Umsinde Emoyeni WEF - Ecological Walkdown Report

Murraysburg, Western Cape Province

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CLIENT

Prepared by:

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Report Name	**Umsinde Emoyeni WEF – Ecological Walkdown Report**
Reference	**Umsinde WEF**
Submitted to	NALA ENVIRONMENTAL
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Declaration	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.

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1 Introduction

The Biodiversity Company was commissioned to undertake the ecological walkdown for the Emoyeni Umsinde Wind Energy Facility, located within the Western Cape.

A requirement of the EA and the Environmental Management Programme report (EMPr) is the undertaking of an ecological walkdown for the approved turbines, roads and powerline footprint areas. The walkdown was undertaken from the 18th until the 24th of April 2022.

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. These disciplines will collectively provide the demarcation of ecological constraints for the larger area.

1.1 Project Description

Umsinde Emoyeni Wind Farm (Pty) Ltd is proposing to establish the 147 MW Umsinde Emoyeni Wind Energy Facility and associated infrastructure. The Environmental Authorisation (DFFE Ref: 14/12/16/3/3/2/686) for the proposed wind energy facility was granted on 06 September 2018 and amended on 20 April 2021 and the latest amendment on the 07 June 2022. The Umsinde Emoyeni Wind Energy Facility and associated infrastructure is located near the town of Murraysburg in the Beaufort West Local Municipality in the Western Cape Province. The proposed wind energy facility is located within the Beaufort West Renewable Energy Development Zone (REDZ). The authorised Umsinde Emoyeni WEF has been registered as a Strategic Integrated Project (SIP) as per the embedded generation investment programme with the Department of Public Works and Infrastructure.

The project will include the following infrastructure as authorised:

- Up to 33 wind turbines (capped at 147MW total capacity) with a hub height of up to 160m, blade length of 90m and rotor diameter of up to 180m;
- Hard standing area of up to 55m by 35m;
- Three temporary Laydown areas of up to 150m by 60m each;
- Temporary turbine laydown areas;
- Electrical cabling and on-site substation;
- Existing farm access tracks and watercourse crossings will be upgraded;
- Internal access roads;

- On-site office compound, including site offices, parking and an operation and maintenance facility including a control room;
- Anemometer masts;
- Security fencing; and
- CCTV monitoring towers.

The following properties have been identified for the Umsinde Emoyeni Wind Energy Facility and associated infrastructure:

- Portion 3 (Portion of Portion 1) of the Farm Driefontein No.26;
- Portion 7 (De Tafel) Portion of Portion 2) of the Farm Driefontein No.26;
- Portion 10 (Portion of Portion 1 of the Farm Driefontein No.26;
- Remainder of Portion 2 of Farm Driefontein No.26;
- Portion 1 of the Farm Klein Driefontein No.152;
- Remainder of the Farm Klein Driefontein No.152;
- Portion 2, portion of Portion 9 of Farm Witteklip 32;
- Remainder of the Farm De Hoop No. 30; and
- Portion 4 of the Farm De Hoop No.30.

Umsinde Emoyeni Wind Farm (Pty) Ltd has commissioned Nala Environmental (Pty) Ltd to undertake the ground truthing and subsequent finalisation of the EMPrs in terms of NEMA EIA Regulations. As per the conditions of the Environmental Authorisations, independent specialist walkthrough's have been undertaken to inform the final layout and final Environmental Management Programme for the wind energy facility and associated infrastructure.

1.2 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; 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 for the area.

1.3 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[1] to the development area subsequent to the site visit may affect the results;
- The field assessment was limited to accessible turbines due to time and weather constraints, where turbines and roads could not be reached, notes were made of similar habitat within the general WEF area;
- Only a single season survey was undertaken, thus no temporal variances have been considered; 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

Turbine, road and powerline positions were supplied by the client. A 150 m corridor width (total width is 300 m) was considered for the road and powerline routes. A 200 m assessment buffer was assigned to turbine sites. 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.

2.2 Ecological Information

2.2.1 Terrestrial Ecology

The ecological assessment completed for the proposed Umsinde Emoyeni WEF (Simon Todd, 2015) was considered for background information. A list of plant species of conservation concern which are known to occur in the vicinity of the WEF as provided by Simon Todd (2015) is presented in Table 2-1. Those in red are confirmed present in the immediate area, but not necessarily within the development footprint.

Table 2-1 Listed plant species (Todd 2015)[Threat Status: Dec = Declining; EN = Endangered]

Family	Species	Threat status
Amaryllidaceae	*Boophone disticha*	Dec
Asphodelaceae	*Kniphofia ensifolia subsp. autumnalis*	EN
Geraniaceae	*Geranium ornithopodiodes*	EN

[1] A revised layout was provided in October 2022. The placement of infrastructure in relation to the designated ecological sensitivities has been updated for this report submission.

Geraniaceae	*Pelargonium sidoides*	Dec
Lamiaceae	***Salvia repens var. keiensis***	DDD

Of the flora species considered likely to occur in the area by Todd (2015), these were not recorded from the study area and are not considered a risk due to their widespread occurrence (Todd 2015). One additional species was found *Gethylis longistyla*, which is classified as rare.

Of the faunal study conducted by Todd in 2015, the most notable comment was that the drainage systems within the site do contain wide floodplains or alluvial terraces which are the known preferred habitat of the Riverine Rabbit (*Bunolagus monticularis).* Todd (2015), concluded that "*It is not considered likely that the Riverine Rabbit occurs at the site. This species is associated with silty floodplains and if it were to occur anywhere at the site, it would be on the lowland floodplains of the major rivers. As these areas would be avoided by the development, the possibility of impact on this species can be discounted*".

Todd (2015) indicates that three listed species are likely to occur in the area, but that the effect of the WEF would be low considering the widespread distribution of the species as well as their mobility. These species are the Black-footed cat (*Felis nigripes),* which is listed as Vulnerable, the Leopard (*Pathera pardus*), which is listed as Near Threatened and the Honey Badger (*Mellivora capensis*), listed as Endangered (Todd 2015).

The author added that the Karoo Padloper (*Homopus boiulengeri*), a listed karoo endemic tortoise species may occur on site, as may the Plain Mountain Adder (*Bitis inornate*) a little-known species that occurs in the general area (Todd 2015). Todd (2015) indicates that reptiles are unlikely to be affected by wind turbines. Todd (2015) notes that tortoises (Angulate Tortoises, *Chersina angulata* with occasional observations of Karoo Tent Tortoises, *Psammobates tentorius tentorius*) may be negatively impacted by the development as they are vulnerable to collisions with motor vehicles and predation by avian predators. The author continued and said that attractive species such as Tent Tortoises are also vulnerable to collection for use as pets or trade, and the increased accessibility resulting from the new roads that will be constructed as part of the development would raise the risk for these species. Of the amphibians likely to occur on site only one is listed: the Giant Bullfrog (*Pyxicephalus adspersus*) which Todd (2015) considers unlikely to be found on site.

2.3 Walkdown

A walkdown survey of the proposed WEF layout was undertaken on 18-24 April 2022. The specialist ecologists traversed the planned footprint areas searching for ecologically sensitive habitats and any species of conservation concern within the corridor. Each accessible turbine position was visited on foot and evaluated according to the potential impact on the surrounding ecosystems. Each accessible road route between turbines was inspected and evaluated. Proposed substation and laydown/site camp locations were also assessed.

As much as possible of the roads and turbine layout was assessed on foot and by 4x4 vehicle. Tracks and waypoints are indicated in Figure 2-1. The site sensitivity (SEI) in relation to the original layout is presented in Figure 2-2. Findings are presented in Table 2-2. A refined layout that considered walkdown findings and also a sensitivity can be seen in Figure 2-3 and Figure 2-4 respectively.

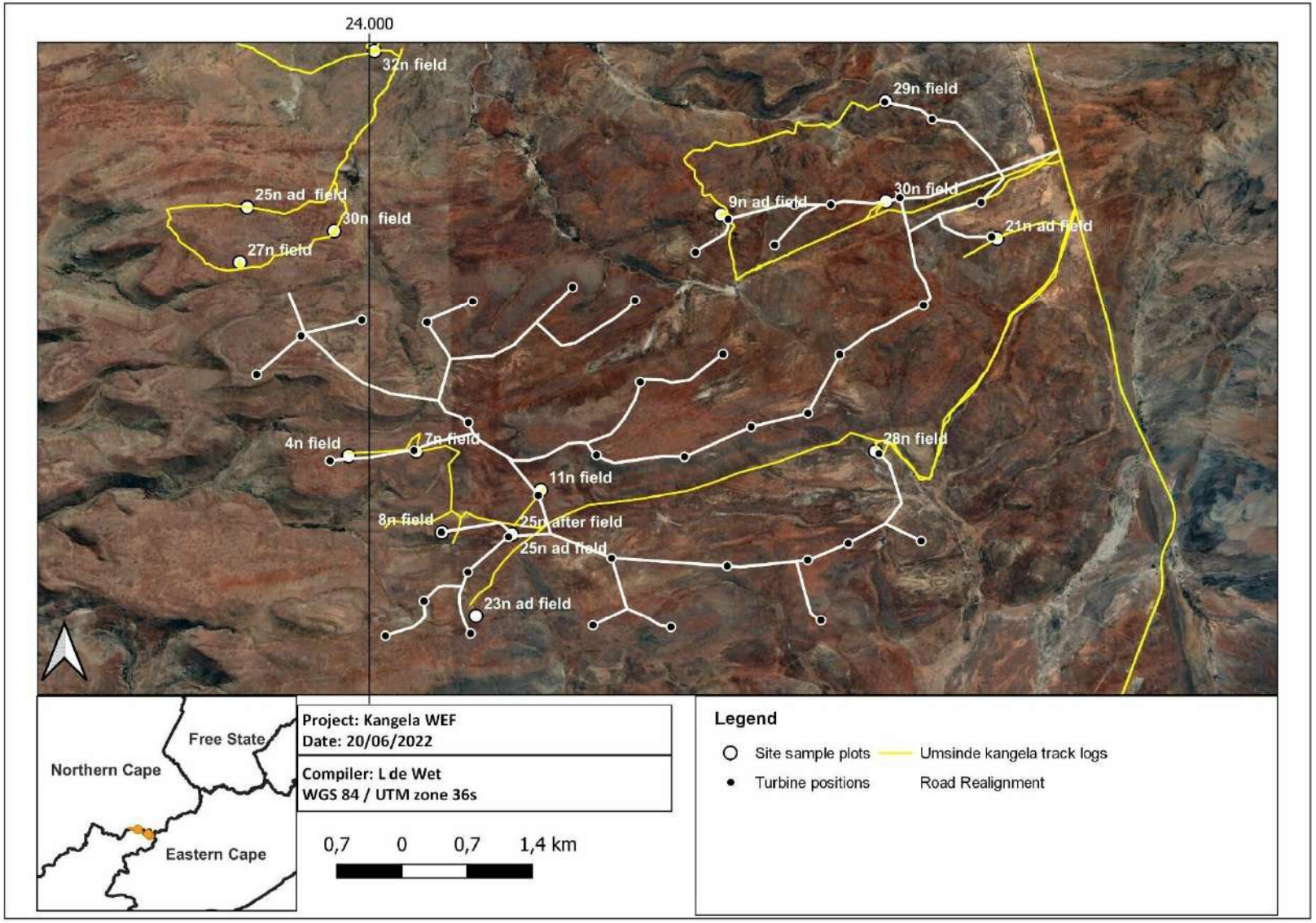

Figure 2-1 The original wind turbine locations as well as the associated roads for the Umsinde WEF indicating turbines visited

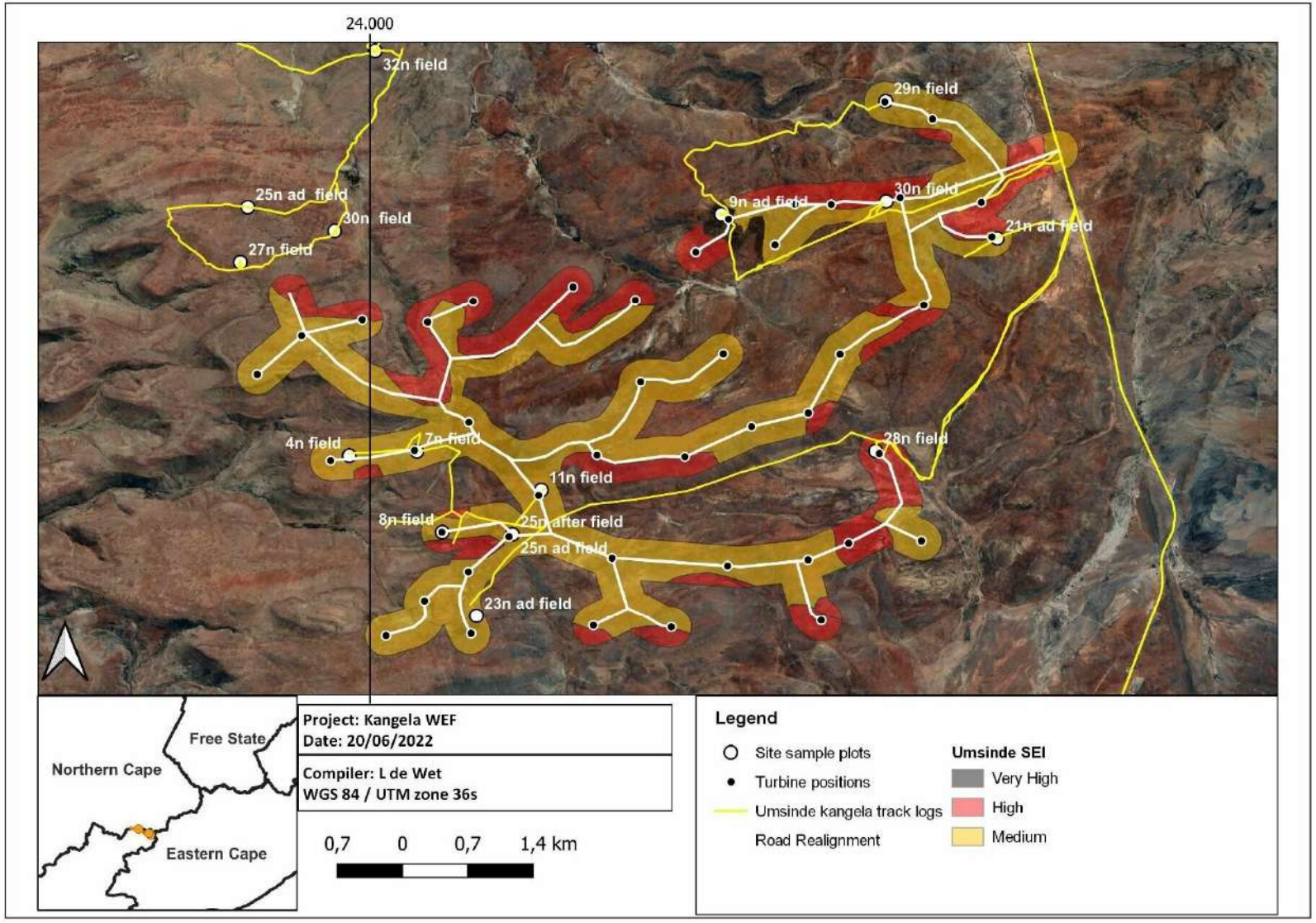

Figure 2-2 The original SEI based on the walkdown for the Umsinde WEF

Table 2-2 Summary Site specific comments and recommendations on the original turbines for Umsinde WEF.

Turbine	Comments and recommendations
	Findings: The site is located in comparatively deeper soils of the karroid scrub dominated by dwarf shrubs. Presence of geophytic SCC. Sensitivity: The presence of geophytic SCC indicate that this turbine sire is sensitive though these can be relocated provided the applicable permits have been obtained. SCC recorded include *Bulbine* sp., *Moraea* sp (pictured far right) and *Romulea tortuosa* (pictures near right). As the geophytic SCC can be moved, the area is considered Medium SEI. Recommendations: All SCC should be relocated prior to construction of the turbine, access roads and associated infrastructure. 
8n	
	Findings: 7n though itself located in somewhat degraded rocky slope karroid scrub habitat, is located adjacent to several dolerite outcrops, considered Very High SEI. This area has been somewhat degraded due to grazing.
7n	Sensitivity: Dolerite outcrops surrounding this turbine increase the sensitivity though the location of the turbine itself is within a Medium SEI. Recommendations: Cognisance of the surrounding dolerite outcrops should be taken and this turbine strictly located out of these areas, Strict mitigation measures apply and SCC must be relocated.

	
4n	Findings: 4n, though itself located in somewhat degraded rocky slope karroid scrub habitat, is located adjacent to several dolerite outcrops, considered Very High SEI. This area has been somewhat degraded due to grazing. Sensitivity: Dolerite outcrops surrounding this turbine increase the sensitivity though the location of the turbine itself is within a Medium SEI. There is the presence of *Aloe broomii*, which can easily be relocated once the relevant permits have been obtained. Recommendations: Cognisance of the surrounding dolerite outcrops should be taken and this turbine strictly located out of these areas, Strict mitigation measures apply and SCC must be relocated. 
25n ad	 Findings: This turbine is located in an are dominated by dwarf karroid shrubs and is somewhat degraded as a result of grazing. Sensitivity: This site is considered a Medium SEI. Recommendations: No ecological constraints are present for the location of this turbine.

	
11n	Findings: This turbine is located in an are dominated by grasses as opposed to the more common dwarf karroid shrubs. Sensitivity: The site is considered a medium SEI. Recommendations: No ecological constraints are present for the location of this turbine. 
23n ad	Findings: This turbine is located in an are dominated by dwarf karroid shrubs and is somewhat degraded as a result of grazing. Sensitivity: This site is considered a Medium SEI. Recommendations: No ecological constraints are present for the location of this turbine.

	
21n ad	Findings: This turbine is located in an are dominated by dwarf karroid shrubs and is somewhat degraded as a result of grazing. Sensitivity: This site is considered a Medium SEI. Recommendations: No ecological constraints are present for the location of this turbine. 
28n	Findings: This turbine is located in an area dominated by dwarf karroid shrubs and is degraded as a result of grazing. Sensitivity: This site is considered a Medium SEI due to high erosion potential. Recommendations: No ecological constraints are present for the location of this turbine.

Findings: This turbine is located in an area dominated by dwarf karroid shrubs on comparatively deeper soils with a high erosion potential. The site is natural with few impacts.

Sensitivity: This site is considered a High SEI due to high erosion potential and the presence of intact natural vegetation.

Recommendations: No ecological constraints are present for the location of this turbine, however, strict mitigation measures must be put into place for the impacts associated with turbine and associated access roads.

30n

Findings: This turbine is located on a rocky pavement within surrounded by good condition karroid scrub dominated by dwarf shrubs.

Sensitivity: This location s considered Very High SEI due to the presence of dolerite outcrops as well as steep slopes with a very high erosion risk and the presence of SCC (*Stomatium duthiae* pictured right).

Recommendations: This turbine should be relocated if possible, or an alternative location found.

9n ad

	
29n	Findings: 29n is located on rocky karroid scrub. Sensitivity: Although rocky with a high sensitivity, this is considered a Medium SEI due to some existing grazing impacts. Recommendations: There are few ecological constraints but mitigation measures must be strictly adhered to in such rocky areas with a high possibility for the presence of sensitive species. 
9n ad	This turbine should be relocated out of the area of Very High SEI or an alternative used.

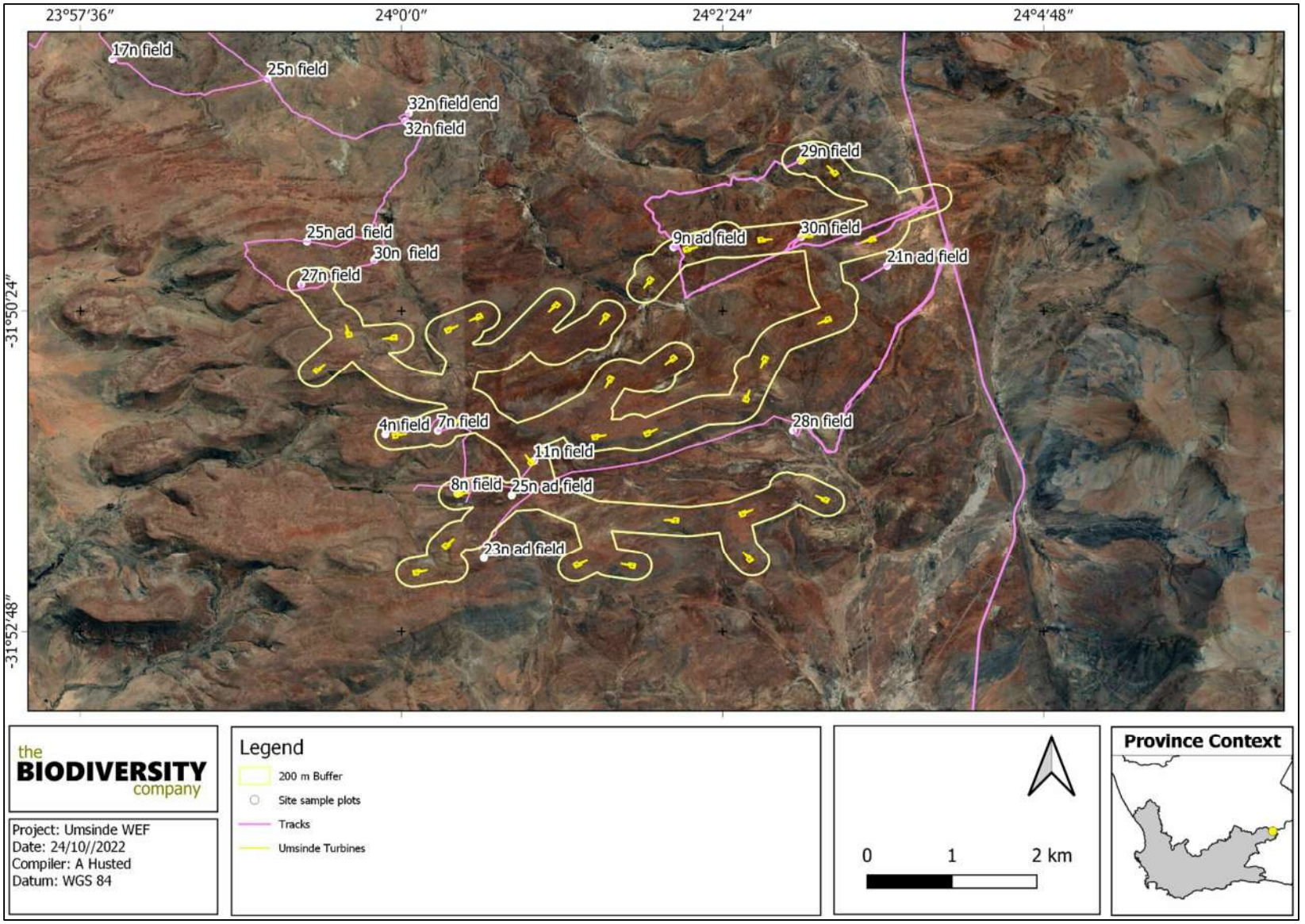

Figure 2-3 The revised wind turbine locations based on the walkdown for the Umsinde WEF.

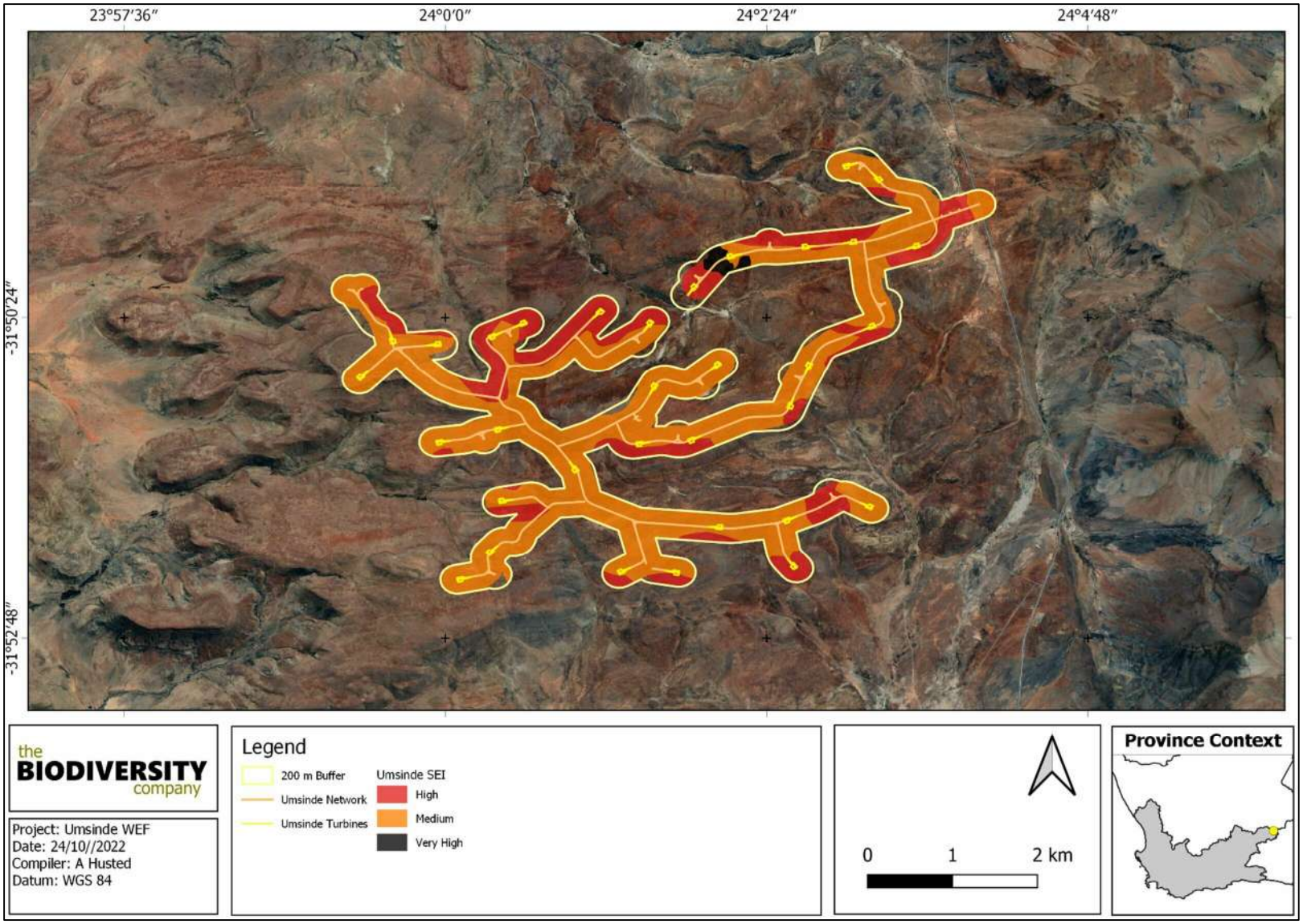

Figure 2-4 Revised SEI based on the walkdown for the Umsinde WEF

2.4 Observations

In response to the walkthrough findings and recommendations (Table 2-2), the layout was updated accordingly. The following are observations made in relation to the updated layout (October 2022) and the general area observed during the walkdown, these are discussed below due to the nature of the occurrence of these fauna and flora being ubiquitous throughout the area:

- No turbines of the revised layout (October 2022) encroach into an area assigned a Very High SEI;

- Access routes and development areas (other than turbine) are in varying sensitivities, include the Very High SEI proximal to turbine 19 which will require access. Measures have been prescribed to mitigate these impacts;

- Geophytes were particularly abundant within the rocky areas. It is important to note that these growth forms, and some succulents, are protected under the Western Cape Legislation (WC Nature-Conservation-Ordinance-19-of-1974) and include all species of Amaryllidaceae; All Iridaceae; All species of Mesembryanthemaceae (including those species now in the Aizoaceae) and All *Orchids* (Orchidaceae). No protected trees, listed in term of the National Forests Act, were observed; and

- Verrox's Tent Tortoise (*Psammobates tentorius veroxii)* is expected to occur throughout the area and thus special awareness and protection of this species is necessary.

- The planned site locations for the batching plant, laydown area and site camp encroach into designated Critical Biodiversity Area (CBA 1) areas as per the provincial Biodiversity Sector Plan (2017) (Figure 2-5). The conservation status of this area for this for the ecological assessment (Todd, 2015) was (then) a designated Ecological Support Area (ESA) (2015). The ecological assessment completed by Todd (2015) assigned a medium sensitivity for the area, with the adjacent drainage channels assigned a high sensitivity. The assigned ecological sensitivity for this area was determined to range from medium to high for the walkdown. The following is recommended to allow for the placement of this temporary infrastructure in the area:

- All mitigation measures prescribed herein, and by Todd (2015) and Arcus (2015) remain applicable; and

- A rehabilitation plan must be compiled and implemented for these structures. The plan must aim to achieve the pre-disturbance ecological condition of the area.

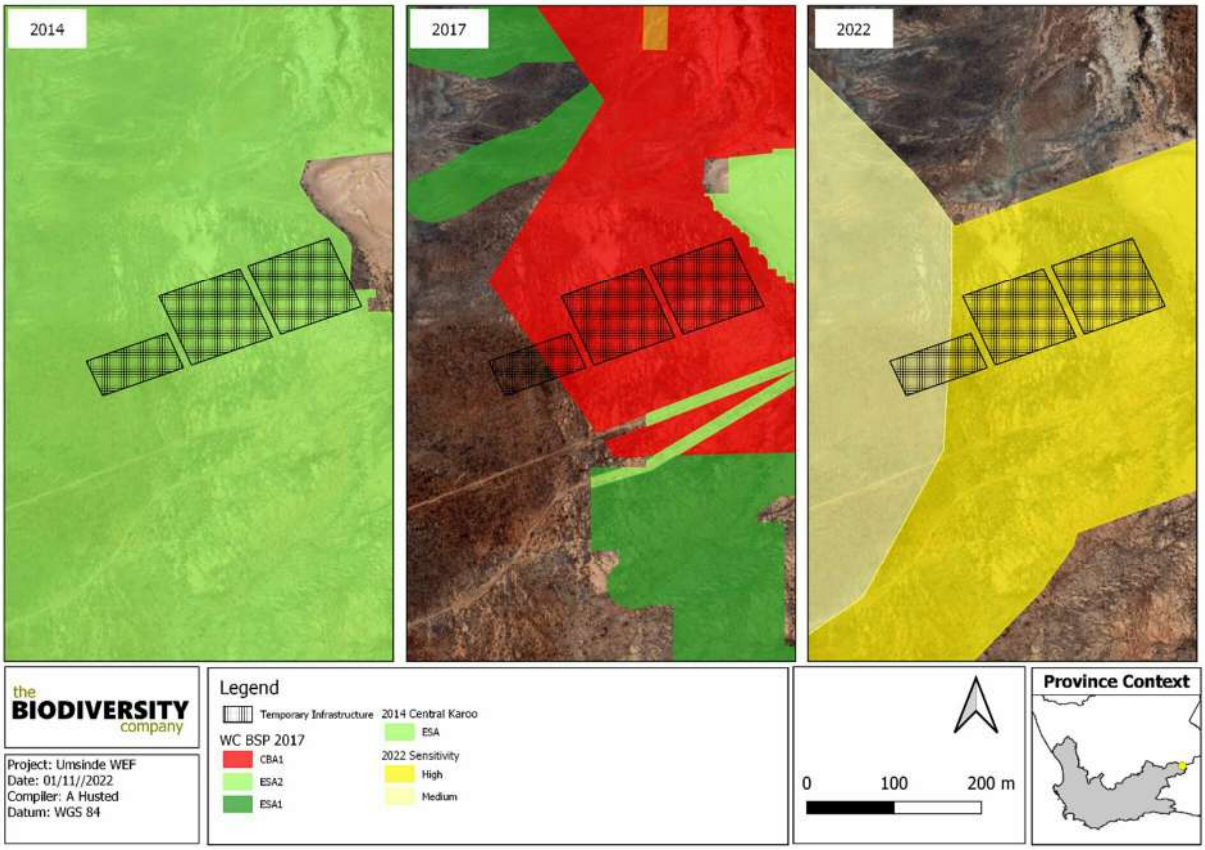

Figure 2-5 Designated conservation status for the proposed temporary infrastructure

2.5 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 2-3 Management objectives for the Umsinde WEF

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Vegetation and Habitats				
Drainage lines must be avoided for turbine placement and a no-go buffer of 30 m must be applied around them. Limited access road crossings are acceptable subject to mitigation prescribed by the aquatic specialist. The aquatic ecology walkdown report must be consulted,	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 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 temporary disturbance	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing

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.				
A qualified environmental control officer must be on site when construction begins. In situations where the threatened and protected plants 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
Existing access routes, especially roads must be made use of as far as possible. 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 identified and demarcated laydown/site camp areas. All materials not required during the operational phase must be removed from the project area once the construction phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas	Ongoing
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. Livestock should be kept out of areas that have been recently re-planted until these areas are well established. .	Operational phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
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 for off-site disposal. 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 off-site where possible, or within in specifically demarcated areas on-site.	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Ongoing

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.	Life of operation	Project manager, Environmental Officer	Any instances	Ongoing
A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.	Life of operation	Environmental Officer & Contractor	Fire Management	During Phase
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. 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 where they should be able to resprout and flourish again. All protected and red-data plants should be relocated, and as many other geophytic species as possible.	Life of operation	Project manager, Environmental Officer	Protected Tree/Plant species	Ongoing
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 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 fauna 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, • 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	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing

• Signs must be put up to enforce this;				
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, this is especially true due to the presence of the Verrox's Tent Tortoise's. The speed limits on-site should be restricted to maximum 30 km/h.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Driving on access roads at night should be limited as far as possible 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
Any holes/deep excavations must be dug and planted in a progressive manner and should not be left open overnight; • Should the holes overnight they must be fenced or covered temporarily to ensure no small fauna species fall in; or inspected each morning and any trapped fauna released by a suitably experienced individual.	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 WEF.	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, or use of other dust suppression measures. • 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 contained. All waste must be disposed at licenced facilities.	Construction/Closure Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Daily
Sufficient toilets must be provided for on-site workers, as per the Occupational Health and Safety Act . 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
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 to allow for the disposal of waste in these bins. Temporary storage of domestic waste shall be in covered waste skips or other suitable containers. 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 / Orange 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 on-site to reduce erosion. • Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface (or	Life of operation	Project manager, Environmental Officer	Water Runoff from road surfaces	Ongoing

other dust suppression measures) and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds where needed; • Signs must be put up to enforce this.				
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, Environmental Officer	Management plan	Before construction phase: Ongoing

2.6 Recommendations

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

- The revised layout (October 2022) has successfully achieved avoidance of the Very High SEI habitats. The number of turbines positioned in High SEI has also been reduced with the layout revision. Based on this the revised layout is considered to be acceptable for development;
- All mitigation measures prescribed by Simon Todd (2015) remain applicable for the development and must be adhered to;
- All mitigation measures prescribed by Arcus (2015) remain applicable for the development and must be adhered to;
- Rocky outcrops must be avoided as much as possible. Avoid fragmenting rocky habitats; and
- To the extent possible within construction timelines, the floral search and rescue operation should ideally be undertaken before the end of February for the summer flowering species, and/or during August for the winter flowering species.

2.7 Conclusion

The current layout (October 2022) is acceptable for terrestrial biodiversity provided all mitigation measures described and referred to herein are adhered to, a Rehabilitation Plan is developed and relevant permits obtained prior to the removal of any protected species that may be damaged or destroyed by the development.

3 References

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