# Appendix G.5

## AQUATIC BIODIVERSITY ASSESSMENT

Groothoek Wind Power (Pty) Ltd

# TERRESTRIAL AND AQUATIC BIODIVERSITY- SCOPING REPORT

## Groothoek Wind Energy Facility (WEF)

DECEMBER 2024

CONFIDENTIAL

Groothoek Wind Power (Pty) Ltd

# TERRESTRIAL AND AQUATIC BIODIVERSITY-SCOPING REPORT

Groothoek Wind Energy Facility (WEF)

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**PROJECT NO. 41106427**

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# EXECUTIVE SUMMARY

Groothoek Wind Power (Pty) Ltd is proposing the development of the Groothoek Wind Energy Facility (WEF) (hereafter refer to as the Project area) in the Free State Province. Groothoek Wind Power (hereafter referred to as 'Groothoek WEF') is proposed to have an energy generation capacity of to up to 300MW.

WSP Group Africa was appointed to undertake the necessary terrestrial and aquatic baseline studies and impact assessments, in support of the scoping, baseline and impact assessment phases of the environmental regulatory process required to authorise development-related activities and infrastructure. This aquatic and terrestrial biodiversity scoping report describes the available information for the terrestrial, riparian and wetland biodiversity of areas that will potentially be impacted by the proposed infrastructure and activities that will be associated with the construction and operation of the Groothoek WEF.

The outcome of the site sensitivity verification assessment, as required by the NEMA gazetted protocols for the specialist assessment and minimum report content requirements for environmental impacts on aquatic and terrestrial biodiversity are presented. The report also documents the scoping-level assessment of the potential impacts of the proposed Project on terrestrial and aquatic biodiversity, i.e. terrestrial vegetation communities, wetland and riparian ecosystems, and associated flora and fauna species. A suite of preliminarily recommended measures for the mitigation of any negative impacts for consideration in the development of the EMPr for the Project, as well as the required scope of baseline data gathering studies for the EIA phase, are provided.

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# 1 INTRODUCTION AND BACKGROUND

Groothoek Wind Power (Pty) Ltd is proposing the development of the Groothoek Wind Energy Facility (WEF) (hereafter refer to as the Project area) in the Free State Province. WSP Group Africa (Pty) Ltd (hereafter referred to as WSP) has been appointed to undertake the necessary terrestrial, wetland and aquatic baseline studies and impact assessments, in support of the scoping, baseline and impact assessment phases of the environmental regulatory process required to authorise the proposed development-related activities and infrastructure.

The Groothoek WEF (Figure 1-1) located in the Free State Province and will have a proposed export capacity of approximately 300 MW (Figure 1-2).

## 1.1 PURPOSE OF THE REPORT

This report describes the available terrestrial, wetland and aquatic ecology information for the Project area and documents the results of the scoping-level screening of the potential impacts of the proposed Project on the receptors (flora and fauna species and ecosystems) associated with the potential Project area of influence.

The report also provides a preliminary set of recommended measures for the mitigation of any negative impacts for ultimate inclusion in the Environmental Management Programme (EMPr) for the Project, to ensure that the relevant South African biodiversity legislative and policy requirements are satisfactorily met.

## 1.2 PROJECT LOCATION AND EXTENT

The Groothoek WEF is located near the town of Harrismith in Ward 5 of the Phumelela Local Municipality (PLM) and in the Thabo Mofutsanyana District Municipality (TMDM) in the Free State Province (Figure 1-1).

The proposed Groothoek development is envisioned to have the following specifications:

| Proposed Infrastructure | Specifications |
|---|---|
| Extent | 6 170 ha |
| Export Capacity | 300 MW |
| Number of Turbines | 55 |
| Rotor Diameter | 200 m |
| Hib Height | 140 m |
| Hard Standing Dimensions | 0.8 ha per turbine |
| Turbine Foundations | ▪ Area of 0,07ha per turbine and crane platform/pad – 0,5ha.<br>▪ Excavation up to 4 m deep, constructed of reinforced concrete to support the mounting ring.<br>▪ Once tower established, footprint of foundation is covered with soil. |
| Substation | ▪ 4 x 33kV/132kV onsite collector substation (IPP Portion), each being up to 2ha |

| Proposed Infrastructure | Specifications |
|---|---|
| Powerlines | ▪ 33kV cabling to connect the wind turbines to the onsite collector substations, to be laid underground where practical. |
| Construction Camp and Laydown area | Construction compounds including site office inclusive of:<br>▪ Concrete Batching plant of up to 1ha<br>▪ Site office of 4 ha<br>▪ laydown area of 8ha |
| Internal Roads | Up to 8m in width |
| Office | Up to 1ha. |
| Battery Energy Storage System (BESS) | ▪ BESS (200MW/800MWh).<br>▪ Li-ion solid state batteries<br>▪ Export Capacity of up to 800MWh<br>▪ Total storage capacity 200MW<br>▪ Storage capacity of up to 6-8 hours<br>▪ The BESS will be housed in containers covering a total approximate footprint of up to 7ha |
| Grid length and connection point | ▪ On-site MTS (Preferred)<br>▪ 20km 132kV line plus off-site MTS (Alternative) |
| Footprints of the substation areas at the start and end of the line – with associated capacities | ▪ Up to 1 ha.<br>▪ 33 kV to 132 kV collector substation to receive, convert and step-up electricity from the WEF to the 132 kV grid suitable supply. |
| Tower options | ▪ Double circuit |
| Width of assessment corridor (distance either side of centre line) | ▪ 400m width in total, 200m either side of centre line. |

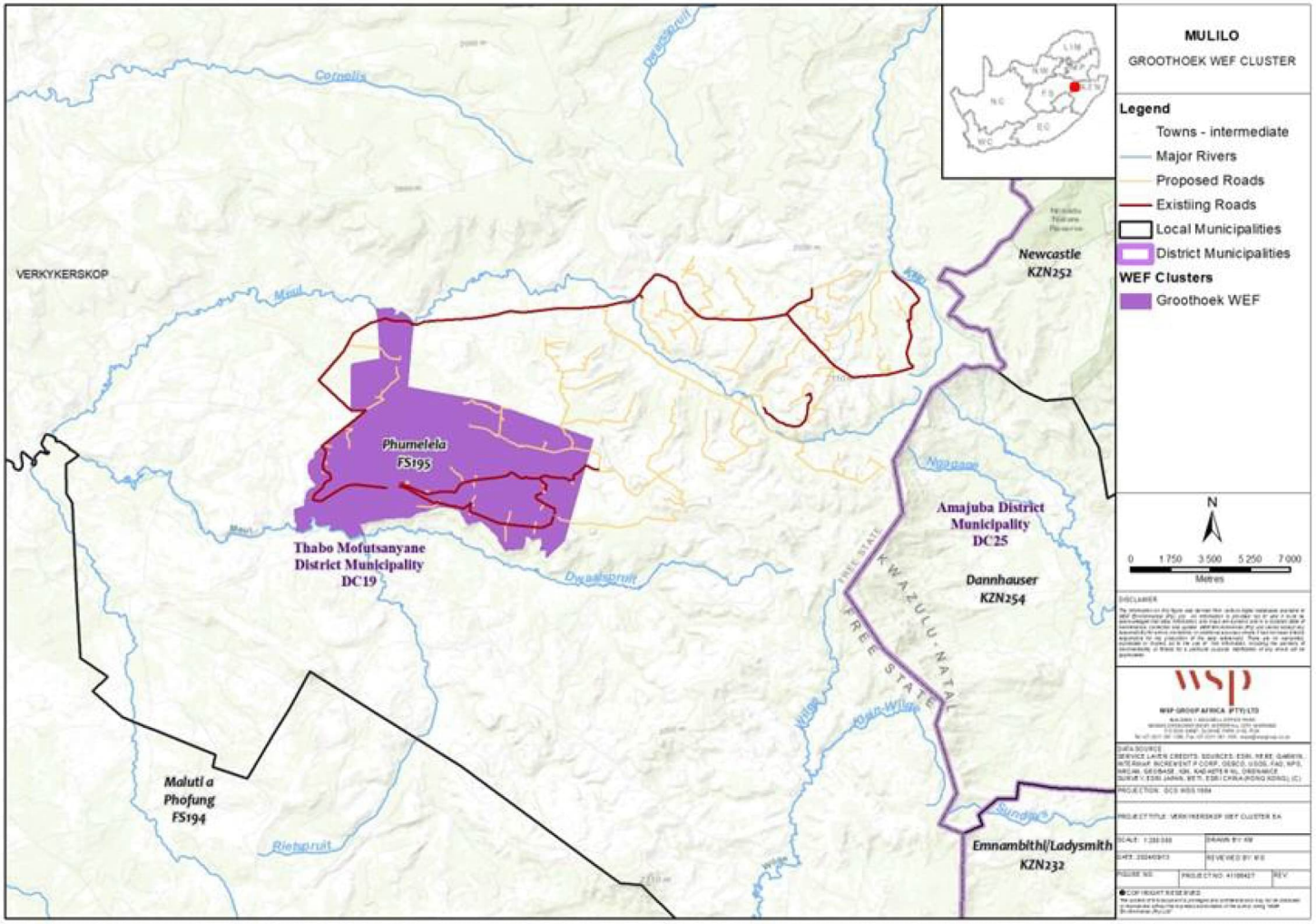


**Figure 1-1 - Locality map of Groothoek WEF**

# 2 APPLICABLE LEGISLATION, POLICY AND STANDARDS

Biodiversity-related South African legislation and policy, were used to guide this scoping assessment are summarised as follows.

## 2.1 SOUTH AFRICAN LEGISLATION AND POLICY

Applicable national and provincial legislation, associated regulations and policies that are pertinent to biodiversity, which were used to guide the EIA, include:

- National Environmental Management Act (NEMA) (Act No. 107 of 1998) including Section 24, concerning Procedures for the assessment and minimum criteria for reporting on identified themes in terms of Sections 24(5)(a) and (h) and 44 of the NEMA, when applying for environmental authorisation;
- Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity, animal and plant species biodiversity.
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), specifically:
  - ToPS – National lists of critically endangered, endangered, vulnerable and protected species (2007)
  - National list of alien and invasive species (2016);
- National Water Act (Act No. 36 of 1998);
- Free State Nature Conservation Ordinance (Act No. 8 of 1969)
- Free State Biodiversity Sector Plan (2013)
- National Protected Area Expansion Strategy (2016).

Recent, relevant South African national policies and guidance were also taken into consideration, in the development of the baseline description and impact assessment process, including:

- Draft National Biodiversity Offset Policy (2017);
- National Biodiversity Offset Guideline (2023) and
- Species Environmental Assessment Guideline (SANBI, 2020).

# 3 METHODOLOGY

This scoping level aquatic and terrestrial biodiversity baseline description and preliminary impact assessment took cognisance of Government Notice No. 320, published in 2020 under the National Environmental Management Act (1998) concerning 'Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Theme in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (1998), when applying for Environmental Authorisation.

In line with the assessment and reporting requirements set out in the protocol, this scoping-level assessment included two main study components; a desktop literature review, which was then supplemented by information gathered during bat and bird studies conducted by Biodiversity Africa and Scientific Aquatic Services in 2022 and during scoping site visits to inform the site sensitivity verification stage, in line with the NEMA protocols. The objectives and tasks associated with these components are described below.

## 3.1 STUDY AREA

The study area for the assessment was defined as the development footprint i.e. the area in which the proposed development will take place, which includes the area that will be disturbed or impacted, plus any watercourses situated within 500 m of that development, i.e. the 'regulated zone' of a watercourse as defined by the National Water Act (Figure 3-1).

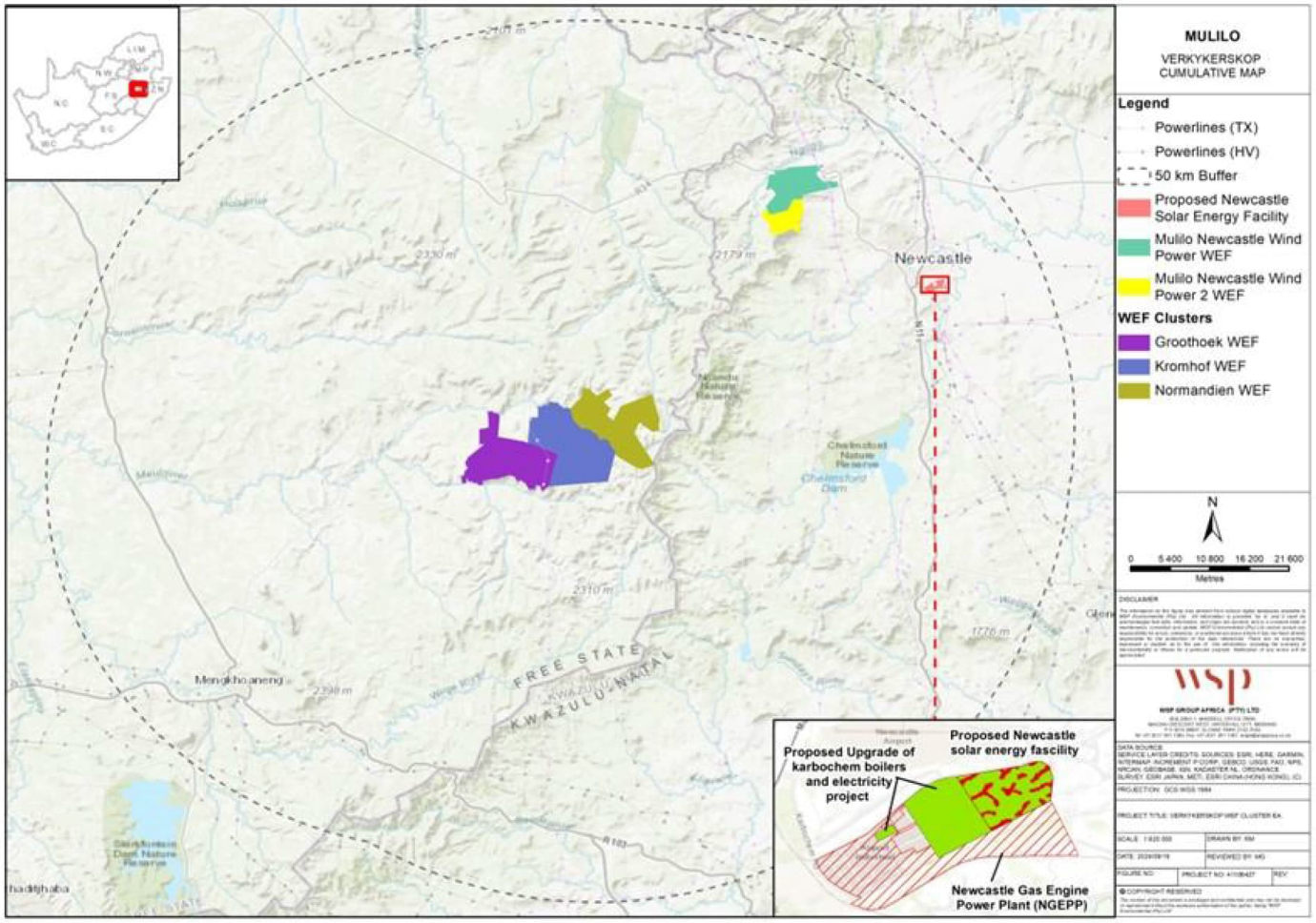


**Figure 3-1 – Broader Project area**

## 3.2 LITERATURE REVIEW

The aim of the desktop literature review component was to collate and review available ecological information related to important biodiversity and conservation features in the Project area of influence, including presence of protected areas or important conservation areas, key ecological processes and functions, and the likely composition and structure of local aquatic biodiversity.

The existing available datasets that were reviewed and consolidated to assess aquatic and terrestrial ecosystems and associated fauna, flora and vegetation include:

- A general vegetation type description relevant to the broader study area was obtained from Mucina and Rutherford (2011);
- The formal conservation context of the region at a provincial and national level was established based on the Free State Biodiversity Sector Plan (2019), the National List of Threatened Ecosystems (NEMBA Threatened Ecosystems, 2011), the South African Protected Areas Database (SAPAD), the South African Conservation Areas Database (SACAD) and the national protected area expansion strategy;
- Nationally-available datasets which were consulted to inform the site sensitivity verification for wetland and riparian habitat include the South African National Wetland Map version 5 (NWM5) (Van Deventer et al., 2019), and the National Freshwater Ecosystem Priority Area database.
- Department of Water and Sanitation datasets, including available information on surface water resources, water management areas, and quaternary catchments.

## 3.3 SITE SENSITIVITY VERIFICATION

A desktop analysis of available satellite imagery, biodiversity datasets and published literature was conducted to indicate the sensitivity of the study area, to determine the need for full Terrestrial and/or Aquatic Biodiversity Specialist Assessments, or Compliance Statements.

The biodiversity description for the current study was informed by desktop assessment, supplemented by preliminary data gathered during bat and bird surveys conducted to date, the Scientific Aquatic Services, Biodiversity Africa studies and a baseline Terrestrial and aquatic dry season study undertaken in June 2024.

## 3.4 BASELINE STUDIES

baseline surveys were conducted in the field during June-July 2024 (dry season) and are scheduled for Oct-Dec 2024 (wet season). The detailed results of the baseline studies will be presented as part of the EIA. Desktop findings for wetland, terrestrial and aquatic ecology in conjunction with the Dry season baseline findings were used to inform this scoping report.

## 3.5 HIGH LEVEL SCREENING OF IMPACTS AND MITIGATION

Appendix 2 of GNR 982, as amended, requires the identification of the significance of potential impacts during scoping. To this end, an impact screening tool has been used in the scoping phase. The screening tool is based on two criteria, namely probability; and consequence (Table 3-1), where the latter is based on general consideration to the intensity, extent, and duration.

The scales and descriptors used for scoring probability (Table 3-2) and consequence (Table 3-3)are detailed below.

**Table 3-1 – Significance screening tool**

| | CONSEQUENCE SCALE | | | | |
|---|---|---|---|---|---|
| PROBABILITY SCALE | | 1 | 2 | 3 | 4 |
| | 1 | Very Low | Very Low | Low | Medium |
| | 2 | Very Low | Low | Medium | Medium |
| | 3 | Low | Medium | Medium | High |
| | 4 | Medium | Medium | High | Very High |

The nature of the impact must be characterised as to whether the impact is deemed to be positive (+ve) (i.e. beneficial) or negative (-ve) (i.e. harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (Error! Reference source not found.) has been applied according to the nature and significance of the identified impacts.

**Table 3-2 – Probability scores and descriptors**

| Score | Descriptor |
|---|---|
| **4** | **Definite**: The impact will occur regardless of any prevention measures |
| **3** | **Highly Probable**: It is most likely that the impact will occur |
| **2** | **Probable**: There is a good possibility that the impact will occur |
| **1** | **Improbable:** The possibility of the impact occurring is very low |

**Table 3-3 – Consequence score descriptions**

| Score | Negative | Positive |
|---|---|---|
| 4 | **Very severe:** An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated. | **Very beneficial:** A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit. |
| 3 | **Severe:** A long-term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these. | **Beneficial:** A long-term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these. |
| 2 | **Moderately severe:** A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated. | **Moderately beneficial:** A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way. |

| | | |
|---|---|---|
| 1 | **Negligible:** A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary. | **Negligible:** A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these. |

**Table 3-4 - Impact Significance Colour Reference System to Indicate the Nature of the Impact**

| Negative Impacts (-ve) | Positive Impacts (+ve) |
|---|---|
| Negligible | Negligible |
| Very Low | Very Low |
| Low | Low |
| Medium | Medium |
| High | High |
| Very High | Very High |

## 3.6 STUDY ASSUMPTIONS AND LIMITATIONS

### 3.6.1. Data used for specialist assessments.

The baseline description is qualitative and is based on available national datasets and published literature for the study area region, and previous ecological studies conducted in the study area in conjunction with a dry season survey.

# 4 TERRESTRIAL BIODIVERSITY BASELINE DESCRIPTION

## 4.1 ENVIRONMENTAL SCREENING TOOL

The proposed infrastructure footprint was assessed at desktop level using the National Web-based Environmental Screening Tool. According to the Tool, the Terrestrial Biodiversity Theme for the study area is rated 'Very High Sensitivity' due to its overlap with land mapped as:

- Critical Biodiversity Areas (CBA) 1 and 2;
- Ecological support Areas (ESA) 1 and 2;
- FEPA sub catchments; and
- National Protected Areas Expansion Strategy (NPAES).

The National Web Based Screening Tool also indicated that the Project area is considered to be of 'Medium' sensitivity in terms of the Plant Species Theme on account of the potential presence of at least 2 flora species of conservation concern, namely; sensitive species 1252 and 998, whose names have been withheld due to their vulnerability to illegal harvesting.

The Project area is considered to be of 'High' sensitivity in terms of the Animal Species Theme, due to the potential presence of the range-restricted Lalande's Black-winged Clonia (*Clonia lalandei)* which is listed as Vulnerable on the SANBI red list (2014), the mammals Spotted-necked Otter (*Hydrictis maculicollis* – Vulnerable), and Oribi (*Ourebia ourebi ourebi* - Endangered); and bird species including Secretarybird *(Sagittarius serpentarius*-Vulnerable*),* Southern Bald Ibis *(Geronticus calvus-Vulnerable),* Denham's bustard *(Neotis denhami-Vulnerable),* Yellow-breasted pipit *(Anthus chloris*-Vulnerable*),*African marsh harrier *(Circus ranivorus*-Endangered*),* Grey crowned crane *(Balearica regulorum*-Endangered*),* Lanner falcon *(Falco biarmicus*-Vulnerable*),*White-bellied bustard *(Eupodotis senegalensis*-Vulnerable*),* Rudd's lark *(Heteromirafra ruddi*-Endangered*),* Botha's lark *(Spizocorys fringillaris*-Endangered*),* Black stork *(Ciconia nigra*-Vulnerable*),* Caspian tern *(Sterna caspia*-Vulnerable*),* Verreaux's eagle *(Aquila verreauxii*-Vulnerable*),* in addition to sensitive species 15 and 23, whose names have been withheld due to their vulnerability to illegal poaching and disturbance.

## 4.2 REGIONAL TERRESTRIAL BIODIVERSITY CONTEXT

The study area consists of CBAs and ESAs (Figure 4-8), which are largely aligned with grassland, cultivated stands and a single water body West of the Project area (Figure 4-2). In addition to species identified by the screening tool, desktop studies revealed additional animal and plant species that could possibly occur in the Project area. The full expected species lists can be seen in Appendix 1 and 2 respectively.

The study area is situated in the Eastern Free State Sandy Grassland (Gm4) vegetation type (Figure 4-7), which has a conservation status of Least Concern. In addition, the Grasslands' Important Bird Area (IBA) occurs 5km to the North of the Project area and Alexpan IBA occurs 16km South-West of the Project area (Figure 4-5). These key features are further discussed in the sections that follow.

## TERRESTRIAL CRITICAL BIODIVERSITY AREAS (CBAS) AND ECOLOGICAL SUPPORT AREAS (ESAS)

The Project area was compared to relevant available spatial biodiversity planning datasets, i.e. the Free State Biodiversity Sector Plan (2019), in order to assess the local and regional biodiversity context of the site.

The Free State Biodiversity Sector Plan defines five categories of conservation focus; protected areas, critical biodiversity areas (CBA), ecological support areas (ESA), other natural areas, and modified habitats. Definitions for each are listed below. These areas present risks to the Project in terms of impact, as well as opportunities for contribution to achieving provincially-set targets for biodiversity conservation, through focused biodiversity management planning and adherence to the mitigation hierarchy at EIA stage:

- **Protected Areas**: protected areas recognised in terms of the National Environmental Management Protected Areas Act, No. 57 of 2003, that are currently considered to meet biodiversity targets in the FSBSP.
- **Critical Biodiversity Area**: areas (outside of Protected Areas) that are required to meet biodiversity targets for biodiversity pattern (species and ecosystems) and ecological processes. They should remain in a natural state that is maintained in good ecological condition.
- **Ecological Support Area**: play an important role in supporting the ecological functioning of critical biodiversity areas or for generating or delivering important ecosystem services. They support landscape connectivity and resilience to climate change adaptation. They need to be maintained in at least an ecologically functional state.
- **Other Natural Areas**: often retain much of their natural character and may contribute significantly to maintenance of viable species populations and natural ecosystem functioning and may provide important ecological infrastructure and ecosystem services. They are not, however, prioritized for immediate conservation action in the MBSP.
- **Modified:** often referred to as transformed, these areas have lost a significant proportion (or all) of their natural biodiversity and in which ecological processes have broken down (in some cases irretrievably), as a result of biodiversity-incompatible land-use practices such as ploughing, hardening of surfaces, mining, cultivation and the construction of houses or other built infrastructure.

The entirety of the Project area is mapped as CBAs and ESAs (Figure 4-1), which are largely aligned with grassland, cultivated stands and several wetlands, as presented in the national landcover dataset (GTI, 2020) (Figure 4-2). These datasets are based on satellite imagery interpretation and as such the data may be aged and will require in-field verification. A key output of the vegetation and flora baseline study (to be conducted) will be the vegetation map of the Project area, which defines the location and extent of natural and modified vegetation communities – these will be utilised for CBA/ESA extent verification purposes in the Terrestrial Biodiversity Specialist Assessment at EIA stage.

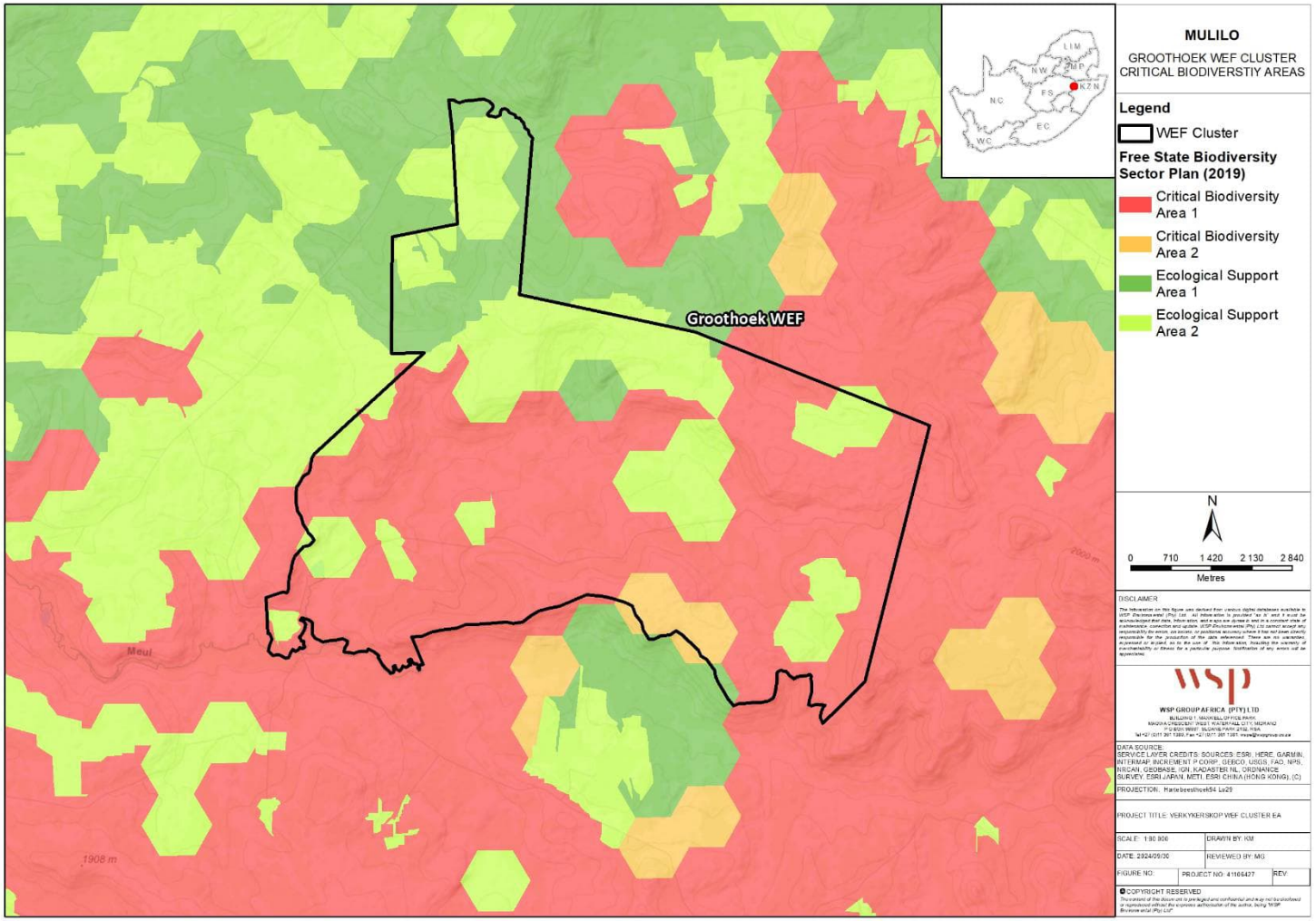


**Figure 4-1 - Project area in relation to FSBSP (2019)**

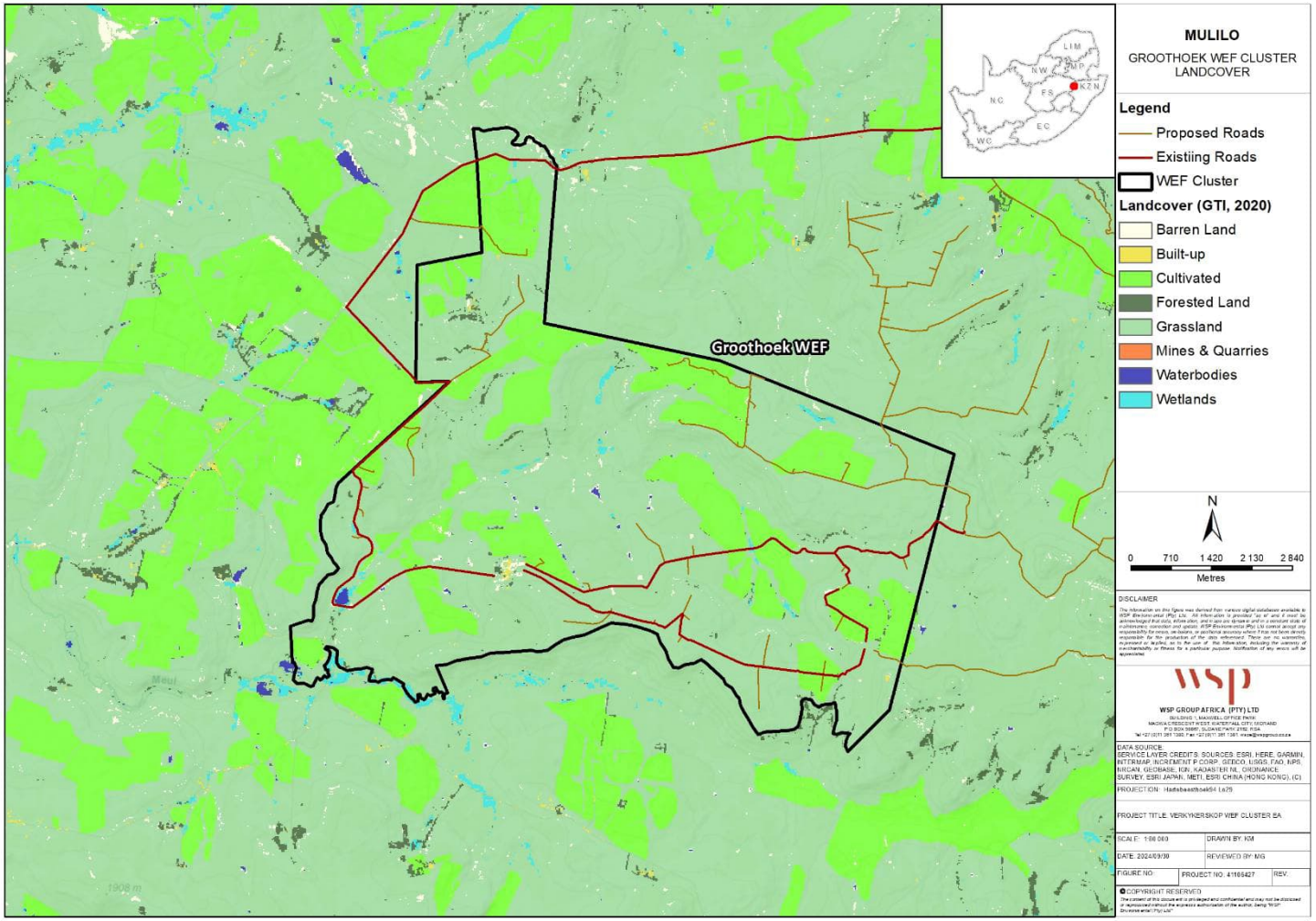


**Figure 4-2 - Landcover dataset for Project area (GTI,2020)**

## PRIORITY AREAS FOR PROTECTED AREA EXPANSION

The majority of the development footprint coincides with areas that have been identified as Priority Focus Areas as part of the National Protected Area Expansion Strategy (2018) (Figure 4-3), which is aligned with the FSBSP CBAs and ESAs (Figure 4-1).

## PROTECTED AREAS

No nationally protected areas are situated within the project area, with the closest feature listed on the National Protected Areas Register (DFFE, 2022) being the Upper Wilge Protected Environment, which lies at the South-West to the Project area (Figure 4-4).

## KEY BIODIVERSITY AREAS

As per communication from BirdLife South Africa (July 2024) it should be noted that IBA's are being replaced by Key Biodiversity Areas (KBA's).

Key Biodiversity Areas (KBA's) are 'sites that contribute significantly to the global persistence of biodiversity', which means they are the most important places in the world for species and their habitats – whether these be in terrestrial, freshwater, estuarine or marine ecosystem (Key Biodiversity Areas, 2024).

The Global Standard for the Identification of Key Biodiversity Areas, published in 2016, sets out internationally agreed scientific criteria for the identification of KBAs worldwide. Sites qualify as global KBAs if they meet the specific standardised criteria and quantitative thresholds focused on one or more of five trigger aspects:

- Threatened biodiversity
- Geographically restricted biodiversity
- Ecological integrity
- Biological processes
- Irreplaceability through quantitative analysis

The Project Site only overlaps with the Eastern Free State Escarpment Key Biodiversity Area (KBA ID S471) (Figure 4-6).

Eastern Free State Escarpment is a large terrestrial site with substantial protection, found in the Free State, South Africa. Most of the site is composed of flat to slightly undulating and undulating terrain with streams and rivers that drain the foothills of the Drakensberg. Vegetation consists of closed grassland dominated by *Eragrostis curvula, Tristachya leucothrix* and *Themeda triandra.* Embedded within the site are many hills and small mountains carrying Basotho Montane Shrubland. Due to wide range of grazing and fire regimes, the grassland has a patchy appearance. A smaller portion of the landscape is comprised of undulating grassland plains, with small, scattered patches of dolerite outcrops in areas. *Protea caffra* communities and patches of *Leucosidea* scrub feature at higher altitudes. Whereas on steep talus slopes and kloofs of the mesas and other mountain flanks supporting tall, in places very dense shrubland dominated by broad-leaved *mesophyllous* shrubs. Mesas are often encircled by striking upper cliffs of Clarens Sandstone.

This site qualifies as a Key Biodiversity Area of international significance that meets the thresholds for 3 criteria described in the Global Standard for the Identification of KBAs. Based on current available information, 8 species meet one or more KBA criteria for this site. The KBA trigger species at this site include birds, mammals, and reptiles. The site meets criterion A1 due to the presence of significant

proportions of the global populations of 6 threatened species. An assemblage of co-occurring range-restricted species in the Aves taxonomic group regularly present within the site meets criterion B2. A quantitative analysis of irreplaceability indicate that the site is 100% irreplaceable for the global persistence of 2 species, therefore meeting criterion E.

15 other potential trigger species meet minimum population parameter thresholds for the site, but presence and/or minimum reproductive units (RU) required to meet KBA criteria cannot be confirmed with available data. The table below presents the confirmed SCC that occur within the KBA.

**Table 4-1 – Confirmed SCC triggering criteria**

| Taxon group | Season | Scientific name | Common name | Red List | RU's | % in site | KBA criteria |
|---|---|---|---|---|---|---|---|
| Mammalia | Resident | *Redunca fulvorufula* | Mountain reedbuck | **EN** | 10 | 0.15% | A1c |
| Reptilia | Resident | *Tetradactylus breyeri* | Breyer's long-tailed seps | **NT** | 10 | 7.60% | - |
| Aves | Resident | *Hemimacronyx chloris* | Yellow-breasted pipit | **VU** | 10 | 1.91% | A1b |
| | Non-breeding | *Circus maurus* | Black harrier | **EN** | 5 | 0.11% | - |
| | Non-breeding | *Sarothrura ayresi* | White-winged flufftail | **CR** | 5 | 0.83% | A1a |
| | Resident | *Spizocorys fringillaris* | Botha's lark | **EN** | 5 | 3.87% | A1a, A1c, B2 |
| | Resident | *Sylvia nigricapillus* | Bush blackcap | **VU** | 10 | 1.78% | A1b, B2 |

## IMPORTANT BIRD AREAS

Grasslands' IBA occurs 5km to the North of the Project area (Figure 4-5). It contains wetlands of international importance (Birdlife International, 2024). The IBA supports large numbers of a rich diversity of resident and migratory waterbirds, in addition to most of South Africa's threatened and endemic grassland species including;

- A significant proportion of the globally endangered White-winged Flufftail (*Sarothrura ayresi*);
- 85% of the global population of Rudd's Lark (*Heteromirafra ruddi*);
- Botha's Lark (*Spizocorys fringillaris*), which is highly localized within moist clay highveld grassland on black clays or dolerite soils.
- Yellow-breasted Pipit (*Anthus chloris*) which favours mid-altitude, well-developed grassland.
- The world's largest breeding colonies of Southern Bald Ibis (*Geronticus calvus*).
- Widespread populations of Blue crane (*Grus paradisea*), Black-winged Pratincole (*Glareola*
- *nordmanni*), Denham's Bustard (*Neotis denhami*) and White-bellied Korhaan (*Eupodotis senegalensis*).
- African Rock Pipit (*Anthus crenatus*), Ground Woodpecker (*Geocolaptes olivaceus*), Buff-streaked chat (*Saxicola bifasciata*) and Cape Rock Thrush (*Monticola rupestris*) occurring on exposed outcrops and rocky slopes at higher altitudes;

- Gurney's sugarbird (*Promerops gurneyi*) occurring around proteoid woodland on the escarpment.
- Black Stork (Ciconia nigra) which breeds on steep cliffs;
- Chorister Robin-chat (*Cossypha dichroa*), Forest Canary (*Serinus scotops*), Bush Blackcap
- (*Lioptilus nigricapillus*) and Orange Ground Thrush (*Zoothera gurneyi*) populations occurring in forested patches.

Alexpan (ZA032) IBA occurs 16km South-West of the Project area (Figure 4-5) and provides grassland-highveld habitat for Southern Bald Ibis (*G.calvus*)-Vulnerable, Rudd's Lark (H.*ruddi*)-Endangered, Botha's Lark (*S. fringillaris*)-Endangered and Yellow-breasted Pipit (*H. chloris*)-Vulnerable.

IBA designation is not a statutory level of protection, and does not preclude wind farm development, however, avoidance where possible is advised (BirdLIfe South Africa (BLSA), 2019), It is likely that this will be a focus of discussion once consultations with relevant provincial and non-governmental (BLSA, Endangered Wildlife Trust) conservation organisations are held; and underscores the need for a very robust preconstruction bird monitoring programme. Early consultation with BLSA is recommended, since White-winged Flufftail (*S. ayresi*) is very cryptic and difficult to survey (survey is only possible via acoustic methods, and its call parameters have not yet been made public) and is understood to fly at night, which presents a significant risk of BLSA objection to a WEF development. The possible impacts of the Project and mitigation strategies will be delt with in a separate Avifauna study.

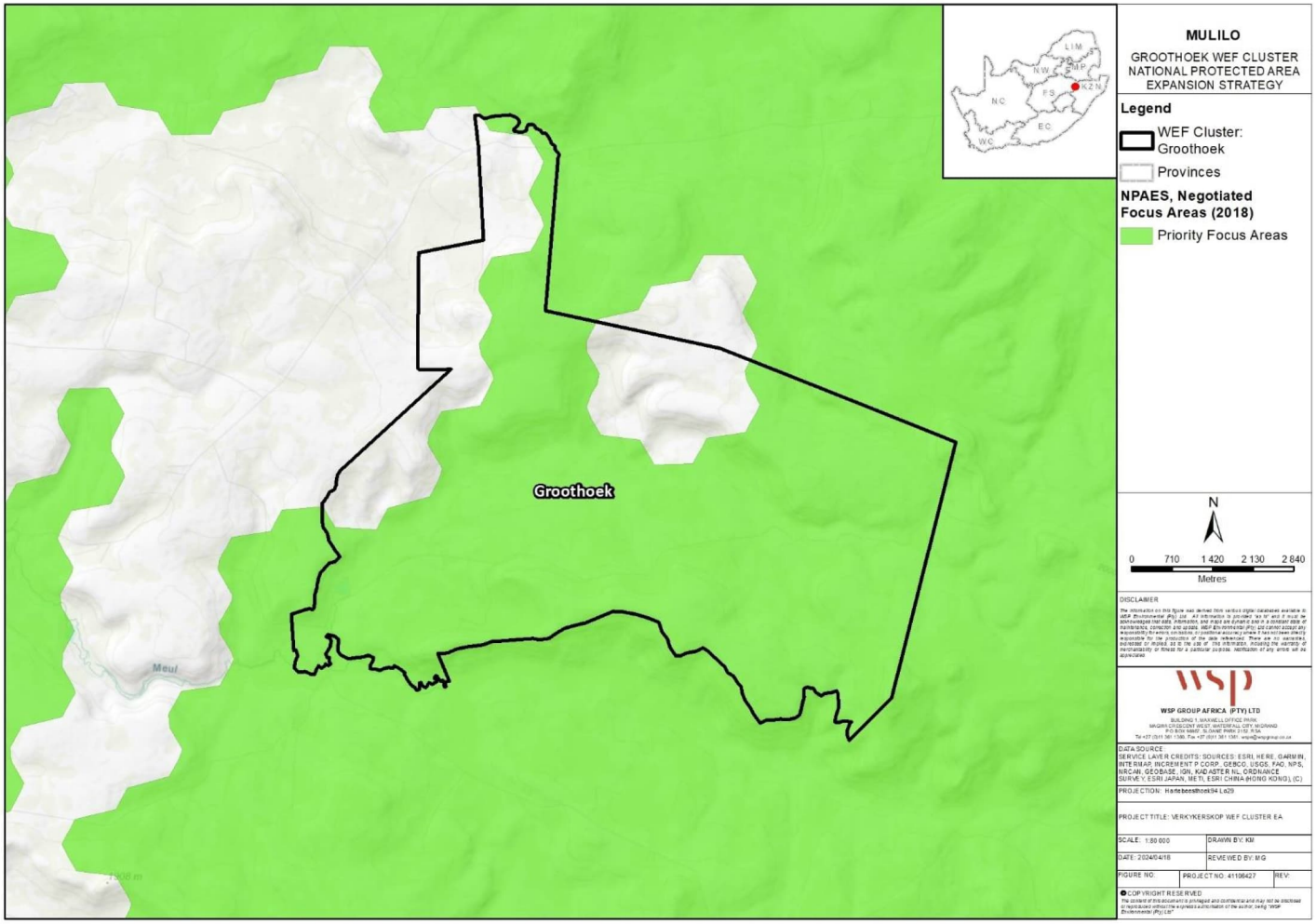


**Figure 4-3 - Project area in relation to National Protected Area Expansion Strategy (2018)**

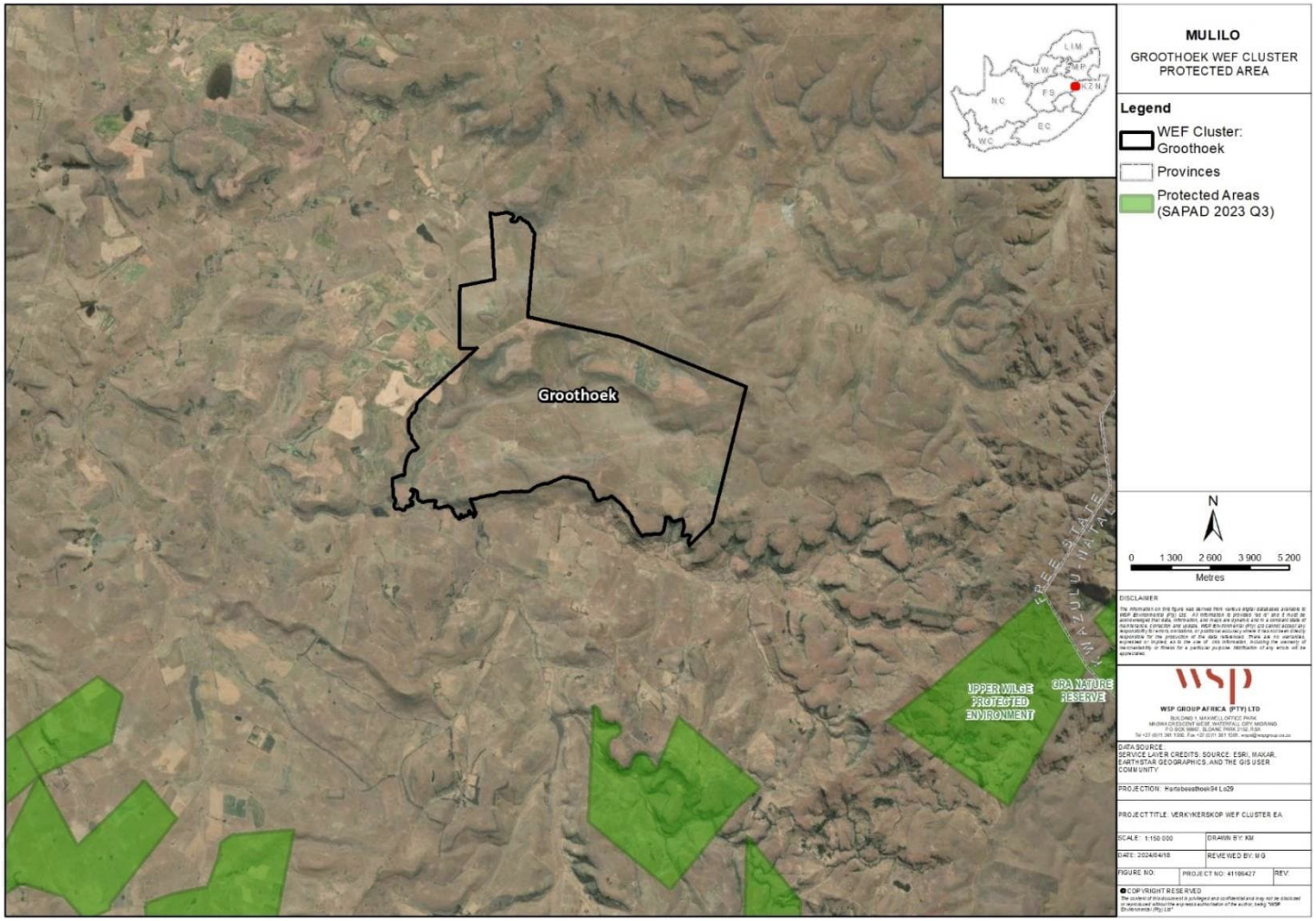


**Figure 4-4 - Project area in relation to South African Protected Area Database (2023)**

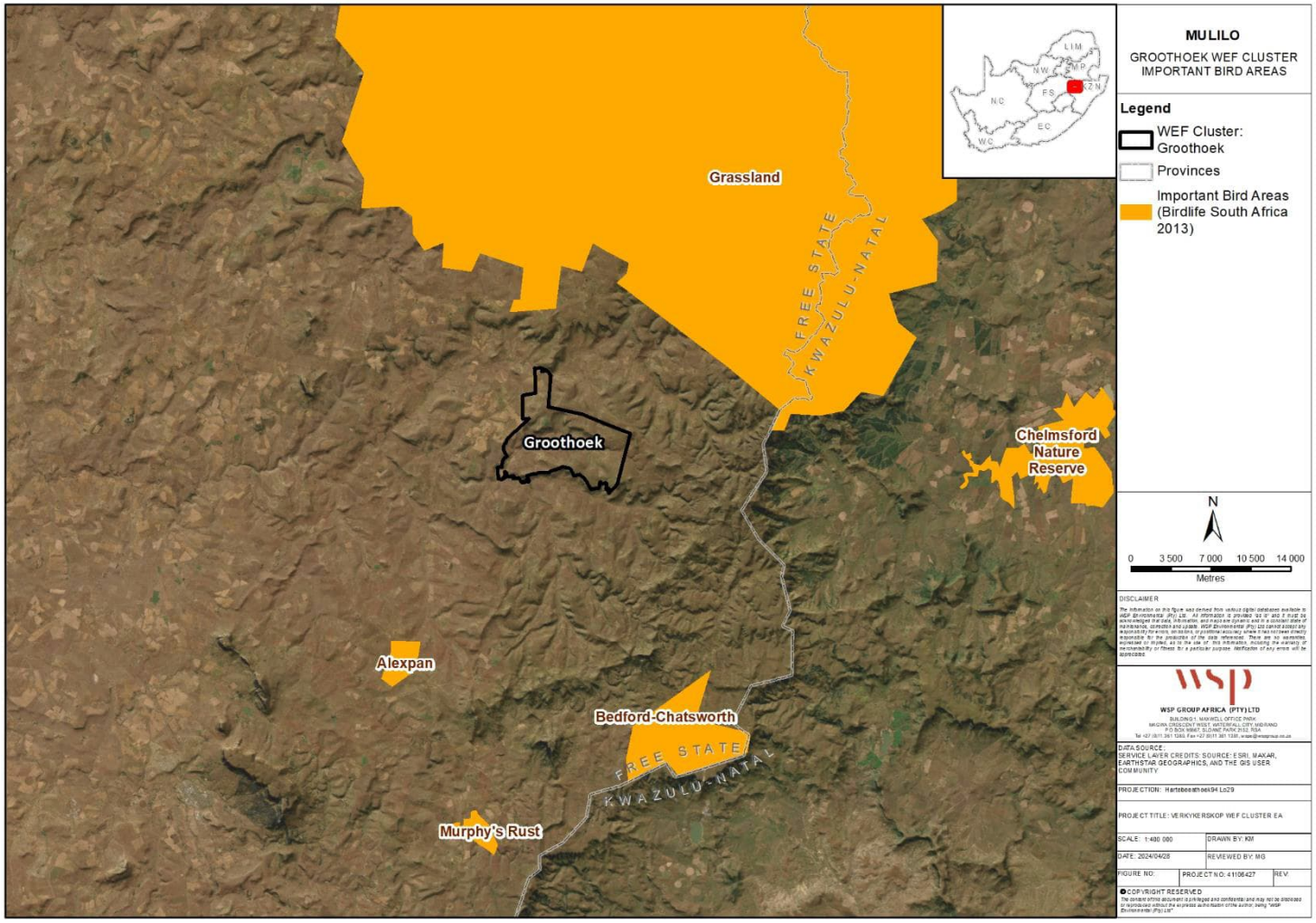


**Figure 4-5 - Project area in relation to Important Bird Areas (2013)**

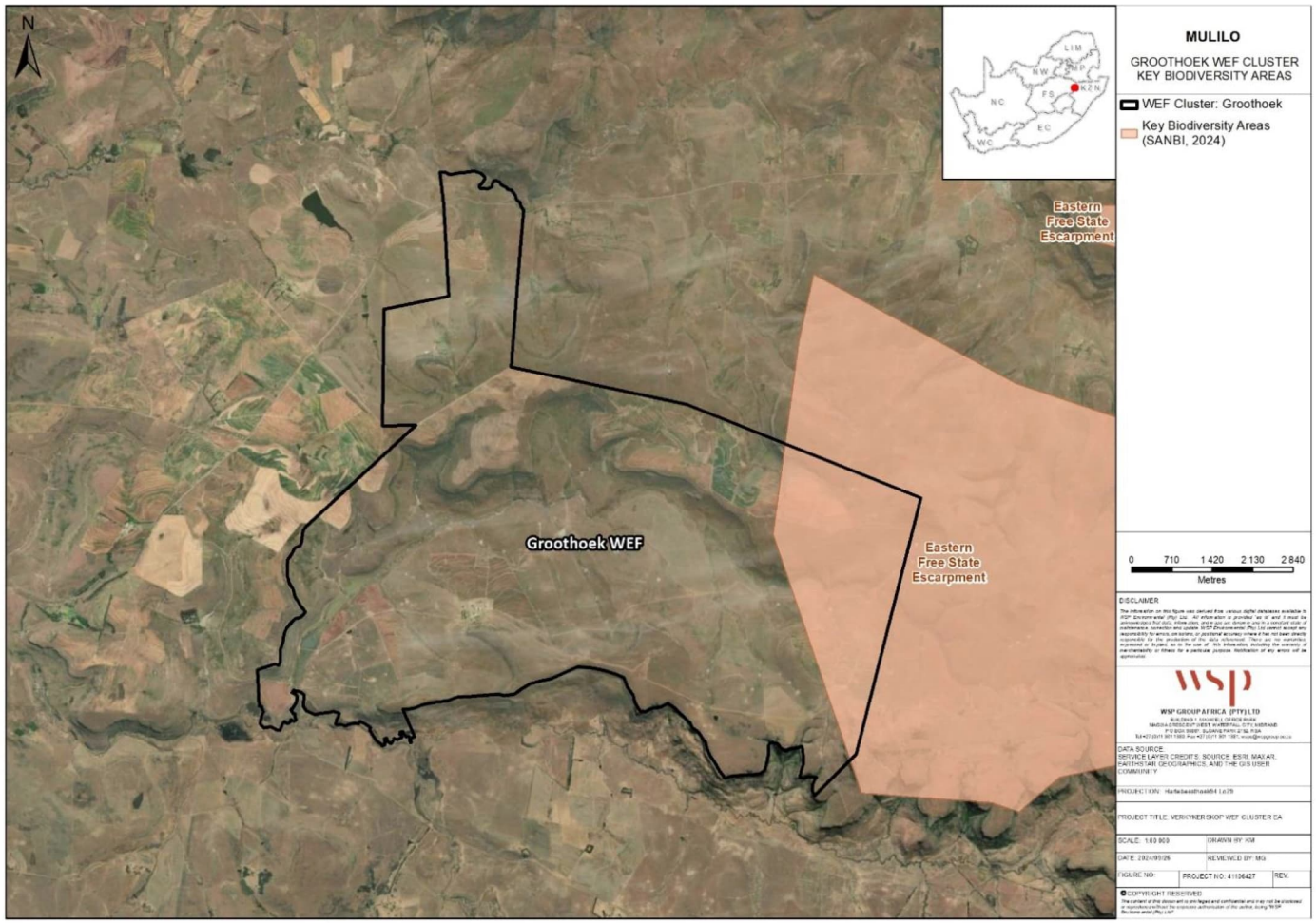


**Figure 4-6 - Project area in relation to Key Biodiversity Areas (2024)**

## 4.3 TERRESTRIAL VEGETATION AND FLORA

The Project area is situated within the Eastern Free State Sandy Grassland (Gm4) vegetation type (Figure 4-7). This vegetation type was previously listed as Near Threatened ( Figure 4-8), however has since been reclassified to Least Concern (Red List of Ecosystems, 2022).

### FLORA FEATURES OF CONSERVATION CONCERN

The majority of the Project area is considered to be of 'Medium sensitivity' in terms of the Plant Species Theme of the National Screening Tool, on account of the potential presence of at least two Vulnerable flora species namely the sensitive species 1252 and 998. An additional 10 species have been identified from desktop assessment. These include Sensitive Species 1248 (Endangered); Sensitive Species 851 (Vulnerable); *Prunus Africana* (Vulnerable); *Zaluzianskya distans* (Vulnerable); *Anemone fanninii* (Near Threatened); *Eucomis bicolor* (Near Threatened); *Polygala praticola* (Near Threatened); *Merwilla plumbea* (Near Threatened); *Ocotea bullata* (Endangered) and *Lotononis amajubica* (Rare).

The presence of these species will only be confirmed upon completion of Flora baseline survey in the wet season.

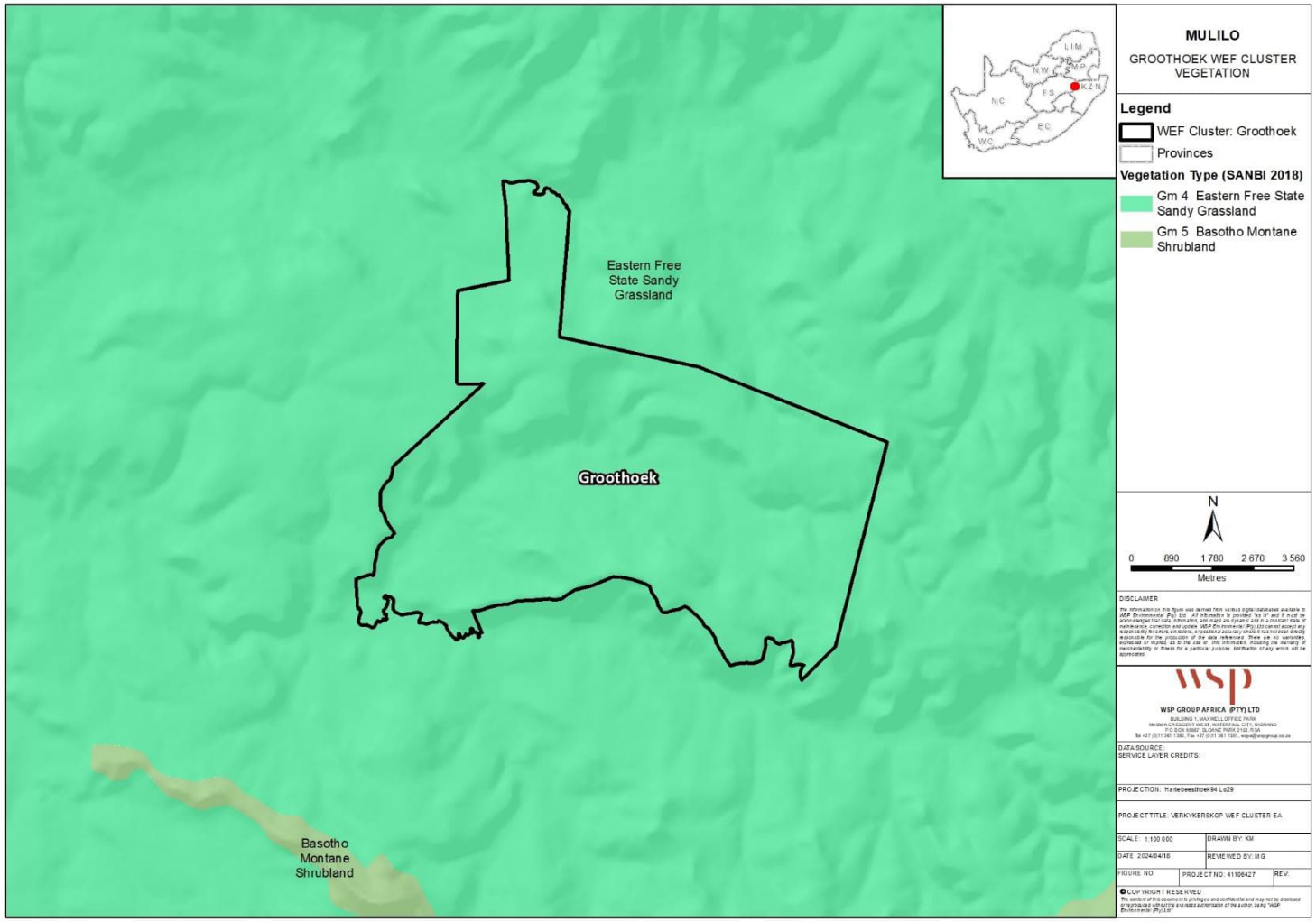


**Figure 4-7 - Project area in relation to National Vegetation Types**

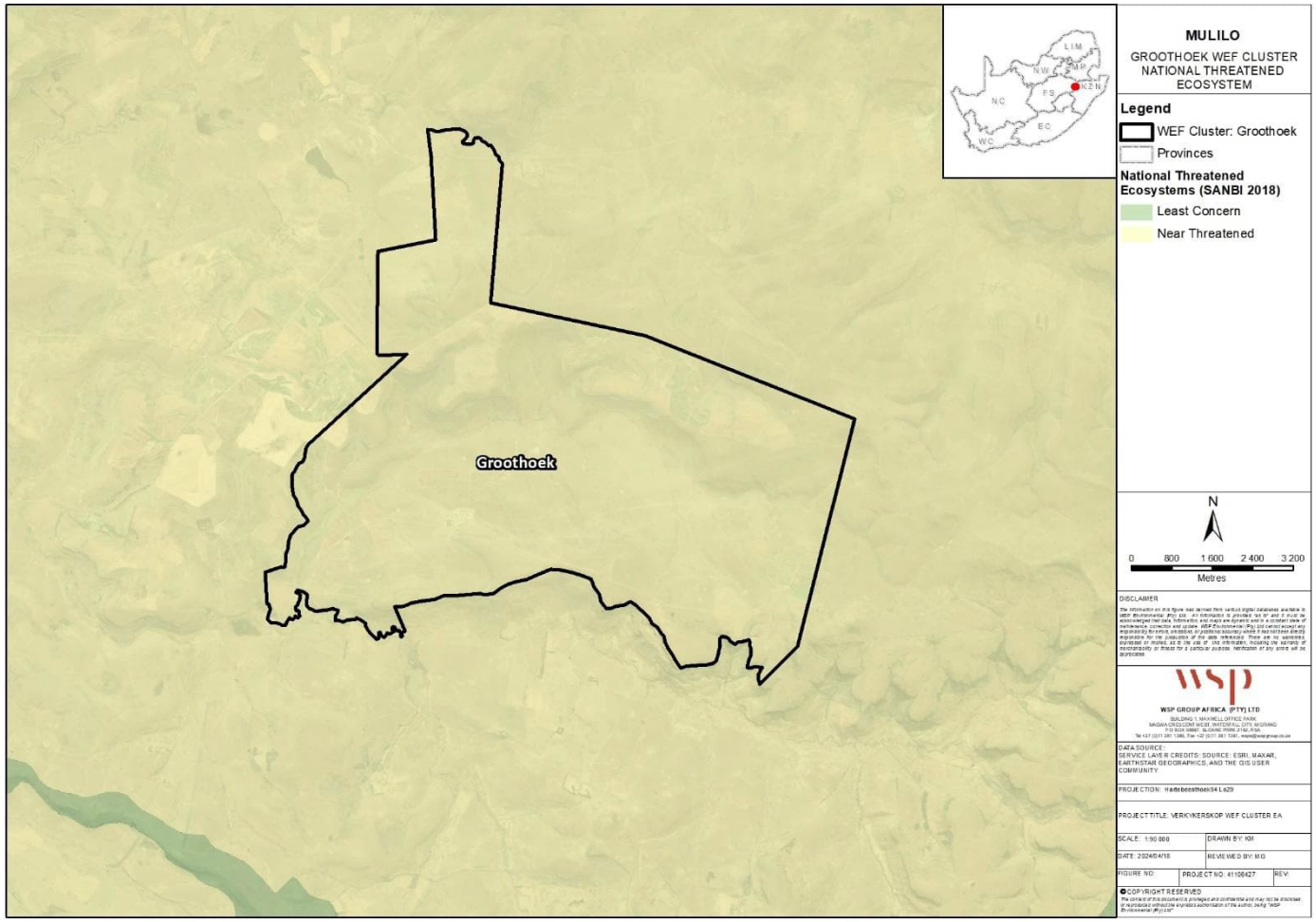


**Figure 4-8 - Project area in relation to National Threatened Ecosystems**

## 4.4 FAUNA

Details of fauna species of conservation concern (SCC) with potential to occur in the project are summarised in the sections that follow. The occurrence of these species in the Project area will need to be confirmed during the baseline data gathering phase.

### MAMMALS

Fifteen mammal SCC have the potential to occur in the Project area based on historical distribution; however only some of these are likely to be present. These could be present in undisturbed areas of primary grassland and wetland, and may also occur in the vicinity of cultivated lands. These include:

- Two Critically endangered species: Mountain Reedbuck (*Redunca fulvorufula*); of which just Mountain Reedbuck could potentially occur;
- Nine Near threatened species, of which six could potentially occur: Brown Hyaena (*Parahyaena brunnea*); Grey Rhebok (*Pelea capreolus*); African Clawless Otter (*Aonyx capensis*); Highveld Golden Mole (*Amblysomus septentrionalis*); Serval (*Leptailurus serval*) and Vlei Rat (*Otomys auratus*);
- Three Vulnerable species: White-tailed Rat (*Mystromys albicaudatus*); Oribi (*Ourebia ourebi ourebi*); Spotted necked Otter (*Hydrictis maculicollis*); and one Endangered species: Black-footed Cat (*Felis nigripes*).

### HERPETOFAUNA

Although the national screening tool indicates no sensitivities in terms of support of herpetofauna; three reptile species with potential to occur have been identified from desktop assessment. These include the Near Threatened species Drakensberg Dwarf Chameleon (*Bradypodion dracomontanum*) and Breyer's Long-Tailed Seps (Tetradactylus breyeri) as well as the Vulnerable Giant Dragon Lizard (*Smaug giganteus*) (ReptileMAP, 2022). No amphibian SCC are anticipated to occur in the Project area (FrogMAP, 2022).

### AVIFAUNA

The following Vulnerable Avifauna species have been flagged by the DFFE screening tool as potentially occurring in the Project area. These include: Secretarybird *(S. serpentarius);* Southern Bald Ibis *(G. calvus);* Yellow-breasted pipit *(A. chloris*); Denham's bustard *(N. denhami);* Lanner falcon *(F.biarmicus*); White-bellied bustard *(E.senegalensis); Black stork (C. nigra);* Caspian tern *(S. caspia) and* Verreaux's eagle *(A. verreauxii).* In addition, the following Endangered species could occur: African marsh harrier *(C. ranivorus*); Grey crowned crane *(B. regulorum);* Rudd's lark *(H. ruddi) and* Botha's lark *(S. fringillaris).* These species will be addressed in a separate Avifauna study.

### INVERTEBRATES

The national screening tool flags potential presence of the Vulnerable, range-restricted invertebrate species Lalande's Black-winged Clonia (*Clonia lalandei*) which is associated with undisturbed savanna-woodland habitat (SANBI ,2014). Potentially suitable habitats for the support of this species will be assessed in the field, and the need for any baseline survey work identified, during site sensitivity verification.

## 4.5 EXISTING IMPACTS ON BIODIVERSITY AND DRIVERS OF CHANGE

The Project area is situated in a largely untransformed landscape, interspersed by low density cultivated fields, pastures and occasional exotic tree plantations, from which a low level of impact has occurred through habitat transformation. Barriers to faunal movement in the shape of dams, dirt roads and cattle/boundary fencing occur throughout the Project area.

# 5 AQUATIC BIODIVERSITY BASELINE DESCRIPTION

This section summarises, at a desktop level, the baseline aquatic environment of the Project area. It draws upon existing studies and published information.

## 5.1 ENVIRONMENTAL SCREENING TOOL

The proposed infrastructure footprint was assessed at desktop level using the National Web-based Environmental Screening Tool. According to the Tool, the Aquatic Biodiversity Theme for the study area is rated 'Very High Sensitivity' due to the presence of:

- FEPA sub-catchments;
- Rivers with largely natural Present Ecological Status (PES AB); and
- Wetlands of the Mesic Highveld Grassland Bioregion, including Depression; Floodplain and Valley Bottom hydrogeomorphic (HGM) types.

## 5.2 REGIONAL AQUATIC BIODIVERSITY CONTEXT

Freshwater ecosystems were identified from desktop screening. The majority of these freshwater ecosystems meet the definition of a wetland as contained in the National Water Act, 1998 (Act No. 36 of 1998). The extent and classification of wetland systems will be confirmed during baseline studies.

The Project area falls within the middle Vaal Water Management Area (WMA) within the C81L quaternary catchment. This catchment receives a mean annual precipitation of approximately 500 mm to 700 mm (DWS, 2014).

The DWS (2016) SQR Summary, including the PES, is provided for each of the associated watercourses (Table 5-1). The Meul SQR is approximately 2.3 km in length flowing North of the Project area and expected to host a total of eight fish species and 63 macroinvertebrate taxa. The Dwaalspruit SQR is approximately 2.15 km in length flowing South of the Project area and expected to host a total of seven fish species and 62 macroinvertebrate taxa. The Present Ecological Status (PES) of these systems is 'Largely natural with few modifications' (Figure 5-1). These systems are considered ecologically stressed due anthropogenic activities including agricultural cultivation and mining.

**Table 5-1 - Present Ecological State, Importance and Sensitivity**

| River Name | SQR Code | PES | Category Description | EI | ES |
|---|---|---|---|---|---|
| Meul | C81L-02594 | B | Largely Natural | High | Very High |
| Dwaalspruit | CL81-02695 | B | Largely Natural | High | High |
| SQR= Sub-Quaternary Reach, PES= Present Ecological Status, EI= Ecological Importance, ES= Ecological Sensitivity | | | | | |

### FRESHWATER ECOSYSTEM PRIORITY AREA (FEPA) SUB-CATCHMENTS

Priority wetlands running West of the Project area and FEPA sub-catchments are listed in Figure 5-2 and Figure 5-3 below.

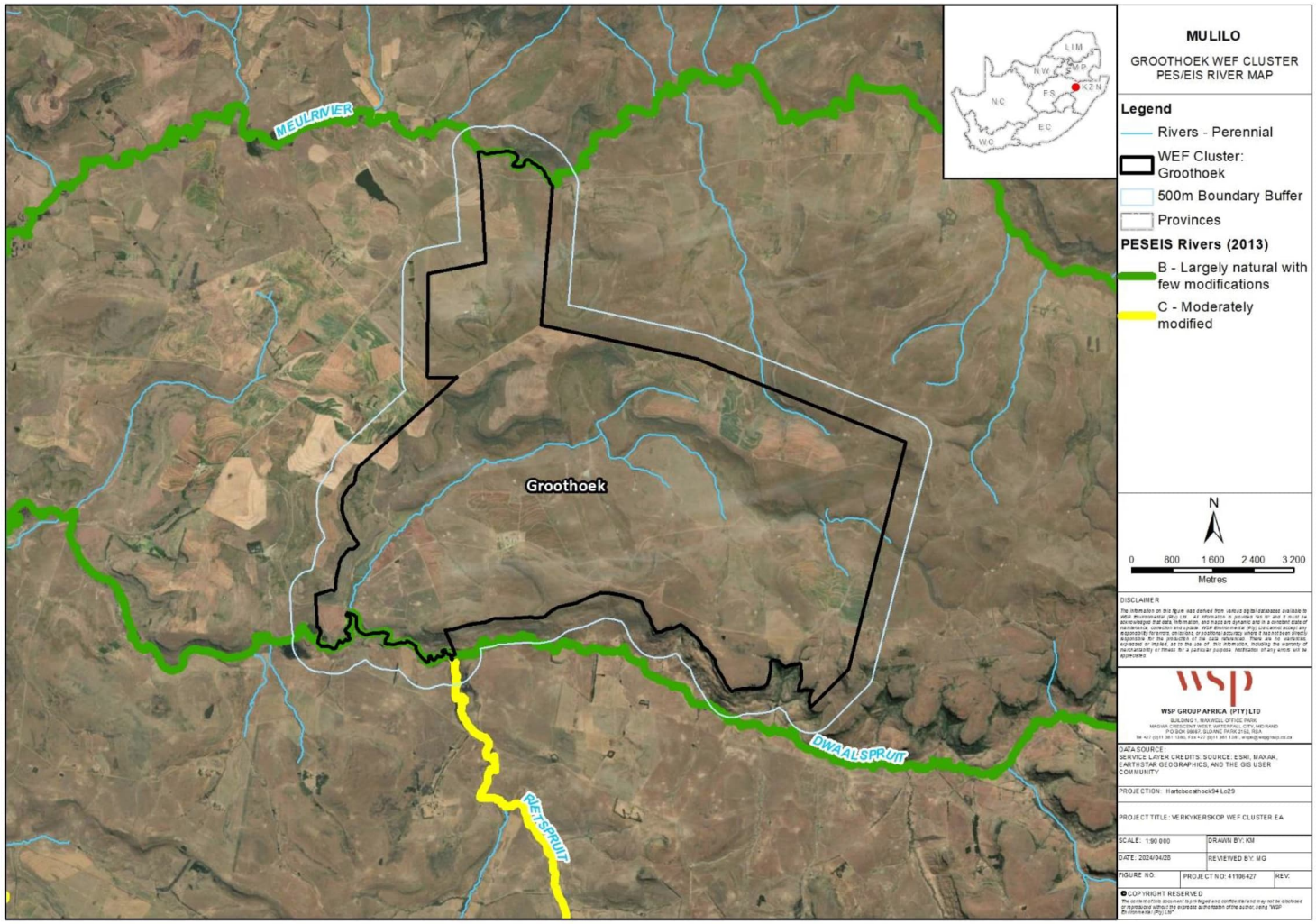


**Figure 5-1 – Project area in relation to PES**

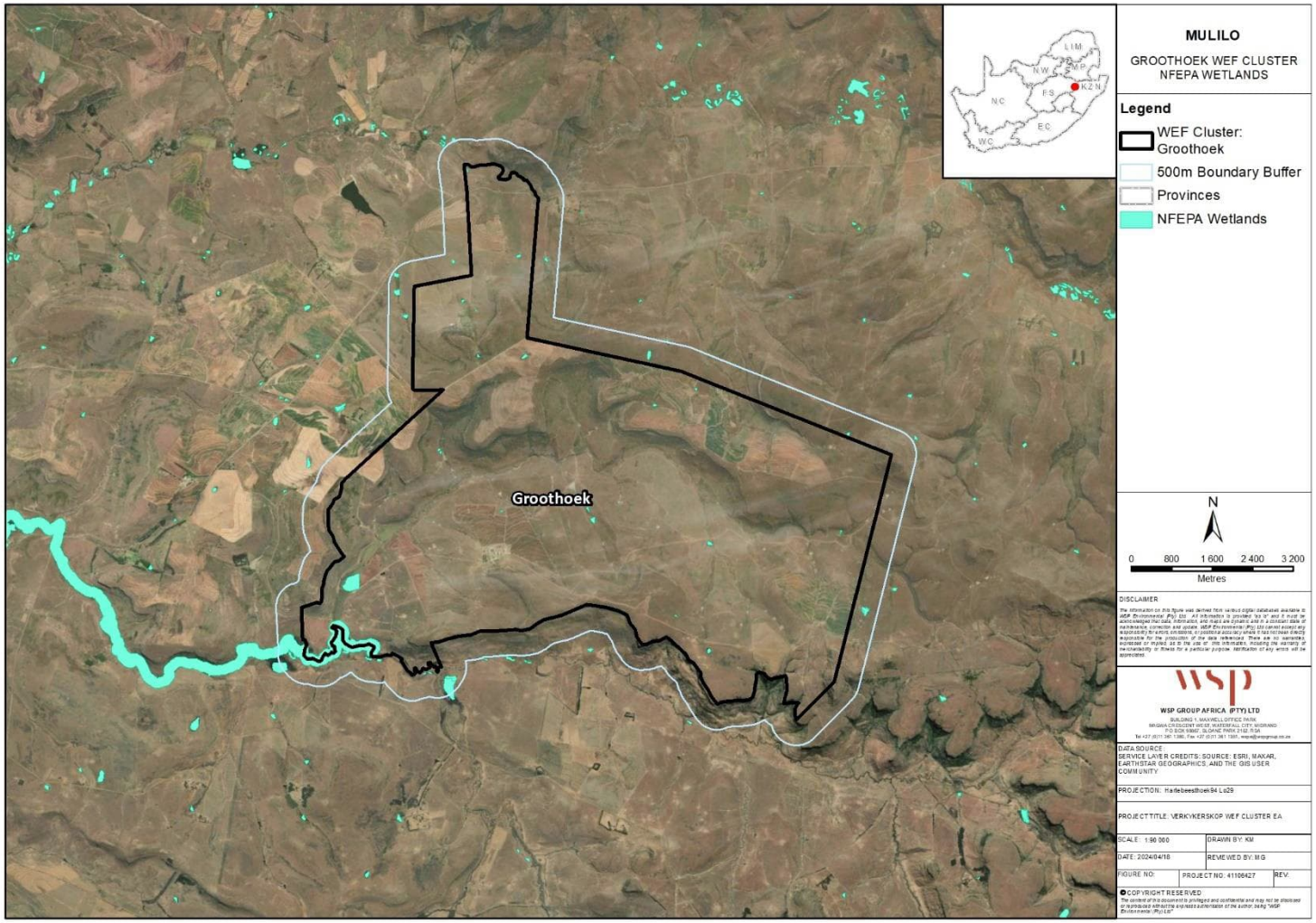


**Figure 5-2 - Project area in relation to priority (NFEPA) wetlands**

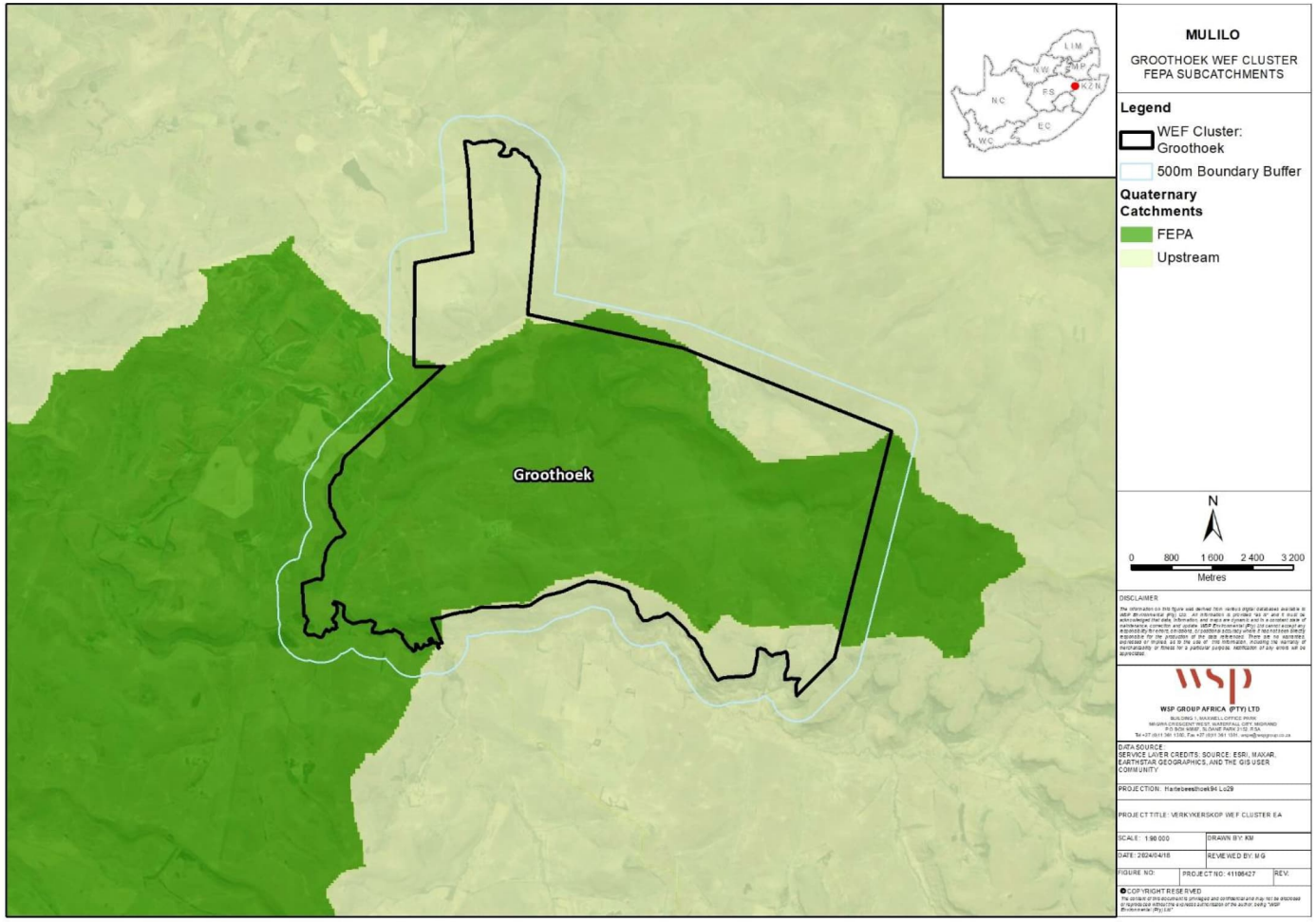


**Figure 5-3 - Project area in relation to FEPA sub-catchments**

## NATIONAL WETLAND MAP 5 WETLANDS

The South African National Wetland Map version 5 (NWM5) portrays the most up-to-date spatial data for the extent and types of estuarine and inland aquatic (freshwater) ecosystems of South Africa (Van Deventer et al., 2019). The proposed development footprint in relation to wetlands mapped as part of the National Wetland Map 5 project is illustrated on Figure 5-4.

Floodplain wetlands occur at the northern and southern extent of the Project area, with two channelled-valley bottom wetlands in the western part of the Project area. The extent and condition of these wetlands will be confirmed during the site verification process.

## BASELINE AQUATIC BIOMONITORING LOCATIONS

Baseline aquatic biomonitoring locations for the Project area have been selected ((Figure 5-5) based on the proposed positioning of WEF infrastructure and access roads, and the future need to measure and monitor potential impacts on the various surface water systems that coincide and interact with the proposed infrastructure and activities.

The baseline aquatic monitoring locations will be presented in the overall Aquatic Biodiversity Specialist Assessment that will be produced in support of the EIA.

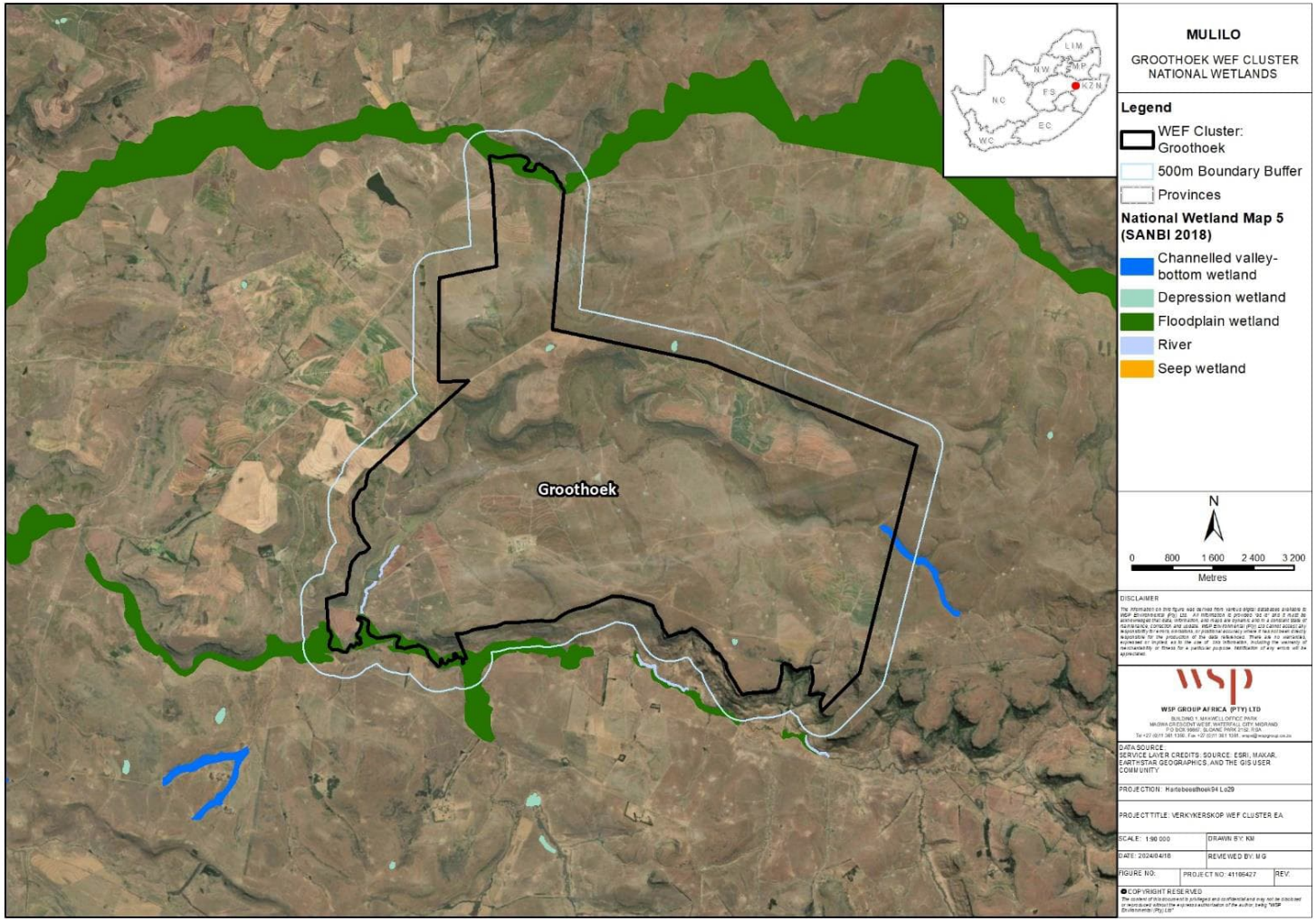


**Figure 5-4 - Project area in relation to NWM5**

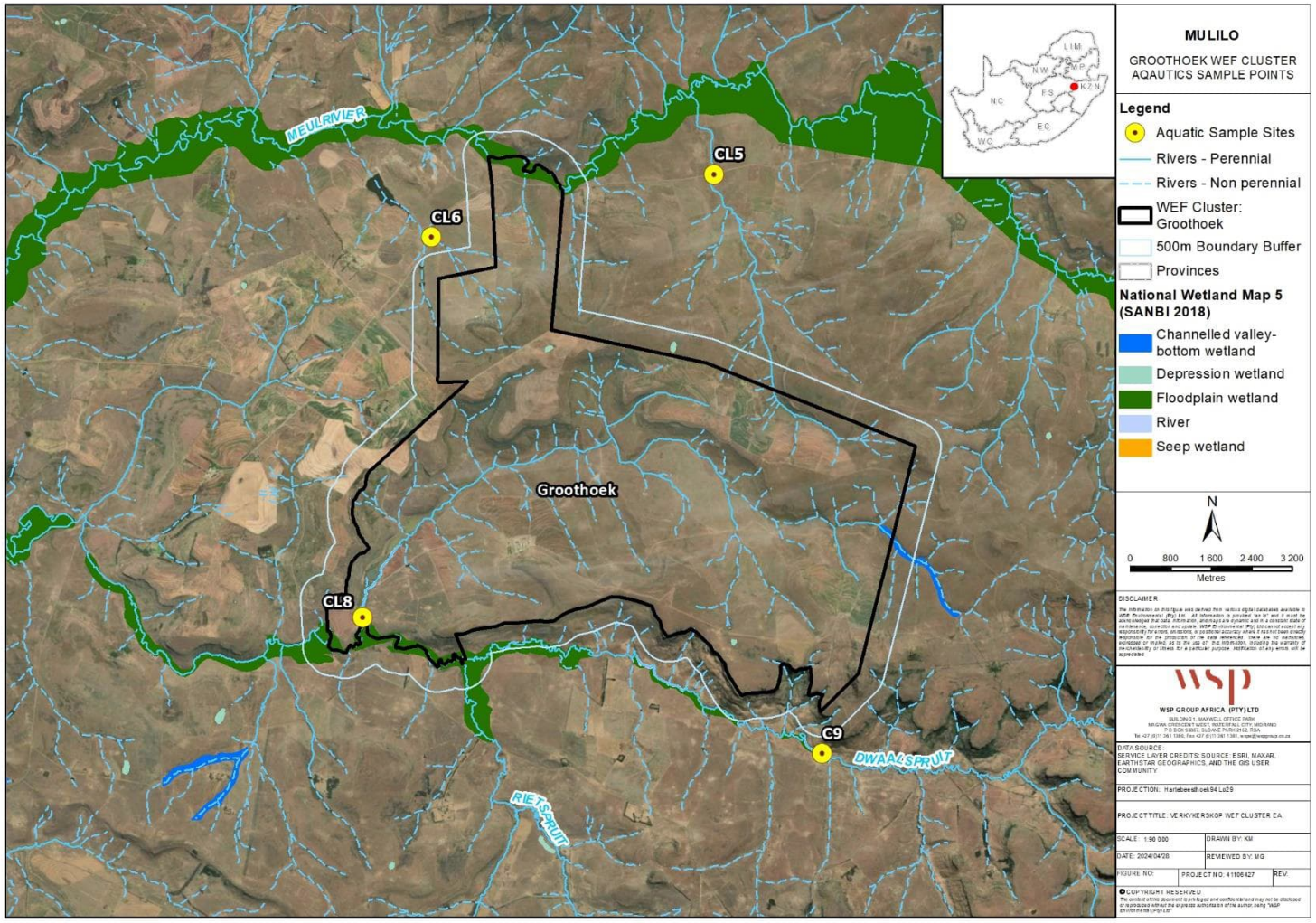


**Figure 5-5 - Project area in relation to aquatic survey sites**

# 6 SITE SENSITIVITY VERIFICATION – PRELIMINARY OUTCOME

The preliminary findings (Table 6-1) of the site sensitivity verification exercise are based primarily on desktop assessments and supplemented by an individual dry season (June 2024) sampling survey. Further extensive field verification is required during the wet season to ground-truth these results.

**Table 6-1 – Site sensitivity verification results**

| Theme | Screening tool sensitivity | site-based sensitivity | Motivation | Scoped report requirement |
|---|---|---|---|---|
| Aquatic biodiversity | Very high | High in rivers and wetland areas. | Presence of NFEPA wetland cluster, and rivers in good ecological condition within 500 m of Project area. | Aquatic Biodiversity Specialist Assessments, covering wetland and riparian systems |
| Terrestrial biodiversity | Very high | Medium – ESA<br>High - CBA | Although much of the Project area may be occupied by cultivated/secondary grasslands, areas that coincide with provincial conservation targets require special consideration in design phase to minimise impacts and possible offset requirements. | Terrestrial Biodiversity Specialist Assessment |
| Animal species | High | Medium | Possible presence of protected species. | Animal Species Specialist Assessment Report |

| Theme | Screening tool sensitivity | site-based sensitivity | Motivation | Scoped report requirement |
|---|---|---|---|---|
| Plant species | Medium | Medium in undisturbed areas | Primary and secondary grasslands could support plant SCC. | Plant Species Specialist Assessment Report |

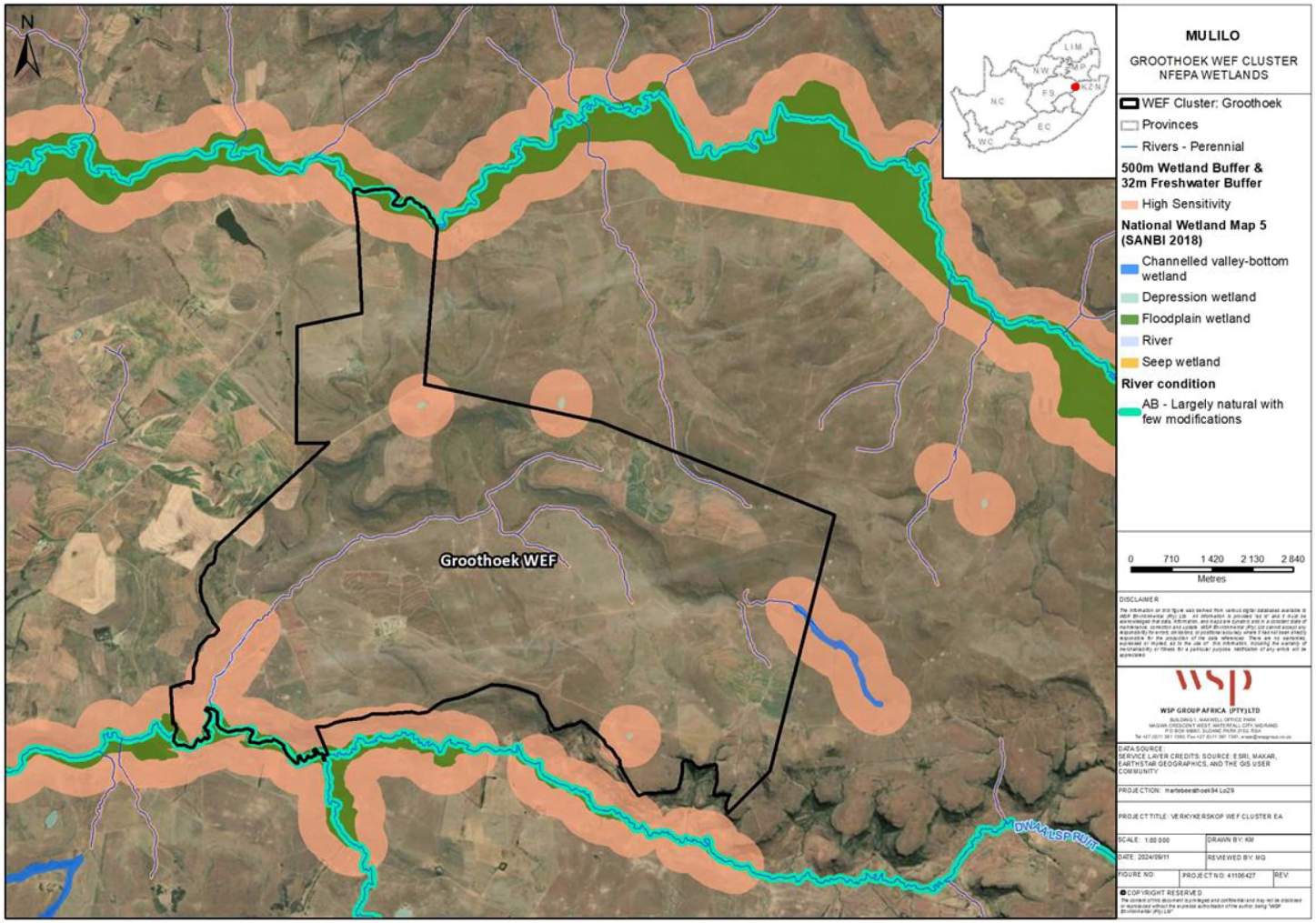


**Figure 6-1 - Desktop Based Aquatic Biodiversity Sensitivity Mapping**

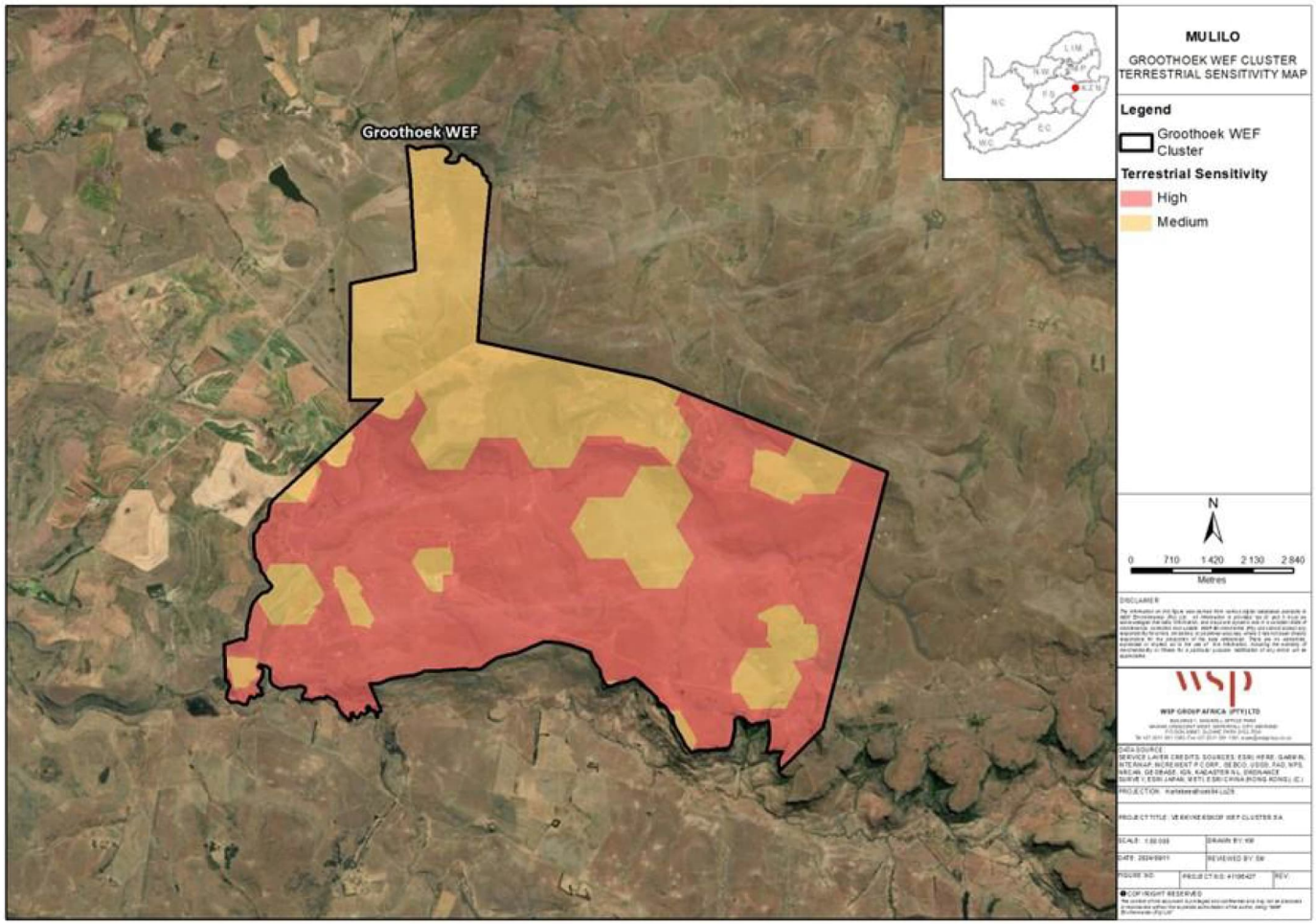


**Figure 6-2 - Desktop Based Terrestrial Ecology (Inclusive of Animal and Plant sp.) sensitivity mapping**

# 7 SCREENING OF POTENTIAL IMPACTS

## 7.1 AQUATIC ECOSYSTEMS

The construction and operation of the proposed new infrastructure could result in the following key impacts on Aquatic ecosystems:

- Temporary water quality deterioration;
- Increase in sediment load due to earth works and subsequent loss of habitat;
- Establishment and spread of alien and invasive species; and
- Flow modification.

The outcomes of the screening of the potential impacts are summarised in Table 7-1 and described in detail in the following sections.

### CONSTRUCTION PHASE

Construction phase will involve various activities such as vegetation clearing, soil disturbance, generation of dust and establishment of infrastructure. All the latter activities may impact aquatic ecosystems and biota as discussed below.

**Water quality deterioration**

Vegetation clearing and soil disturbances may result in bare land which increase surface runoff, soil erosion and subsequently, the amount contaminants from the construction site as well as adjacent agricultural activities entering the associated watercourses. Furthermore, the establishment of infrastructure will increase impervious surfaces and thus possibly exacerbate the cascade of events that result from bare land as explained above. Ultimately, water quality at the affect watercourses may be compromised.

Without mitigation, this impact would be highly probable with potentially severe consequences, resulting in a potential impact of high significance. The application of the recommended mitigation measures may however reduce both the potential consequence and the probability of the impact occurring as predicted, resulting in a residual impact of low significance.

**Increase in sediment load due to earth works and subsequent loss of habitat.**

Sediment load to nearby watercourses may increase due to increase in surface runoff and soil erosion caused by vegetation clearance and establishment of infrastructure. An increase in sediment load within watercourses may result in various impacts such as an increase in turbidity (i.e., suspended solids) that may affect biology of biota. Deposition of increased volume of sediment may also change benthic habitat. The latter impacts may therefore be limiting to aquatic biota and ultimately affect aquatic biodiversity of the affected systems.

Prior to mitigation measures, the impact is definite, and could result in an impact of high significance. The probability of the impact can be reduced to probable with moderately severe consequence and ultimately a residual impact of low significance.

**Establishment and spread of alien and invasive species.**

Disturbances caused by vegetation clearing and earth works during construction, and transporting construction machinery between sites, increase the risk of introducing alien invasive plant species

(AIS) that may invade riparian zones. Many AIS are characterised by high water uptake which may ultimately decrease water volume and flow within rivers, thereby altering the hydrological regime of the watercourses.

This impact is probable with an impact of medium significance without mitigation. Probability of the impact occurring may be reduced to probable and potential consequence to moderately severe and ultimately residual impact of low significance.

## OPERATION PHASE

Impacts expected for the construction phase are likely to continue during the operation phase as discussed below.

**Water quality deterioration**

In the absence of proper stormwater management infrastructure, stormwater flows from the substation hardstanding have the potential to deliver contaminants to downslope watercourses. Sewerage facilities at the substations must be properly designed to ensure that no adverse impacts on groundwater or surface water quality are incurred. If improperly managed, these aspects could impact water quality and aquatic habitat which in turn will negatively affect the aquatic biota.

Since best practise design and management will be utilised to ensure that stormwater, sewerage and any other potential contaminants, the impact is considered of low probability, and thus of medium significance. The application of the recommended mitigation measures will further reduce the probability of the impact occurring, resulting in a reduced residual impact of low significance.

**Establishment and spread of alien and invasive species.**

The potential establishment of alien invasive species in, and immediately adjacent to, the proposed development footprint will continue to be an impact of concern during the operational phase.

Without mitigation, the consequence of the potential impact is considered severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of high significance. With the continued implementation of an active alien species control programme during the operational phase, the probability of the impact occurring can be reduced, resulting in a residual impact of low significance.

**Table 7-1 – Aquatic biodiversity impact summary**

| Activity | Potential impact | Affected receptors | Probability | Consequence | Significance without mitigation | Probability | Consequence | Significance with mitigation |
|---|---|---|---|---|---|---|---|---|
| **Construction Phase** | | | | | | | | |
| Bulk earthworks and clearance of vegetation in construction footprint | Water quality deterioration | Sensitive aquatic biota | 4 | 3 | High | 2 | 2 | Low |
| | Increased sediment load | Sensitive aquatic biota | 4 | 3 | High | 2 | 2 | Low |
| | Establishment and spread of AIS | Sensitive aquatic biota | 3 | 2 | Medium | 2 | 2 | Low |
| **Operation Phase** | | | | | | | | |
| Presence of infrastructure (i.e., paved surfaces) and movement of moving machinery in and out of site and adjacent areas | Water quality deterioration | Sensitive aquatic biota | 3 | 2 | Medium | 2 | 2 | Low |
| | Increased sediment load | Sensitive aquatic biota | 3 | 2 | Medium | 2 | 2 | Low |
| | Establishment and spread of AIS | Sensitive aquatic biota | 4 | 3 | High | 2 | 2 | Low |

### MITIGATION MEASURES

The following impact mitigation and management measures are recommended to avoid/minimise potential impacts on the watercourse arising from the construction activities:

- Limit vegetation removal to the infrastructure footprint area only. Where removed or damaged, vegetation areas (riparian or aquatic related) should be revegetated as soon as possible.
- Bare land surfaces downstream of construction activities must be vegetated to limit erosion from the expected increase in surface runoff from infrastructure.
- Environmentally friendly barrier systems, such as silt nets should be utilised downslope of construction sites to limit erosion and sediment runoff from construction.
- Storm water must be diverted from the construction site and managed in such a manner to diffusely disperse clean runoff and prevent the concentration of storm water flow.
- Water used at construction sites should be utilised in such a manner that it is kept on site and not allowed to run freely into nearby watercourses.
- Construction chemicals, such as cement and hydrocarbons should be used in an environmentally safe manner with correct storage as per each chemical's specific storage descriptions.
- All vehicles must be frequently inspected for leaks.
- No material may be dumped or stockpiled within any rivers or drainage lines in the vicinity of the proposed project.
- All waste must be removed and transported to appropriate waste facilities; and
- High rainfall periods (usually November to March) should be avoided during the construction phase to minimise the risk of increased surface runoff in attempt to limit erosion and the entering of external material (i.e. contaminants and/or dissolved solids) into associated aquatic system.
- Aquatic ecosystem monitoring for duration of construction – particularly in the aftermath of rainfall events, to inform the need for adaptive management measures
- Bi-annual aquatic monitoring during operation, should potentially significant impacts be predicted.

## 7.2 WETLANDS

The construction and operation of the proposed new infrastructure is anticipated to result in the following key impacts on aquatic ecosystems (Wetlands)

- Loss of wetland habitat
- Interruption to surface hydrology.
- Establishment and spread of alien and invasive species.
- Increased sediment load into wetlands
- Increased potential for erosion in wetlands.

The outcomes of the screening of the potential impacts are summarised in Table 7-2 and outlined in the following sections.

### CONSTRUCTION PHASE

Construction phase impacts on aquatic (wetland and riparian systems) largely arise as a result of direct impacts on the receiving environment due to clearing of land within wetlands or their immediate catchments in advance of project development, and resultant loss of wetland habitat. The earthworks and activities involved during the construction phase of the Project can potentially exert negative impacts on sensitive ecosystems including loss of wetland habitat, catchment landcover changes

resulting in increased sediment entry to downstream systems, construction of wetland/riparian system crossings causing impoundments/barriers to movement for aquatic species, contamination of water bodies by construction materials / nb vehicles (hydrocarbons etc), increased potential of erosion due to surface runoff and soil disturbances and the establishment and spread of alien and invasive species (AIS).

**Direct Loss of wetland habitat**

Clearing of vegetation and establishment of infrastructure of the proposed project may lead to a permanent loss of wetland vegetation within the existing wetlands. This impact is definite considering that the proposed project traverses a portion of adjacent wetlands habitats.

The consequence of the impact and ultimately its significance prior to mitigation measures are severe and high respectively as it will have indirect impacts on the catchment yield as well as loss of habitat for vulnerable wetland species. The implementation of mitigation measures can reduce it to an impact of medium significance. Since wetland loss cannot be fully mitigated, offsets need to be considered for any permanent loss of wetland habitat.

**Erosion**

The removal of wetland vegetation for the construction of the proposed development could result in an increase of bare soil/surfaces in the study area which could lead to increased runoff in and around the study area which ultimately results in soil erosion. The impact of soil erosion is considered highly probable during construction and could have a moderate consequence on wetland soil, resulting in a medium impact significance without mitigation. With the implementation of mitigation measures this probability of this impact can be reduced, resulting in a residual impact of low significance.

**Establishment and spread of alien invasive species.**

Movement of vehicles and equipment during the construction phase have a high probability of spreading of alien invasive species. The consequence of this impact is moderate, resulting in a medium impact significance prior to mitigation. The significance of the impact can be reduced to low post-mitigation, since the implementation of the recommended mitigation measures lower the probability of occurrence.

**Changes in wetland health/ functioning**

Bulk earthworks involved in site development in the immediate catchment of wetlands have the potential to cause indirect impacts on wetland habitat through compaction/removal of recharge or interflow soils, as well as increased sediment deposition to downslope wetland ecosystems through stormwater runoff. If not carefully managed, the potential impact could be severe, and the likelihood highly probable, resulting in an impact of medium significance. The significance of the impact can however be reduced to low with the implementation of the proposed mitigation measures.

**Contamination of riparian systems**

Bare lands, paved surfaces and water used on site have the potential to increase flow rates, sediment input, erosion and contaminants in the associated watercourses if allowed to flow freely from the MRA. Spills of sand may occur into watercourses during the transportation of ROM. These influences will directly impact on water quality and aquatic habitat which in turn will negatively affect the aquatic biota.

The impact is considered highly probable during the construction phase, and could be severe, resulting in an impact of high significance. The recommended mitigation measures could reduce the likelihood of the impact occurring and ultimately reduce the residual impact to low significance.

## OPERATION PHASE

Operational phase impacts relate to the possible exacerbation of the impacts expected during construction phase such as soil erosion, surface water and soil contamination, and possible risk of spread of alien and invasive plant species.

### Erosion

The increased presence of hardened surfaces in the study area could potentially exacerbate soil erosion, through surface run off. This impact is probable with a moderate impact severity resulting in an impact of medium significance. With the implementation of mitigation measures, the probability of this impact occurring is reduced, and is expected to be of low significance for wetland soils.

### Spread of alien and invasive species

The potential establishment of alien invasive species in, and immediately adjacent to, the proposed development footprint will continue to be an impact of concern during the operational phase. Without mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of medium significance. With the continued implementation of an active alien species control programme during the operational phase, the probability of the impact occurring can be reduced, resulting in a residual impact of low significance.

### Contamination of riparian habitat systems

Bare lands, paved surfaces and water used on site have the potential to increase flow rates, sediment input, erosion and contaminants in the associated watercourses if allowed to flow freely from the MRA. These influences will directly impact on water quality and aquatic habitat which in turn will negatively affect the wetland biota.

Before mitigation measures, the impact is highly probable with a residual impact of medium significance. Although the application of the recommended mitigation measures may reduce the probability of the impact occurring, the potential consequence will remain the same. The residual impact will however be reduced to low significance.

## MITIGATION MEASURES

Mitigation measures that are designed to avoid and minimise the loss and degradation of the wetland habitat and function on the site are summarised in the sections that follow.

- Placement of permanent or temporary (e.g. laydown areas) infrastructure in wetland habitat should be avoided:
    - Areas of direct loss must be addressed via additional conservation actions/offsets as required.
    - A loss/disturbance buffer zone of at least 100 m should be maintained between the maximum extent of construction works and the outer boundary of wetlands and riparian zones.
- The development footprints should be clearly marked out with flagging tape/posts in the field and vegetation clearing should be restricted to the proposed project footprints only, with no clearing permitted outside of these areas.

- Locate all waste disposal or storage facilities and temporary construction infrastructure at least 50 m from the edge of delineated wetlands.
- Wetland/river crossings should be constructed utilizing designs that ensure that hydrological integrity of the affected wetlands is preserved, and natural flow regimes are maintained (i.e. no impoundment upstream of crossings, or flow concentration downstream of crossings.
- Construction activities within wetlands should take place in winter (during the dry season).
- Install erosion prevention measures prior to the onset of construction activities. Measures should include low berms on approach and departure slopes to crossings to prevent flow concentration, sediment barriers along the lower edge of bare soil areas, placement of hay bales around the within wetland construction areas, and re-vegetation of disturbed areas as soon as possible.
- An alien and invasive species management plan should be developed for the Project, which includes details of strategies and procedures that must be implemented on site to control the spread of alien and invasive species. A combined approach using both chemical and mechanical control methods, with periodic follow-up treatments informed by regular monitoring, is recommended.
- Develop a biodiversity management plan for implementation of the required mitigation measures during the construction and operation phases.
- Monitoring of wetland health must be conducted within one year of completion of construction, to measure any changes to the baseline status and ensure that recommended mitigation measures are sufficient to address any significant impacts. The PES/EIS of the existing wetlands must also be reviewed during the monitoring period.

**Table 7-2 – Wetlands impact assessment summary**

| Activity | Potential impact | Affected receptors | Probability | Consequence | Significance without mitigation | Probability | Consequence | Significance with mitigation |
|---|---|---|---|---|---|---|---|---|
| **Construction Phase** | | | | | | | | |
| Bulk earthworks and clearance of vegetation in construction footprint | Direct Loss of wetland habitat | Sensitive habitats | 4 | 4 | High | 2 | 4 | Medium |
| | Erosion | Wetland soil | 3 | 3 | Medium | 2 | 2 | Low |
| | Establishment and spread of AIS | Wetland habitat | 3 | 3 | Medium | 2 | 2 | Low |
| | Changes in wetland health/functioning | Wetland Flora and faunal species | 3 | 3 | Medium | 2 | 2 | Low |
| | Contamination of riparian habitat systems | Sensitive biota | 4 | 3 | High | 2 | 2 | Low |
| **Operation Phase** | | | | | | | | |
| Presence of infrastructure (i.e., paved surfaces) and | Erosion | Wetland soil | 2 | 3 | Medium | 2 | 2 | Low |
| | Establishment and spread of AIS | Wetland habitat | 3 | 2 | Medium | 2 | 2 | Low |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| movement of moving machinery in and out of site and adjacent areas | Contamination of riparian habitat systems | Sensitive biota | 3 | 2 | Medium | 2 | 2 | Low |

## 7.3 TERRESTRIAL BIODIVERSITY INCLUSIVE OF PLANT AND ANIMAL SP.

The construction and operation of the proposed new infrastructure is anticipated to result in the following key impacts on terrestrial biodiversity receptors:

- Direct impacts through clearing of land and resultant loss of biodiversity (flora and fauna SCC, ecosystems of concern).
- Establishment and spread of alien and invasive species.
- Loss and fragmentation of faunal habitats.
- Injury and mortality of fauna SCC.
- Contamination and disturbance of aquatic (riparian) ecosystems
- Loss and disturbance of wetland habitat
- Changed land-use in affected catchments.

The outcomes of the screening of the potential impacts are summarised in Table 7-3 and described in detail in the following sections.

### CONSTRUCTION PHASE

During construction phase, vegetation will need to be cleared to establish infrastructure. In the process, soil will be disturbed, and dust will be generated. Earthworks will also lead to disturbance of soil and modification of existing habitat. All the latter activities may impact flora and fauna species as discussed below.

**Direct loss and disturbance of natural habitat and associated flora SCC**

The construction of the proposed infrastructure and access roads could result in the direct and permanent loss of areas of natural habitat.

This impact is considered highly probable, and the consequence could be very severe since permanent loss of natural habitat cannot be mitigated. The significance of the impact would be high.

Assuming that the mitigation hierarchy is implemented at design stage to ensure that the potential footprint of infrastructure/activities within natural habitat areas is avoided/minimised to the maximum extent possible, it is expected that high significance impacts will be restricted to a relatively small proportion of the Project area. The residual impact is therefore reduced to medium.

**Establishment and spread of alien and invasive species.**

Disturbances caused by vegetation clearing and earth works during construction could exacerbate the establishment and spread of AIS.

Alien plant infestations can spread exponentially, suppressing, or replacing indigenous vegetation. This may result in a breakdown of ecosystem functioning and a loss of biodiversity. Without mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of medium significance.

With the development of an auditable AIS Management Plan for the project, and the strict implementation of the recommended active control and monitoring measures throughout the construction phase, the probability of the impact occurring can be reduced, resulting in a residual impact of low significance.

**Injury and mortality of faunal species of conservation concern.**

The bulk earthworks involved in site development have the potential to injure/kill individual ground-dwelling and relatively slow-moving faunal species, which will be at risk and vulnerable to heavy machinery movements and site clearance activities.

Without mitigation, the likelihood of this impact occurring is moderate and the consequence of the potential impact could be severe, amounting to an impact of medium significance. Once mitigation measures are implemented, principally avoiding/minimising construction/excavation in high-risk habitats for ground-dwelling species, the probability of the impact occurring can be reduced, resulting in a residual impact of low significance.

## OPERATION PHASE

Several of the risks to terrestrial biodiversity expected during the construction phase, will extend to the operation phase of the project. The impacts relate to the spread of the alien and invasive plant species that may have colonised new areas during the construction phase; fragmentation of fauna habitats/barriers to movement, and the risk of injury/mortality presented to fauna by vehicular traffic utilising the access roads. These are discussed below.

**Spread of alien invasive species**

The potential establishment of alien invasive species in, and immediately adjacent to, the proposed development footprint will continue to be an impact of concern during the operational phase. Without mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of medium significance. With the continued implementation of an active alien species control programme during the operational phase, the probability of the impact occurring can be reduced, resulting in a residual impact of low significance.

**Fragmentation of habitats, barriers to movement**

Infrastructure associated with the development footprint, traffic movements and anthropogenic activity around the Project area will result in diving up the environment and resulting in barriers hindering natural faunal movement. The impact is considered highly probable, resulting in an impact of medium significance prior to mitigation.

The application of the recommended mitigation measures reduces both the potential consequence and the probability of the impact occurring as predicted, resulting in a residual impact of low significance.

**Injury and mortality of faunal species**

Increased vehicle traffic in the study area during the operation phase may pose a risk of injury and existing mortality of fauna species. The probability of the potential impact on fauna during the operational phase is expected to be low given the existing levels of traffic movements and sensory disturbance at the site, and the effect of the preceding construction works. The impact is considered highly probable, resulting in an impact of moderate significance prior to mitigation.

The application of the recommended mitigation measures reduces both the potential consequence and the probability of the impact occurring as predicted, resulting in a residual impact of low significance.

## MITIGATION MEASURES

Mitigation measures that are designed to avoid and minimise the severity and consequence of the potential impacts on terrestrial biodiversity receptors within the Project area include:

- Avoid undisturbed areas, particularly wetland habitat to the extent possible. A loss/disturbance buffer zone of at least 100 m should be maintained between the maximum extent of construction works and the outer boundary of wetlands and riparian zones.
- Vegetation clearing should be restricted to the proposed project footprints only, with no clearing permitted outside of these areas.
- Install erosion prevention measures prior to the onset of construction activities. Measures should include low berms on approach and departure slopes to crossings to prevent flow concentration, sediment barriers along the lower edge of bare soil areas, placement of hay bales around the within wetland construction areas, and re-vegetation of disturbed areas as soon as possible.
- High rainfall periods (usually November to March) should be avoided during the construction phase to possibly avoid increased surface runoff in attempt to limit erosion and that may modify the existing habitat.
- An alien and invasive species management plan should be developed for the Project, which includes details of strategies and procedures that must be implemented on site to control the spread of alien and invasive species. A combined approach using both chemical and mechanical control methods, with periodic follow up treatments informed by regular monitoring, is recommended.
- Existing stands of alien and invasive species should be removed from the Project area prior to commencement of construction.
- Development of biodiversity management/action plan.
    - Specific provision for biodiversity conservation, including details of any required offsets, should be made in the project Biodiversity Offset Report.
    - Inclusion of a practical framework and schedule, details of key performance indicators, recommended monitoring protocols for the delivery of mitigation measures, and costs for implementation in the Biodiversity Offset Report is recommended.
- Establish monitoring requirements.
    - The presence of alien and invasive flora species should be documented prior to the commencement of the development of the infrastructure and rehabilitation activities, and the baseline case used as a benchmark against which the spread of these species can be monitored. Annual monitoring inspections should identify target areas for clearing and subsequent rehabilitation/re-vegetation programmes.
    - A record of fauna mortalities/injury due to interactions with Project infrastructure/activities should be kept on site and regularly reviewed to inform the need for implementation of any additional mitigation measures.

**Table 7-3 – Terrestrial biodiversity impact assessment summary**

| Activity | Potential impact | Affected receptors | Probability | Consequence | Significance without mitigation | Probability | Consequence | Significance with mitigation |
|---|---|---|---|---|---|---|---|---|
| **Construction Phase** | | | | | | | | |
| Bulk earthworks and clearance of vegetation in construction footprint | Direct Loss of natural habitat and associated flora SCC | Sensitive habitats, flora SCC | 3 | 4 | High | 2 | 4 | Medium |
| | Disturbance of natural habitat and associated flora SCC | Sensitive habitats, flora SCC | 3 | 2 | Medium | 2 | 2 | Low |
| | Establishment and spread of AIS | Sensitive habitats, flora SCC | 3 | 2 | Medium | 2 | 2 | Low |
| | Injury and mortality of fauna SCC | Fauna SCC | 3 | 2 | Medium | 2 | 2 | Low |
| **Operation Phase** | | | | | | | | |
| Presence of infrastructure (i.e., paved surfaces) and movement of moving machinery in | Spread of AIS | Sensitive habitats, flora SCC | 3 | 2 | Medium | 2 | 2 | Low |
| | Fragmentation of habitats, barriers to movement | Fauna SCC | 3 | 2 | Medium | 1 | 2 | Low |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| and out of site and adjacent areas | Injury and mortality of fauna SCC | Fauna SCC | 3 | 2 | Medium | 2 | 1 | Very Low |

# 8 CONCLUSION

## 8.1 AQUATIC BIODIVERSITY

The Project area falls within the middle Vaal Water Management Area (WMA), and the quaternary catchment C81L. The Dwaalspruit forms a channel running south and the Meul forms a channel running North of the Project Area. The Present Ecological Status (PES) of both of these systems is 'Largely natural with few modifications' (Figure 5-1). The channels fall within the C81L river catchment which receives a mean annual precipitation of approximately 500 mm to 700 mm (DWS, 2014) and is considered ecologically stressed due anthropogenic activities including agricultural cultivation and mining.

Given the extent and importance of agricultural activities in the region, the availability and protection of water and freshwater ecosystems is considered of prime importance, and efforts must be made to ensure that wherever possible, the proposed wind energy facility does not impact negatively on the freshwater ecosystems. Although total avoidance of all freshwater ecosystems is unlikely to be feasible, particularly in terms of linear infrastructure (access roads and powerlines), the information presented in the scoping report will be utilised during the planning phase to ensure that as far as possible, infrastructure is placed outside of the freshwater ecosystems and their buffer zones.

A full aquatic baseline survey, consisting of high and low flow surveys of fish and macroinvertebrates, habitats and in-situ water quality, will be performed on river systems within the project area of influence, so that the potential significance of risks posed by the proposed WEF development can be assessed and mitigation measures refined accordingly.

## 8.2 TERRESTRIAL BIODIVERSITY

The intactness of Critical Biodiversity Areas that overlap with the Project area will be assessed and reported on after the Wet season survey to ensure species composition and abundance is accounted for as many species are senescent during the dry season. Development within natural state areas (areas of high sensitivity) should be avoided to the degree possible. If development is to commence in these areas, a biodiversity offset strategy will be required during the EIA phase and will be relevant to all species themes.

### PLANT SPECIES OF CONSERVATION CONCERN

Although all vegetation types found within the site are listed as Least Concern by the RLE (2021), areas of primary and secondary grassland, woodlands and wetlands have the potential to support plant SCC. Twelve plant SCC have been identified as having a high likelihood of occurrence within the study area. A detailed botanical field survey to confirm the presence of these species on site will be undertaken during the wet season (Oct 2024 -Jan 2025). The survey will also be used to map vegetation communities and assess their ecological condition, to inform the assessment of Site Ecological Importance (SEI) and inform the need for design mitigation (avoidance) plus identification of any requirement for offset where significant residual impacts are unavoidable.

### ANIMAL SPECIES OF CONSERVATION CONCERN

The majority of the study area is indicated by the DFFE Screening Tool (2020) as being of 'very high' sensitivity for the faunal species theme due to the presence of 32 species (those identified in

the screening report and the additional species identified from the literature review) that are likely to occur within the Project area.

Baseline animal species field surveys to establish the presence of these species on site, with a focus on mammal and herpetofauna species, was conducted during the dry season (June-July 2024), wet season surveys (Oct 2024 -Dec 2024) seasons are also scheduled.  In addition, an assessment of site suitability for support of invertebrate SCC will be done to determine whether dedicated invertebrate surveys are required.

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# Appendix A

## FAUNAL SCC SPECIES POSSIBLY OCCURING WITHIN THE PROJECT AREA.

| Faunal Group | Species Name | Common Name | Conservation Status (SANBI) |
|---|---|---|---|
| **Invertebrate** | *Clonia lalandei* | Lalande's Black-winged Clonia | Vulnerable |
| **Reptile** | *Bradypodion dracomontanum* | Drakensberg Dwarf Chameleon | Near Threatened |
| | *Smaug giganteus* | Giant Dragon Lizard | Vulnerable |
| | *Tetradactylus breyeri* | Breyer's Long-Tailed Seps | Near Threatened |
| **Mammal** | *Parahyaena brunnea* | Brown Hyaena | Near Threatened |
| | *Syncerus caffer* | African Buffalo | Near Threatened |
| | *Pelea capreolus* | Grey Rhebok | Near Threatened |
| | *Aonyx capensis* | African Clawless Otter | Near Threatened |
| | *Amblysomus septentrionalis* | Highveld Golden Mole | Near Threatened |
| | *Diceros bicornis* | Black Rhino | Critically Endangered |
| | *Redunca fulvorufula* | Mountain Reedbuck | Endangered |
| | *Felis nigripes* | Black-footed Cat | Vulnerable |
| | *Mystromys albicaudatus* | White-tailed Rat | Vulnerable |
| | *Ceratotherium simum* | White Rhino | Near Threatened |
| | *Equus quagga* | Plains Zebra | Near Threatened |
| | *Leptailurus serval* | Serval | Near Threatened |
| | *Otomys auratus* | Vlei Rat | Near Threatened |
| | *Hydrictis maculicollis* | Spotted-necked Otter | Vulnerable |
| | *Ourebia ourebi ourebi* | Oribi | Endangered |
| **Avian** | *Sagittarius serpentarius* | Secretarybird | Vulnerable |
| | *Geronticus calvus* | Southern Bald Ibis | Vulnerable |
| | *Anthus chloris* | Yellow-breasted pipit | Vulnerable |
| | *Circus ranivorus* | African marsh harrier | Endangered |
| | *Neotis denhami* | Denham's bustard | Vulnerable |
| | *Balearica regulorum* | Grey crowned crane | Endangered |
| | *Falco biarmicus* | Lanner falcon | Vulnerable |
| | *Eupodotis senegalensis* | White-bellied bustard | Vulnerable |
| | *Heteromirafra ruddi* | Rudd's lark | Endangered |
| | *Spizocorys fringillaris* | Botha's lark | Endangered |
| | *Ciconia nigra* | Black stork | Vulnerable |
| | *Sterna caspia* | Caspian tern | Vulnerable |
| | *Aquila verreauxii* | Verreaux's eagle | Vulnerable |

# Appendix B

## FLORAL SCC SPECIES POSSIBLY OCCURING WITHIN THE PROJECT AREA.

| Species Name | Conservation Status (SANBI) |
|---|---|
| *Sensitive Species 1248* | Endangered |
| *Sensitive Species 851* | Vulnerable |
| *Sensitive Species 1252* | Vulnerable |
| *Sensitive Species 998* | Vulnerable |
| *Prunus Africana* | Vulnerable |
| *Zaluzianskya distans* | Vulnerable |
| *Anemone fanninii* | Near Threatened |
| *Eucomis bicolor* | Near Threatened |
| *Polygala praticola* | Near Threatened |
| *Merwilla plumbea* | Near Threatened |
| *Ocotea bullata* | Endangered |
| *Lotononis amajubica* | Rare |

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