropus afer</i>	Aardvark	ToPS Protected	Occurs in a broad range of habitats, including the semi-arid Karoo areas of southern Africa, grasslands, all savannah types, rainforests, woodlands and thickets. Well-adapted for multiple habitats, including arid regions, as long as sufficient prey are available. Absent from hyper-arid habitats and avoid very rocky terrain that is difficult to dig in. Occur at all altitudes within the assessment region but are not common on steep slopes. Also known to occupy farmlands, for example in the Drakensberg Midlands of KwaZulu-Natal Province.	Low: No individuals, burrows, spoor, scat/droppings or any other evidence associated with the presence of these two species was observed throughout the study area, during the site assessment. An extensive search yielded no sightings/findings. Due to the undeveloped yet slight to moderately disturbed ecological state of the study area along with the continued surrounding anthropogenic activities associated with the township, the presence of individuals or burrowing sites of these two species is therefore highly unlikely/improbable and it is highly unlikely/improbable that the area would specifically/exclusively be relied upon by these two species as refuge or for breeding, foraging and/or persistence purposes. It is anticipated that these two species would rather prefer to utilise the surrounding undeveloped natural karroid shrubland habitat further away from the township and associated anthropogenic activities
Canidae	<i>Otocyon megalotis</i>	Southern Bat-eared Fox	ToPS Protected	Prime habitat is mainly short grass plains and areas with bare ground, but it is also found in open scrub vegetation and arid, semi-arid or winter rainfall shrub lands, and open arid savannah. They are absent from true desert or afforested areas.	

7.3.1.2. Herpetofauna

No threatened herpetofaunal species are indicated by the platform iNaturalist as having been previously identified in the local area and therefore having a realistic chance/possibility of potentially/likely occurring throughout the local and broader landscape into which the study area falls.

7.3.1.3. Avifauna

No threatened avifaunal species are indicated by the platform iNaturalist as having been previously identified in the local area and therefore having a realistic chance/possibility of potentially/likely occurring throughout the local and broader landscape into which the study area falls.

7.3.2. Common/General Species

No mammalian burrows were found to be present throughout the study area. Due to the undeveloped yet slight to moderately disturbed ecological state of the study area along with the continued surrounding anthropogenic activities associated with the township, it is not expected that the study area will be regularly visited/traversed by any meso-predatory- and small mammals or small deer species or be specifically/exclusively relied upon by any such species as refuge or for breeding, foraging and/or persistence purposes.

The study area does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website (<https://www.birdlife.org.za/what-we-do/important-bird-and-biodiversity-areas/media-and-resources/#1553597171790-6f83422a-a731>). No individuals or nests of any conservationally significant or important bird species were found to be present throughout the study area. Only individuals of general/common local resident bird species were found to be sporadically present.

The study area is likely occasionally visited/traversed and even frequented by common/general herpetofaunal species individuals. Due to the undeveloped yet slight to moderately disturbed ecological state of the study area along with the continued surrounding anthropogenic activities associated with the township, it is however not expected that the study area will be specifically/exclusively relied upon by any such species as refuge or for breeding, foraging and/or persistence purposes.

It is anticipated that all such common/general faunal species would rather prefer to utilise the surrounding undeveloped natural karroid shrubland habitat further away from the township and associated anthropogenic activities.

No other actual faunal sightings/encounters occurred during the site assessment.

7.3.3. Conclusion

No individuals, nests, burrows, spoor, scat/droppings or any other evidence associated with the presence of any faunal Species of Conservation Significance (SCC) was observed throughout the study area, during the site assessment. An extensive search yielded no sightings/findings.

Due to the extensive and dense woody component associated with the significant ephemeral stream (legally declared alien invasive species infestation), the stream habitat is visibly extensively utilised by various common/general bird-, amphibian- and other faunal species.

The slight to moderately disturbed ephemeral preferential water flow paths/drainage lines habitats are not specifically/exclusively relied upon by any common/general aquatic bird-, amphibian- and other aquatic faunal species.

Due to the undeveloped yet slight to moderately disturbed ecological state of the study area along with the continued surrounding anthropogenic activities associated with the township, the presence of nesting or burrowing sites of such species is therefore highly unlikely/improbable and it is highly unlikely/improbable that the area would specifically/exclusively be relied upon by any such species as refuge or for breeding, foraging and/or persistence purposes. It is anticipated that such species would rather prefer to utilise the surrounding undeveloped natural karroid shrubland habitat further away from the township and associated anthropogenic activities. The mobility of faunal/avifaunal species allows for individuals to simply leave an area where disturbance is taking place and relocate to surrounding similar, adequate areas. These factors significantly reduce the animal species conservational significance/value of the area.

It is therefore evident from a faunal biodiversity perspective, that the study area does not constitute an important component of the faunal ecology of the area. The extensive local and broader landscape surrounding the study area furthermore also mainly constitutes a vast, relatively homogenous, continuous undeveloped natural landscape. The size of the study area is therefore negligible relative to the surrounding natural landscape. It is consequently not anticipated that the proposed development would pose any significant risk to- or impact on the faunal communities throughout the local or broader surrounding landscape.

7.4. Site Ecological Importance (SEI)

See section 3 for the methodology outlining the criteria for categorisation of Site Ecological Importance (SEI).

7.4.1. Plant Species

The floral species Site Ecological Importance (SEI) of the study area is classified as **Low** as it is merely viewed as being slightly ecologically important and/or sensitive on local scale. The study area is therefore merely viewed as being of low overall long-term conservational significance/value for habitat preservation and continued ecological connectivity, -functionality and -integrity persistence in support of the surrounding ecosystem, broader vegetation type and floral habitats. Minimisation and restoration mitigation - development activities of medium to high impact are consequently acceptable followed by appropriate restoration activities.

The SEI calculation is as follows:

Conservation Importance	+	Functional Integrity	=	Biodiversity Importance
(Low)	+	(Medium)	=	(Low)
Biodiversity Importance	+	Receptor Resilience	=	Site Ecological Importance
(Low)	+	(Low)	=	(Low)

7.4.2. Animal Species

The faunal species Site Ecological Importance (SEI) of the study area is classified as **Very Low** as it is not viewed as being ecologically important and/or sensitive on any scale. The study area is therefore not viewed as being of any overall long-term conservational significance/value for habitat preservation and continued ecological connectivity, -functionality and -integrity persistence in support of the surrounding ecosystem or faunal habitats. Minimisation mitigation - development activities of medium to high impact acceptable and restoration activities may not be required.

The SEI calculation is as follows:

Conservation Importance	+	Functional Integrity	=	Biodiversity Importance
(Very Low)	+	(Medium)	=	(Very Low)
Biodiversity Importance	+	Receptor Resilience	=	Site Ecological Importance
(Very Low)	+	(Low)	=	(Very Low)

7.5. Ecological Site Sensitivity Features Map

The ecological site sensitivity features map below (see A3 sized map in the Appendices: Appendix 7) illustrates the locations of the identified aquatic ecological features and recommended buffer zone as well as the identified conservationally significant plant species individuals associated with the study area.

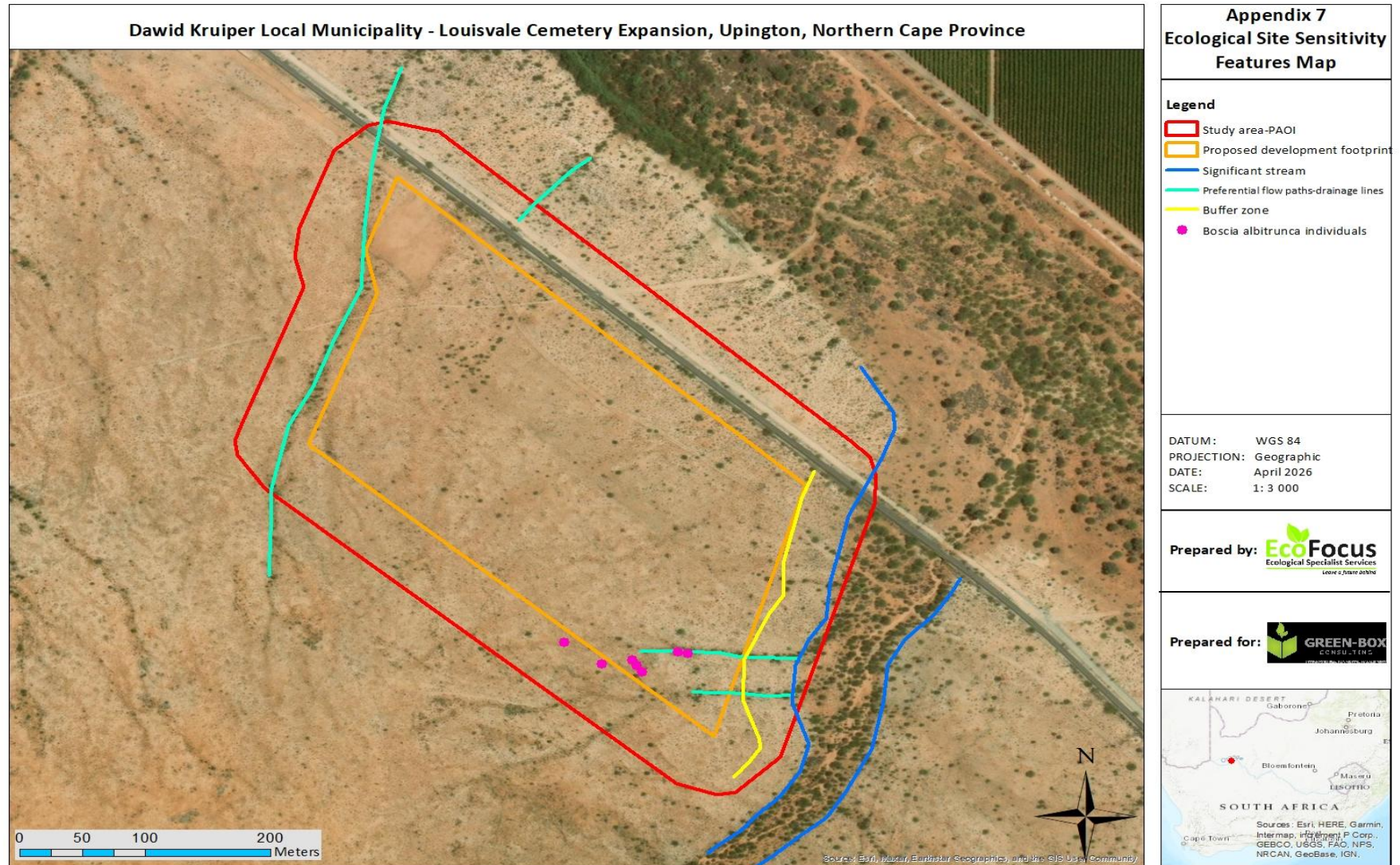


Figure 15: Ecological site sensitivity features map illustrating the locations of the identified aquatic ecological features and recommended buffer zone as well as the identified conservationally significant plant species individuals associated with the study area

8. Ecological Receptor Impact Management and Mitigation

8.1. Receptor Impacts

No medium- or high significance potential long-term ecological receptor impacts were identified for the proposed development. The following main ecological impact receptors could potentially be affected by the proposed development:

- Clearance and transformation of a negligible slight to moderately disturbed portion of Least Concerned Kalahari Karroid Shrubland vegetation type (NKb5)
- Clearance and transformation of a negligible slight to moderately disturbed portion associated with common/general faunal/floral species habitats/individuals as well as provincially protected plant- and nationally protected tree species individuals
 - Individuals/clusters of the provincially protected species *Adenium oleifolium* (< 10 individuals), *Aloe claviflora* (< 10 clusters) and *A hereroensis* (< 5 individuals) were found to be sparsely present throughout the study area.
 - Ten small woody shrub individuals of the provincially protected species *Boscia foetida* as well as seven small tree individuals ($\leq 2\text{m}$ in height) of the nationally protected tree species *Boscia albitrunca* were furthermore also found to be present throughout the study area. Two of the latter species individuals are however situated outside the proposed development footprint
- Contamination of a negligible slight to moderately disturbed portion of directly surrounding Least Concerned Kalahari Karroid Shrubland vegetation type (NKb5) along with common/general faunal/floral species habitats/individuals as well as provincially protected plant- and nationally protected tree species individuals by slight fugitive dust generation, emissions and fallout
- Fragmentation of the local ecological connectivity, -functionality and -integrity and subsequent direct and/or indirect impact on common/general faunal/floral species habitats and community movement/migration/dispersal
- Exotic- and legally declared alien invasive species establishment and spreading within the reasonably natural directly surrounding landscape
- Noise and lighting generation and disturbance to common/general diurnal and nocturnal faunal species utilising the local surrounding landscape
- Alteration/impeding of the sources/drivers and flow regime of the significant ephemeral stream (volumes and peak flow) and consequent impact on the ecological functionality and - integrity of the local watershed and broader quaternary surface water catchment and drainage area

- Contamination of the sources/drivers and flow regime of the significant ephemeral stream and consequent impact on the ecological functionality and -integrity of the local watershed and broader quaternary surface water catchment and drainage area (sewage, hydrocarbons, embalment chemicals and corpse decomposition, surface material/soil erosion as well as slight fugitive dust generation, emissions and fallout)
- The original proposed development footprint was however proactively revised after the initial site sensitivity verification, based on the recommended buffer zone associated with the single second-order non-perennial watercourse (significant ephemeral stream) which flows past the proposed development footprint within 100 m to the east (see sections 7.1 & 8.3)
- Contamination of soil and groundwater resources (hydrocarbons, embalment chemicals and corpse decomposition)

8.2. Cumulative Impact

The potential for future similar developments in the same geographical area, which could lead to further cumulative impacts, cannot be meaningfully anticipated. It is however unlikely that further similar cemetery expansion and subsequent transformation would take place throughout the local area, over time.

If unmitigated, the significant potential long-term ecological receptor impacts identified for the proposed development (see section 8.1), could potentially merely low cumulative impact to the existing negative impacts associated with the merely limited existing residential and commercial transformation associated with the Louisvale township as well as historical and currently active agricultural cropland cultivation transformation solely concentrated along the length of the Orange River, throughout the local and broader surrounding landscape. The extensive local and broader landscape surrounding the study area however mainly constitutes a vast, relatively homogenous, continuous undeveloped natural landscape. The size of the study area is therefore negligible relative to the surrounding natural landscape.

It is the opinion of the specialist, by application of the NEMA Mitigation Hierarchy, that all the identified potential cumulative ecological receptor impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels, by implementation of the recommended mitigation measures (see section 8.3). It is therefore not anticipated that the proposed development will add any significant residual cumulative ecological receptor impacts to the surrounding environment, if all recommended mitigation measures as per this ecological report (see section 8.3) are adequately implemented and managed, for both the construction- and subsequent operational phases of the proposed development.

8.3. Mitigation and Management Measures

The following main ecological receptor impact management and mitigation measures are recommended for the proposed development (if applicable):

- The proposed development footprint must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the surrounding undeveloped landscape outside the proposed development footprint may take place
- No temporary or permanent site construction basecamps may be established within the surrounding undeveloped landscape outside the proposed development footprint
- Adequately cordon off the proposed development construction footprint and ensure that no construction activities, machinery or equipment operate or impact within the surrounding undeveloped landscape outside the cordoned off area
- Adequate operational procedures for construction machinery and equipment must be developed in order to strictly govern and restrict movement of machinery only within the proposed development construction footprint and to ensure environmentally responsible construction practices and activities
- Existing roads and farm tracks in close proximity to the proposed development construction footprint, must be used during the construction phase. No new temporary roads or tracks may be constructed or implemented through the surrounding undeveloped landscape outside the proposed development footprint
- Disturbed areas within and immediately surrounding the proposed development construction footprint must be adequately rehabilitated concurrently with- or as soon as practicably possible after the construction processes. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced SACNASP registered ecologist, if deemed necessary by the competent authority
- A Nationally Protected Tree License has to be obtained from the Department of Forestry, Fisheries and the Environment (competent authority), prior to the commencement of any construction activities and the subsequent potential removal/destruction of any identified nationally protected tree species individuals
 - It is however recommended that as many of the nationally protected tree species *Boscia albitrunca* individuals as practicably possible/feasible, should not be removed/damaged and should be left in situ and intact

- A Provincial Flora Permit has to be obtained from the Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform (competent authority), prior to the commencement of any construction activities and the subsequent removal/destruction of any identified indigenous- and provincially protected flora
 - It is however recommended that a representative number of individuals/clusters of the species *Adenium oleifolium* (minimum 5), *Aloe claviflora* (minimum 5) and *A hereroensis* (minimum 3) must be adequately relocated to another suitable and similar area as to where it was removed from. This relocation process must be completed prior to the commencement of any vegetation clearance- and/or construction activities. A Protected Plant Species Relocation Management Plan must be compiled by a suitably qualified and experienced SACNASP registered ecologist
- It is recommended that a sufficient grazing management plan and practices must be implemented for livestock of the local community. This must be done in order to prevent any significant overgrazing of the surrounding landscape and to attempt to improve/restore the ecological condition, over time
- Implement adequate alien invasive species management and prevention measures during the construction- and subsequent operational phases of the proposed development. An Alien Invasive Species Management Plan must be compiled by a suitably qualified and experienced SACNASP registered ecologist, if deemed necessary by the competent authority
- It is recommended that all individuals of any identified legally declared alien invasive species must be actively eradicated from the study area and specifically surrounding the artificial flow channel, in accordance with the requirements of the National Environmental Management: Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014. Removed materials must also be adequately and lawfully disposed of, in order to prevent potential further spreading/dispersal
- Implement adequate stormwater and erosion management measures during the construction- and subsequent operational phases of the proposed development. This must be done to sufficiently manage stormwater runoff and clean/dirty water separation, in order to prevent any significant surface water contamination of the local and broader surrounding landscape as well as prevent any significant soil erosion from occurring within and around the proposed development footprint and to attempt to maintain the ecological connectivity, - functionality and -integrity of the local watershed and broader sub-quaternary surface water catchment and drainage area

- It is recommended that the development design layouts for the proposed infrastructure must include adequate stormwater management measures to ensure that sufficient volumes and quality of surface water runoff from the study area during seasonal rainfall events, continue to be channelled through the local catchment
- It is further recommended that sufficient stormwater cut-off berms/trenches be constructed around the upslope boundaries of the proposed cemetery footprint. These cut-off berms/trenches must assist with- and manage clean/dirty water separation by diverting and channelling clean surface water runoff from the surrounding natural landscape around the proposed cemetery footprint during seasonal rainfall events, for continued flow. The cut-off berms/trenches are to be adequately lined internally, if deemed necessary by the engineer to prevent channel erosion. The cut-off berms/trenches are to be adequately maintained and regularly cleaned out, as and when necessary
- Water flow-breaks and dispersal infrastructure should be installed at the water release-points of the of the design layouts. This infrastructure must be able to adequately reduce the water flow velocity and disperse the water over a larger surface area, prior to entering into the surrounding landscape. This is necessary to prevent any potential localised erosion, which could occur at the water release-points due to high water volume concentration and flow velocity build-up. The water flow-breaks and dispersal infrastructure are to be adequately maintained and regularly cleaned out, as and when necessary
- The detailed design layouts including the slope- and measurement/capacity parameters of the stormwater cut-off berms/trenches, water flow-breaks and dispersal infrastructure must be calculated and determined by a suitably qualified and experienced engineer, in order to achieve this objective
- A Geo-hydrological assessment must be conducted of the study area, in order to determine the direct impacts of the proposed development on groundwater resources/aquifers, if deemed necessary by the competent authority
- A Water Use License Application (WULA)/General Authorisation (GA) must be submitted to the Department of Water and Sanitation for the proposed development within 100 m of the significant ephemeral stream as well as through the small and very small ephemeral preferential water flow paths/drainage lines associated with the study area, as required in accordance with the National Water Act (Act 36 of 1998)
- All the applicable requirements in terms of Sections 9 and 10 of GNR 40229: General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for Water Uses as Defined in Section 21(c) or Section 21(i), must be adequately implemented for both the construction- and subsequent operational phases of the proposed development

- By implementing the relevant Department of Water and Sanitation (DWS) Wetland/Watercourse buffer calculation tools, a minimum Water Quality- and Biodiversity Buffer distance of approximately 22 m from the significant ephemeral stream, was determined. In accordance with the precautionary principle of the National Environmental Management Act (Act 107 of 1998), it is however highly recommended that the buffer zone be increased by a further 13 m due to the potentially significant additional continual anthropogenic activities associated with the subsequent operational phase of the established development. It is therefore recommended that a minimum Water Quality- and Biodiversity Buffer distance of approximately 35 m be implemented around the significant ephemeral stream. No current or future development or transformation or any movement/operations of machinery/equipment may take place within the buffered zone
 - The original proposed development footprint was therefore proactively revised after the initial site sensitivity verification, based on the recommended buffer zone associated with the stream (see section 7.1)
- If building materials, hydrocarbons or other chemicals are to be stored on site during the construction- or subsequent operational phases, the storage areas must be situated as far away as practicably possible/feasible from the significant ephemeral stream and minimum outside the buffer zone
- Building material, hydrocarbon and other chemical storage areas must be adequately banded in order to be able to contain a minimum of 150 % of the capacity of storage tanks/units
- Adequate hydrocarbon and other chemical storage, handling, usage and spillage clean-up procedures must be developed, and all relevant employees must be sufficiently trained on- and apply these procedures during the construction- or subsequent operational phases
- Spill kits must be readily available at the construction- and subsequent operational site. All relevant employees must be adequately trained on the correct procedure and use of the spill kits
- Suitable and lawful management and disposal of hydrocarbons other chemicals and all waste products generated by the proposed cemetery must be ensured by the applicant
- Implement suitable dust suppression and management measures during the construction- and subsequent operational phases of the proposed development
- Construction areas and -roads to be sufficiently wetted down during the construction phase of the proposed development, if/when necessary, in order to suppress/prevent significant fugitive dust generation, emissions and fallout

- Adequate operational procedures for machinery and equipment must be developed to strictly govern and restrict movement of machinery, in order to avoid unnecessary fugitive dust generation, emissions and fallout and ensure environmentally responsible operational practices and activities
- It is recommended that environmentally friendly/biodegradable embalming chemical products, caskets and other options be utilised as far as practicably possible/feasible in all the corpse preparation and burial processes associated with the operational phase of the proposed cemetery
- It is recommended that no bright light from any spotlights or perimeter lights or loud/excessive noise should be emitted into the surrounding landscape, during the nighttime. As little light emissions as practicably/reasonably possible from the established development, should occur during nighttime as this could lure aquatic bird- and other nocturnal avifaunal species individuals towards the perimeter fences and potentially result in collisions and mortality
- Lighting and illumination infrastructure technology and layout designs must be done in an environmentally friendly and responsible manner
- The minimum amount of lighting and illumination infrastructure which is practicably/feasibly possible for the established development to function at, must be utilised during nighttime
- Lighting and illumination infrastructure must as far as practicably possible be directed at low shining angles towards the ground and towards the inner portions of the established development, in order to reduce the amount of bright light being emitted into the surrounding natural landscape
- Lower shining intensity environmentally friendly lighting products must be utilised in order to reduce the brightness of light being emitted into the surrounding natural landscape
- An adequate sewage management system must be installed for the proposed development
- Adequate leakage detection and prevention systems/measures must be installed into the sewage management system in order to detect any potential leakages and subsequent contamination of soil and groundwater resources
- If any leakages or overflows of the sewage management system occur, the competent authority must immediately be notified and the necessary steps must be followed by the applicant to locate and remediate the source of contamination, as soon as practicably possible/feasible
- The integrity of the sewage management system must be inspected on a regular basis and adequately maintained over time, in order to ensure its continued functionality and prevent any leakages or failures

9. Conclusion

The identified single second-order non-perennial watercourse (significant ephemeral stream) scored a **Low/Marginal Ecological Importance and Sensitivity (EIS)** value and is viewed as being of low-moderate overall long-term aquatic ecological/conservational value/significance for the continued ecological connectivity, -functionality and -integrity persistence of the local watershed and broader sub-quadernary surface water catchment and drainage area in support of the surrounding ecosystem as well as the aquatic faunal/floral ecology of the area. It is consequently deemed important that the stream be adequately buffered out of the proposed development footprint in order to ensure that its natural flow regime is not significantly and/or permanently contaminated or impacted by the proposed development.

The small and very small ephemeral preferential water flow paths/drainage lines associated with the study possess very low, if any overall long-term aquatic ecological/conservational value/significance. It is consequently not deemed necessary for these flow paths/drainage lines to be buffered out of the proposed development footprint from a hydrological- or aquatic biodiversity perspective. It is however still recommended that the natural flow regime of the flow path/drainage line situated directly adjacent west of the proposed development footprint, should not be significantly and/or permanently contaminated or impacted by the proposed development, if practicably possible/feasible.

If adequate mitigation measures are implemented for the construction- and subsequent operational phases (see section 8.3), it is not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area. It will also not significantly impact on any local aquatic ecological features (watercourses or wetlands) or the continued ecological connectivity, -functionality and -integrity of the local watershed and broader sub-quadernary surface water catchment and drainage area. Mitigation measures must therefore focus on ensuring that the natural flow regimes of the significant ephemeral stream, flow paths/drainage lines and Upstream Management Area are as far as practicably possible/feasible, not significantly and/or permanently contaminated or impacted by the proposed development.

The study area scored a **Low** floral species Site Ecological Importance (SEI) value and a **Very Low** faunal species Site Ecological Importance (SEI) value. The study area is therefore rated as possessing **Low** overall long-term ecological/conservational value/significance. The study area is consequently merely viewed as being of low overall long-term conservational significance/value for habitat preservation and continued ecological connectivity, -connectivity, -functionality and -integrity persistence in support of the surrounding ecosystem, broader vegetation type and faunal/floral habitats.

It is therefore evident from a faunal/floral biodiversity perspective, that the study area does not constitute an important component of the faunal/floral ecology of the area. It is consequently not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial terrestrial conservation- and persistence targets of the area or significantly impact on faunal/floral communities or the continued ecological connectivity, -functionality and -integrity of the local and broader surrounding landscape.

No medium- or high significance potential long-term ecological receptor impacts were identified for the proposed development. The following main ecological impact receptors could potentially be affected by the proposed development:

- Clearance and transformation of a negligible slight to moderately disturbed portion of Least Concerned Kalahari Karroid Shrubland vegetation type (NKb5)
- Clearance and transformation of a negligible slight to moderately disturbed portion associated with common/general faunal/floral species habitats/individuals as well as provincially protected plant- and nationally protected tree species individuals
 - Individuals/clusters of the provincially protected species *Adenium oleifolium* (< 10 individuals), *Aloe claviflora* (< 10 clusters) and *A hereroensis* (< 5 individuals) were found to be sparsely present throughout the study area.
 - Ten small woody shrub individuals of the provincially protected species *Boscia foetida* as well as seven small tree individuals ($\leq$ 2m in height) of the nationally protected tree species *Boscia albitrunca* were furthermore also found to be present throughout the study area. Two of the latter species individuals are however situated outside the proposed development footprint

- Contamination of a negligible slight to moderately disturbed portion of directly surrounding Least Concerned Kalahari Karroid Shrubland vegetation type (Nkb5) along with common/general faunal/floral species habitats/individuals as well as provincially protected plant- and nationally protected tree species individuals by slight fugitive dust generation, emissions and fallout
- Fragmentation of the local ecological connectivity, -functionality and -integrity and subsequent direct and/or indirect impact on common/general faunal/floral species habitats and community movement/migration/dispersal
- Exotic- and legally declared alien invasive species establishment and spreading within the reasonably natural directly surrounding landscape
- Noise and lighting generation and disturbance to common/general diurnal and nocturnal faunal species utilising the local surrounding landscape
- Alteration/impeding of the sources/drivers and flow regime of the significant ephemeral stream (volumes and peak flow) and consequent impact on the ecological functionality and -integrity of the local watershed and broader quaternary surface water catchment and drainage area
- Contamination of the sources/drivers and flow regime of the significant ephemeral stream and consequent impact on the ecological functionality and -integrity of the local watershed and broader quaternary surface water catchment and drainage area (sewage, hydrocarbons, embalment chemicals and corpse decomposition, surface material/soil erosion as well as slight fugitive dust generation, emissions and fallout)
- The original proposed development footprint was however proactively revised after the initial site sensitivity verification, based on the recommended buffer zone associated with the single second-order non-perennial watercourse (significant ephemeral stream) which flows past the proposed development footprint within 100 m to the east (see sections 7.1 & 8.3)
- Contamination of soil and groundwater resources (hydrocarbons, embalment chemicals and corpse decomposition)

The potential for future similar developments in the same geographical area, which could lead to further cumulative impacts, cannot be meaningfully anticipated. It is however unlikely that further similar cemetery expansion and subsequent transformation would take place throughout the local area, over time.

If unmitigated, the significant potential long-term ecological receptor impacts identified for the proposed development (see above), could potentially merely low cumulative impact to the existing negative impacts associated with the merely limited existing residential and commercial transformation associated with the Louisvale township as well as historical and currently active agricultural cropland cultivation transformation solely concentrated along the length of the Orange River, throughout the local and broader surrounding landscape. The extensive local and broader landscape surrounding the study area however mainly constitutes a vast, relatively homogenous, continuous undeveloped natural landscape. The size of the study area is therefore negligible relative to the surrounding natural landscape.

It is the opinion of the specialist, by application of the NEMA Mitigation Hierarchy, that all the identified potential cumulative ecological receptor impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels, by implementation of the recommended mitigation measures (see section 8.3). It is therefore not anticipated that the proposed development will add any significant residual cumulative ecological receptor impacts to the surrounding environment, if all recommended mitigation measures as per this ecological report (see section 8.3) are adequately implemented and managed, for both the construction- and subsequent operational phases of the proposed development.

A Nationally Protected Tree License has to be obtained from the Department of Forestry, Fisheries and the Environment (competent authority), prior to the commencement of any construction activities and the subsequent potential removal/destruction of any identified nationally protected tree species individuals. It is however recommended that as many of the nationally protected tree species *Boscia albitrunca* individuals as practicably possible/feasible, should not be removed/damaged and should be left in situ and intact.

By implementing the relevant Department of Water and Sanitation (DWS) Wetland/Watercourse buffer calculation tools, a minimum Water Quality- and Biodiversity Buffer distance of approximately 22 m from the significant ephemeral stream, was determined. In accordance with the precautionary principle of the National Environmental Management Act (Act 107 of 1998), it is however highly recommended that the buffer zone be increased by a further 13 m due to the potentially significant additional continual anthropogenic activities associated with the subsequent operational phase of the established development. It is therefore recommended that a minimum Water Quality- and Biodiversity Buffer distance of approximately 35 m be implemented around the significant ephemeral stream. No current or future development or transformation or any movement/operations of machinery/equipment may take place within the buffered zone.

The original proposed development footprint was therefore proactively revised after the initial site sensitivity verification, based on the recommended buffer zone associated with the stream (see section 7.1).

It is recommended that environmentally friendly/biodegradable embalming chemical products, caskets and other options be utilised as far as practicably possible/feasible in all the corpse preparation and burial processes associated with the operational phase of the proposed cemetery.

The proposed development footprint is confirmed to be of 'low' Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes sensitivity and no potential ecological fatal flaws were identified for the proposed development. It is therefore the opinion of the specialist from an ecological perspective, that the proposed development can be considered by the competent authority for Environmental Authorisation and approval. All recommended mitigation measures as per this ecological report (see section 8.3) must however be adequately implemented and managed for both the construction- and subsequent operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.



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Abbreviated Curriculum Vitae

Qualifications

- M.Env.Sci Ecological Remediation and Sustainable Utilisation/Vegetation Ecology
 - 2011 - North West University Potchefstroom
- B.Sc Botany and Zoology (Cum Laude)
 - 2009 - North West University Potchefstroom

Accredited Courses Completed

- Implementing Environmental Management Systems ISO 14001
 - 2011 - North West University Potchefstroom
- Environmental Law for Environmental Managers
 - 2011 - North West University Potchefstroom
- SASS 5 Aquatic Biomonitoring Training Course
 - 2017 – GroundTruth Consulting
- Tools for Wetland Assessment
 - 2023 – GroundTruth Consulting
- Introduction to Wetland Assessments
 - 2023 – GroundTruth Consulting

Professional Registrations

- South African Council for Natural Scientific Professions (**SACNASP**)
 - Professional Ecological Scientist Registration number 115601
- International Association for Impact Assessment (**IAIA**)
 - Registration number 5232
- South African Green Industries Council (**SAGIC**) Invasive Species training
 - Registration number 2405/2459
- South African Wetland Society (**SAWS**)
 - Membership number 220958

Employment and Experience

March 2011 - October 2011

Upon completion of his studies, Rikus started his career in 2011 as an **Environmental Professional in Training (PIT) at Anglo American Thermal Coal: Environmental Services**. He received environmental training and practical implementation experience in all environmental facets of the mining industry with the focus on: Environmental rehabilitation, land management (biodiversity and invasive species eradication), waste & water-, air quality-, game reserve-, environmental management and legislation, as well as corporate reporting. He was also appointed as the Biodiversity Management Custodian at Anglo American Thermal Coal collieries.

November 2011 - November 2015

He was then employed by **Fraser Alexander Tailings as an Environmental Contracts Manager**, where he was responsible for the technical and operational management of all Fraser Alexander Tailings' mining environmental rehabilitation projects. He was responsible for implementation of rehabilitation- and environmental strategies as well as all facets/entire business value chain of project management.

He conducted a significant amount of quantitative and qualitative ecological vegetation monitoring during his employment period with the company. Such monitoring mainly included environmentally rehabilitated mining areas in the open-cast coal-, gold-, platinum- and chrome mining industries situated in the Free State, Gauteng, Mpumalanga, North-West and Limpopo Provinces. He was involved with analysis, processing and interpretation of environmental monitoring data and compilation of high quality technical/scientific environmental monitoring reports for clients. He was subsequently further involved with providing adequate ecological management and maintenance recommendations for rehabilitated areas. He also provided technical/scientific environmental rehabilitation support to mining clients, with regards to sufficient soil preparation and amelioration, grassing processes, as well as grass species mixtures and ratios.

January 2016 - May 2017

He was then employed by **Enviroworks Consulting as a Senior Ecological Specialist** where he was responsible for all Terrestrial and Aquatic Ecological Specialist Assessments and reporting related to Environmental Impact Assessment (EIA) and Basic Assessment (BA) projects. He also completed numerous EIA and BA projects as the main project Environmental Assessment Practitioner (EAP).

June 2017 - Present

Rikus then subsequently established the company EcoFocus Consulting (Pty) Ltd as the owner and Managing Director, which provides high quality professional environmental and ecological specialist services and solutions to the industrial-, construction-, mining-, agricultural-, renewable energy- and other sectors.

He possesses significant qualifications, vast knowledge, skills as well as technical and practical experience in the project management and environmental specialist fields. This, coupled with his disciplined, determined, innovative, goal-driven and solution-oriented mindset as well as exceptional problem-solving-, communication- and people skills along with his high level of personal standards, ensure high quality, timely and outcomes-based outputs and service delivery relating to any project.

Ecological & Wetland Specialist Assessment & Report Completion for the last two years

2026

- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 107 ha Prieska Power Reserve Doringberg PV Solar Energy Facility Development, Prieska, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 129 ha Farm No. 2727 Residential Development, Bloemfontein, Free State Province.
- Aquatic Ecological Impact Assessment Review for the proposed 12.8 km Khauta South 132 kV Overhead Powerline Development, Riebeeckstad, Free State Province.
- Terrestrial Vegetation Desktop Site Sensitivity Screening Assessment for the proposed 23 786 ha Morgenzon Wind Energy Facility Development, Mpumalanga Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 0.97 ha Brandkop Reservoir Development, Bloemfontein, Free State Province.

- Plant Species-, Rehabilitation-, Soil Erosion- and Alien Invasive Species Management Plan for the proposed 10.2 ha Arbor Acres Poultry Broiler House Development, Dealesville, Free State Province.
- Watercourse/Wetland Assessment Report for the proposed 108 ha Gamsberg Zinc Mine Phase 2 Tailings Storage Facility and Associated Infrastructure Development, Aggeneys, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 108 ha Gamsberg Zinc Mine Phase 2 Tailings Storage Facility and Associated Infrastructure Development, Aggeneys, Northern Cape Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 5.4 ha Farm Die Vlakte No. 731 Poultry Broiler House Development, Boshof, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 5.4 ha Farm Die Vlakte No. 731 Poultry Broiler House Development, Boshof, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 11.55 ha Farm No. 406 Piggery Expansion, Heilbron, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 11.55 ha Farm No. 406 Piggery Expansion, Heilbron, Free State Province.
- Aquatic Ecological Impact Assessment Review for the proposed 165 MW Khauta North Solar PV Facility BESS and O&M Building Development, Riebeeckstad, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 17.5 ha Ladybrand Wastewater Treatment Works (WWTW) Upgrade, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 17.5 ha Ladybrand Wastewater Treatment Works (WWTW) Upgrade, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 5.95 ha Askham Cemetery Expansion, Northern Cape Province.

2025

- Aquatic Ecological Compliance Statement for the proposed Obed Nkosi Residential and Attenuation Pond Development, Heidelberg, Gauteng Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed Obed Nkosi Residential and Attenuation Pond Development, Heidelberg, Gauteng Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 1 200 m² Erf 2103 Upington Single Residential Development, Northern Cape Province.
- Aquatic Ecological Compliance Statement for the proposed 990 m and 0.23 ha Nala Local Municipality Pipeline and Pumping Station Development, Bothaville, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 990 m and 0.23 ha Nala Local Municipality Pipeline and Pumping Station Development, Bothaville, Free State Province.
- Grazing and Invasive Species Follow-up Assessment for the Farm Retiefs Nek No. 123 outside Bethlehem, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes Compliance Statement for the proposed 5.84 ha Modder Rivier Truckstop Development, Northern Cape Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes Specialist Assessment Report for the proposed 462 ha Manoke Residential Development, Burgersfort, Limpopo Province.
- Terrestrial- as well as Plant- and Animal Species Themes Site Sensitivity Verification Report for the proposed 800 ha Seriti Green (Pty) Ltd Middelburg Mine Services (MMS) Solar PV Energy Facility Northern Portion Development, eMalahleni, Mpumalanga Province.
- Terrestrial- as well as Plant- and Animal Species Themes Site Sensitivity Verification Report for the proposed 510 ha Seriti Green (Pty) Ltd Middelburg Mine Services (MMS) Solar PV Energy Facility Southern Portion Development, eMalahleni, Mpumalanga Province.
- Terrestrial- as well as Plant- and Animal Species Themes Site Sensitivity Verification Reports for the proposed 17.4 km Seriti Green (Pty) Ltd Middelburg Mine Services (MMS) Overhead Powerline North Options A & B Developments, eMalahleni, Mpumalanga Province.
- Terrestrial- as well as Plant- and Animal Species Themes Site Sensitivity Verification Reports for the proposed 7.12 km Seriti Green (Pty) Ltd Middelburg Mine Services (MMS) Overhead Powerline Olifants Grid Northern Exit, South A & South B Developments, eMalahleni, Mpumalanga Province.

- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 600 m Jagersfontein Road and Bridge Watercourse Crossing Development, Free State Province.
- Ecological Re-vegetation and Alien Invasive Species Management Plan for the proposed Nketoana Local Municipality Existing Waste Water Treatment Works Decommissioning, Lindley, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 29.6 ha Hoopstad Cemetery Development, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 29 ha Bultfontein Cemetery Development, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 43.2 ha Witho Developers Upington Residential Development, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 64.6 ha Phaliso Residential Development, Trompsburg, Free State Province.
- Aquatic Biodiversity Theme SSV & Compliance Statement for the proposed 78.7 km 386 Phetogo - Welbedacht Pipeline Development, Dewetsdorp, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 78.7 km 386 Phetogo - Welbedacht Pipeline Development, Dewetsdorp, Free State Province.
- Aquatic Biodiversity Theme SSV & Compliance Statement for the proposed 643 ha and 9.3 km Sol Platz Solar PV Facility with Battery Energy Storage System, Electrical Grid Connection, and Associated Infrastructure Development, Bloemfontein, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 643 ha and 9.3 km Sol Platz Solar PV Facility with Battery Energy Storage System, Electrical Grid Connection, and Associated Infrastructure Development, Bloemfontein, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 13 ha AHB Logistix Upington Truckstop Expansion, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 153 ha 322 Majwemasweu Township Development, Brandfort, Free State Province.
- Indigenous species list for the proposed Riverton Water Treatment Works (WTW) Perimeter Fenceline Development, Northern Cape Province.

- National Water Act (Act 36 of 1998) Section 21 C & I Water Use Letter for the proposed Kathu Waste Handling Facility Transfer Station Development, Northern Cape Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 18 ha Springbokvlakte Coldmix Plant Development, Bela-Bela, Limpopo Province.
- Aquatic Biodiversity Theme SSV & Compliance Statement for the proposed 880 m Smaldeel Road Upgrade, Kroonstad, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 15.3 ha Ribblesdale Industrial Park Development, Bloemfontein, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 10.6 ha Ribblesdale Borrow Pit Development, Bloemfontein, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 10.4 ha Holtzhuisfontein Borrow Pit Development, Bloemfontein, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 29.6 ha Hoopstad Cemetery Development, Free State Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 7 ha Olyvenshouts Drift Settlement Raisin Drying Facility, Upington, Northern Cape Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 8.1 ha Olyvenshouts Drift Settlement Raisin Drying Facility NEMA Section 24G, Upington, Northern Cape Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 47.6 ha Brandfontein Feedlots Expansion, Burgersdorp, Eastern Cape Province.
- Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes SSV & Compliance Statement for the proposed 10.2 ha Holtzhuisfontein Borrow Pit Development, Bloemfontein, Free State Province.
- Aquatic Ecological Impact Assessment Review for the proposed 101 ha Khauta West 80 MW Solar PV Energy Facility Development, Riebeeckstad, Free State Province.

- Terrestrial Biodiversity- as well as Plant- and Animal Species Themes SSV & Specialist Assessment Report for the proposed 209.41 ha Beginsel Agriculture Estate Development, Clarens, Free State Province.
- Watercourse/Wetland Assessment Report for the proposed 9 ha Barkly West Wastewater Treatment Works (WWTW) Refurbishment, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 9 ha Barkly West Wastewater Treatment Works (WWTW) Refurbishment, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 47.6 ha Brandfontein Feedlots Expansion, Burgersdorp, Eastern Cape Province.
- Desktop Site Sensitivity Maps for the proposed refurbishment of Moeding WWTW and 10 Pump Stations, Phuthaditjhaba, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix review for the proposed 7.22 ha Welgegund Borrow Pit Development, Excelsior, Free State Province.
- Watercourse/Wetland Assessment Report for the proposed 9.1 ha Utopia Gas Depot & Light Industrial Development, Bethlehem, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 9.1 ha Utopia Gas Depot & Light Industrial Development, Bethlehem, Free State Province.
- Aquatic Biodiversity Theme SSV & Specialist Assessment Report for the proposed 262 ha 434 Orange River Solar Facility 1 Associated Infrastructure Development, Groblershoop, Northern Cape Province.