



Umbila Emoyeni Phase One Wind Farm Terrestrial, Avifaunal and Freshwater Walkdown

Bethal, Mpumalanga

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CLIENT

savannah
environmental

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Reference	Umbila Wind Farm
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Declaration	<p>The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.</p>

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1 Introduction

Emoyeni Renewable Energy Farm were granted an Environmental Authorisation (EA) on 26 January 2023 (DFFE Ref: 14/12/16/3/3/2/2160) and 27 January 2023 (DFFE Ref: 14/12/16/3/3/2/2162) for the construction and operation of the Umbila Wind Energy Facility (WEF) and Grid Infrastructure respectively.

The Biodiversity Company was commissioned to undertake the ecological walkdown for the Umbila Wind Farm. The authorised Umbila WEF falls just south of the town, Bethal in the Lekwa Local Municipality, Mpumalanga. The energy facility comprises of 25 wind turbines, an on-site 132 kV substation, a main transmission substation (MTS), a power line linking to the existing Eskom transmission infrastructure, underground cables linking the turbines to the substations, crane platforms, operations and maintenance compound area, car park, storage area and internal access roads (12-13m wide) to each turbine.

A requirement of the EA and the Environmental Management Programme (EMPr) is the undertaking of an ecological walkdown for the approved turbines, roads and powerline footprint areas. A Walkdown of the first phase WEF development area and grid connection infrastructure was undertaken from the 19th until the 22nd March 2023.

The purpose of the ecological walkdown was to locate and identify any sensitive ecological habitats, and also protected or threatened plant species and/or fauna of conservation concern within the development footprint areas. The presence of all listed and protected species is detailed herein, where applicable, and this information can be used to supplement the requirements of the necessary permit application that is required from the provincial authority, i.e. the Department of Agriculture, Environmental Affairs, Rural Development and Land Reform before construction can commence. Spatial data was also provided for the walkdown which demarcated sensitivity areas which were also considered for the placement of infrastructure.

This report only presents the findings from the ecological walkdown, and should be considered in conjunction with other disciplines and reports. These disciplines will collectively provide the demarcation of ecological constraints for the larger area.

1.1 Terms of Reference

The Terms of Reference (ToR) for this assessment include the following:

- Review of existing information related to the development;
- Conduct an ecological walkdown for the planned footprint areas;
- Compilation of a report detailing the results of the walkdown;
- Detail and ecological constraints identified for the planned infrastructure;
- Present information on the presence of any Species of Conservation Concern (SCC), specifically Highveld Golden Moles; and

- Provide information and recommendations for the micro-siting of relevant infrastructure.
- Provide information to adequately inform any contractors, environmental officers and personnel pertaining to the ecological significance of the area.

1.2 Assumptions and Limitations

The following assumptions and limitations should be noted for the assessment:

- The assessment area was based on the spatial file provided by the client and any alterations to the development area subsequent to the site visit may affect the results; and
- All regional and site-specific environmental information are contained within the original (submitted) documents and were therefore not repeated within this document. This document focuses only on the very specific mandate and findings of the walkdown and its associated ecosystem evaluations.

2 Approach

2.1 Spatial Data

Phase 1 Turbine and road positions, and powerline positions for the EGI were supplied by the client. A 50 m corridor width (total width is 100 m) was considered for the road and powerline routes. These corridors were used as guidelines during the walkdown and ecosystem evaluation phase. GPS accuracy during the field surveys varied from 4 to 15 m. The findings for the turbine and road are discussed in the subsequent sections. The infrastructure assessed are included below (Figure 2-1, Figure 2-2, Figure 2-3).

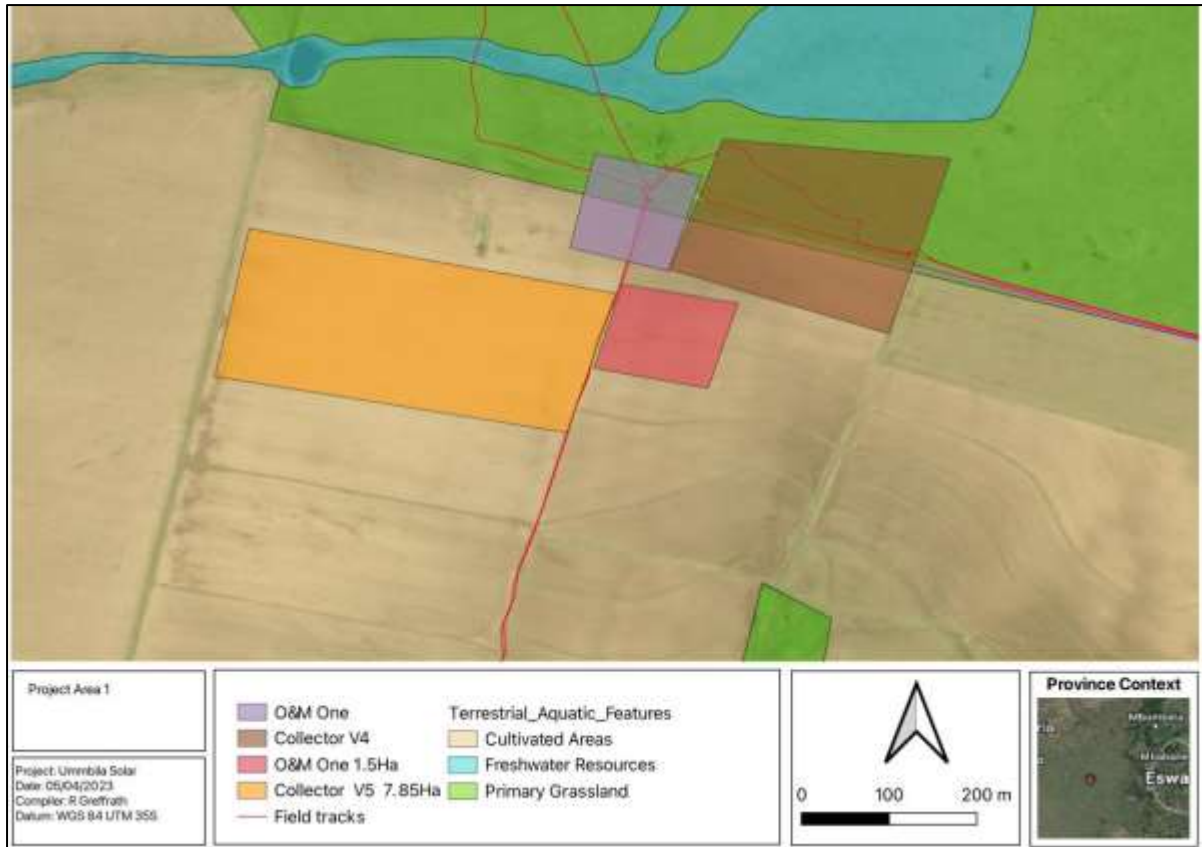


Figure 2-1 Project infrastructure

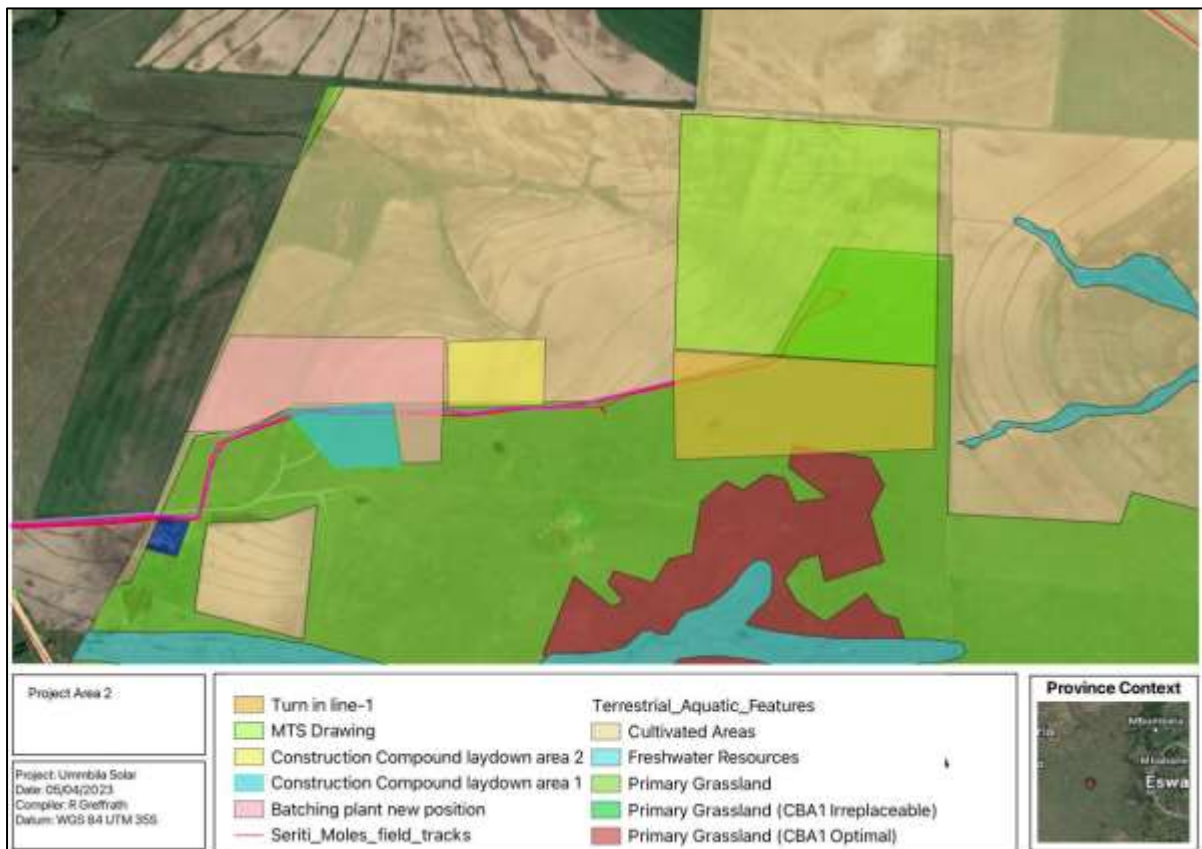


Figure 2-2 Project infrastructure

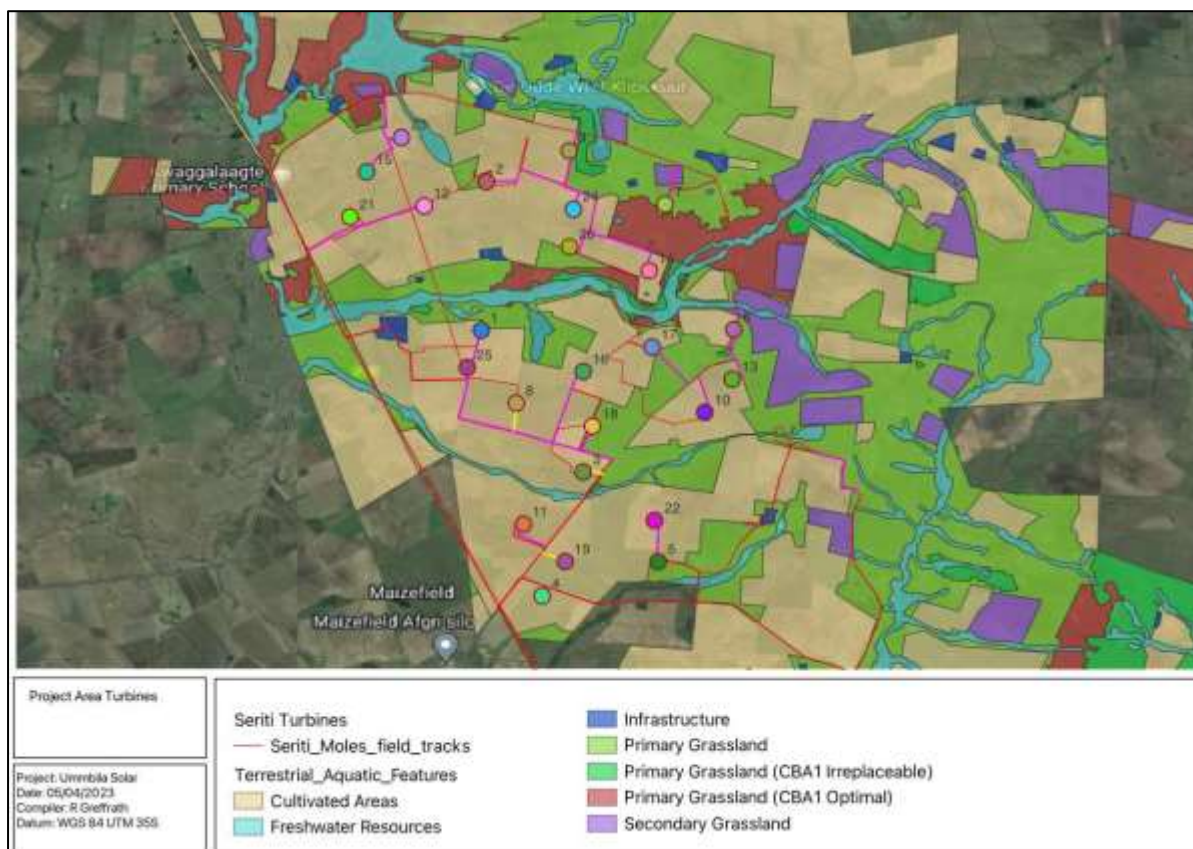


Figure 2-3 Project infrastructure, pylon and access road locations

2.2 Past Ecological Information

The ecological assessment completed for the proposed Umbila WEF (Botha and Keet, 2022) was considered for background information. A list of plant SCC which are known to occur in the vicinity of the Umbila WEF as provided (Botha and Keet, 2022) is presented in Table 2-1.

Table 2-1 Listed plant species

Family	Species	IUCN Status
Apocynaceae	<i>Schizoglossum peglerae</i>	EN
Asparagaceae	<i>Asparagus fractiflexus</i>	EN
Aizoaceae	<i>Khadia carolinensis</i>	VU
Amaryllidaceae	<i>Nerine gracilis</i>	VU
Apocynaceae	<i>Aspidoglossum xanthosphaerum</i>	VU
Apocynaceae	<i>Miraglossum davyi</i>	VU
Apocynaceae	<i>Pachycarpus suaveolens</i>	VU
Asphodelaceae	<i>Aloe hlangapies</i>	VU
Iridaceae	<i>Gladiolus paludosus</i>	VU
Apocynaceae	<i>Stenostelma umbelluliferum</i>	NT
Asphodelaceae	<i>Kniphofia typhoides</i>	NT

Family	Species	IUCN Status
Asteraceae	<i>Cineraria austrotransvaalensis</i>	NT
Fabaceae	<i>Argyrolobium campicola</i>	NT
Hyacinthaceae	<i>Merwillia plumbea</i>	NT
Iridaceae	<i>Gladiolus robertsoniae</i>	NT
Orchidaceae	<i>Habenaria barbertoni</i>	NT
Euphorbiaceae	<i>Acalypha caperonioides var. caperonioides</i>	DD
Hyacinthaceae	<i>Drimia elata</i>	DD
Iridaceae	<i>Hesperantha rupestris</i>	DD
Agapanthaceae	<i>Agapanthus inapertus subsp. intermedius</i>	LC
Amaryllidaceae	<i>Boophone disticha</i>	LC
Amaryllidaceae	<i>Brunsvigia natalensis</i>	LC
Amaryllidaceae	<i>Brunsvigia radulosa</i>	LC
Amaryllidaceae	<i>Crinum bulbispermum</i>	LC
Amaryllidaceae	<i>Crinum graminicola</i>	LC
Amaryllidaceae	<i>Cyrtanthus breviflorus</i>	LC
Amaryllidaceae	<i>Cyrtanthus stenanthus</i>	LC
Amaryllidaceae	<i>Cyrtanthus tuckii</i>	LC
Amaryllidaceae	<i>Haemanthus humilis subsp. hirsutus</i>	LC
Amaryllidaceae	<i>Haemanthus montanus</i>	LC
Amaryllidaceae	<i>Scadoxus puniceus</i>	LC
Araceae	<i>Zantedeschia albomaculata subsp. albomaculata</i>	LC
Araceae	<i>Zantedeschia albomaculata subsp. macrocarpa</i>	LC
Araceae	<i>Zantedeschia rehmannii</i>	LC
Asphodelaceae	<i>Aloe boylei</i>	LC
Asphodelaceae	<i>Aloe davyana</i>	LC
Asphodelaceae	<i>Aloe ecklonis</i>	LC
Asphodelaceae	<i>Aloe graciliflora</i>	LC
Asphodelaceae	<i>Aloe jeppeae</i>	LC
Asphodelaceae	<i>Aloe maculata subsp. maculata</i>	LC
Asphodelaceae	<i>Kniphofia albescens</i>	LC
Asphodelaceae	<i>Kniphofia porphyrantha</i>	LC
Dioscoreaceae	<i>Dioscorea dregeana</i>	LC
Hyacinthaceae	<i>Eucomis montana</i>	LC
Hyacinthaceae	<i>Eucomis pallidiflora subsp. pallidiflora</i>	LC
Iridaceae	<i>Gladiolus crassifolius</i>	LC
Iridaceae	<i>Gladiolus dalenii subsp. dalenii</i>	LC
Iridaceae	<i>Gladiolus ecklonii</i>	LC

Family	Species	IUCN Status
<i>Iridaceae</i>	<i>Gladiolus elliotii</i>	LC
<i>Iridaceae</i>	<i>Gladiolus longicollis subsp. longicollis</i>	LC
<i>Iridaceae</i>	<i>Gladiolus longicollis subsp. platypetalus</i>	LC
<i>Iridaceae</i>	<i>Gladiolus papilio</i>	LC
<i>Iridaceae</i>	<i>Gladiolus sericeovillosus subsp. calvatus</i>	LC
<i>Iridaceae</i>	<i>Gladiolus sericeovillosus subsp. sericeovillosus</i>	LC
<i>Iridaceae</i>	<i>Gladiolus vinosomaculatus</i>	LC
<i>Iridaceae</i>	<i>Gladiolus woodii</i>	LC
<i>Iridaceae</i>	<i>Hesperantha coccinea</i>	LC
<i>Iridaceae</i>	<i>Watsonia bella</i>	LC
<i>Iridaceae</i>	<i>Watsonia pulchra</i>	LC
<i>Orchidaceae</i>	<i>Brachycorythis ovata subsp. ovata</i>	LC
<i>Orchidaceae</i>	<i>Brachycorythis pubescens</i>	LC
<i>Orchidaceae</i>	<i>Brownleea parviflora</i>	LC
<i>Orchidaceae</i>	<i>Disa aconitoides subsp. aconitoides</i>	LC
<i>Orchidaceae</i>	<i>Disa cooperi</i>	LC
<i>Orchidaceae</i>	<i>Disa nervosa</i>	LC
<i>Orchidaceae</i>	<i>Disa patula var. transvaalensis</i>	LC
<i>Orchidaceae</i>	<i>Disa stachyoides</i>	LC
<i>Orchidaceae</i>	<i>Disa versicolor</i>	LC
<i>Orchidaceae</i>	<i>Disperis cooperi</i>	LC
<i>Orchidaceae</i>	<i>Disperis fanniniae</i>	LC
<i>Orchidaceae</i>	<i>Eulophia cooperi</i>	LC
<i>Orchidaceae</i>	<i>Eulophia hians var. hians</i>	LC
<i>Orchidaceae</i>	<i>Eulophia hians var. inaequalis</i>	LC
<i>Orchidaceae</i>	<i>Eulophia hians var. nutans</i>	LC
<i>Orchidaceae</i>	<i>Eulophia ovalis var. bainesii</i>	LC
<i>Orchidaceae</i>	<i>Eulophia ovalis var. ovalis</i>	LC
<i>Orchidaceae</i>	<i>Eulophia parvilabris</i>	LC
<i>Orchidaceae</i>	<i>Habenaria clavata</i>	LC
<i>Orchidaceae</i>	<i>Habenaria dives</i>	LC
<i>Orchidaceae</i>	<i>Habenaria epipactidea</i>	LC
<i>Orchidaceae</i>	<i>Habenaria falcicornis subsp. caffra</i>	LC
<i>Orchidaceae</i>	<i>Habenaria lithophila</i>	LC
<i>Orchidaceae</i>	<i>Neobolusia tysonii</i>	LC
<i>Orchidaceae</i>	<i>Orthochilus foliosus</i>	LC
<i>Orchidaceae</i>	<i>Orthochilus leontoglossus</i>	LC

Family	Species	IUCN Status
Orchidaceae	<i>Orthochilus welwitschii</i>	LC
Orchidaceae	<i>Pterygodium dracomontanum</i>	LC
Orchidaceae	<i>Pterygodium nigrescens</i>	LC
Orchidaceae	<i>Satyrium hallackii</i> subsp. <i>ocellatum</i>	LC
Orchidaceae	<i>Satyrium neglectum</i> subsp. <i>neglectum</i>	LC
Orchidaceae	<i>Satyrium parviflorum</i>	LC
Orchidaceae	<i>Satyrium trinerve</i>	LC
Orchidaceae	<i>Schizochilus zeyheri</i>	LC
Proteaceae	<i>Protea roupelliae</i> subsp. <i>roupelliae</i>	LC
Hyacinthaceae	<i>Eucomis autumnalis</i> subsp. <i>clavata</i>	NE
Orchidaceae	<i>Satyrium longicauda</i> var. <i>longicauda</i>	NE
Apocynaceae	<i>Ceropegia breviflora</i>	
Apocynaceae	<i>Ceropegia rehmannii</i>	
Iridaceae	<i>Gladiolus</i> sp.	
Orchidaceae	<i>Eulophia</i> sp.	
Orchidaceae	<i>Orthochilus</i> sp.	
Orchidaceae	<i>Orthochilus vinosus</i>	

In 2022, Gerhard Botha and Jan-Hendrik Keet conducted the Fauna and Flora assessment. No red list flora SCC were found in the project area. Six provincially protected species were found, namely; *Aloe ecklonis* (LC), *Boophone disticha* (LC), *Crinum bulbispermum* (LC), *Gladiolus ecklonii* (LC), *Gladiolus woodii* (LC) and *Haemanthus humilis* subsp. *hirsutus* (LC).

The faunal study recorded a total of 32 mammal species with five (5) species being of conservation concern. These were the Serval (NT), Brown hyena (NT); Vlei rat (NT), Cape clawless otter (NT), and South African hedgehog (NT). The findings of the report suggested that habitat loss for all the SCCs would not be significant due to the footprint of the project area being relatively small in a relatively homogenous and intact surrounding landscape.

A total of six (6) amphibian species and ten (10) reptile species were observed by Botha and Keet, (2022), none of which were SCC and are all fairly common.

The avifaunal study by Arcus Consulting, (2022) found that of the 45 species identified during the screening study only 26 were seen in flight in the project area, resulting in a lower site ecological importance.

2.2.1 Highveld Golden Mole

The project area is located over probable Highveld Golden Mole range, their presence in this range has however not been confirmed, the study attempted to confirm or disprove their presence within the infrastructure areas. Personal communication with landowners indicated that no moles are active in the project areas. This species occurs in meadows and edges of marshes in high-altitude grasslands of Mpumalanga and possibly extending toward the Free State and Gauteng borders. Its habitat preference is restricted to friable soils in valleys and on mountainsides, where individuals may co-exist with the Rough-haired Golden Mole,

Chrysospalax villosus. They are common in well-irrigated farmyards, gardens, golf courses, and present also in exotic plantations, though seemingly at lower densities. In the Wakkerstroom district it is found in thickets of Oldwood trees (*Leucosidea sericea*) on the banks of streams in valleys but avoid scrubby vegetation in kloofs and along rocky ridges, where it is replaced by Sclater's Golden Mole, *Chlorotalpa sclateri* (Bronner 2013).

3 Walkdown

The specialist ecologists traversed the planned footprint areas searching for ecologically sensitive habitats and any SCC within the corridor. Each turbine position was visited on foot and evaluated according to the potential impact on the surrounding ecosystems. Each road and powerline route between turbines / pylons was inspected and evaluated.

The project area was divided into “turbine site positions” and “road and cable spans between towers”. The findings of each section are discussed in the text in Table 3-1.

Table 3-1 Summary Site specific comments and recommendations¹ on the turbines for the Umbila Wind Farm.

Turbines	Comments and recommendations	Photograph
T23	<p>Findings: No specific ecological constraints were recorded.</p> <p>Location: Located in maize fields (low sensitivity)</p> <p>Sensitivity area: Classified as low sensitivity area.</p> <p>Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.</p> <p>Recommendation: Move Turbines position 19m south onto nearest contour line of the maize fields.</p>	

¹ Rare species are according to the Red List of South African Plants and species protected are listed under the Mpumalanga Nature Conservation Act No. 10 of 1998.

T15

Findings: No specific ecological constraints were recorded.

Location: Located in maize fields (low sensitivity)

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine position 39m north onto the road crossing between the agricultural lands, for easier access.



T7

Findings: No specific ecological constraints were recorded.

Location: Located in previously designated medium sensitivity area.

Sensitivity area: Classified as moderate sensitivity area.

The substrate of this area is not suitable to Golden Moles, no mole activity was recorded.

Recommendation: No changes to placement area required.



Findings: No specific ecological constraints were recorded. A clump of alien trees is located 150 m from the Turbine location with one old and abandoned bird nest.

T6



Location: Located in previously designated low sensitivity area.

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Keep Turbine on the road next to the fence line.



Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Soya lands)

Sensitivity area: Classified as low sensitivity area.

T13

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine towards the nearest road 133m east of Soya lands. Do not place the Turbine on the other side of the road.



Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Soya lands)

Sensitivity area: Classified as low sensitivity area.

T10

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine to the nearest road crossing 109m south-east of Soya lands.



Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

Sensitivity area: Classified as low sensitivity area.

T17

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine 43m South to the nearest road crossing next to mielie lands.



Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

Sensitivity area: Classified as low sensitivity area.

T14

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine south to the nearest road crossing 162m SW, next to mielie lands. It will be easier to access the turbine.



Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

Sensitivity area: Classified as low sensitivity area.

T20

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine 70m south into the old cultivated land next to the road, access will be easier.



Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

Sensitivity area: Classified as low sensitivity area.

T24

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remain unchanged.



Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

Sensitivity area: Classified as low sensitivity area.

T9

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine 45m east into the road next to the natural veld. Access will be easier.



Findings: No specific ecological constraints were recorded. There is a clump of alien trees 270 m from the point, but no priority species was recorded.

Location: Located in previously designated low sensitivity area. (Old cultivated lands)

T2

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remains unchanged.



T12

Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine 41m west into the road crossing. Access will be easier.



T21

Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Planted pasture)

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remains unchanged.



T16

Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Old cultivated lands)

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remains unchanged.



T18

Findings: No specific ecological constraints were recorded.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Location: Located in previously designated medium sensitivity area.

Sensitivity area: Classified as moderate sensitivity area. One (1) *Boophone disticha* (Protected) is present within the area.



Recommendation: No changes to placement area required. Relocation (rescue) of the single protected plant.

Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

Sensitivity area: Classified as low sensitivity area.

T25

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine 53m east to the road or 170m south to the road crossing. Access will be easier.



T1

Findings: No specific ecological constraints were recorded. One species of conservation concern, a Blue Korhaan (Globally listed as Near-Threatened) was heard calling from approximately 500 m North East from the turbine point.

Location: Located in previously designated low sensitivity area. (Mielie lands)

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remains unchanged.



T8

Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Soya lands)

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Move Turbine to the nearest road 20m east of Soya lands.



Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

T3

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remains unchanged.



Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

**T11 and
WTG 26**

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remains unchanged.



T19

Findings: No specific ecological constraints were recorded.
Location: Located in previously designated low sensitivity area. (Planted pasture)
Sensitivity area: Classified as low sensitivity area.
Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.
Recommendation: Position remains unchanged.



**Batching
plant,
Construction
compound,
Turn in line
and MTS**

Findings: No specific ecological constraints were recorded.
Location: Located in previously designated low and medium sensitivity area (Soya lands, undulating grasslands and old lands)
Sensitivity area: Classified as low – medium sensitivity area.
Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.
Recommendation: Position to remain unchanged.



T4

Findings: No specific ecological constraints were recorded. There is a clump of alien trees located 335 m from the turbine position but no priority species birds of prey were recorded.

Location: Located in previously designated low sensitivity area. (Planted pasture)

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remains unchanged.



Findings: No specific ecological constraints were recorded.

One nest was recorded 40 m north of the collector site in an alien tree and one Black-winged Kite was recorded perched in a dead tree nearby.



Collector site, OM 1 and OM 1,5

Location: Located in previously designated low and medium sensitivity area (Mielie lands, Soya lands and undulating grasslands)

Sensitivity area: Classified as low – medium sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position to remain unchanged.



T22

Findings: No specific ecological constraints were recorded.

Location: Located in previously designated low sensitivity area. (Mielie lands)

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remains unchanged. The position of the collector site could also be moved 100 m south in case the nest recorded is active.



T5

Findings: No specific ecological constraints were recorded. A clump of alien trees is located 330 m away from turbine point but no priority species were recorded.

Location: Located in previously designated low sensitivity area. (Planted pasture)

Sensitivity area: Classified as low sensitivity area.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

Recommendation: Position remains unchanged.



Findings: No specific ecological constraints were recorded.

A clump of alien trees is located 50 m west of powerline, but no priority species were recorded. The powerline does cross a stream and bird flappers are recommended.

Location: Located in previously designated low to very high sensitivity area (Soya lands, Mielie lands, undulating grasslands, old lands and wetlands). Location of pylons not on wetlands, only the cables traverse the wetlands and therefore wetland damage will likely be minimum. Construction phase must avoid any wetland damage.

Sensitivity of area: Classified as a low – very high sensitivity. *Crinum bulbispermum* (Protected) is present within the area. The position of the *Crinum bulbispermum* plants is underneath the powerline but not in the footprint of the pylon. No disturbance to the area where the plants occur is foreseen, however the position of the plants is noted for thoroughness.

Habitat suitable to Highveld Golden Moles are present, though no signs of mole activity was recorded.

**Pylons 1-11
From
collectors to
MTS**



Recommendation: Positions of pylons to remain unchanged.



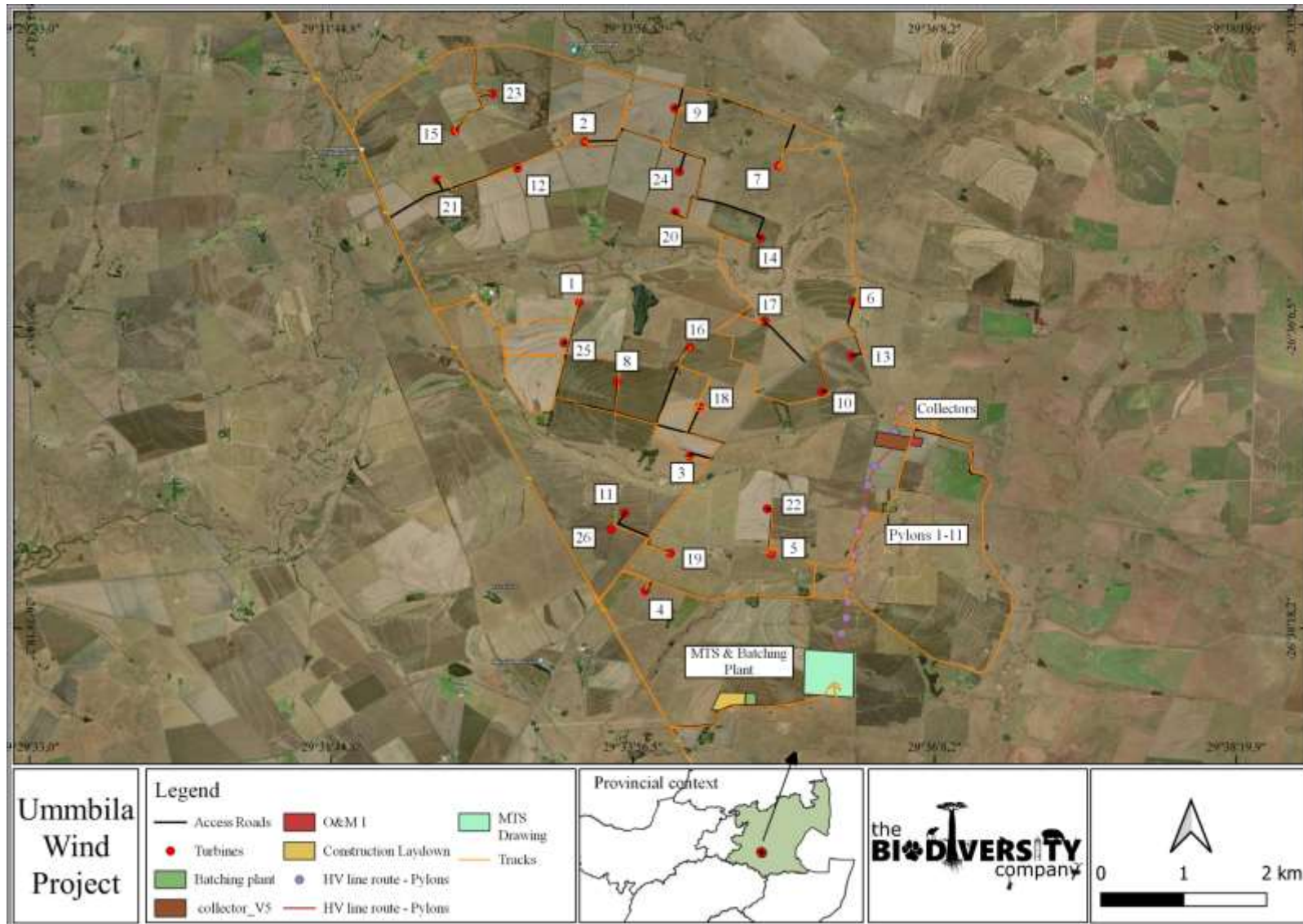


Figure 3-1 The Wind turbines as well as the associated roads and cables for the Umbila Wind Farm Phase 1

3.1 Observations

The following are observations made in the general area during the walkdown, these are discussed below due to the nature of the occurrence of these fauna and flora being ubiquitous throughout the area:

- Most of the areas were either heavily transformed through cultivation or through heavy grazing. This region has been heavily utilised, throughout the last 50+ years to produce agricultural products. Maize, Soya and *Eragrostis* production is high in this region and because the production is good many natural fields have been ploughed and sown, increasing the grazing pressure on the little natural land that is left. Thus, fauna and flora SCCs are unlikely to occur in high numbers in this region.

3.2 Mitigation

The aim of the management outcomes is to present the mitigations in such a way that they can be incorporated into the existing Environmental Management Programme (EMPr), allowing for more successful implementation and auditing of the mitigations and monitoring guidelines.

Table 3-2 Management objectives for the Umbila wind project

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Vegetation and Habitats				
Drainage lines must be avoided for turbine placement and access roads, and a no-go buffer of 20 m must be applied around them.	Life of operation	Project manager, Environmental Officer	Development footprint	Ongoing
Areas of indigenous vegetation, even secondary communities outside of the direct turbine footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted to flat areas as far as possible. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. All structure footprints to be rehabilitated and landscaped after installation is complete. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing
Existing access routes, especially roads must be made use of. The development areas and access roads should be specifically demarcated so that during the construction phase, only the demarcated areas may be impacted upon.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	Ongoing
All laydown, chemical toilets etc. should be restricted to the disturbed project footprint only. No materials may be stored outside the project footprint, and all materials must be removed	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
<p>from the project footprint once the construction phase has been concluded. No permanent construction structures should be permitted. No storage of vehicles or equipment will be allowed outside of the designated project areas.</p> <p>Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. All livestock must always be kept out of the project area, especially areas that have been recently re-planted.</p>	Operational phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
<p>A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area.</p>	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Ongoing
<p>It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.</p>	Life of operation	Project manager, Environmental Officer	Any instances	Ongoing
<p>A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.</p>	Life of operation	Environmental Officer & Contractor	Fire Management	During Phase
<p>Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. For turbine infrastructure, development areas and routes where protected plants cannot be avoided, these plants, many being geophytes or small succulents, should be removed from the soil and relocated/ re-planted in similar habitats away from the development footprint where they should be able to resprout and</p>	Life of operation	Project manager, Environmental Officer	Protected Tree/Plant species	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
flourish again. All protected and red-data plants should be relocated out of the project footprint, and as many other geophytic species as possible.				
For the threatened species that may not be destroyed, it is recommended that professional service providers that deal with plant search and rescue be used to remove such plants and use them either for later rehabilitation work or other conservation projects.	Planning Phase, Pre-Construction	Project manager, Environmental Officer & Contractor	Fire Management	During Phase

Management outcome: Fauna

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
A qualified environmental control officer must be on site when construction begins. In situations where the threatened and protected animals must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development of a search, rescue and recovery program is suggested for the protection of these species.	Construction Phase	Environmental Officer, Contractor	Presence of any floral or faunal species.	During phase
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, <ul style="list-style-type: none"> Signs must be put up to enforce this 	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing
The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna.	Construction	Project manager, Environmental Officer & Design Engineer	Construction/Closure Phase	Ongoing
Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals	Construction/Operational Phase	Environmental Officer	Noise levels	Ongoing
No trapping, killing, or poisoning of any wildlife is to be allowed <ul style="list-style-type: none"> Signs must be put up to enforce this. 	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings, dust and erosion is limited. The speed limits should be restricted to at most 30 km/h.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons. <ul style="list-style-type: none"> Driving on access roads at night should be restricted in order to reduce or prevent wildlife road mortalities which occur more frequently during this period. 	Life of operation	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day in the case.	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Any holes/deep excavations must be dug and planted in a progressive manner and should not be left open overnight; <ul style="list-style-type: none"> Should the holes be left open overnight they must be covered temporarily to ensure no small fauna species fall in. 	Planning and Construction	Environmental Officer & Contractor, Engineer	Presence of trapped animals and open holes	Ongoing
Ensure that cables and connections are insulated successfully to reduce electrocution risk.	Life of project	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing

Management outcome: Alien species

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Compilation of and implementation of an alien vegetation management plan for the 100 meter grid corridor.	Life of operation	Project manager, Environmental Officer & Contractor	Assess presence and encroachment of alien vegetation	As per existing EMPR
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths.	Construction/Operational Phase	Project manager, Environmental Officer & Contractor	Footprint Area	Life of operation
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site	Life of operation	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation

Management outcome: Dust

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces. <ul style="list-style-type: none"> No non-environmentally friendly suppressants may be used as this could result in pollution of water sources 	Life of operation	Contractor	Dustfall	Dust monitoring program.

Management outcome: Waste management

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Waste management must be a priority and all waste must be collected and stored effectively.	Life of operation	Environmental Officer & Contractor	Waste Removal	Weekly
Litter, spills, fuels, chemicals and human waste in and around the project area must be stored effectively and if spilt, must be cleaned up immediately.	Construction/Closure Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Daily
A minimum of one toilet must be provided per 15 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.	Life of operation	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.	Life of operation	Environmental Officer & Health and Safety Officer	Availability of bins and the collection of the waste.	Ongoing
Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site.	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Collection/handling of the waste.	Ongoing
Refuse bins will be emptied and secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Management of bins and collection of waste	Ongoing, every 10 days
Management outcome: Environmental awareness training				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr. The avoidance and protection of the very high sensitivity areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Management outcome: Erosion				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Speed limits of 30 km/h must be put in place to reduce erosion. <ul style="list-style-type: none"> Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds; Signs must be put up to enforce this. 	Life of operation	Project manager, Environmental Officer	Water Runoff from road surfaces	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Life of operation	Project manager, Environmental Officer	Routes used within the area	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds.	Life of operation	Project manager, Environmental Officer	Re-establishment of indigenous vegetation	Progressively
A stormwater management plan must be compiled and implemented.	Life of operation	Project manager,	Management plan	Before construction

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
		Environmental Officer		phase: Ongoing

3.3 Recommendations

Recommendations have been provided for the footprint areas that will have notable impacts on the local habitats and / or SCC. The following recommendations are in addition to what has been provided for the footprint areas:

- All mitigation measures prescribed by Botha and Keet, (2022) remain applicable for the development and must be adhered to;
- Wetland habitat must be avoided as much as possible, and
- The floral search and rescue operation must be undertaken before the end of February for the summer flowering species.

4 References

Arcus Consulting (2022) *Avifaunal Specialist Assessment For The Proposed Umbila Emoyeni Renewable Energy Development Near Bethal , Mpumalanga Emoyeni Renewable Energy Farm (Pty) Ltd.*

Botha, G. and Keet J.-H. (2022) 'Umbila Terrestrial Biodiversity Impact Assessment', (October).

Bronner GN. 2013. *Amblysomus septentrionalis* Highveld Golden-mole. Pages 232–233 in Kingdon J, Happold D, Hoffmann M, Butynski T, Happold M, Kalina J, editors. *Mammals of Africa, Volume I: Introductory Chapters and Afrotheria*. Bloomsbury Publishing, London, UK