



UMSOBOMVU WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE

Botanical Micro-siting Report



ENVIRONMENTAL AND SOCIAL ADVISORY SERVICES



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| PROPOSED UMSOBOMVU WIND ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE SITUATED IN THE UMSOBOMVU LOCAL MUNICIPALITY (NORTHERN CAPE PROVINCE) AND THE INXUBA YETHEMBA LOCAL MUNICIPALITY (EASTERN CAPE PROVINCE) | |
| BOTANICAL MICRO-SITING REPORT | |
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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---------|---|
| CTMF | Concrete Tower Manufacturing Facility |
| DEDEAT | Department of Economic Development, Environmental Affairs and Tourism |
| DAEARDL | Department of Agriculture, Environmental Affairs, Rural Development and Land Reform |
| EA | Environmental Authorisation |
| GIS | Geographical Information System |
| IUCN | International Union for the Conservation of Nature |
| LC | Least Concern |
| MTS | Main Transmission Station |
| PNCO | Provincial Nature Conservation Ordinance |
| POSA | Plants of Southern Africa |
| SANBI | South African National Biodiversity Institute |
| SCC | Species of Conservation Concern |
| WEF | Wind Energy Facility |
| WTG | Wind Turbine Generator |



1. INTRODUCTION AND BACKGROUND TO THE STUDY

Umsobomvu Wind Power (Pty) Ltd is proposing to develop, construct, and operate a Wind Energy Facility (WEF) consisting of a total of twenty-six (26) turbines and associated infrastructure near Nouport and Middleburg in the Umsobomvu Local Municipality (Northern Cape Province) and the Inxuba Yethemba Local Municipality (Eastern Cape Province). In line with the recommendations specified in the Ecological Impact Assessments, as well as the conditions outlined in the Environmental Authorisations (EAs) associated with the development of the Umsobomvu WEF and associated infrastructure (between 2016 and 2021), a botanical micro-siting investigation of the proposed development footprint is required to be undertaken prior to the commencement of vegetation clearance and construction. The following report outlines the findings of the botanical micro-siting investigation undertaken for the proposed Umsobomvu WEF and associated infrastructure.

2. OBJECTIVES AND TERMS OF REFERENCE

The main objective of this study was to identify and locate Species of Conservation Concern (SCC) within the proposed development footprint of the Umsobomvu WEF and associated infrastructure. The purpose of this was to make recommendations regarding the refinement of the development layout to avoid sensitive areas. The terms of reference for this study are outlined below:

- Identify and record the location of SCC present within the development footprint of the Umsobomvu WEF and associated infrastructure.
- Produce a table and associated map containing the SCC observed and their distribution.
- Provide recommendations and mitigation measures to ensure the minimal loss of SCC as a consequence of the proposed development.
- Based on the findings and outcomes of this report, make recommendations regarding the refinement of the development layout, including the placement of turbines and associated infrastructure, if required.
- Determine permitting requirements. *[NB: It is not the purpose of the study to comply with or apply for any permitting requirements at this stage].*
- Summarise the findings of the micro-siting investigation in a report.

3. ASSUMPTIONS AND LIMITATIONS

- Species of Conservation Concern (SCC) are difficult to find and identify. Whilst every effort was made to identify and locate all SCC within the development footprint, it is likely that additional SCC will be found during vegetation clearance and construction of the development, particularly those that were not flowering at the time of the site survey.
- Due to the terrain of the project area, as well as time constraints, certain areas were inaccessible and were therefore not assessed during the site survey. However, a significant portion of similar habitat within the study site was surveyed which provided sufficient information on the SCC present in the affected area in order to draw conclusions and make recommendations.
- It should be noted that the location of every individual SCC was not recorded as this would require a substantial amount of time. Rather, a representative sample of SCC



observed within each site was recorded and the extent of the expected populations were mapped.

- The majority of the Umsobomvu WEF development footprint occurs within Besemkaree Koppies Shrubland (Grassland Biome). Only a small portion of the access road falls within Eastern Upper Karoo vegetation (Nama Karoo-Biome). The micro-siting investigation for the Umsobomvu WEF was undertaken in September (Spring). The optimum survey period for the Grassland Biome is October to March (SANBI, 2020). The lack of morphological features (including fruit or flowers) made identifying potential SCC to species level which are likely to occur within the development footprint difficult. Additionally, the project area has been affected by a prolonged drought which has left the grassland extremely dry. As a result, a number of species may be dormant. However, it should be noted that a number of Ecological Impact Assessments have been undertaken over the years for the proposed Umsobomvu WEF, during which only one (1) threatened SCC was identified, namely *Gibbaeum petrense* (Vulnerable). However, this is likely a misidentification as *G. petrense* has only ever been recorded in less than 10 locations on the northern slopes of Langeberg within the Western Cape Province (Extent of Occurrence of <10 km²). Its habitat includes white quartz patches overlaying clay slopes on shale ridges (Vlok and Raimondo, 2006) which does not occur within the study area. As such, based on the absence of threatened SCC a follow-up micro-siting survey within the optimum survey period for the Grassland Biome was not deemed necessary.
- It should be noted that the layout for the Umsobomvu WEF has been amended slightly since the undertaking of the micro-siting investigation. As such, the tracks illustrated on the maps below may fall just outside of the development footprint for some of the turbines. However, based on the area cover and the findings of the micro-siting investigation undertaken for the Umsobomvu WEF and associated infrastructure, as well as the adjacent Coleskop WEF, it is the opinion of the specialist that an additional micro-siting investigation is not required, and that the information obtained is substantial enough to draw conclusion and estimate population numbers for permitting purposes.
- The information, as presented in this document, only has reference to the study site as indicated on the project maps. Therefore, this information cannot be applied to any other area without a detailed investigation being undertaken.

4. METHODOLOGY

A list of plant SCC¹ likely to occur within the development footprint (Table 1) was compiled based on those recorded in previous studies undertaken within the project area (CES, 2014; 2016; 2021) as well as the South African National Biodiversity Institute (SANBI) Plants of Southern Africa (POSA) plant database (<http://posa.sanbi.org>). It should be noted that the majority of the species are classified as Least Concern (LC), except for *Huernia piersii* and

¹ Species of Conservation Concern are species that are assessed according to the IUCN Red List Criteria as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Data Deficient (DD) or Near Threatened (NT), as well as range-restricted species which are not declining and are nationally listed as Rare or Extremely Rare [also referred to in some Red Lists as Critically Rare]. However, in this report SCC also include those species that are protected in terms of the Eastern Cape Nature And Environmental Conservation Ordinance No. 19 Of 1974, the Northern Cape Nature Conservation Act No. 9 Of 2009, National Environmental Management: Biodiversity Act, 2004 (Act 10 Of 2004): Publication of Lists Of Critically Endangered, Endangered, Vulnerable and Protected Species, and the Notice of the List of Protected Tree Species Under the National Forests Act, 1998 (Act No. 84 Of 1998).



Tridentea virescens which are both classified as rare. However, based on the habitat requirements and known distribution of these rare species, the likelihood of occurrence on site is classified as low. The site survey was undertaken over the course of seven (7) days, from the 13th to the 20th of September 2021. The study area was visually surveyed to identify and locate plant SCC present within the development footprint. Identified SCC were GPS tagged using OruxMaps. The distribution of the SCC identified and tagged on site were mapped using GIS software.



Table 1: List of plant SCC likely to occur within the project area.

| Family | Species | IUCN | SA Red List | PNCO | NCNCA | Protected Tree | NEM: BA | Habitat, distribution and population trend (SANBI Red List) | Probability of occurrence on site based on habitat requirements | Confirmed during this assessment (Yes/No) |
|-------------|------------------------------------|------|-------------|------------|------------|----------------|---------|--|---|---|
| Aizoaceae | <i>Delosperma lootsbergense</i> | LC | LC | - | Schedule 2 | - | - | According to Clark and Raimondo (2019), this species is endemic to the high mountains of the Eastern Cape interior, including the Sneeuwberg Range near Graaff-Reinet, the Stormberg near Molteno, and the Suurberg Range on the border of the Northern Cape south of Noupoot. Its habitat mainly includes rocky slopes and cliffs in high altitude montane grasslands and Nama-Karoo. | High | Possibly |
| Aizoaceae | <i>Galenia subcarnosa</i> | LC | LC | - | Schedule 2 | - | - | According to Kamundi and Victor (2006), this species is endemic to South Africa and mainly occurs in the Eastern Cape and Northern Cape Province. | High | No |
| Aizoaceae | <i>Stomatium middelburgense</i> | LC | LC | - | Schedule 2 | - | - | This species is endemic to South Africa and mainly occurs in the Eastern Cape Province (Burgoyne, 2006). | Confirmed on site (CES, 2021) | Yes |
| Apocynaceae | <i>Xysmalobium gomphocarpoides</i> | LC | LC | Schedule 4 | Schedule 2 | - | - | This species is endemic to South Africa and occurs in the Eastern Cape, Free State, Northern Cape, North West, and Western Cape Provinces. According to Foden and Potter (2005) this taxon was not selected in any one of their four screening processes for highlighting potential taxa of conservation concern for detailed assessment and was hence given an automated status of Least Concern. | Possible | No |
| Apocynaceae | <i>Gomphocarpus fruticosus</i> | - | LC | Schedule 4 | Schedule 2 | - | - | This species is widespread, common and not in danger of extinction. It is not endemic to South Africa. It occurs on dry sandy soils in open disturbed places (often on riverbanks) in a variety of habitats including Albany Thicket, Desert, Fynbos, Grassland, Indian Ocean Coastal Belt, Nama Karoo, Savanna, and Succulent Karoo in the Eastern Cape, Free State, | Confirmed in broader project area (CES, 2018) | Yes |



| Family | Species | IUCN | SA Red List | PNCO | NCNCA | Protected Tree | NEM: BA | Habitat, distribution and population trend (SANBI Red List) | Probability of occurrence on site based on habitat requirements | Confirmed during this assessment (Yes/No) |
|------------------|---------------------------|------|-------------|------------|------------|----------------|---------|---|---|---|
| | | | | | | | | Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West, and Western Cape Provinces (von Staden, 2012). | | |
| Asphodelaceae | <i>Aloe broomii</i> | LC | LC | Schedule 4 | Schedule 2 | - | - | This species is widespread in the central interior of South Africa, from the eastern Karoo in the south-eastern parts of the Northern Cape and adjacent areas in the Western Cape eastwards through the southern Free State and the Eastern Cape interior. Major habitats include Nama-Karoo and Grasslands (von Staden, 2018). | Confirmed on site (CES, 2021) | Yes |
| Crassulaceae | <i>Crassula umbellata</i> | LC | LC | - | Schedule 2 | - | - | This species is endemic to South Africa and occurs on sandy or gravelly slopes of the Fynbos and Succulent Karoo Biome in the Eastern Cape, Northern Cape and Western Cape Provinces (Foden and Potter, 2009). | Possible | No |
| Crassulaceae | <i>Crassula setulosa</i> | NE | LC | - | Schedule 2 | - | - | According to van der Colff (2015), this species is not endemic to South Africa and occurs in a wide variety of habitats in the Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, and North West Provinces. | High | Yes |
| Iridaceae | <i>Morea huttonii</i> | - | LC | Schedule 4 | Schedule 2 | - | - | According to Cholo and Foden (2006), this species is not endemic to South Africa. There is a lack of information on the habitat requirements for this species, however it has been recorded in the Eastern Cape, Free State, KwaZulu-Natal, and Mpumalanga Provinces. | Confirmed in broader project area (CES, 2018) | No |
| Orobanchaceae | <i>Harveya pumila</i> | - | LC | Schedule 4 | - | - | - | According to Victor (2004), this species is not endemic to South Africa and occurs in the Eastern Cape, Free State, Gauteng, KwaZulu-Natal, and Mpumalanga Provinces. | Confirmed in broader project area (CES, 2018) | Yes |
| Scrophulariaceae | <i>Nemesia sp.</i> | | | - | Schedule 2 | - | - | Unknown | Possible | No |



| Family | Species | IUCN | SA Red List | PNCO | NCNCA | Protected Tree | NEM: BA | Habitat, distribution and population trend (SANBI Red List) | Probability of occurrence on site based on habitat requirements | Confirmed during this assessment (Yes/No) |
|-------------------|----------------------------------|------|-------------|------|------------|----------------|---------|---|---|---|
| Scrophulariaceae | <i>Manulea plurirosulata</i> | LC | LC | - | Schedule 2 | - | - | According to Foden and Potter (2005), this species is endemic to South Africa and occurs in the Eastern Cape and Free State Provinces. There is a lack of information on the habitat requirements for this species, however this taxon was not selected in any one of four screening processes for highlighting potential taxa of conservation concern for detailed assessment and was hence given an automated status of Least Concern. | Possible | No |
| Scrophulariaceae | <i>Jamesbrittenia filicaulis</i> | LC | LC | - | Schedule 2 | - | - | According to Foden and Potter (2005), this species is not endemic to South Africa and occurs within the Eastern Cape, Free State and KwaZulu-Natal Provinces. There is a lack of information on the habitat requirements for this species, however this taxon was not selected in any one of four screening processes for highlighting potential taxa of conservation concern for detailed assessment and was hence given an automated status of Least Concern. | Possible | Yes |
| Aizoaceae | <i>Ruschia intricata</i> | - | LC | - | Schedule 2 | - | - | According to Burgoyne (2006), this species has been classified as LC and its population trend has been classified as stable. It is endemic to South Africa and occurs in the Eastern Cape, Free State, Northern Cape, and Western Cape Provinces. | Confirmed in broader project area (CES, 2018) | Yes |
| Aizoaceae | <i>Psilocaulon coriarium</i> | - | LC | - | Schedule 2 | - | - | According to Burgoyne (2006), this species has been classified as LC and is not endemic to South Africa and occurs in the Eastern Cape, Free State, Northern Cape, and Western Cape Provinces. There is little information relating to this species' habitat requirements. | | No |
| Anacampserotaceae | <i>Anacampseros ustulata</i> | - | LC | - | Schedule 2 | - | - | According to Williamson and Potter (2005), this species is endemic to South Africa and | Confirmed in broader | Yes |



| Family | Species | IUCN | SA Red List | PNCO | NCNCA | Protected Tree | NEM: BA | Habitat, distribution and population trend (SANBI Red List) | Probability of occurrence on site based on habitat requirements | Confirmed during this assessment (Yes/No) |
|----------------|------------------------------|------|-------------|------------|------------|----------------|---------|---|---|---|
| | | | | | | | | occurs in the Eastern Cape, Free State, and Western Cape Provinces. Its population trend is currently stable. | project area (CES,2021) | |
| Amaryllidaceae | <i>Haemanthus cf humilis</i> | - | LC | Schedule 4 | Schedule 2 | - | - | According to Snijman and Victor (2004), this species is not endemic to South Africa. It is widespread and occurs in all nine provinces of South Africa. | Confirmed in broader project area (CES, 2021) | Yes |
| Apocynaceae | <i>Huernia piersii</i> | - | Rare | Schedule 4 | Schedule 2 | - | - | According to Victor and Dold (2009), this species is endemic to the Eastern Cape Province. It occurs at high altitudes on bare dolerite domes in the Grassland and Nama-Karoo Biome. It has been recorded in the Eastern Great Karoo between Graaff-Reinet, Sterkstroom and Steynsburg. Despite its rare status, its population trend is classified as stable. The study site is underlain by sedimentary deposits of the Tarkastad Subgroup, the upper layer of the two subdivisions forming the Beaufort Group of the Karoo Supergroup, and does not contain bare dolerite domes. As such, the likelihood of occurrence on site is classified as low. | LOW | No |
| Apocynaceae | <i>Tridentea virescens</i> | - | Rare | Schedule 4 | Schedule 2 | - | - | According to Victor (2009), this species is not endemic to South Africa. It is widespread and occurs as sporadic small populations of up to six plants. No threats are known to impact this species and its population trend has been classified as stable. Its habitat includes stony or hard loam in flood plains. The soils of the study site are classified as leptosols which are very shallow soils that overly continuous rock. These soils are usually extremely gravelly and/or stony and the parent material consists of various types of continuous rock or of unconsolidated materials with less than 20 % fine earth. | LOW | No |



| Family | Species | IUCN | SA Red List | PNCO | NCNCA | Protected Tree | NEM: BA | Habitat, distribution and population trend (SANBI Red List) | Probability of occurrence on site based on habitat requirements | Confirmed during this assessment (Yes/No) |
|--------|---------|------|-------------|------|-------|----------------|---------|--|---|---|
| | | | | | | | | The majority of the development footprint also occurs on higher altitudes (hills and plateaus outside) and not within the flood plain. The likelihood of occurrence on site based on habitat requirements and known distribution is classified as low. | | |



5. VEGETATION OF THE STUDY AREA

According to SANBI's National Vegetation Map (2018), the proposed Umsobomvu WEF and associated infrastructure occurs within two (2) vegetation types, namely Eastern Upper Karoo and Besemkaree Koppies Shrubland.

Eastern Upper Karoo (*Nama-Karoo Biome*)

Eastern Upper Karoo vegetation occurs on flats and gently sloping plains in the Northern Cape, Eastern Cape and Western Cape Provinces. It is characterised by dwarf microphyllous shrubs and 'white' grasses of the genera *Aristida* and *Eragrostis*. This vegetation type is classified as **Least Concern** (SANBI, 2021), with a conservation target of 21%. It is considered poorly protected, but portions of Eastern Upper Karoo vegetation is statutorily conserved in the Mountain Zebra and Karoo National Parks as well as in Oviston, Commando Drift, Rolfontein and Gariiep Dam Nature Reserves. The historical extent of this vegetation type amounted to 49834.17 km², of which approximately 97% currently remains (SANBI, 2021).

Besemkaree Koppies Shrubland (Grassland Biome)

Besemkaree Koppies Shrubland occurs on the slopes of koppies, butts, and tafelbergs in the Northern Cape, Free State and Eastern Cape Provinces. The geology underlying this vegetation type typically includes dolerite koppies and sills embedded within Karoo Supergroup sediments. Besemkaree Koppies Shrubland is characterised by a two-layered karroid shrubland: the lower layer is characterised by a closed canopy dominated by dwarf small leaved shrubs and abundant grasses, while the upper canopy is characterised by a loose canopy of tall shrubs dominated by species such as *Searsia erosa*, *S. burchellii*, *S. ciliata*, *Euclea crispa*, *Diospyros austro-africana* and *Oleo europaea*.

Besemkaree Koppies Shrubland is classified as **Least Concern** (SANBI, 2021), with a Conservation Target of 28%. It is largely excluded from intensive agricultural activities. It is considered poorly protected however portions of this vegetation type were statutorily conserved in the Rolfontein, Tussen Die Riviere, Oviston, Gariiep Dam, Caledon, and Kalkfontein Dam Nature Reserve when assessed by Mucina *et al* (2006). The historical extent of Besemkaree Koppies Shrubland amounted to 9677.82 km², of which approximately 95% currently remains (SANBI, 2021).

6. RESULTS

The floral SCC identified during the micro-siting investigations undertaken for the proposed Umsobomvu WEF and associated infrastructure are listed in Table 2 below. All SCC recorded during the micro-siting investigation are classified as Least Concern but protected either in terms of the Northern Cape Nature Conservation Act (NC NCA) (Act No. 9 of 2009) or the Provincial Nature Conservation Ordinance (PNCO) (Act No. 19 OF 1974), or both. According to the South African National Biodiversity Institute (SANBI) Red List of South African Plants, *a species is classified as Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are*





considered at low risk of extinction. Widespread and abundant species are typically classified in this category.



It should be noted that Table 2 below also includes SCC that did not necessarily occur within the direct development footprint, but were also observed within the broader project area.





Table 2: Plant SCC recorded during the micro-siting investigation.

| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|-----------|-------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Aizoaceae | <i>Ruschia indurata</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |
|  | Aizoaceae | <i>Ruschia sp.</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |



| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|-----------|---------------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Aizoaceae | <i>Ruschia intricata</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |
|  | Aizoaceae | <i>Stomatium middelburgense</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|-----------|---------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Aizoaceae | <i>Stomatium integrum</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |
|  | Aizoaceae | <i>Rabiea albinota</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|-----------|---------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Aizoaceae | cf <i>Delosperma</i> sp. | Schedule 2 | LC | Schedule 4 | - | - | Yes |
|  | Aizoaceae | <i>Crassula dependens</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|-----------|-----------------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Aizoaceae | <i>Chasmatophyllum musculinum</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |
|  | Aizoaceae | <i>Trichodiadema pomeridianum</i> | Schedule 2 | LC | Schedule 4 | - | - | No. Observed within the broader project area. |




| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|-------------------|------------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Amaryllidaceae | <i>Brunsvigia radulosa.</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |
|  | Anacampserotaceae | <i>Anacampseros ustulata</i> | Schedule 2 | LC | Schedule 4 | - | - | No. Observed within the broader project area. |




| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|-------------|-----------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Apocynaceae | <i>cf Microloma armatum</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |
|  | Apocynaceae | <i>Asclepias crispa</i> | Schedule 2 | LC | Schedule 4 | - | - | No. Observed within the broader project area. |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|---|-------------|--------------------------------|-------------------------------------|-------------------|------------------------------------|-------------------|-------|--|
|  | Apocynaceae | <i>Gomphocarpus fruticosus</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|---|---------------|---------------------|-------------------------------|-------------|------------------------------|----------------|-------|---|
|  | Asphodelaceae | <i>Aloe broomii</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |




| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|---------------|---------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Asphodelaceae | <i>Kniphofia stricta</i> | Schedule 2 | LC | Schedule 4 | - | - | No. Observed within the broader project area. |
|  | Crassulaceae | <i>Crassula corallina</i> | Schedule 2 | LC | - | - | - | Yes |




| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|--------------|---|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Crassulaceae | <i>Crassula pubescens ssp. rattrayi</i> | Schedule 2 | LC | - | - | - | Yes |
|  | Crassulaceae | <i>Crassula nudicaulis</i> | Schedule 2 | LC | - | - | - | Yes |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|---|--------------|--------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Crassulaceae | <i>Crassula setulosa</i> | Schedule 2 | LC | - | - | - | Yes |




| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|--------------|-----------------------------|-------------------------------------|-------------------|------------------------------------|-------------------|-------|--|
|  | Crassulaceae | <i>Cotyledon orbiculata</i> | Schedule 2 | LC | - | - | - | Yes |




| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|--------------|-----------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Crassulaceae | <i>Crassula sarcocaulis</i> | Schedule 2 | LC | - | - | - | Yes |
|  | Crassulaceae | <i>Crassula tetragona</i> | Schedule 2 | LC | - | - | - | Yes |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|---|---------------|-------------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Euphorbiaceae | <i>Euphorbia clavarioides</i> | Schedule 2 | LC | - | - | - | Yes |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|---------------|------------------------------|-------------------------------------|-------------------|------------------------------------|-------------------|-------|--|
|  | Euphorbiaceae | <i>Euphorbia mauritanica</i> | Schedule 2 | LC | - | - | - | Yes |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|-------------|-----------------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Geraniaceae | <i>Pelargonium minimum</i> | Schedule 1 | LC | - | - | - | No. Observed within the broader project area. |
|  | Geraniaceae | <i>Pelargonium abrotanifolium</i> | Schedule 1 | LC | - | - | - | No. Observed within the broader project area. |





| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|-------------|-------------------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Geraniaceae | <i>Pelargonium ranunculophyllum</i> | Schedule 1 | LC | - | - | - | No. Observed within the broader project area. |
|  | Geraniaceae | <i>Pelargonium sidoides</i> | Schedule 1 | LC | - | - | - | Yes |




| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|---------------|---------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Iridaceae | <i>Moraea polystachya</i> | Schedule 2 | LC | Schedule 4 | - | - | No. Observed within the broader project area. |
|  | Orobanchaceae | <i>Hyobanche sp.</i> | Schedule 2 | LC | Schedule 4 | - | - | Yes |



| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|--|------------------|------------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Oxalidaceae | <i>Oxalis obliquifolia</i> | Schedule 2 | LC | - | - | - | Yes |
|  | Scrophulariaceae | <i>Diascia cf capsularis</i> | Schedule 2 | LC | Schedule 4 | - | - | No. Observed within the broader project area. |



| Photograph | Family | Species | NC NCA (Act No. 9 of 2009) | SA Red List | PNCO (Act No. 19 OF 1974) | Protected Tree | NEMBA | Observed within the development footprint of the WEF (YES/NO) |
|---|------------------|----------------------------------|----------------------------|-------------|---------------------------|----------------|-------|---|
|  | Scrophulariaceae | <i>Jamesbrittenia filicaulis</i> | Schedule 2 | LC | - | - | - | Yes |



WTG 01, 02, 03, 04, 07 & 08

WTG 01, 02, 03, 04, 07 and 08 fall within the Eastern Cape Province. Four (4) SCC were recorded within the overall footprint of the Umsobomvu WTG 01, 02, 03, 04, 07 and 08 in terms of the PNCO (Act No. 19 OF 1974), namely *Delosperma multiflorum*, *Ruschia sp.*, *Stomatium middelburgense*, and cf *Microloma armatum*, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 1). Due to time constraints and accessibility, WTG 07 was not surveyed. However, the vegetation, slope, and position in the landscape was similar to the surrounding WTG’s which allows for the extrapolation of potential SCC likely to occur within the footprint of WTG 07.

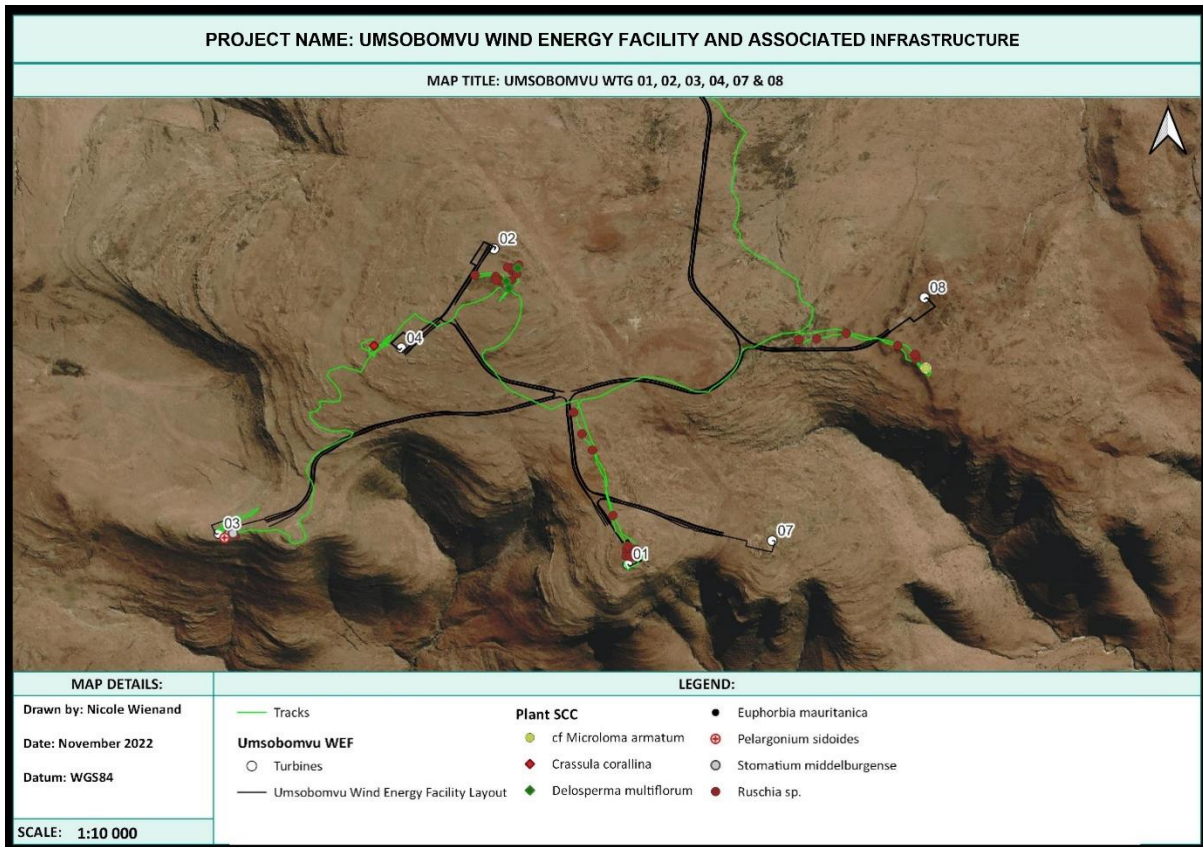


Figure 1: SCC identified and tagged within the development footprint of the Umsobomvu WTG 01, 02, 03, 04, 07 and 08.

Table 3 below lists the SCC that were identified within the footprint for the Umsobomvu WEF WTG 01, 02, 03, 04, 07 and 08.

Table 3: SCC identified within the footprint for Umsobomvu WTG 01, 02, 03, 04, 07 and 08.

| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|--------------------|-------------------------|---|----------------------------------|
| WTG 01 | | | |
| <i>Ruschia sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| WTG 02 | | | |



| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|---|-------------------------|--|----------------------------------|
| <i>Delosperma multiflorum</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Ruschia sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Stomatium middelburgense</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| WTG 03 | | | |
| <i>Ruschia sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Stomatium middelburgense</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| WTG 04 | | | |
| <i>Crassula corallina</i> was recorded within WTG 04. However, this species is not protected in terms of the Eastern Cape PNCO (Act No. 19 of 1974). | | | |
| WTG 07 | | | |
| Due to time constraints and accessibility, WTG 07 was not surveyed. However, the vegetation, slope, and position in the landscape was similar to the surrounding WTG's which allows for the extrapolation of potential SCC likely to occur within the footprint of WTG 07. Based on the findings of the surrounding WTGs, it is presumed that <i>Delosperma multiflorum</i> , <i>Stomatium middelburgense</i> , <i>Ruschia sp.</i> , and <i>Microloma armatum</i> occur within the footprint of WTG 07, all classified as protected in terms of Schedule 4 of the EC PNCO (Act No. 19 of 1974). | | | |
| WTG 08 | | | |
| <i>cf Microloma armatum</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Ruschia sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |

Recommendations

- A permit must be obtained from the Eastern Cape DEDEAT prior to the damage, destruction or removal of any SCC identified at the site.
- To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation, which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.
- SCC which are known to survive translocation must be translocated to the nearest similar habitat.



WTG 05, 12 & 19

WTG 05, 12 & 19 falls within the Eastern Cape Province. Four (4) SCC were recorded within the overall footprint of the Umsobomvu WTG 05, 12 and 19 in terms of the PNCO (Act No. 19 OF 1974), including *Delosperma* sp., *Ruschia* sp., *Stomatium middelburgense*, and *cf Microloma armatum*, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 2). It should be noted that the position of WTG 05 has shifted since the micro-siting and therefore has not been directly assessed. However, only one (1) SCC was recorded within the original footprint of WTG 05, including *M. armatum* (LC) (Table 4).

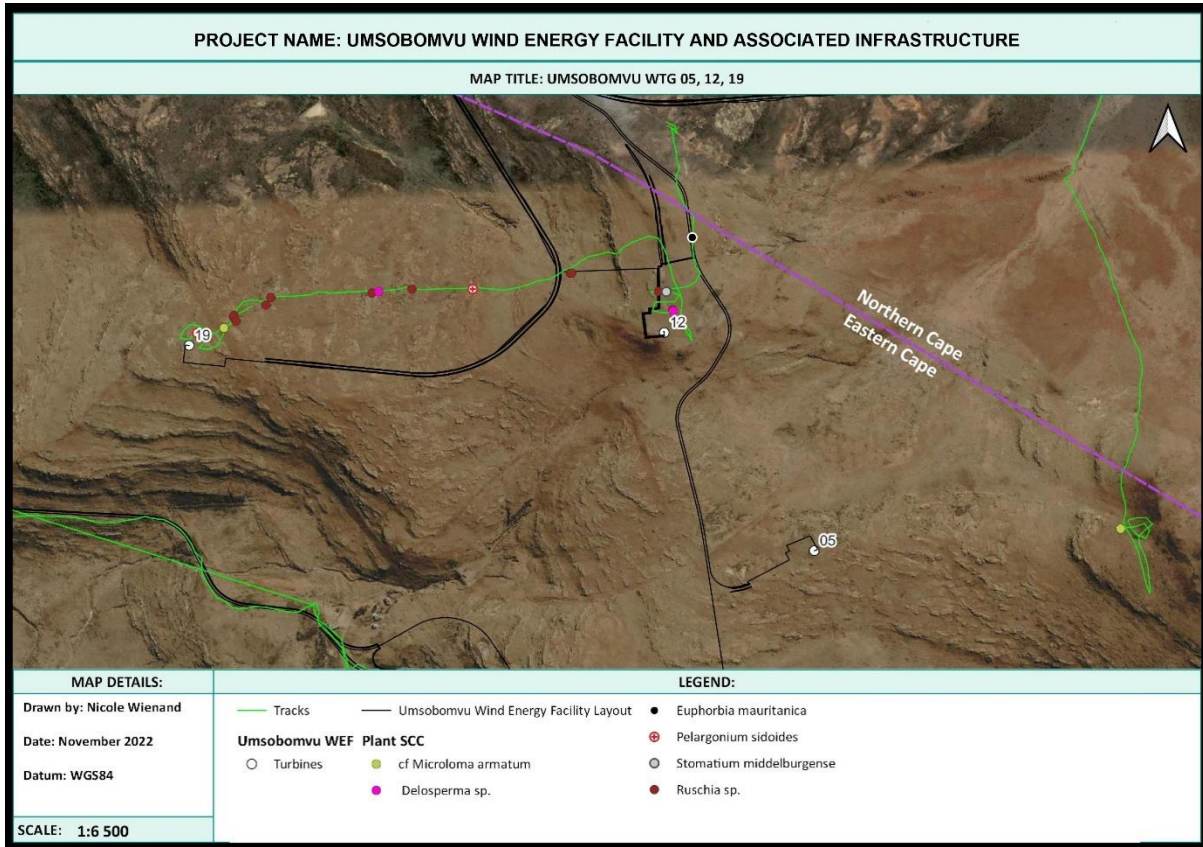


Figure 2: SCC identified and tagged within the development footprint of the Umsobomvu WTG 05, 12 and 19.

Table 4 below lists the SCC that were identified within the footprint for the Umsobomvu WEF WTG 05, 12 and 19.

Table 4: SCC identified within the footprint for Umsobomvu WTG 05, 12 and 19.

| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|-----------------------------|-------------------------|--|----------------------------------|
| WTG 05 (Original) | | | |
| <i>cf Microloma armatum</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| WTG 12 | | | |



| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|---------------------------------|-------------------------|--|----------------------------------|
| <i>Delosperma sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Ruschia sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Stomatium middelburgense</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| WTG 19 | | | |
| <i>cf Microloma armatum</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Ruschia sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Delosperma sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |

Recommendations

- A permit must be obtained from the Eastern Cape DEDEAT prior to the damage, destruction or removal of any of the other SCC identified at the site.
- To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.
- SCC which are known to survive translocation must be translocated to the nearest similar habitat.



WTG 10, 17 and 25

WTG 10, 17 and 25 fall within the Northern Cape Province. Eleven (11) SCC were recorded within the overall footprint of the Umsobomvu WTG 10, 17 and 25 in terms of the Northern Cape Nature Conservation Act (NC NCA) (Act No. 9 of 2009), including *Euphorbia mauritanica*, *Ruschia indurata*, *Ruschia intricata*, *Ruschia sp.*, *Stomatium middelburgense*, *Crassula setulosa*, *Crassula sarcocaulis*, *Cotyledon sp.*, *Rabiea albinota*, *Chasmatophyllum musculinum*, and cf *Microloma armatum*, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 3). It should be noted that the position of WTG 17 has shifted approximately 100 m to the south. However, it is unlikely that the species composition is different to the original turbine position assessed.

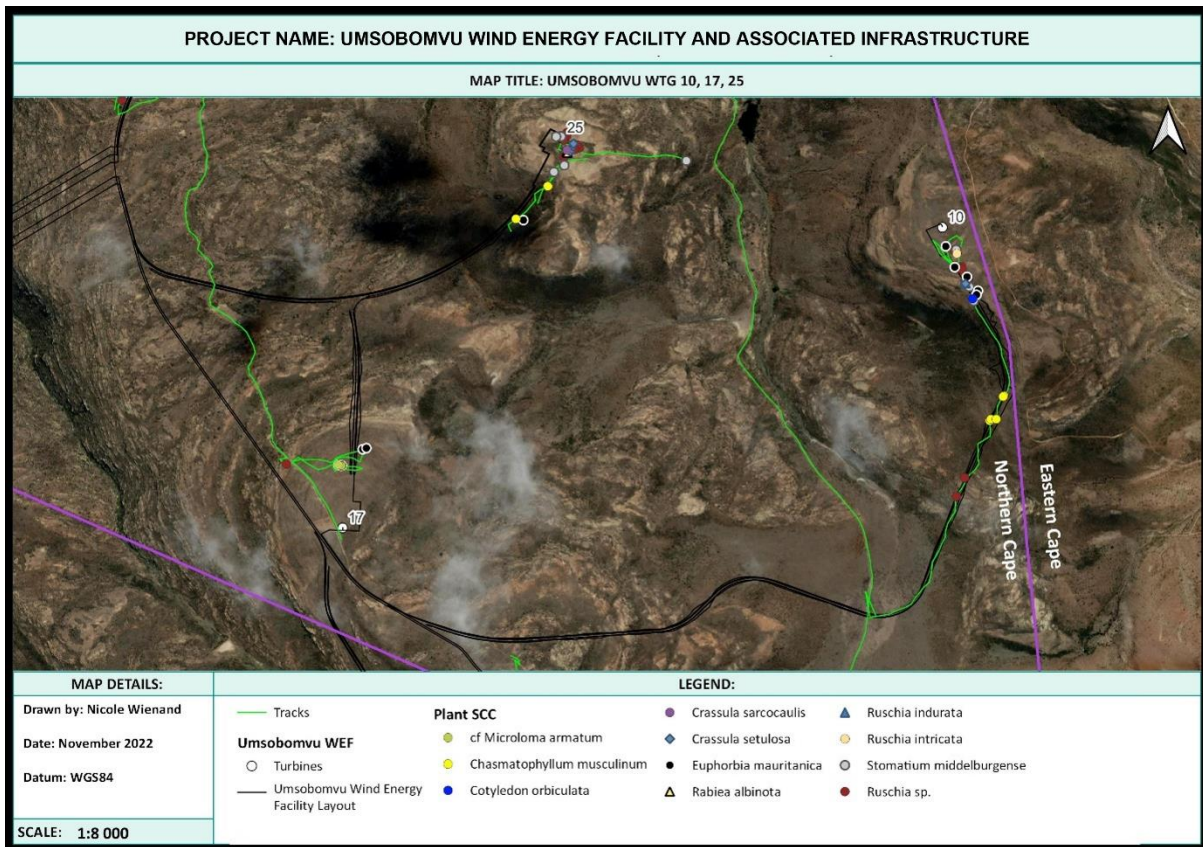


Figure 3: SCC identified and tagged within the development footprint of the Umsobomvu WTG 10, 17 and 25.

Table 5 below lists the SCC that were identified within the footprint for the Umsobomvu WEF WTG 10, 17 and 25.

Table 5: SCC identified within the footprint for Umsobomvu WTG 10, 17 and 25.

| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|-----------------------------------|-------------------------|--|----------------------------------|
| WTG 10 | | | |
| <i>Chasmatophyllum musculinum</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |



| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|-----------------------------------|-------------------------|---|----------------------------------|
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia indurata</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia intricata</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Stomatium middelburgense</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Euphorbia mauritanica</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Cotyledon orbiculata</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Crassula setulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| WTG 17 | | | |
| <i>cf Microloma armatum</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Euphorbia mauritanica</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| WTG 25 | | | |
| <i>Chasmatophyllum musculinum</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Crassula setulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Crassula sarcocaulis</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Stomatium middelburgense</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Rabiea albinota</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Euphorbia mauritanica</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |



Recommendations

- A permit must be obtained from the Northern Cape DAEARDL prior to the damage, destruction or removal of any of the other SCC identified at the site.
- To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs (see Figure 10 below). Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.
- SCC which are known to survive translocation must be translocated to the nearest similar habitat.



WTG 14, 16 and 22

WTG 14, 16 and 22 all fall within the Eastern Cape Province. Only one (1) SCC was recorded within the overall footprint of the Umsobomvu WTG 14 and 16 in terms of the PNCO (Act No. 19 OF 1974), cf *Microlooma armatum* which is classified as Least Concern according to the SANBI Red List of South African Plants (Figure 4). It should be noted that the position of WTG 22 has shifted since the micro-siting investigation and therefore has not been directly assessed. However, it is unlikely that the species composition would differ significantly to WTG 14 and 16.

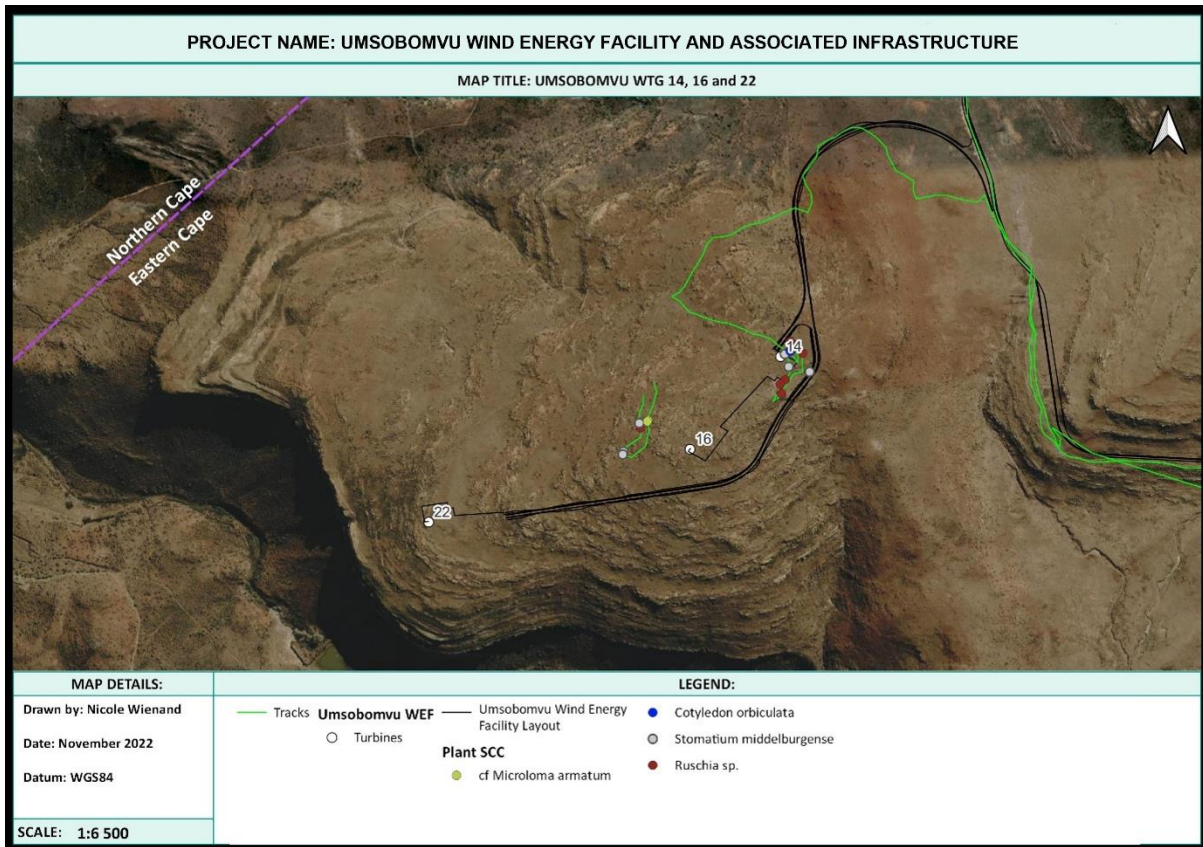


Figure 4: SCC identified and tagged within the development footprint of the Umsobomvu WTG 14, 16 and 22.

Table 6 below lists the SCC that were identified within the footprint for the Umsobomvu WEF WTG 14 and 16.

Table 6: SCC identified within the footprint for Umsobomvu WTG 14 and 16.

| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|---------------------------------|-------------------------|---|----------------------------------|
| WTG 14 | | | |
| <i>Ruschia sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Stomatium middelburgense</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| WTG 16 | | | |



| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|---------------------------------|-------------------------|---|----------------------------------|
| <i>cf Microloma armatum</i> | LC | Schedule 4 of the EC PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Ruschia sp.</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |
| <i>Stomatium middelburgense</i> | LC | Schedule 4 of the PNCO (Act No. 19 OF 1974) | DEDEAT |

Recommendations

- A permit must be obtained from the Eastern Cape DEDEAT prior to the damage, destruction or removal of any of the other SCC identified at the site.
- To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs (see Figure 10 below). Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.
- SCC which are known to survive translocation must be translocated to the nearest similar habitat.



WTG 24

WTG 24 falls within the Northern Cape Province. Four (4) SCC were recorded within the overall footprint of the Umsobomvu WTG 24 in terms of the NC NCA (Act No. 9 of 2009), including *Chasmatophyllum musculinum*, *Ruschia sp.*, *Stomatium middelburgense*, and *Cotyledon orbiculata*, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 5).

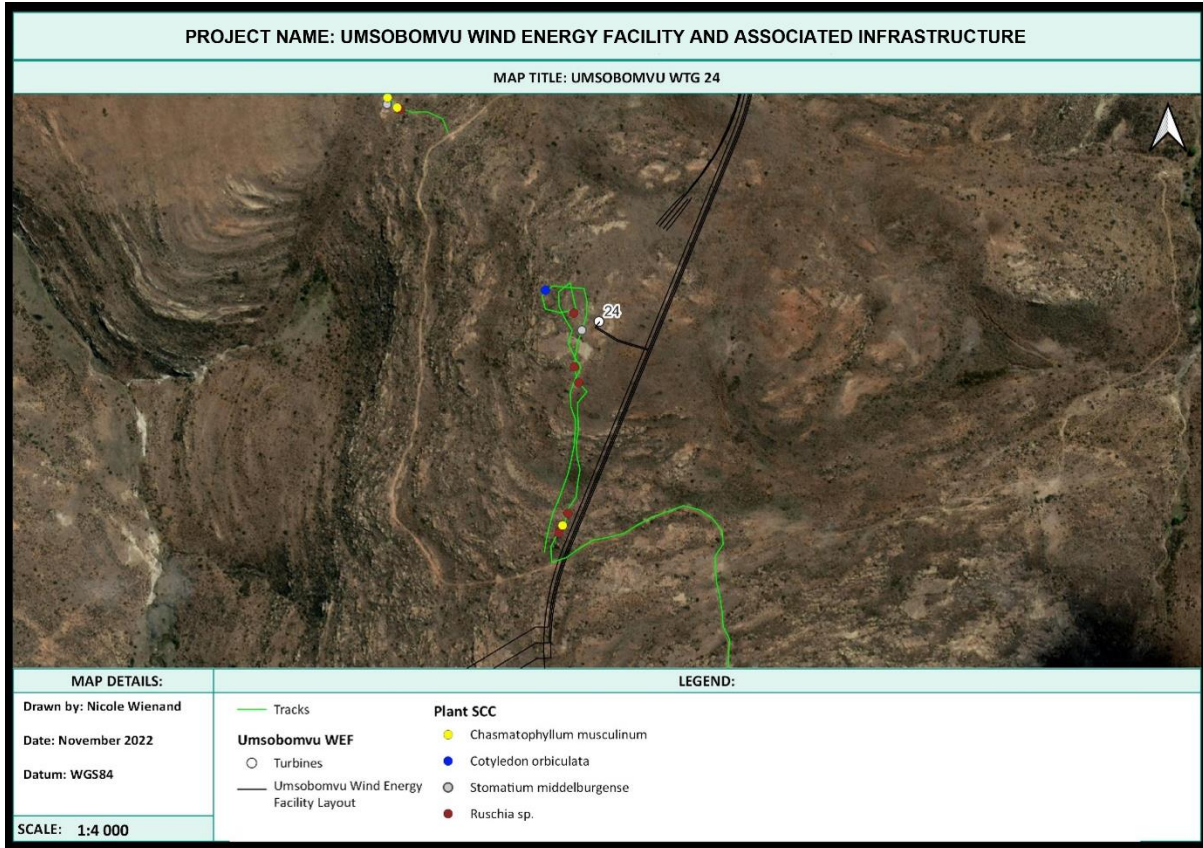


Figure 5: SCC identified and tagged within the development footprint of the Umsobomvu WTG 24.

Table 7 below lists the SCC that were identified within the footprint for the Umsobomvu WEF WTG 24.

Table 7: SCC identified within the footprint for Umsobomvu WTG 24.

| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|-----------------------------------|-------------------------|---|----------------------------------|
| WTG 24 | | | |
| <i>Chasmatophyllum musculinum</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |



| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|---------------------------------|-------------------------|---|----------------------------------|
| <i>Stomatium middelburgense</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Cotyledon orbiculata</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |

Recommendations

- A permit must be obtained from the Northern Cape DAEARDL prior to the damage, destruction or removal of any of the other SCC identified at the site.
- To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.
- SCC which are known to survive translocation must be translocated to the nearest similar habitat.



WTG 06 and 18

WTG 06 and 18 fall within the Northern Cape Province. Four (4) SCC were recorded within the overall footprint of the Umsobomvu WTG 06 and 18 in terms of the NC NCA (Act No. 9 of 2009), including *Euphorbia mauritanica*, *Ruschia sp.*, *Stomatium middelburgense* and *Aloe broomii*, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 6). It should be noted that the position of WTG 18 has shifted approximately 65 m to the north. However, it is unlikely that the species composition is different to the original turbine position assessed.

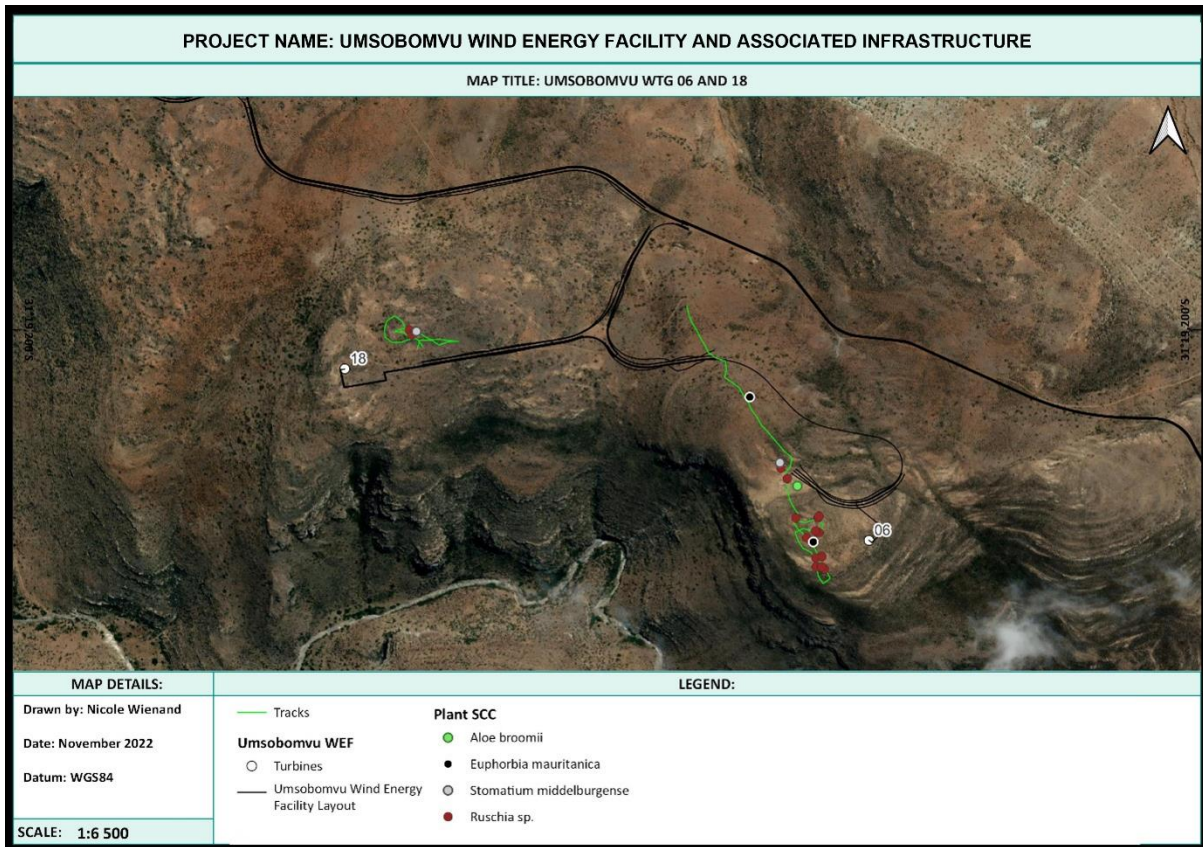


Figure 6: SCC identified and tagged within the development footprint of the Umsobomvu WTG 06 and 18.

Table 8 below lists the SCC that were identified within the footprint for the Umsobomvu WEF WTG 06 and 18.

Table 8: SCC identified within the footprint for Umsobomvu WTG 06 and 18.

| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|---------------------------------|-------------------------|---|----------------------------------|
| WTG 06 | | | |
| <i>Euphorbia mauritanica</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Stomatium middelburgense</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |



| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|---------------------------------|-------------------------|---|----------------------------------|
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Aloe broomii</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| WTG 18 | | | |
| <i>Stomatium middelburgense</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |

Recommendations

- A permit must be obtained from the Northern Cape DAEARDL prior to the damage, destruction or removal of any of the other SCC identified at the site.
- To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.
- SCC which are known to survive translocation must be translocated to the nearest similar habitat.



WTG 09 and 21

WTG 09 and 21 fall within the Northern Cape Province. Five (5) SCC were recorded within the overall footprint of the Umsobomvu WTG 09 and 21 in terms of the NC NCA (Act No. 9 of 2009), including cf *Microloma armatum*, *Ruschia intricata*, *Ruschia sp.*, *Stomatium middelburgense*, and *Crassula setulosa*, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 7). It should be noted that the position of WTG 21 has shifted less than 60 m to the west. However, it is unlikely that the species composition is different to the original turbine position assessed.

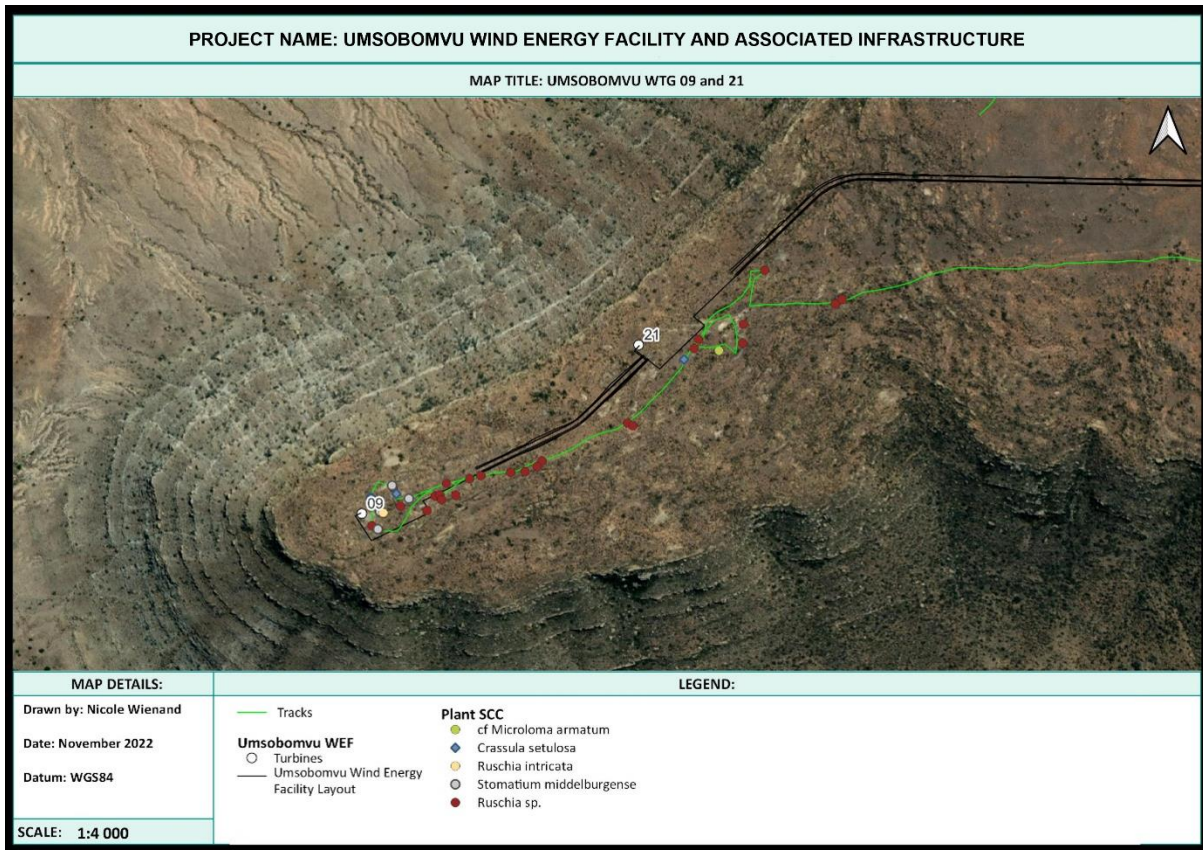


Figure 7: SCC identified and tagged within the development footprint of the Umsobomvu WTG 09 and 21.

Table 9 below lists the SCC that were identified within the footprint for the Umsobomvu WEF WTG 09 and 21.

Table 9: SCC identified within the footprint for Umsobomvu WTG 09 and 21.

| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|--------------------------|-------------------------|---|----------------------------------|
| WTG 09 | | | |
| <i>Crassula setulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |



| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|---------------------------------|-------------------------|---|----------------------------------|
| <i>Ruschia intricata</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Stomatium middelburgense</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| WTG 21 | | | |
| <i>Microlooma armatum</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Crassula setulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |

Recommendations

- A permit must be obtained from the Northern Cape DAEARDL prior to the damage, destruction or removal of any of the other SCC identified at the site.
- To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.
- SCC which are known to survive translocation must be translocated to the nearest similar habitat.



WTG 13, 20 and 23

WTG 13, 20 and 23 fall within the Northern Cape Province. Nine (9) SCC were recorded within the overall footprint of the Umsobomvu WTG 13, 20 and 23 in terms of the NC NCA (Act No. 9 of 2009), including *Euphorbia mauritanica*, *Ruschia intricata*, *Ruschia sp.*, *Stomatium middelburgense*, *Delosperma sp.*, *Chasmatophyllum musculinum*, *Cotyledon orbiculata*, *Crassula setulosa*, and *Brunsvigia radulosa*, all of which are classified as Least Concern according to the SANBI Red List of South African Plants (Figure 8). It should be noted that the positions of WTG 13 and 20 have shifted slightly. However, it is unlikely that the species composition is different to the original turbine positions assessed.

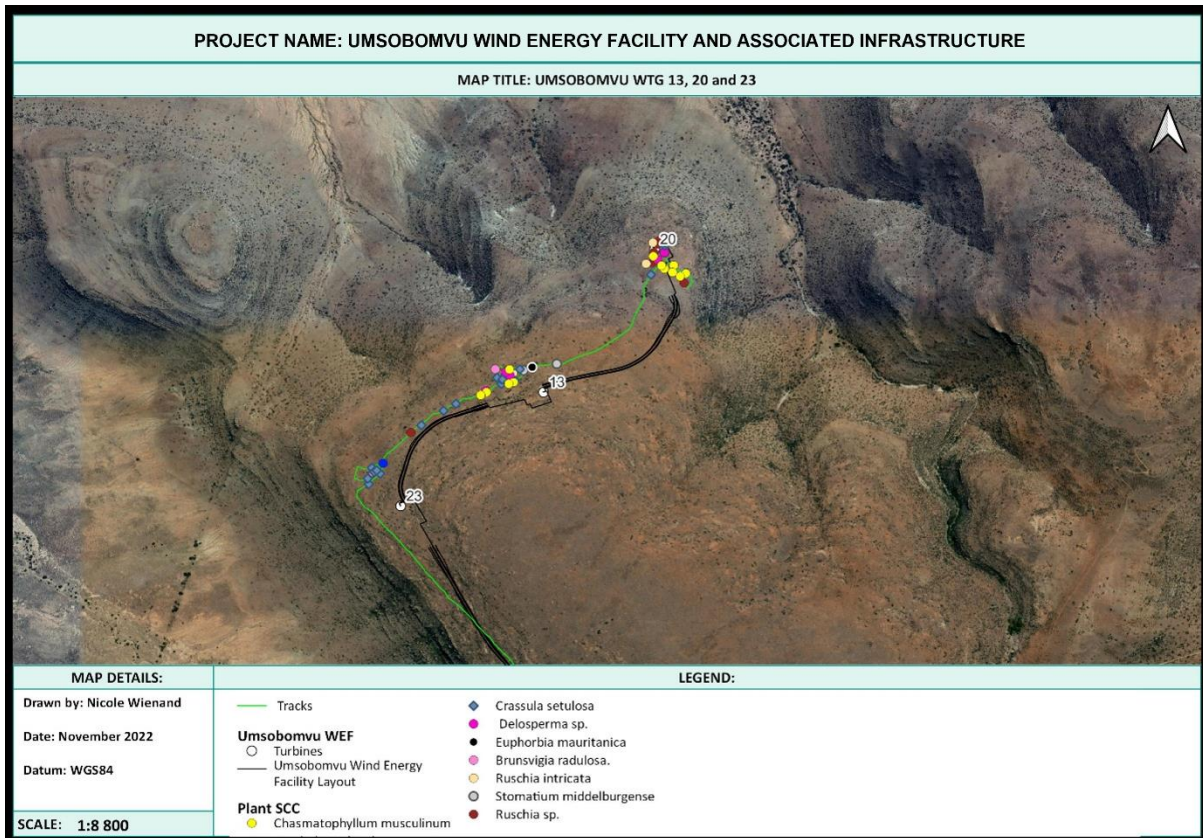


Figure 8: SCC identified and tagged within the development footprint of the Umsobomvu WTG 13, 20 and 23.

Table 10 below lists the SCC that were identified within the footprint for the Umsobomvu WEF WTG 13, 20 and 23.

Table 10: SCC identified within the footprint for Umsobomvu WTG 13, 20 and 23.

| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|--------------------------|-------------------------|---|----------------------------------|
| WTG 13 | | | |
| <i>Delosperma sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia intricata</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |



| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|-----------------------------------|-------------------------|---|----------------------------------|
| <i>Stomatium middelburgense</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Crassula setulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Brunsvigia radulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Euphorbia mauritanica</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Chasmatophyllum musculinum</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| WTG 20 | | | |
| <i>Chasmatophyllum musculinum</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia intricata</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Stomatium middelburgense</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Delosperma sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Crassula setulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| WTG 23 | | | |
| <i>Brunsvigia radulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Cotyledon orbiculata</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Crassula setulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |

Recommendations

- A permit must be obtained from the Northern Cape DAEARDL prior to the damage,



- destruction or removal of any of the other SCC identified at the site.
- To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.
 - SCC which are known to survive translocation must be translocated to the nearest similar habitat.



WTG 11 & 15

WTG 11 and 15 fall within the Northern Cape Province and could not be accessed due to large troops of baboons on site. However, considerable effort was made to get as close to WTG 15 as possible, in order to draw conclusions regarding the potential SCC likely to occur on site. Six (6) SCC were recorded within and near to the 400 kV MTS in terms of the NC NCA (Act No. 9 of 2009), including *Brunsvigia radulosa*, *Stomatium middelburgense*, *Ruschia sp.*, *Ruschia intricata*, *Aloe broomii*, and *Crassula setulosa* classified as Least Concern (Figure 9). It is presumed that these species would occur within the footprints of WTG 11 and 15.

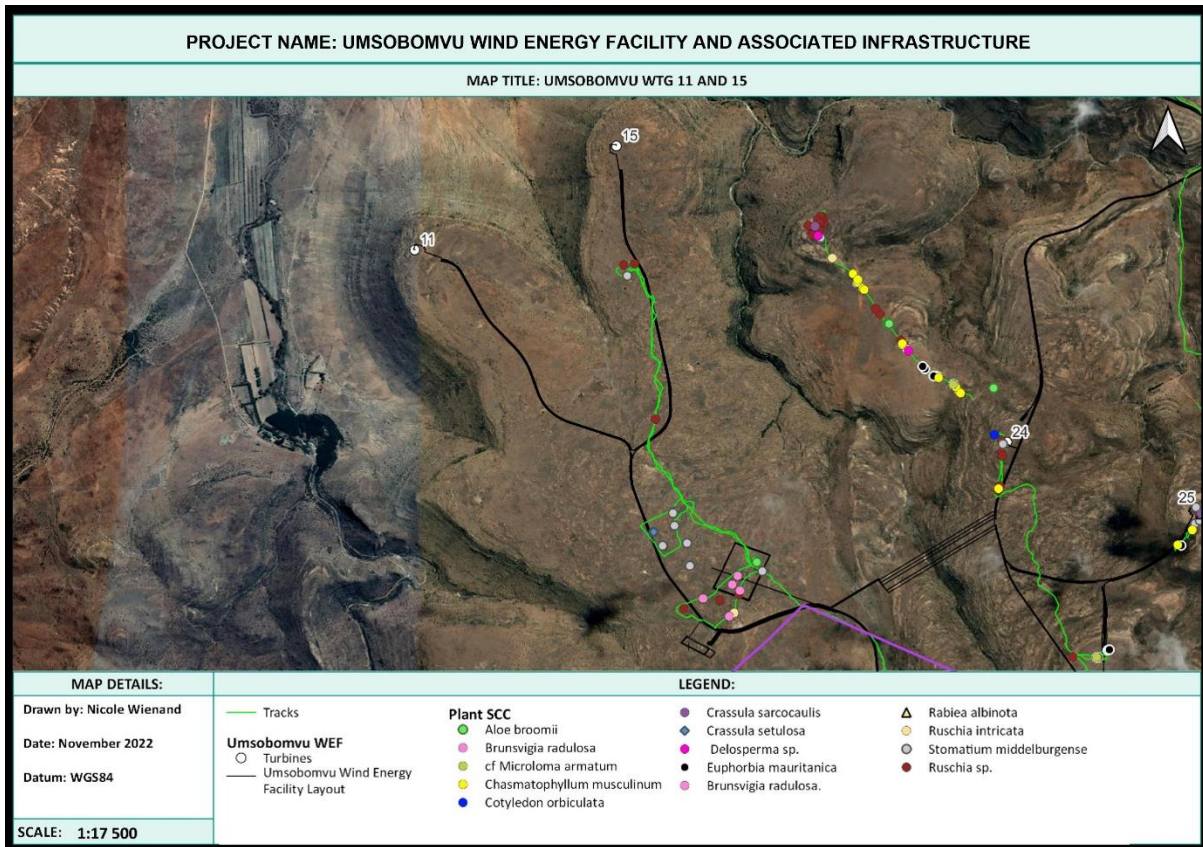


Figure 9: SCC identified and tagged within the development footprint of the Umsobomvu WTG 11 and 15.

Table 11 below lists the SCC that were identified within the footprint for the Umsobomvu WEF 400 kV MTS, and therefore WTG 11 & 15.

Table 11: SCC identified within the footprint for the 400 kV MTS, and therefore WTG 11 & 15.

| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|-------------------------------------|-------------------------|---|----------------------------------|
| 400 kV MTS (WTG 11 & 15) | | | |
| <i>Aloe broomii</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia sp.</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |



| Species | SANBI Red List Category | Protected Under | Authority for Permit Application |
|---------------------------------|-------------------------|---|----------------------------------|
| <i>Stomatium middelburgense</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Ruschia intricata</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Brunsvigia radulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |
| <i>Crassula setulosa</i> | LC | Schedule 2 of NC NCA (Act No. 9 of 2009) | DAEARDL |

Recommendations

- A permit must be obtained from the Northern Cape DAEARDL prior to the damage, destruction or removal of any of the other SCC identified at the site.
- To account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species.
- SCC which are known to survive translocation must be translocated to the nearest similar habitat.



7. CONCLUSIONS AND RECOMMENDATIONS

A total of thirty-five (35) floral SCC were recorded during the micro-siting investigation for the proposed Umsobomvu WEF and associated infrastructure, all of which are classified as Least Concern. The SCC identified were common and widespread throughout the project area. However, it should be noted that due to the timeframes associated with the development of this project, the micro-siting investigation for the Umsobomvu WEF and associated infrastructure was undertaken in September (Spring) and not within the optimal survey periods for the Grassland and Nama-Karoo Biomes respectively (SANBI, 2020). The lack of morphological features (including fruit or flowers) made identifying potential SCC (as well as confirming the identification of the SCC recorded) difficult. However, most species were identified to species level and most species identifications were confirmed on iNaturalist. Additionally, the project area has been affected by a prolonged drought which has left the grassland extremely dry. As a result, a number of species may be dormant. However, it should be noted that a number of Ecological Impact Assessments have been undertaken over the years (within different seasons) for the proposed Umsobomvu WEF, during which only one (1) threatened SCC was identified, namely *Gibbaeum petrense* (Vulnerable). However, this is likely a misidentification as *G. petrense* has only ever been recorded in less than 10 locations on the northern slopes of Langeberg within the Western Cape Province (Extent of Occurrence of <math><10\text{ km}^2</math>). Its habitat includes white quartz patches overlaying clay slopes on shale ridges (Vlok and Raimondo, 2006) which does not occur within the study area. As such, based on the absence of threatened SCC a follow-up micro-siting survey within the optimum survey period for the Grassland Biome was not deemed necessary.

However, following the precautionary approach, to account for potential SCC which may have gone undetected during the micro-siting investigation, it is recommended that a Search and Rescue Operation is conducted during the peak survey period for the respective biomes (see Figure 10 below) in which the project occurs. Should additional SCC be identified during the Search and Rescue operation which were not accounted for during this micro-siting investigation, separate permits must be obtained prior to the damage, destruction, removal or translocation of these species. SCC which are known to survive translocation must be translocated to the nearest similar habitat.

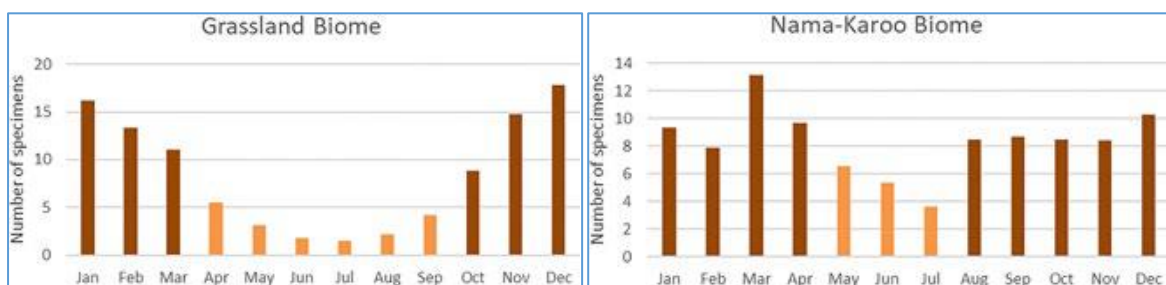


Figure 10: Plant collection month summary for the Grassland and Nama-Karoo Biome to indicate optimal survey periods (source: Species Environmental Assessment Guideline, SANBI, 2020).



8. REFERENCES

- Burgoyne, P.M. 2006. *Ruschia intricata* (N.E.Br.) H.E.K.Hartmann & Stüber. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/12.
- Burgoyne, P.M. 2006. *Psilocaulon coriarium* (Burch. ex N.E.Br.) N.E.Br. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/15.
- Burgoyne, P.M. 2006. *Ruschia intricata* (N.E.Br.) H.E.K.Hartmann & Stüber. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.
- Burgoyne, P.M. 2006. *Stomatium middelburgense* L.Bolus. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.
- CES. 2018. Umsobomvu I Wind Energy Facility: Ecological Report.
- Cholo, F. & Foden, W. 2006. *Moraea huttonii* (Baker) Oberm. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.
- Clark, V.R. & Raimondo, D. 2019. *Delosperma lootsbergense* Lavis. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.
- Foden, W. & Potter, L. 2005. *Xysmalobium gomphocarpoides* (E.Mey.) D.Dietr. var. *gomphocarpoides*. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.
- Foden, W. & Potter, L. 2005. *Manulea plurirosulata* Hilliard. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.
- Foden, W. & Potter, L. 2009. *Crassula umbellata* Thunb. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.
- Foden, W. & Potter, L. 2005. *Jamesbrittenia filicaulis* (Benth.) Hilliard. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.
- Kamundi, D.A. & Victor, J.E. 2006. *Galenia subcarnosa* Adamson. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.
- Mucina, L., Rutherford, MC., Plamer, AR., Milton, SJ., Scott, L., Lloyd, W., van der Merwe, B., Hoare, DB., Bezuidenhout, H., Vlok, JHJ., Euston-Brown, DIW., Powrie, LW., Dold, AP. 2006. Nama-Karoo Biome. *Strelitzia* **19**, p325-347.
- Mucina, L., Hoare, DB., Lotter, MC., du Preez, J., Rutherford, MC., Scott-Shaw, CR., Bredenkamp, GJ., Powrie, LW., Scott, L., Camp, SK., Cilliers, SS., Bezuidenhout, H., Mostert, TH., Siebert, SJ., Winter, PJD., Burrows, JE., Dobson, L., Ward, RA., Stalmans, M., Oliver, EGH., Siebert, F., Schmidt, E., Kobisi, K., Kose, L. 2006. Grassland Biome. *Strelitzia* **19**, 379.
- SANBI Red List of South African Plants. Available at: <http://redlist.sanbi.org/species.php?species=2206-25>.



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

SANBI. 2021. Red List of Terrestrial Ecosystems of South Africa – Assessment details per ecosystem type. Version: 20210823.

Skowno, AL., Raimondo, DC., Poole, CJ., Fizotti, B (eds) (2019). National Biodiversity Assessment 2018 Technical report Volume 1: Terrestrial realm. South African National Biodiversity Institute, Pretoria.

Skowno AL, Matlala M, Slingsby J, Kirkwood D, Raimondo DC, von Staden L, Holness SD, Lotter M, Pence G, Daniels F, Driver A, Desmet PG, Dayaram A (2019). Terrestrial ecosystem threat status assessment 2018 - comparison with 2011 assessment for provincial agencies. National Biodiversity Assessment 2018 Technical Report. South African National Biodiversity Institute, Pretoria.

Snijman, D.A. & Victor, J.E. 2004. *Haemanthus humilis* Jacq. subsp. *humilis*. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/15.

van der Colff, D. 2015. *Crassula setulosa* Harv. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.

Victor, J.E. 2004. *Harveya pumila* Schltr. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.

Victor, J.E. & Dold, A.P. 2009. *Huernia piersii* N.E.Br. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.

Victor, J.E. 2009. *Tridentea virescens* (N.E.Br.) L.C.Leach. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.

Vlok, J.H. & Raimondo, D. 2006. *Gibbaeum petrense* (N.E.Br.) Tischer. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2022/11/11.

von Staden, L. 2012. *Gomphocarpus fruticosus* (L.) Aiton f. subsp. *decepiens* (N.E.Br.) Goyder & Nicholas. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.

von Staden, L. 2018. *Aloe broomii* Schönland var. *broomii*. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/26.

Williamson, G. & Potter, L. 2005. *Anacampseros ustulata* E.Mey. ex Fenzl. National Assessment: Red List of South African Plants version 2020.1. Accessed on 2021/10/15.