

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

**AHB Logistix Upington Truckstop
Expansion, Northern Cape Province**

July 2025

Compiled for:



GREEN-BOX
CONSULTING

INTEGRATED ENVIRONMENTAL MANAGEMENT

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

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, AHB Logistix, proposes to formally expand their existing filling station and truckstop, directly adjacent north-east of the town of Upington, Northern Cape Province. According to the information received from the EAP, the proposed development will tie into the existing municipal water, sewage and electrical infrastructure.

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 footprint 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 footprint 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: 14 July 2025

Duration: 2.5 hours

Season: This date forms part of the winter season. The seasonal timing of the assessment therefore did not coincide with the general flowering times of the listed 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 grassland/shrubland habitats, which were not necessarily visible aboveground due to the timing of the site assessment.

The seasonal timing of the assessment was irrelevant for successful identification of the listed faunal Species of Conservation Concern (SCC), if present.

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 footprint, 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.
- Sample sites were assessed in accordance with the Species Environmental Assessment Guideline (SANBI, 2020).
 - Fourteen sample sites were assessed within the study area/PAOI.
 - This equates to an observation density of approximately 1.08 sample sites/ha.
 - 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, borrows, spoor, scat 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 study area is traversed by numerous footpaths and dirt roads that are used for daily commuting by the local community. Illegal squatters are also established within an old, dilapidated homestead situated directly inside the central-western boundary of the proposed development footprint. Due to these continued surrounding anthropogenic activities, 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 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 filling station and truckstop expansion 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 and only during the construction phase. Impeding and contamination of watercourse flow regimes by altered water runoff (volumes and peak flow), could however pose a significant long-term direct potential ecological receptor impact for the local surrounding landscape during the operational phase, which will increase the study area/PAOI.

Contamination of soil and groundwater resources by hydrocarbons and other chemicals in the event of above- and belowground fuel storage tank leakages/seepages, ruptures, overflows or operational spillages at the fuel pumps along with the significant volumes of wastewater generated from the wash way, could furthermore also pose significant long-term direct potential ecological receptor impacts for the local surrounding landscape during the operational phase, which will increase the study area/PAOI. The significance of this potential receptor impact must however be assessed by a Geo-hydrological study, if deemed necessary by the competent authority.

Suitable dust management and prevention measures must be implemented during the construction phase of the proposed development. Construction areas and -roads must be sufficiently wetted down during the construction phase of the proposed development, in order to prevent significant fugitive dust generation, emissions and fallout. Adequate operational procedures for machinery and equipment must also be developed to strictly govern and restrict movement of machinery, in order to avoid unnecessary fugitive dust generation and emissions and ensure environmentally responsible operational practices and activities.

Adequate stormwater and erosion management measures must be implemented 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 functionality and -integrity of the local watershed and broader quaternary surface water catchment and drainage area. The development design layouts for the proposed infrastructure must also 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 towards south.

The fuel storage tanks must be adequately bunded in order to be able to contain a minimum of 150 % of the capacity of the storage tanks. 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- and subsequent operational phases. Spill kits must be readily available at the construction- and subsequent operational site and all relevant employees must be adequately trained on the correct procedure and use of the spill kits. Adequate leakage detection and prevention systems/measures must be implemented for the filling station and truckstop in order to detect any potential leakages and subsequent contamination of groundwater resources. Adequate dirty water collection and containment sumps/drains or other measures must be constructed as part of the truck wash bay designs. These sumps/drains or other measures must assist with- and manage clean/dirty water separation by preventing contaminated water runoff from leaving the truck wash bay and entering the surrounding natural landscape.

The study area/PAOI will therefore merely constitutes 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 5.3 ha in size, while the study area/PAOI constitutes a slightly increased single footprint area of approximately 13 ha in size. The proposed development footprint is situated on a Portion of Erf No. 1 (SG 21 Digit Code: C02800070000000100000), although the study area/PAOI also falls within the directly adjacent surrounding land portions. The study area/PAOI is situated directly adjacent north-east of the town of Upington, Northern Cape Province. The town 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 inside the municipal urban edge. Access to the study area/PAOI is obtained by way of the N14 National Highway.

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

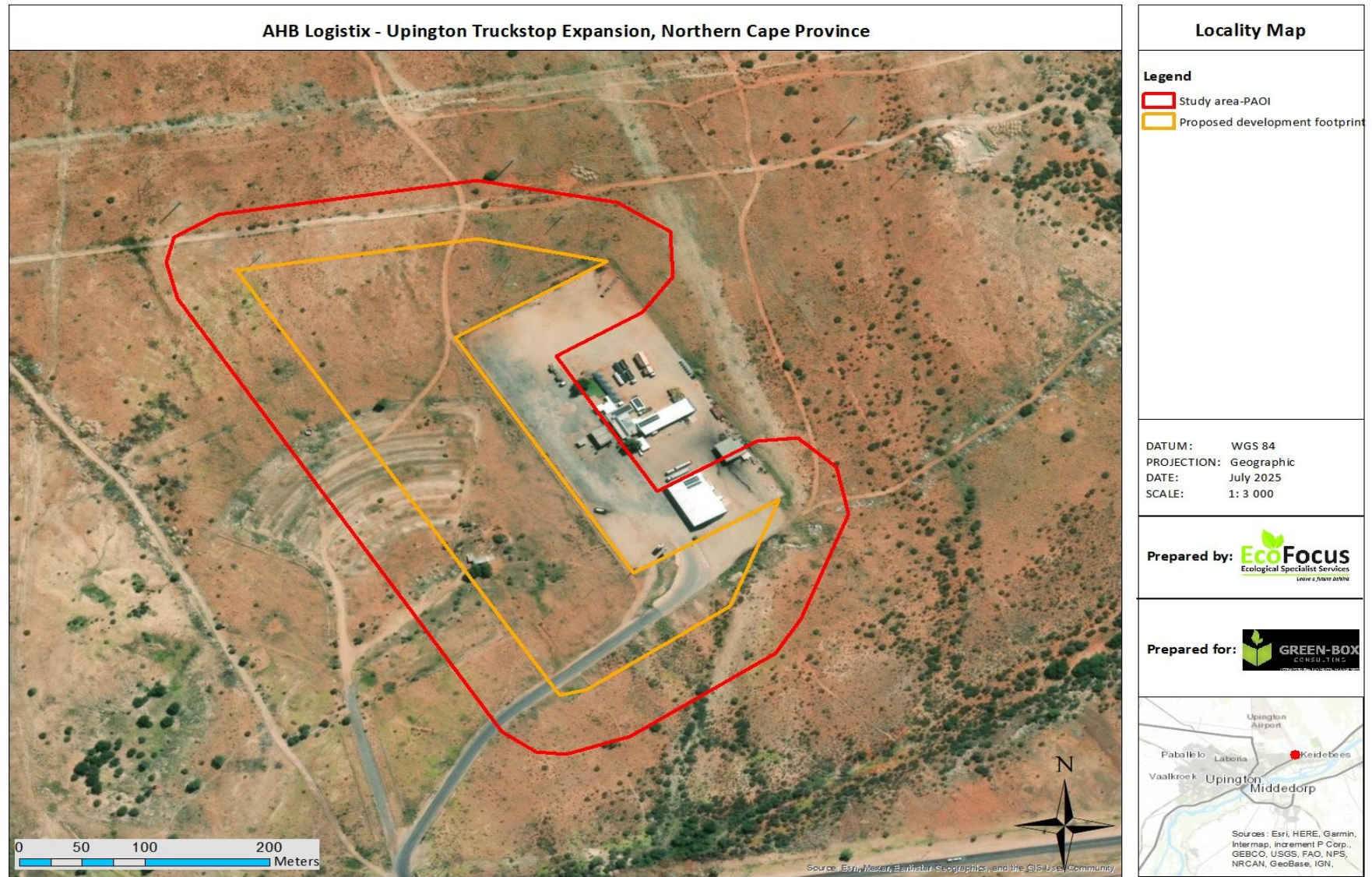


Figure 1: Locality map illustrating the proposed development footprint and study area/PAOI

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 Kalahari Karroid Shrubland vegetation type (Nkb5), which is characterised by low karroid shrubland on flat, gravel plains. Karoo related elements start to meet northern floristic features indicating transitional zone (SANBI, 2006-2024). This vegetation type is classified as Least Concerned (SANBI, 2006-2024 & Revised List of Ecosystems Threatened and in Need of Protection, 2022).

4.5.2. Provincial Biodiversity Status

The majority of the study area is categorised as Degraded, according to the Northern Cape Biodiversity Spatial Plan 2024 (Oosthuysen *et al.*, 2024), which sets out biodiversity priority areas in the province. Merely the small north-western portion of the study area is however categorised as Other Natural Area (ONA), according to the Northern Cape Biodiversity Spatial Plan 2024 (Oosthuysen *et al.*, 2024).

See vegetation type- and provincial biodiversity status maps below (see A3 sized maps in the Appendices).



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

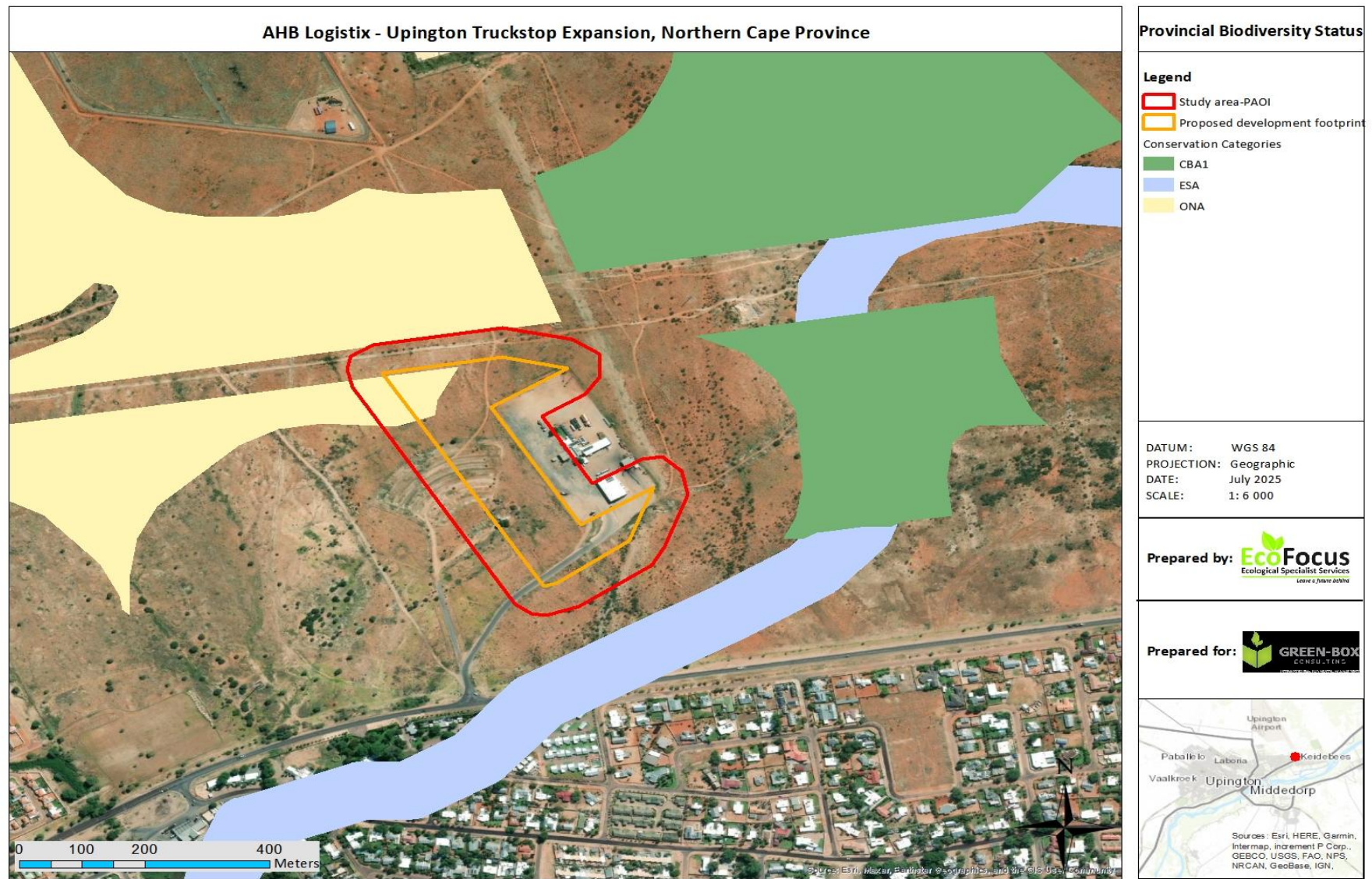


Figure 3: Provincial biodiversity status map illustrating the provincial biodiversity statuses/categories associated with the study area

4.6. Specialist GPS Track and Sample Sites Map

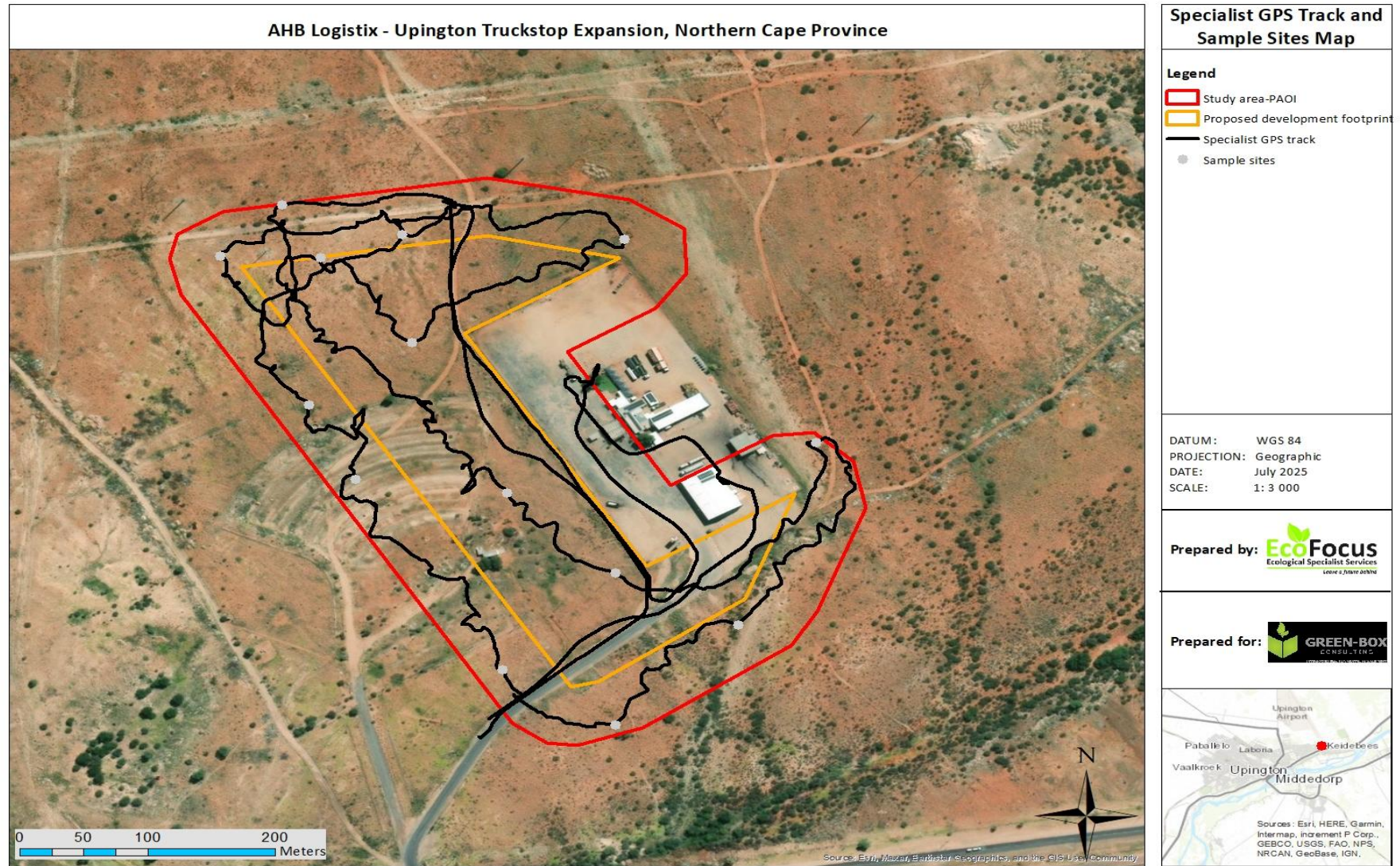


Figure 4: Specialist GPS track and sample sites map illustrating the assessment route used by the specialist

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 ecological assessment.
- The seasonal timing of the assessment did not coincide with the general flowering times of the listed 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 grassland/shrubland habitats, which were not necessarily visible aboveground due to the timing of the site assessment.
- The seasonal timing of the assessment was irrelevant for successful identification of the listed faunal Species of Conservation Concern (SCC), if present.
- The assessment was restricted to the winter season and 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 study area is traversed by numerous footpaths and dirt roads that are used for daily commuting by the local community. Illegal squatters are also established within an old, dilapidated homestead situated directly inside the central-western boundary of the proposed development footprint. Due to these continued surrounding anthropogenic activities, 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, industrial and commercial transformation associated with the town 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.
- According to the latest municipal Spatial Development Framework (SDF), further extensive residential, industrial and commercial development in excess of 180 ha is envisaged for the local area directly adjacent north of the town (west of the proposed development footprint). It is therefore likely that further similar filling station and truckstop development and subsequent transformation could take place throughout the local area, over time which would lead to further cumulative impacts.

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.

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

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 - 2760 Sub Quaternary Reach (SQR), within the Nama Karoo Ecoregion (26). The study area generally slopes slightly towards the south.

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), there are no significant natural perennial watercourses, -wetlands or -salt pans of which the regulated areas fall within the proposed development footprint.

Two very small first-order ephemeral preferential water flow paths/drainage lines commence- and flow past the proposed development footprint within 100 m. It is evident from a hydrological- and aquatic biodiversity perspective, that the ephemeral preferential water flow paths/drainage lines associated with the study area do not constitute important components of the local watershed and broader 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.

According to the National Freshwater Ecosystem Priority Areas Database (NFEPA, 2011), the portion of the D73E - 2760 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 utilise 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.

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 fragmented as well as moderate to highly disturbed and degraded ecological state of the majority of the study area, the study area is therefore not representative/reminiscent of the natural climax state of the relevant Least Concerned Kalahari Karroid Shrubland vegetation type (NKb5). The study area also 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.

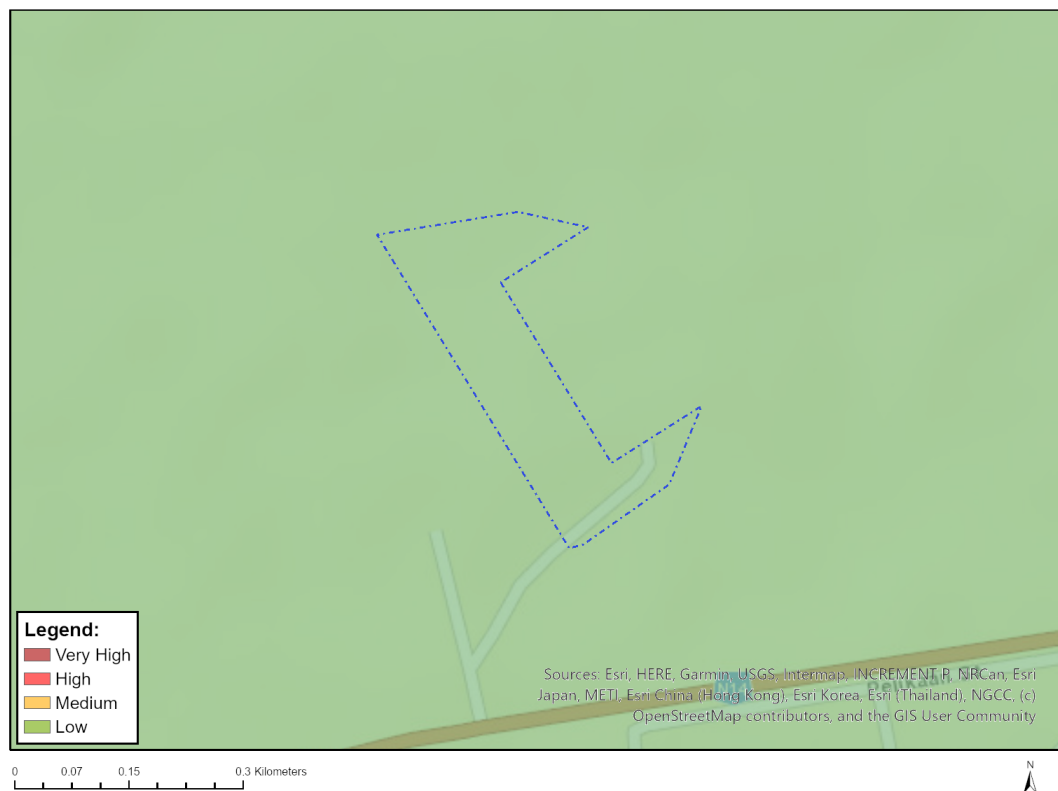


Figure 7: Plant Species Theme Sensitivity as per the DFFE National Web-Based Environmental Screening Tool Report

The provincially protected species *Mesembryanthemum guerichianum* was found to be well-represented throughout the study area, while the provincially protected species *Adenium oleifolium*, *Mesembryanthemum coriarium* and *M tetragonum* (both low confidence ID) were also found to be present but to a lesser extent. Two small individuals situated directly adjacent each other, of the nationally protected tree species *Vachellia erioloba* were also found to be present throughout the study area. A single individual of the provincially protected species *Aloe hereroensis* as well as three clusters of the provincially protected species *Aloe claviflora* were found to be present throughout the study area.

No Red Data Listed-, other nationally protected- 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 the listed floral Species of Conservation Concern (SCC) and was therefore not favourable for successful identification of such species, if present. Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the majority of the study area, the presence of individuals of these species is therefore highly unlikely/improbable. It is anticipated that these species would rather be present throughout the undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town. More underground bulb-plant species (geophytes) could however potentially be present throughout the karroid grassland/shrubland habitats, which were not necessarily visible aboveground due to the timing of the site assessment. Due to the disturbed and degraded ecological state, this is however unlikely.

Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the majority of the study area, the study area is therefore not representative/reminiscent of the natural climax state of the relevant Least Concerned Kalahari Karroid Shrubland vegetation type (NKb5). The study area also 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 north-easterly corner is rated as being of 'medium' sensitivity.

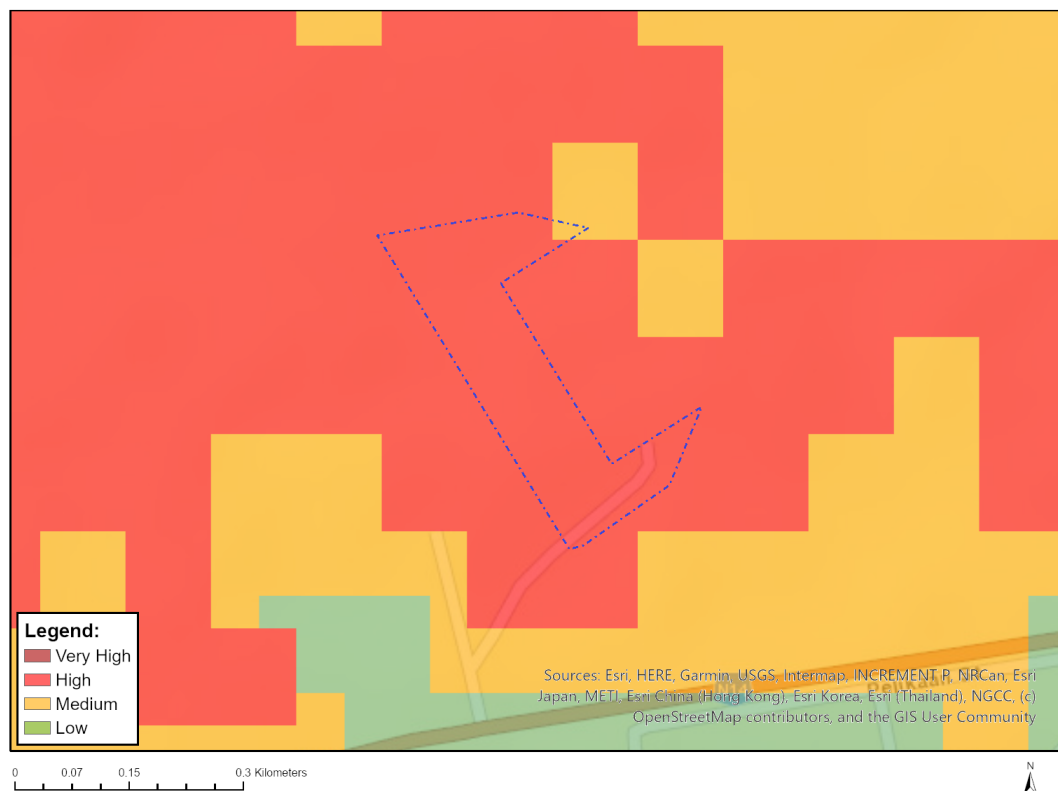


Figure 8: Animal Species Theme Sensitivity as per the DFFE National Web-Based Environmental Screening Tool Report

The sensitivity ratings are for the potential (medium rating) and likely (high 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 highlighted based on their 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 areas rated as being of 'high' sensitivity, during the site assessment. The karroid grassland/shrubland associated with the study area also does not provide suitable nesting habitat for this species. An extensive search also yielded no sightings/findings. Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the of the majority of the study area along with the continued surrounding anthropogenic activities associated with the town, illegal squatters, existing filling station and truckstop and highway and the virtually complete absence of sufficiently sized and shaped tree individuals for nesting, the presence of nesting sites of this species is therefore highly unlikely/improbable.

					The study area however provides a limited degree of suitable foraging habitat for this species. It is anticipated that this species would rather prefer to utilise the undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town, existing filling station and truckstop and highway.
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 or specifically within the areas rated as being of 'medium sensitivity', during the site assessment. The karroid grassland/shrubland associated with the study area however provides a limited degree of suitable nesting habitat for this species. An extensive search however yielded no sightings/findings. Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the of the majority of the study area along with the continued surrounding anthropogenic activities associated with the town, illegal squatters, existing filling station and truckstop and highway, the presence of nesting sites of this species is therefore highly unlikely/improbable.

					It is anticipated that this species would rather prefer to utilise the undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town, existing filling station and truckstop and highway.
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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 nests of any conservationally significant or important bird species were found to be present throughout the study area. Only general/common local resident bird species and nests were found to be present throughout the study area.

No individuals, nests, burrows, spoor, scat 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 fragmented as well as moderate to highly disturbed and degraded ecological state of the majority of the study area along with the continued surrounding anthropogenic activities associated with the town, illegal squatters, existing filling station and truckstop and highway, the presence of nesting or burrowing sites of such species is also unlikely and it is unlikely that the area would specifically be utilised 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 undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town, existing filling station and truckstop and highway. 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 study 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 'high and medium' Animal Species Theme sensitivity ratings for portions of the study area but rather concludes that these portions are rated as 'low' sensitivity. The entire study area is therefore rated as '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.

6.5. Site Sensitivity Verification Map

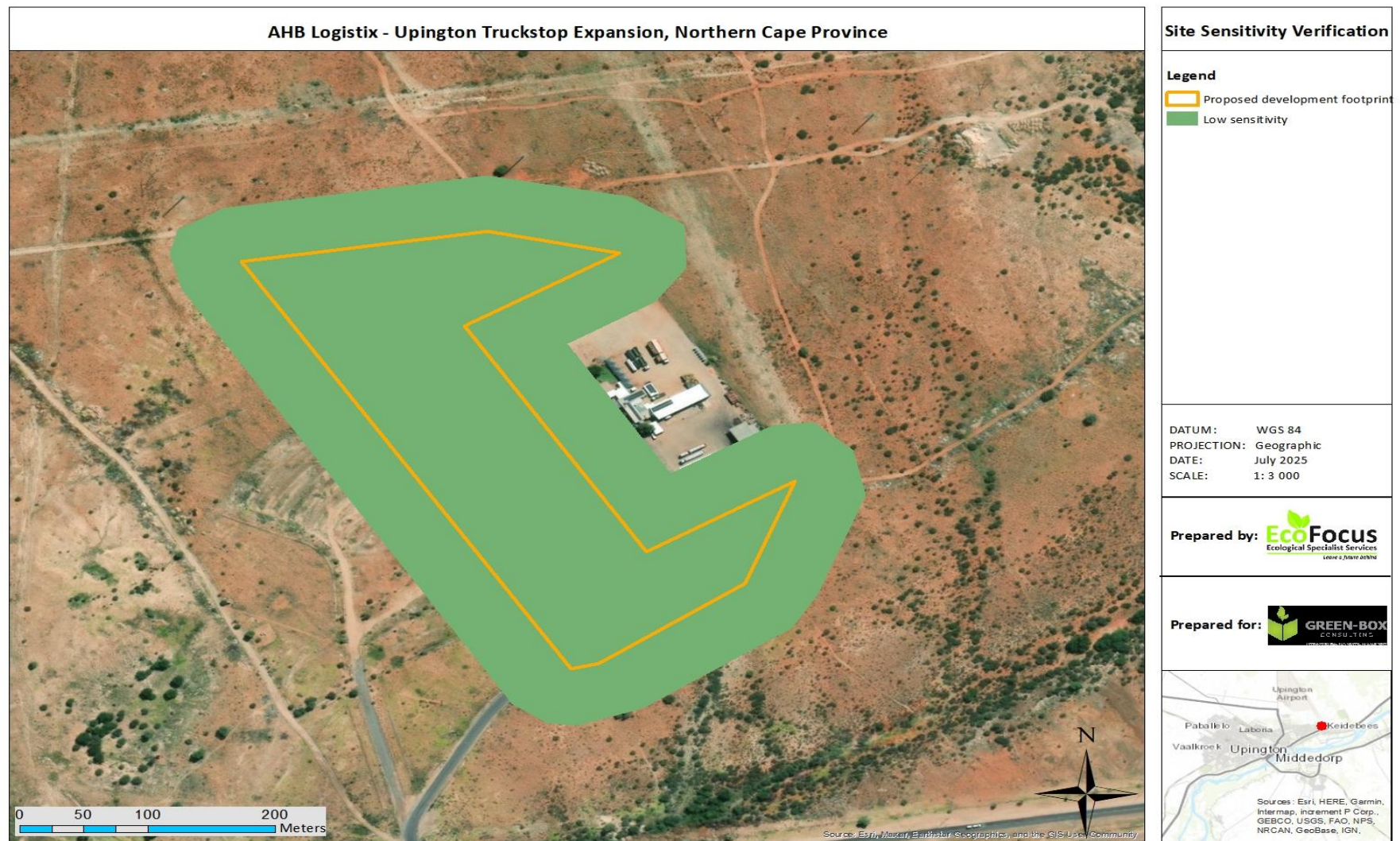


Figure 9: Site sensitivity verification map illustrating the combined sensitivities of the Terrestrial- and Aquatic Biodiversity- as well as Plant- and Animal Species Themes associated with the study area

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 - 2760 Sub Quaternary Reach (SQR), within the Nama Karoo Ecoregion (26). The study area generally slopes slightly towards the south.

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), there are no significant natural perennial watercourses, -wetlands or -salt pans of which the regulated areas fall within the proposed development footprint.

Two very small first-order ephemeral preferential water flow paths/drainage lines commence- and flow past the proposed development footprint within 100 m.

According to the National Freshwater Ecosystem Priority Areas Database (NFEPA, 2011), the portion of the D73E - 2760 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 utilise 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. It is consequently not anticipated that the proposed development of the study area would pose any significant risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area or impact significantly on any local aquatic ecological features (watercourses or wetlands) or the continued ecological functionality and -integrity of the local watershed and broader quaternary surface water catchment and drainage area.

See desktop water catchment and drainage data map below (see A3 sized map in the Appendices).

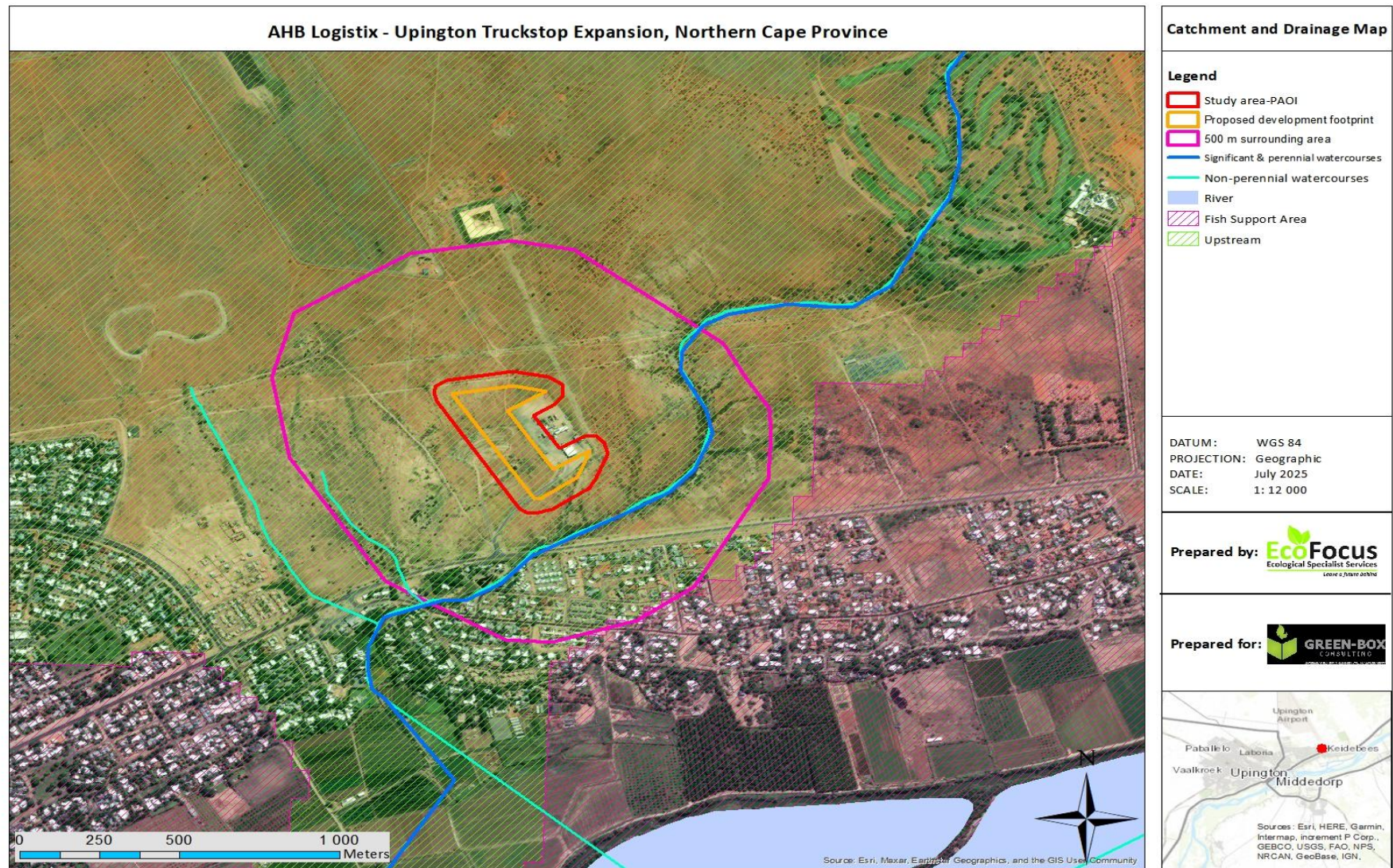


Figure 10: Desktop water catchment and drainage data map illustrating the main watercourses and wetlands/pans as well as the Upstream Management Area associated with the study area

7.1.3. Preferential Water Flow Paths/Drainage Lines

Two very small first-order ephemeral preferential water flow paths/drainage lines commence- and flow past the proposed development footprint within 100 m. These flow paths/drainage lines commence directly adjacent outside the south-eastern portion of the study area. They continue in a southerly direction for a very short distance and then discharge into a significant fifth-order ephemeral watercourse approximately 140 m south of the proposed development footprint.

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.

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

The flow paths/drainage lines are in a moderate to highly disturbed pioneer to sub-climax ecological state. This is mainly as a result of significant historical and continued anthropogenic activity and disturbance throughout the local area and consequent exotic- and alien invasive species establishment, associated with the existing residential environment and highway.

The woody component along the edges/banks of the flow paths/drainage lines is overwhelmingly dominated by shrubs and small tree individuals of the indigenous species *Senegalia mellifera* and the legally declared alien invasive species *Prosopis glandulosa* (Category 3 in the Northern Cape Province). No hydrophytic/obligate- or facultative wetland grass-, reed- or sedge species were found to be present within the flow paths/drainage lines.

It is therefore evident from a hydrological- and aquatic biodiversity perspective, that the ephemeral preferential water flow paths/drainage lines associated with the study area do not constitute important components of the local watershed and broader 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 regimes of the flow paths/drainage lines should not be significantly and/or permanently contaminated or impacted by the proposed development, if practicably possible/feasible.



Figure 11: Two images illustrating the presence of the two very small first-order ephemeral preferential water flow paths/drainage lines which commence directly adjacent outside the south-eastern portion of the study area and continue in a southerly direction (red arrows indicate the water flow direction)

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

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).

Preferential water flow paths/drainage lines

Due to their very small sizes and ephemerality of the habitats associated with the two first-order ephemeral 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

Extensive historical excavation and earthmoving activities are evident throughout the majority of the study area. Merely small fragmented portions of undeveloped natural landscape still remain within the northern portion of the study area. The terrestrial ecological features identified throughout the study area are therefore divided into the following main categories for reporting purposes:

- Historical excavation and earthmoving area
- Remaining undeveloped natural area

7.2.1. Historical Excavation and Earthmoving Area

The re-established vegetation of the historical excavation and earthmoving area constitutes a medium-height terrestrial karroid grassland habitat. The study area should however in actual fact house a karroid shrubland habitat associated with the relevant vegetation type (see section 4.5.1). Historical building rubble dumping is sparsely evident throughout the area and the study area is traversed by numerous footpaths and dirt roads that are used for daily commuting by the local community. Illegal squatters are also established within an old, dilapidated homestead situated directly inside the central-western boundary of the proposed development footprint and domestic waste/garbage dumping is therefore sporadically evident throughout the area. The existing filling station and truckstop is furthermore also situated directly adjacent east of the proposed development footprint. 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 re-established karroid grassland habitat is therefore in a highly disturbed and degraded pioneer ecological state.

The karroid grassland habitat is mainly dominated by the robust/resilient Increaser 2 type grass species *Enneapogon cenchroides* (Van Oudtshoorn, 2022), while the grass species *Stipagrostis spp.* are also well-represented. The grass species *Aristida spp.*, *Enneapogon desvauxii*, *Eragrostis spp.* and *Schmidtia pappophoroides* were also found to be present but to a lesser extent. This overwhelming dominance of hardy Increaser 2 type grass species and virtually complete absence of any desired palatable Decreaser type climax grass species (Van Oudtshoorn, 2022), confirms the disturbed and degraded pioneer ecological state of the karroid grassland habitat.

The karroid shrub species *Pogonospermum genistifolium* is well-represented, while the species *Aptosimum lineare*, *A procumbens*, *A spinescens*, *Hermannia sp.*, *Lyceum cinereum*, *Phaeoptilum spinosum*, *Rhigozum trichotomum*, *Salsola aphylla* and *Zygophyllum decumbens* were merely found to be sparsely present throughout the karroid grassland habitat.

A diverse forb- or succulent layer was not evident throughout the karroid grassland habitat, during the site assessment. This is most likely as a result of the disturbed and degraded ecological state of the local landscape together with the timing of the assessment. The provincially protected species *Mesembryanthemum guerichianum* was found to be well-represented, while the forb species *Acanthopsis disperma*, *A. hoffmannseggiana*, *Barleria macrostegia*, *Blepharis mitrata*, *Kleinia longiflora*, *Sesamum triphyllum* and *Tetraena simplex* as well as the legally declared alien invasive species *Cylindropuntia fulgida* (Category 1b) were merely found to be sparsely present.

Small woody shrub individuals of the indigenous species *Senegalia mellifera* and *Vachellia tortilis* as well as the legally declared alien invasive species *Prosopis glandulosa* (Category 3 in the Northern Cape Province) were merely found to be sporadically present throughout the karroid grassland habitat. Two small individuals situated directly adjacent each other, of the nationally protected tree species *Vachellia erioloba* were also found to be present.

The karroid grassland habitat associated with the historical excavation and earthmoving area is rated as possessing **Very Low** overall long-term ecological/conservational value/significance.



Figure 12: Three images illustrating examples of the highly disturbed and degraded medium height terrestrial karroid grassland habitat at the sample sites, associated with the extensive historical excavation and earthmoving area within the majority of the study area; sparse building rubble dumping is visibly evident

7.2.2. Remaining Undeveloped Natural Area

The small fragmented portions of undeveloped natural landscape which still remain within the northern portion of the study area, constitute a low-growing open terrestrial karroid shrubland habitat with a sparse grass layer. As discussed under section 7.2.1, the study area is traversed by numerous footpaths and dirt roads that are used for daily commuting by the local community. Illegal squatters are also established within an old, dilapidated homestead situated directly inside the central-western boundary of the proposed development footprint and domestic waste/garbage dumping is therefore sporadically evident throughout the area. The existing filling station and truckstop is furthermore also situated directly adjacent east of the proposed development footprint. 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 sub-climax ecological state.

The karroid shrubland habitat is mainly dominated by the species *Pogonospermum genistifolium* and *Rhigozum trichotomum*, while the species *Aptosimum lineare*, *A procumbens*, *A spinescens*, *Hermannia sp.*, *Lyceum cinereum*, *Phaeoptilum spinosum*, *Salsola aphylla* and *Zygophyllum decumbens* are also well-represented.

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 local landscape together with the timing of the assessment. The forb species *Acanthopsis disperma*, *A hoffmannseggiana*, *Barleria macrostegia*, *Blepharis mitrata*, *Kleinia longiflora*, *Sesamum triphyllum*, *Tetraena simplex* as well as the provincially protected species *Adenium oleifolium*, *Mesembryanthemum coriarium* (low confidence ID), *M guerichianum* and *M tetragonum* (low confidence ID) were all found to be present but to a lesser extent. A single individual of the provincially protected species *Aloe hereroensis* as well as three clusters of the provincially protected species *Aloe claviflora* were found to be present.

Small woody shrub individuals of the indigenous species *Senegalia mellifera* and *Vachellia tortilis* were merely found to be sporadically present throughout the karroid shrubland habitat.

The sparse grass layer mainly consists of a representative mixture of the grass species *Aristida spp.*, *Enneapogon desvauxii*, *Eragrostis spp.*, *Schmidtia pappophoroides* and *Stipagrostis spp.*, while the robust/resilient Increaser 2 type grass species *Enneapogon cenchroides* (Van Oudtshoorn, 2022) was merely found to be sparsely present.

The karroid shrubland habitat associated with the remaining undeveloped natural area is rated as possessing **Low** overall long-term ecological/conservational value/significance.



Figure 13: Three images illustrating examples of the slight to moderately disturbed low-growing open terrestrial karroid shrubland habitat at the sample sites, associated with the small fragmented portions of undeveloped natural landscape which still remain within the northern portion of the study area

7.2.3. 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 highlighted based on their threatened status)

Taxonomic Family	Scientific Name	Common Name	Red List Categories	Habitat Requirements	Probability of Occurrence
Capparaceae	<i>Boscia albitrunca</i>	Shepherd's tree	Nationally Protected	Kalahari Karroid Shrubland vegetation type (NKb5)	Low: No individuals 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 the listed floral Species of Conservation Concern (SCC) and was therefore not favourable for successful identification of such species, if present. Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the majority of the study area, the presence of individuals of these species is therefore highly unlikely/improbable. It is anticipated that these species would rather be present throughout the undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town.
Capparaceae	<i>Boscia foetida</i>	Stink Shepherds tree	Provincially Protected		
Euphorbiaceae	<i>Euphorbia spp.</i>	Melkbos	Provincially Protected		
Apocynaceae	<i>Hoodia gordonii</i>	Ghaap	Provincially Protected Specially		
Apocynaceae	<i>Orbea spp.</i>	Carrion flower	Provincially Protected		
Apocynaceae	<i>Stapelia spp.</i>	Carrion flower	Provincially Protected		

The provincially protected species *Mesembryanthemum guerichianum* was found to be well-represented throughout the study area, while the provincially protected species *Adenium oleifolium*, *Mesembryanthemum coriarium* and *M tetragonum* (both low confidence ID) were also found to be present but to a lesser extent. Two small individuals situated directly adjacent each other, of the nationally protected tree species *Vachellia erioloba* were also found to be present throughout the study area. A single individual of the provincially protected species *Aloe hereroensis* as well as three clusters of the provincially protected species *Aloe claviflora* were found to be present throughout the study area.

No Red Data Listed-, other nationally protected- 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 the listed floral Species of Conservation Concern (SCC) and was therefore not favourable for successful identification of such species, if present. Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the majority of the study area, the presence of individuals of these species is therefore highly unlikely/improbable. It is anticipated that these species would rather be present throughout the undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town. More underground bulb-plant species (geophytes) could however potentially be present throughout the karroid grassland/shrubland habitats, which were not necessarily visible aboveground due to the timing of the site assessment. Due to the disturbed and degraded ecological state, this is however unlikely.

Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the majority of the study area, the study area is therefore not representative/reminiscent of the natural climax state of the relevant Least Concerned Kalahari Karroid Shrubland vegetation type (NKb5). The study area also 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 consequently not anticipated that the proposed development would pose any significant risk to achieving and maintaining national and/or provincial conservation- and persistence targets of the area or significantly impact on floral communities or the continued ecological functionality and -integrity of the local surrounding landscape.

7.2.4. Plant Species List for the Study Area

Table 12: Plant species list for the 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 cenchroides</i>	<i>Acanthopsis hoffmannseggiana</i>	<i>Aptosimum procumbens</i>
<i>Enneapogon desvauxii</i>	<i>Adenium oleifolium</i>	<i>Aptosimum spinescens</i>
<i>Eragrostis spp.</i>	<i>Aloe claviflora</i>	<i>Hermannia sp.</i>
<i>Schmidtia pappophoroides</i>	<i>Aloe hereroensis</i>	<i>Lyceum cinereum</i>
<i>Stipagrostis spp.</i>	<i>Barleria macrostegia</i>	<i>Phaeoptilum spinosum</i>
-	<i>Blepharis mitrata</i>	<i>Pogonospermum genistifolium</i>
-	<i>Cylindropuntia fulgida</i>	<i>Prosopis glandulosa</i>
-	<i>Kleinia longiflora</i>	<i>Rhigozum trichotomum</i>
-	<i>Mesembryanthemum coriarium</i>	<i>Salsola aphylla</i>
-	<i>Mesembryanthemum guerichianum</i>	<i>Senegalia mellifera</i>
-	<i>Mesembryanthemum tetragonum</i>	<i>Vachellia erioloba</i>
-	<i>Sesamum triphyllum</i>	<i>Vachellia tortilis</i>
-	<i>Tetraena simplex</i>	<i>Zygophyllum decumbens</i>

7.2.5. Ecological Drivers, Functions, Processes and Corridors

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

The karroid grassland/shrubland habitats associated with the study area are rated as possessing **Very Low** and **Low** overall long-term ecological/conservational value/significance. The size of the study area is also negligible relative to the surrounding natural landscape and will therefore not impact significantly on the natural rainfall drainage and surface waterflow of the area towards the Orange River to the south.

Adequate stormwater and erosion management measures must be implemented during the construction- and subsequent operational phases of the proposed development. This must be done to sufficiently manage storm water 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 functionality and -integrity of the local watershed and broader quaternary surface water catchment and drainage area. The development design layouts for the proposed infrastructure must also 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 towards south. It is further recommended that sufficient stormwater cut-off berms/trenches be constructed around the upstream boundaries of the proposed filling station and truckstop. 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 filling station and truckstop during seasonal rainfall events, for continued flow.

The negligible size of the study area will also not significantly impact on the natural fire/burning regimes or result in any significant habitat fragmentation of the vast surrounding undisturbed natural habitat. It will therefore not pose any significant direct or indirect impact to the ecological connectivity, -functionality and -integrity of the local and broader surrounding landscape or 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.

7.2.6. 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.

7.2.7. Freshwater Ecosystem Priority Areas (FEPA)

As per section 7.1.2, according to the National Freshwater Ecosystem Priority Areas Database (NFEPA, 2011), the portion of the D73E - 2760 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 utilise 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. It is consequently not anticipated that the proposed development of the study area would pose any significant risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area or impact significantly on any local aquatic ecological features (watercourses or wetlands) or the continued ecological functionality and -integrity of the local watershed and broader quaternary surface water catchment and drainage area

The size of the study area is also negligible relative to the surrounding natural landscape and will therefore not impact significantly on the natural rainfall drainage and surface waterflow of the area towards the Orange River to the south. Adequate stormwater and erosion management measures must be implemented during the construction- and subsequent operational phases of the proposed development. This must be done to sufficiently manage storm water 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 functionality and -integrity of the local watershed and broader quaternary surface water catchment and drainage area. The development design layouts for the proposed infrastructure must also 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 towards south. It is further recommended that sufficient stormwater cut-off berms/trenches be constructed around the upstream boundaries of the proposed filling station and truckstop. 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 filling station and truckstop during seasonal rainfall events, for continued flow.

7.3. Animal Species Theme

7.3.1. Species of Conservation Concern (SCC)

Mammals

The following threatened mammalian species 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 highlighted based on their 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 africae australis</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 or any other evidence associated with the presence of this species was observed throughout the study area, during the site assessment. The karroid grassland/shrubland associated with the study area however provides a limited degree of suitable habitat for this species. An extensive search however yielded no sightings/findings. Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the of the majority of the study area along with the continued surrounding anthropogenic activities associated with the town, illegal squatters, existing filling station and truckstop and highway, the presence of burrowing sites of this species is therefore highly unlikely/improbable.

					It is anticipated that this species would rather prefer to utilise the undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town, existing filling station and truckstop and highway.
Otididae	<i>Hydricis maculicollis</i>	Spotted-necked otter	Globally Near Threatened/Nationally Vulnerable	Perennial habitat/watercourses. aquatic	Low: No individuals, spoor, scat 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 these two 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 to the south.
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 or any other evidence associated with the presence of these two species was observed throughout the study area, during the site assessment. The karroid grassland/shrubland associated with the study area however provides a limited degree of suitable habitat for these two species. An extensive search however yielded no sightings/findings. Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the of the majority of the study area along with the continued surrounding anthropogenic activities associated with the town, illegal squatters, existing filling station and truckstop and highway, the presence of burrowing sites of these two species is therefore highly unlikely/improbable. It is anticipated that these two species would rather prefer to utilise the undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town, existing filling station and truckstop and highway.
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.	

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.

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. General/Common Species

Clusters of small borrows associated with the general/common mammalian species *Geosciurus inauris* (Cape ground squirrel) were found to be moderately present throughout the study area. Individuals of the general/common mammalian species *Cynictis penicillata* (Yellow mongoose) were also sporadically encountered throughout the study area. Nests of general/common local resident bird species such as *Passer melanurus* (Cape sparrow) were found to be moderately present throughout the study area, while individuals of the general/common local resident bird species *Colius striatus* (Speckled mousebird) and *Lanius collaris* (Southern fiscal) were also found to be sparsely present throughout the study area. No nests of any conservationally significant or important bird species were however found to be present throughout the study area. No other actual faunal sightings/encounters occurred during the site assessment either.

Due to the fragmented as well as moderate to highly disturbed and degraded ecological state of the majority of the study area along with the continued surrounding anthropogenic activities associated with the town, illegal squatters, existing filling station and truckstop and highway, 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 utilised as refuge or for breeding, foraging and/or persistence purposes. It is anticipated that such species would rather prefer to utilise the undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town, existing filling station and truckstop and highway.

7.3.3. Conclusion

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 nests of any conservationally significant or important bird species were found to be present throughout the study area. Only general/common local resident bird species and nests were found to be present throughout the study area.

No individuals, nests, burrows, spoor, scat 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 fragmented as well as moderate to highly disturbed and degraded ecological state of the majority of the study area along with the continued surrounding anthropogenic activities associated with the town, illegal squatters, existing filling station and truckstop and highway, the presence of nesting or burrowing sites of such species is also unlikely and it is unlikely that the area would specifically be utilised 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 undisturbed surrounding undeveloped natural karroid shrubland habitat further away from the town, existing filling station and truckstop and highway. 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 study 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. It is consequently not anticipated that the proposed development of the remainder of the study area 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 **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 functionality and -integrity persistence in support of the surrounding ecosystem, broader vegetation type or floral habitats. Minimisation mitigation - development activities of medium to high impact acceptable and restoration activities may not be required.

The SEI calculation is as follows (see section 3):

$$\begin{array}{rclcl} \text{CI (Very Low)} & + & \text{FI (Low)} & = & \text{BI (Very Low)} \\ \text{BI (Very Low)} & + & \text{RR (Low)} & = & \text{SEI (Very Low)} \end{array}$$

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 functionality and -integrity persistence in support of the surrounding ecosystem or faunal 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 (see section 3):

$$\begin{array}{rclcl} \text{CI (Very Low)} & + & \text{FI (Low)} & = & \text{BI (Very Low)} \\ \text{BI (Very Low)} & + & \text{RR (Low)} & = & \text{SEI (Very Low)} \end{array}$$

7.5. Ecological Site Sensitivity Features Map

The ecological site sensitivity features map below (see A3 sized map in the Appendices) illustrates the locations of the remaining undeveloped natural area and identified conservationally significant plant species individuals as well as the aquatic ecological features associated with the study area.

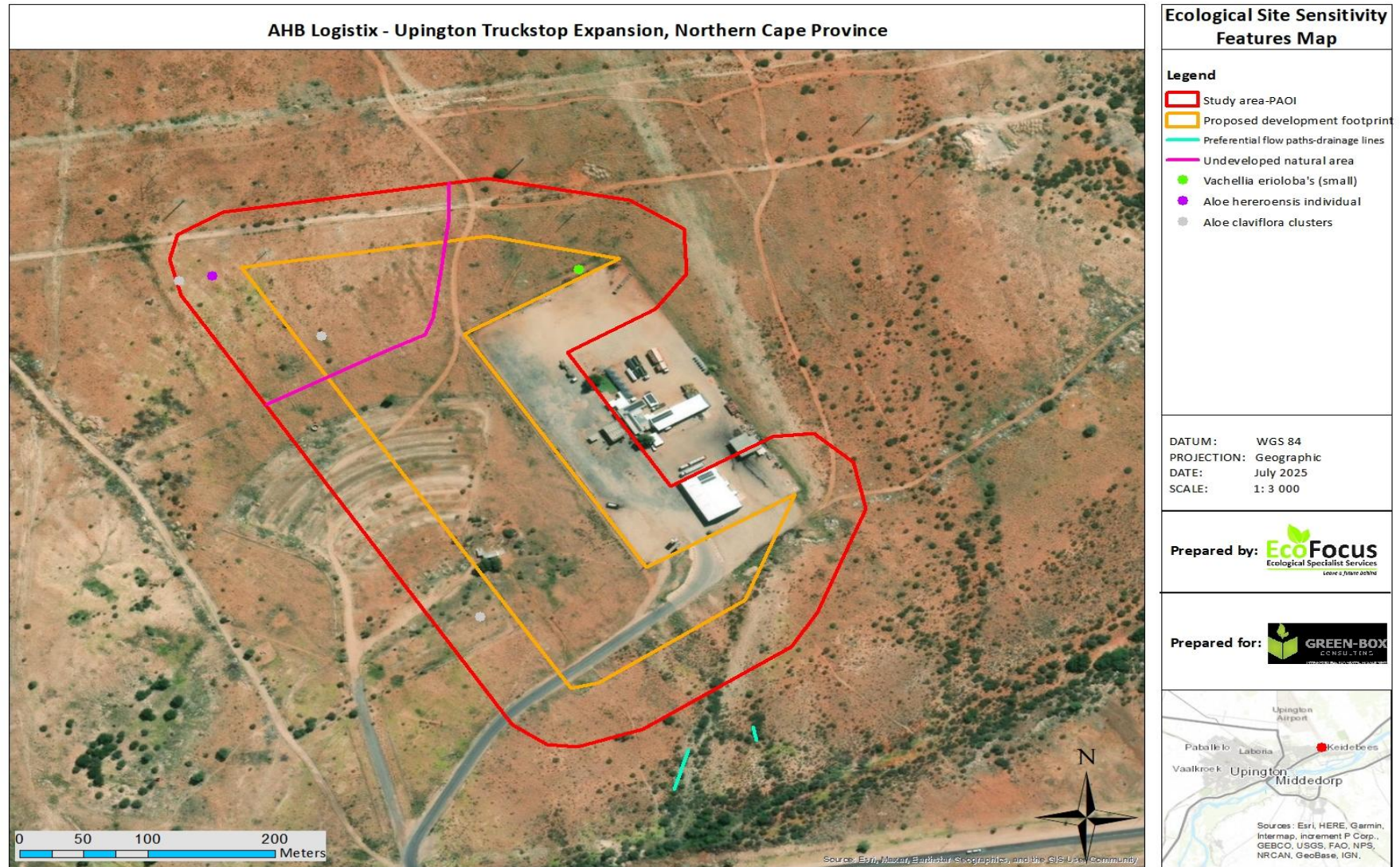


Figure 14: Ecological site sensitivity features map illustrating the locations of the remaining undeveloped natural area and identified conservationally significant plant species individuals as well as the aquatic ecological features associated with the study area

8. Ecological Receptor Impact Management and Mitigation

8.1. Receptor Impacts

A single high significance potential long-term ecological receptor impact was identified for the operational phase of the proposed development (see below). No other medium or high significance potential long-term ecological receptor impacts were identified for the construction- or subsequent operational phases of the proposed development. The following main ecological impact receptors could however potentially be affected by the proposed development:

- Clearance and transformation of a small moderate to highly disturbed and degraded portion of Kalahari Karroid Shrubland vegetation type (NKb5)
- Clearance and transformation of a small moderate to highly disturbed and degraded portion associated with general/common faunal and floral species habitat/individuals
- Contamination of a small slight to moderately disturbed and degraded portion of directly surrounding Kalahari Karroid Shrubland vegetation type (NKb5) as well as general/common faunal and floral species habitat/individuals by slight fugitive dust generation, emissions and fallout
- Exotic- and legally declared alien invasive species establishment and spreading within the small slight to moderately disturbed and degraded directly surrounding portion
- Fragmentation of the local ecological connectivity, -functionality and -integrity and associated faunal and floral species community movement/migration and dispersal
- Contamination of soil and groundwater resources (sewage, hydrocarbons and other chemicals)
 - This constitutes the only high significance potential long-term ecological receptor impact identified for the operational phase of the proposed development
- Alteration and contamination of the flow regimes of the very small ephemeral preferential water flow paths/drainage lines (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 (sewage, hydrocarbons and other chemicals, surface material/soil erosion as well as fugitive dust generation, emissions and fallout)

8.2. Cumulative Impact

According to the latest municipal Spatial Development Framework (SDF), further extensive residential, industrial and commercial development/expansion in excess of 180 ha is envisaged for the local area directly adjacent north of the town (west of the proposed development footprint). It is therefore likely that further similar filling station and truckstop development and subsequent transformation could take place throughout the local area, over time which would lead to further cumulative impacts.

If unmitigated, the significant potential long-term ecological receptor impacts identified for the proposed development (see above), could potentially add low to moderate cumulative impact to the existing negative impacts associated with the limited existing residential, industrial and commercial transformation associated with the town 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 along with the envisaged SDF development/expansion is therefore minute 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. 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 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:

- 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.
- It is recommended that an additional ecological walkthrough as well as 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.

- 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.
- Provincial Flora- and Nest Removal Permits have 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 and/or trees containing bird nests.
 - It is however recommended that the individuals/clusters of each of the provincially protected species *Aloe hereroensis* (individual) and *Aloe claviflora* (three clusters) as well as a representative number of the provincially protected species *Adenium oleifolium* must be adequately relocated to another suitable and similar area as to where they were 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.
- 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.
- 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 storm water 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 functionality and - integrity of the local watershed and broader 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 towards south.

- It is further recommended that sufficient stormwater cut-off berms/trenches be constructed around the upstream boundaries of the proposed filling station and truckstop. 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 filling station and truckstop 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 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 closed inward-draining system design must be adopted for the proposed filling station and truckstop, as far as practicably possible/feasible.
- Proposed fuel storage tanks must be of sufficient manufacturer's quality, must be SABS approved and must comply with the minimum required manufacturing quality standards.
- The fuel storage tanks must be adequately bunded in order to be able to contain a minimum of 150 % of the capacity of the storage tanks.
- 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
- Adequate leakage detection and prevention systems must be installed for the filling station and truckstop in order to detect any potential leakages and subsequent contamination of groundwater resources.

- If a new truck wash bay is to be constructed as part of the proposed filling station and truckstop, it must be situated as far away as practicably possible/feasible from the identified aquatic ecological features.
- Adequate dirty water collection and containment sumps/drains or other measures must be constructed as part of the truck wash bay designs. These sumps/drains or other measures must assist with- and manage clean/dirty water separation by preventing contaminated water runoff from leaving the truck wash bay and entering the surrounding natural landscape.
- If any leakages or overflows of the proposed underground fuel storage tanks 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.
- Suitable and lawful management and disposal of hydrocarbons, other chemicals and all waste products generated by the proposed filling station and truckstop must be ensured by the applicant.
- 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.
- The two very small first-order ephemeral preferential water flow paths/drainage lines associated with the study area 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 regimes of the flow paths/drainage lines should not be significantly and/or permanently contaminated or impacted by the proposed development, if practicably possible/feasible.
- 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 two very small first-order ephemeral preferential water flow paths/drainage lines, as required in accordance with the National Water Act (Act 36 of 1998).
- Implement suitable dust management and prevention 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, in order to 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.
- 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 identified aquatic ecological features.
- 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 night time. As little light emissions as practicably/reasonably possible from the established development, should occur during night time 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 night time.
- 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 within the study area.
- Adequate leakage detection and prevention systems 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.
- Water saving initiatives must be implemented for the established development.
- Environmentally responsible water-use practices and activities must be adopted for the construction- and subsequent operational phases of the proposed development.
- Provide training interventions for the relevant employees on correct environmentally responsible water use practices and activities.

9. Conclusion

It is not anticipated that the proposed development of the study area would pose any significant risk to achieving and maintaining national and/or provincial aquatic conservation- and persistence targets of the area or impact significantly on any local aquatic ecological features (watercourses or wetlands) or the continued ecological functionality and -integrity of the local watershed and broader quaternary surface water catchment and drainage area.

The study area is rated as possessing **Very Low** and **Low** overall long-term ecological/conservational value/significance. The study area scored **Very Low** faunal and floral species Site Ecological Importance (SEI) values and is not viewed as being of any overall long-term conservational significance/value for habitat preservation and continued ecological functionality and -integrity persistence in support of the surrounding ecosystem, broader vegetation type or faunal and floral habitats.

It is therefore evident from a faunal and floral biodiversity perspective, that the study area does not constitute an important component of the faunal and 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 conservation- and persistence targets of the area or significantly impact on faunal and floral communities or the continued ecological functionality and -integrity of the local and broader surrounding landscape.

A single high significance potential long-term ecological receptor impact was identified for the operational phase of the proposed development (see below). No other medium or high significance potential long-term ecological receptor impacts were identified for the construction- or subsequent operational phases of the proposed development. The following main ecological impact receptors could however potentially be affected by the proposed development:

- Clearance and transformation of a small moderate to highly disturbed and degraded portion of Kalahari Karroid Shrubland vegetation type (NKb5)
- Clearance and transformation of a small moderate to highly disturbed and degraded portion associated with general/common faunal and floral species habitat/individuals
- Contamination of a small slight to moderately disturbed and degraded portion of directly surrounding Kalahari Karroid Shrubland vegetation type (NKb5) as well as general/common faunal and floral species habitat/individuals by slight fugitive dust generation, emissions and fallout

- Exotic- and legally declared alien invasive species establishment and spreading within the small slight to moderately disturbed and degraded directly surrounding portion
- Fragmentation of the local ecological connectivity, -functionality and -integrity and associated faunal and floral species community movement/migration and dispersal
- Contamination of soil and groundwater resources (sewage, hydrocarbons and other chemicals)
 - This constitutes the only high significance potential long-term ecological receptor impact identified for the operational phase of the proposed development
- Alteration and contamination of the flow regimes of the very small ephemeral preferential water flow paths/drainage lines (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 (sewage, hydrocarbons and other chemicals, surface material/soil erosion as well as fugitive dust generation, emissions and fallout)

According to the latest municipal Spatial Development Framework (SDF), further extensive residential, industrial and commercial development/expansion in excess of 180 ha is envisaged for the local area directly adjacent north of the town (west of the proposed development footprint). It is therefore likely that further similar filling station and truckstop development and subsequent transformation could take place throughout the local area, over time which would lead to further cumulative impacts.

If unmitigated, the significant potential long-term ecological receptor impacts identified for the proposed development (see above), could potentially add low to moderate cumulative impact to the existing negative impacts associated with the limited existing residential, industrial and commercial transformation associated with the town 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 along with the envisaged SDF development/expansion is therefore minute 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. 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 are adequately implemented and managed, for both the construction- and subsequent operational phases of the proposed development.

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 within the study area can be considered by the competent authority for Environmental Authorisation and approval. All recommended mitigation measures as per this ecological report 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.

10. References

Collins, N.B. 2019. Free State Province Biodiversity Plan: Technical Report v1.0. Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs. Internal Report.

Conservation of Agricultural Resources Act (Act 43 of 1983)

Mucina, L. & Rutherford, M.C. (eds.) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

National Environmental Management Act (Act 107 of 1998)

National Environmental Management: Biodiversity Act (Act 10 of 2004)

National Environmental Management: Biodiversity Act (Act 10 of 2004); Alien and Invasive Species Regulations, 2014

National Forests Act (Act 84 of 1998)

National Water Act (Act 36 of 1998)

NEMBA ToPS, 2023. National Environmental Management: Biodiversity Act (Act 10 of 2004): Republication of the draft list of threatened or protected terrestrial species and freshwater species, restricted activities that are proposed to be prohibited, and restricted activities that are proposed to be exempted for public comment. Government Gazette No. 49470, of 12 October 2023.

Northern Cape Nature Conservation Act (Act 9 of 2009)

Oosthuysen, E. & Geldenhuys, L. 2024. Northern Cape Biodiversity Spatial Plan: Technical Report. Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform, Springbok

Revised List of Ecosystems Threatened and in Need of Protection, 2022 as published in the Government Gazette (Gazette Number 47526, Notice Number 2747) on 18 November 2022 in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004)

South African National Biodiversity Institute (2006-2024). The Vegetation Map of South Africa, Lesotho and Swaziland, Mucina, L., Rutherford, M.C. and Powrie, L.W. (Editors), Online, <https://bgis.sanbi.org/Projects/Detail/2258>, Version 2024.

South African National Biodiversity Institute (SANBI). 2020. Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.2020

Van Deventer, H., Smith-Adao, L., Collins, N.B., Grenfell, M., Grundling, A., Grundling, P-L., Impson, D., Job, N., Lötter, M., Ollis, D., Petersen, C., Scherman, P., Sieben, E., Snaddon, K., Terera, F. & Van der Colff, D. 2019. South African National Biodiversity Assessment 2018: Technical Report. Volume 2b: Inland Aquatic (Freshwater) Realm. CSIR report number CSIR/NRE/ECOS/IR/2019/0004/A. South African National Biodiversity Institute, Pretoria. <http://hdl.handle.net/20.500.12143/6230>

Van Oudtshoorn, F. 2022. Guide to Grasses of Southern Africa. 3rd Revised Edition Briza Publications.

www.climate-data.org

11. Details of the Specialist

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M.Env.Sci. Ecological remediation and sustainable utilisation (NWU: Potchefstroom)

South African Council for Natural Scientific Professions (SACNASP): Professional Ecological Scientist
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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

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 Upton 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 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 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.

2024

- Proposed 0.53 ha Springbok Residential and Hospitality Development, Northern Cape Province.
- Proposed 4 ha Ingenio Academy School Development, Vanderbijlpark, Gauteng Province.
- Proposed 46.2 ha Donkerhoek Residential Development, Kimberley, Northern Cape Province.
- Ecological Compliance Statement for the proposed 28.9 ha Bloemspruit Small Holdings Residential Development, Bloemfontein, Free State Province.
- Proposed 26 ha Kestell Waste Water Treatment Works Development, Free State Province.
- Ecological Compliance Statement for the proposed 16.6 ha Poding Tse Rolo Residential Development, Philippolis, Free State Province.
- Ecological Compliance Statement for the proposed 18.9 ha Oranjekrag Residential Development, Free State Province.
- Ecological Compliance Statement for the proposed 37.1 ha Phaliso Residential Development, Trompsburg, Free State Province.
- Aquatic Ecological Site Verification Report for the proposed 643 ha Sol Platz PV Solar Power Generation Facility Development, Bloemfontein, Free State Province.
- Proposed 129 ha Farm No. 2727 Residential Development, Bloemfontein, Free State Province.

- Water Use License Application (WULA) Risk Assessment for the proposed 80 MW Khauta West Solar PV Facility Development substation, Riebeeckstad, Free State Province.
- Water Use License Application (WULA) Risk Assessment for the proposed 110 MW Khauta South Solar PV Facility Development substation, Riebeeckstad, Free State Province.
- Water Use License Application (WULA) Risk Assessment for the proposed 165 MW Khauta North Solar PV Facility Development substation, Riebeeckstad, Free State Province.
- Water Use License Application (WULA) Risk Assessment Exemption Letter for the proposed Khauta Solar PV Facility Cluster Development, Riebeeckstad, Free State Province.
- Ecological Site Sensitivity Verification Report for the proposed 793.21 ha Matjhabeng Local Municipality Residential Developments, Welkom, Free State Province.
- Proposed 285 ha Project 6 Residential Development, Kimberley, Northern Cape Province.
- Ecological Compliance Statement for the proposed 6.79 ha Bloemhof Mall Development, North West Province.
- Ecological Compliance Statement for the proposed 1.18 ha Farm Wildealskloof No. 1205 Poultry Abattoir & Piggery Development, Bloemfontein, Free State Province.
- Aquatic Ecological Compliance Statement for the proposed 5 km Kookfontein to Ellendale Road Upgrade, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 5 km Kookfontein to Ellendale Road Upgrade, Northern Cape Province.
- Aquatic Ecological Compliance Statement for the proposed 4 km Ga-Hohuwe to Dithakong Road Upgrade, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 4 km Ga-Hohuwe to Dithakong Road Upgrade, Northern Cape Province.
- Ecological Compliance Statement for the proposed 21.02 ha Sasolburg to Heilbron Road Borrow Pit Developments, Free State Province.
- Watercourse and Wetland Audit for the proposed 18.73 ha Nketoana Local Municipality Geluk Dam Development, Reitz, Free State Province.
- Rehabilitation and Alien Invasive Species Management Plan for the proposed 18.73 ha Nketoana Local Municipality Geluk Dam Development, Reitz, Free State Province.
- Aquatic Biodiversity Theme Compliance Statement for the proposed 19 km Orange River Solar Facility 132 kV Transmission Line Development, Groblershoop, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 19 km Orange River Solar Facility 132 kV Transmission Line Development, Groblershoop, Northern Cape Province.

- Watercourse/Wetland Buffer Zone Review for the proposed 94.4 ha Marikana Residential Development, Ladybrand, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 94.4 ha Marikana Residential Development, Ladybrand, Free State Province.
- Terrestrial Ecological Compliance Statement for the proposed 12.6 ha Mall of Kroonstad Shopping Centre Development, Free State Province.
- Ecological Compliance Statement for the proposed 14.39 ha Sasolburg to Koppies Road Borrow Pit Developments, Free State Province.
- Proposed 190 ha Kwanonzame Residential Development, Middelburg, Eastern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 190 ha Kwanonzame Residential Development, Middelburg, Eastern Cape Province.
- Proposed 177 ha Midros Residential Development, Middelburg, Eastern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 177 ha Midros Residential Development, Middelburg, Eastern Cape Province.
- Rehabilitation and Alien Invasive Species Management Plan for the proposed 18.2 ha Nketoana Local Municipality WWTW Development, Lindley, Free State Province.
- Proposed 4.32 ha Phahamisa Agricultural Cooperative Piggery Development, Kroonstad, Free State Province.
- Ecological Compliance Statement for the proposed 0.49 ha Grootvlei Poultry Hatchery Development, Kroonstad, Free State Province.
- Proposed 4.8 km Prieska Power Reserve Water and Sewage Pipeline Developments, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 4.8 km Prieska Power Reserve Water and Sewage Pipeline Developments, Northern Cape Province.
- Ecological Compliance Statement for the proposed 5.38 ha Farm De Hoop No. 320 Poultry Layer Houses Development, Bloemfontein, Free State Province.
- Ecological Compliance Statement for the proposed 4.99 ha Jan Nico Goliath Tiger-eye Mining Development, Griekwastad, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 4.99 ha Jan Nico Goliath Tiger-eye Mining Development, Griekwastad, Northern Cape Province.
- Ecological Compliance Statement for the proposed 2.5 ha Northern Cape Truckers Tiger-eye Mining Development, Griekwastad, Northern Cape Province.

- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 2.5 ha Northern Cape Truckers Tiger-eye Mining Development, Griekwastad, Northern Cape Province.
- Terrestrial and Aquatic Ecological Impact Assessment Review for the proposed 87 ha Khauta e Nyane 50 MW Solar PV Energy Facility Development, Riebeeckstad, Free State Province.
- Terrestrial and Aquatic Ecological Impact Assessment Review for the proposed 273 ha Khauta North 165 MW Solar PV Energy Facility Development, Riebeeckstad, Free State Province.
- Terrestrial and Aquatic Ecological Impact Assessment Review for the proposed 168 ha Khauta South 110 MW Solar PV Energy Facility Development, Riebeeckstad, Free State Province.
- Terrestrial and Aquatic Ecological Impact Assessment Review for the proposed 101 ha Khauta West 80 MW Solar PV Energy Facility Development, Riebeeckstad, Free State Province.
- Ecological Compliance Statement for the proposed 1.5 ha Eskom Masimong 132kV Switching Station Development, Riebeeckstad, Free State Province.
- Ecological Compliance Statement for the proposed 900 m Batlharo Bridge Development, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 900 m Batlharo Bridge Development, Northern Cape Province.
- Ecological Compliance Statement for the proposed 8.13 ha Pilane Milling Plant Development, Vredefort, Free State Province.
- Ecological Compliance Statement for the proposed 3.72 ha Pilane Poultry Broiler Houses and Abattoir Development, Potchefstroom, North West Province.
- Proposed 62.4 ha Kismet Agri-Industrial Park Development, Vrede, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 62.4 ha Kismet Agri-Industrial Park Development, Vrede, Free State Province.
- Terrestrial and Aquatic Ecological Impact Assessment Review for the proposed 12.8 km Khauta 132 kV Overhead Powerline Development, Riebeeckstad, Free State Province.
- Ecological Compliance Statement for the proposed 1 ha CC Chickens Abattoir Rendering Plant Development, Kroonstad, Free State Province.
- Ecological Compliance Statement for the proposed 4 ha Itau Milling Plot 48 Milling Plant Development, Bloemfontein, Free State Province.
- Proposed 247 ha Namahadi Residential Development, Frankfort, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 247 ha Namahadi Residential Development, Frankfort, Free State Province.

- Ecological Compliance Statement for the proposed 17.8 ha Leander Substation Battery Energy Storage System (BESS) Development, Riebeeckstad, Free State Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 17.8 ha Leander Substation Battery Energy Storage System (BESS) Development, Riebeeckstad, Free State Province.
- Aquatic Ecological Compliance Statement for the proposed 44 km N1 National Highway Section Upgrade, Zandkraal to Winburg, Free State Province.
- Grazing and Invasive Species Assessment for the Farm Kareeboom No. 1191 outside Paul Roux, Free State Province.
- Aquatic Ecological Compliance Statement for the proposed 179 ha Groblershoop PV Solar Power Generation Facility & Battery Energy Storage System (BESS) Development, Northern Cape Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed 179 ha Groblershoop PV Solar Power Generation Facility & Battery Energy Storage System (BESS) Development, Northern Cape Province.
- Ecological Compliance Statement for the proposed 14.4 ha Farm Mier No. 585 Hospitality Resort Development, Northern Cape Province.
- Aquatic Ecological Compliance Statement for the proposed Impumelelo Residential and Attenuation Pond Development, Devon, Gauteng Province.
- Water Use License Application (WULA) Risk Assessment Matrix for the proposed Impumelelo Residential and Attenuation Pond Development, Devon, Gauteng Province.
- Ecological Compliance Statement for the proposed 7.22 ha Welgegund Borrow Pit Development, Excelsior, Free State Province.
- Protected plant environmental screening for the proposed 18.23 km Mangaung Metropolitan Municipality Design, Documentation and Supervision of IPTN Road Infrastructure, Bloemfontein, Free State Province.