KLIPFONTEIN SOLAR PV FACILITY PLANT RESCUE AND PROTECTION PLAN

Klipfontein Solar PV Facility

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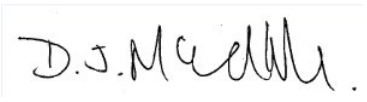

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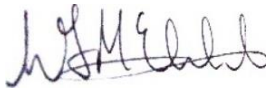

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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
DFFE	Department of Environment, Forestry & Fisheries
EA	Environmental Authorization
ECO	Environmental Control Officer
EMPr	Environmental Management Programme
FSBCP	Free State Biodiversity Conservation Plan
NEMBA	National Environmental Management: Biodiversity Act (Act No.10 of 2004)
NFA	National Forestry Act
MAP	Mean Annual Precipitation
ToPS	Threatened or Protected Species
VVSG	Vaal Vet Sandy Grassland
WFSCG	Western Free State Clay Grassland

Klipfontein Solar PV Facility Plant Rescue and Protection Plan

1. INTRODUCTION

This Plant Rescue and Protection Management Plan has been prepared on behalf of Klipfontein Solar PV PTY LTD for the authorised Klipfontein commercial photo-voltaic (PV) solar power generation facility near Dealesville in the western Free State Province (authorised by way of reference number: 14/12/16/3/3/2/722, as amended).

The proposed development site is situated at the transition zone between Vaal Vet Sandy Grassland (VVSG) and Western Free State Clay Grassland (WFSCG), part of the Dry Highveld Grassland complex of grassland vegetation types (SANBI, 2022). In contrast to the mesic primary grasslands, Dry Highveld Grasslands have fewer geophytic forb species (SANBI, 2013; Mucina and Rutherford, 2006). There is considerable local variation, however, and these species are nevertheless important components of the plant community.

Geophytes are the usual targets of rescue and translocation or protection initiatives. The objective of this document is to mitigate the risks associated with the permanent removal or damage of plant Threatened of Protected Species (ToPS). As per Section 56 of NEMBA, this applies to:

a) Critically Endangered Species: any indigenous species facing an extreme high risk of extinction in the wild in the immediate future.
b) Endangered Species: indigenous species facing a high risk of extinction in the wild in the near future, although not considered Critically Endangered.
c) Vulnerable Species: indigenous species facing a high risk of extinction in the wild in the medium-term future, although not considered Critically Endangered or Endangered.
d) Protected Species: any species of high conservation value or national importance or requiring regulation in order to ensure that the species are managed in an ecologically sustainable manner.

In accordance with the Environmental Authorisation (EA), a Plant Rescue Plan should be compiled for inclusion in the EMPr. The purpose of the Plant Rescue Plan is to provide practical guidance on the search and rescue of plant ToPS, together with any other plants that can be used to add value to the rehabilitation process. The objective is to identify and remove or relocate relevant plant species (particularly protected species) to areas where they will be able to persist in the local landscape. This is a legal requirement in terms of the Free State Nature Conservation Ordinance No.8 or 1969, Chapter IV, which states that species of indigenous plants protected under Schedule 6 may not be removed except under the authority of a permit issued by the relevant authorities.

The specialist terrestrial ecological study for the Environmental Impact Assessment (EIA) process was undertaken by S. Todd and A. Skownow (2014), and this is considered to be the primary resource for the plant species identified within the study site. Their specialist report provides a list of plant species that have been recorded within the broader Dealesville landscape, according to the SANBI SIBIS database**.

*** http://biodiversityadvisor.sanbi.org/online-biodiversity-data/sabif-3/sibis/*

The Threatened and Protected Species regulations provide for the regulation of activities which may directly or indirectly impact threatened and protected species. Such species are identified under NEMBA; as well as Schedule 1 of the Free State Nature Conservation Act (2008). The Department of Environment, Forestry & Fisheries (DFFE) also regularly publishes an updated list of nationally protected tree species. A further resource used was the Free State Province Biodiversity Plan (Collins, 2016), which lists the plant species of arguably the greatest conservation significance. Species listed under the National Red Data List of Plants as well as those protected under the provincial legislation and by DFFE must be specified on permit applications required for site clearing.

A site visit was undertaken in January 2022. A number of zig-zagging transects, totalling 12,3 km, were walked across the site polygons, and the species that would be candidates for translocation counted and logged. The width of survey was approximately 6m, allowing the number of plants encountered to be placed into a spatial context. This number was then extrapolated to the area of the entire study site.

2. ASSUMPTIONS AND LIMITATIONS

- The broader landscape in which the study site occurs is fairly heterogenous, consisting of flat primary grassland, rocky dolerite ridges and outcrops, clay and sandy soils, wetlands and salt pans and their ecotones. The areas earmarked for development are situated within the grasslands, with ridges, wetlands and salt pans excluded. The ToPS were therefore limited to those found within primary grassland habitat.
- The final layouts for the development and its infrastructure were not available at the time of the site visit. The proposed development footprint occupies one half of the 363ha of the proposed development site. The plant rescue survey was therefore not as precise as it would have been had the development footprint been available at the time of the site visit.
- The field trip incorporated undertaking plant searches for six project sites, amounting to some 4500 ha of grassland. It was not possible to undertake an exhaustive, co-ordinated search for threatened or protected species within the time and budget available. The transects walked are intended to be a representative sample of the grasslands within the site, with the number of target plants determined by extrapolation.
- Many of the protected plants, such as the *Helichrysum* species and the *Euphorbia* species are low-growing and inconspicuous. The survey took place during late summer when the grass sward was tall. The season had also been one of above average rainfall, resulting in unusually tall, dense sward cover. Under these conditions it is difficult to reliably locate these species.
- *Nerine laticoma* flowers in October. When not flowering it is inconspicuous and difficult to locate, particularly within a dense sward.

3. IDENTIFICATION OF SPECIES OF CONSERVATION CONCERN

Table 3.1 shows the ToPS species that could potentially be found in the Klipfontein project area because they have historically been recorded within the landscape. **It should be noted that none of these species are included in the NEMBA list**. Only *P. oppositifolia* is included in the FSBCP (Collins, 2016). The species are included in the provincial Free State Schedule 1 protected species list (2008), although they are all considered to be Least Concern at a national level (Red List of South African Plants, SANBI 2004). They have been provided provincial protection due to:

- Their potential to be harvested for economic purposes due to their aromatic or ethnobotanical properties and potential (*Helichrysum* spp, *Euphorbia* spp).
- Their potential for wild populations to be harvested for the commercial horticultural trade (bulbs- *Ammocharis* spp. and *Nerine* spp.).
- The encroachment of the periphery of their distribution into the Free State. They may be abundant across their core distribution, but scarce on the fringes within the Free State (some *Euphorbia* spp). The mandate of the Free State nature conservation authorities is to maintain all native species occurring within the province. Hence provincial protection for a species that is common across its range, but rare in the province.
- The assessment and conclusions that they are range restricted and the number of mature plants in the wild population is less than 10 000 plants (*Pentzia oppositifolia*). There is evidence that this species has been under-surveyed, with a high probability of more sites and a higher population occurring.

Olea europa subs. africana is a protected tree species under the National Forestry Act (NFA). It occurs on rocky slopes and outcrops, several localised areas of which occur within the Klipfontein project area. There is a moderately low probability that single *O. europa* trees may occur within grasslands on the edge of these rocky areas extending to within the proposed development footprint.

Table 3.1 ToPS plant species potentially found within the proposed Klipfontein development site.

	Species on site	Habitat	Probability of Occurrence Within Site
1	*Nerine laticoma*	Deep red sandy soils. Dormant during winter, dies back. Flowers in summer.	High.
2	*Helichrysum dregeanum*	Dry, sandy or stony grassland, in dwarf shrub communities.	High.
3	*Helichrysum pentzioides*	Rocky outcrops and along drainage lines.	Moderate
4	*Helichrysum caespititium*	Bare or sparsely grassed areas within grasslands and savannas.	High.
5	*Helichrysum lucilioides*	Rocky , stony hills and karroid plains.	Moderately low.
6	*Euphorbia arida*	Sheltered under shrubs in karroid shrublands.	Moderately Low
7	*Euphorbia rectirama (E. spartaria)*	Dry rangelands.	Moderate
8	*Euphorbia inaequilatera var. inaequilatera*	Open patches in grassland, often on seasonally wet ground.	Moderate
9	*Pentzia oppositifolia*	Overgrazed areas on red sandy clay soil.	High
10	*Ammocharis coranica*	Open patches in grassland.	High
11	*Olea europa*	On rocky slopes and outcrops.	Moderate

Should any *Olea Europa subs. africana* individuals be found within the proposed development footprint, a permit from the DFFE will be required.

4. CONSERVATION PRINCIPLES FOR SPECIES OF CONSERVATION CONCERN

4.1 PRINCIPLES

- The actual footprint of the development should be surveyed in detail by a botanist prior to the commencement of clearing operations. All ToPS should be clearly marked and the translocation team should follow closely behind the botanist to transplant any marked plants to previously identified translocation sites. The botanist should also be involved in selecting and verifying the translocation sites.
- Areas with substantial populations of plants with high conservation significance or plants protected by national or provincial regulations should be avoided. Where protection cannot be achieved by avoidance, succulent and bulb plants should be salvaged and translocated to adjacent habitat.
- Translocation of herbaceous perennials and woody plants mostly has a low success rate. It is possible, however, if the entire rhizosphere (the volume of soil surrounding the plant roots which is under the influence of the root) is transplanted with the plant (**Figure 4.1**). This not only protects the roots but maintains important key relationships between soil microbe populations (bacterial and mycorrhizal) and the roots necessary for plant survival.

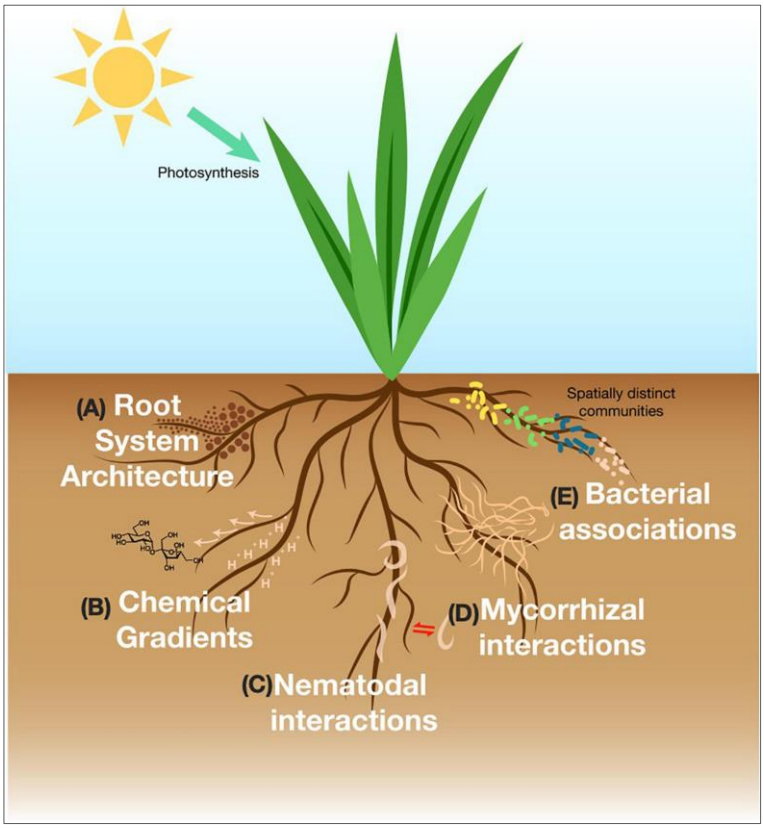

Figure 4.1: Rhizosphere of the root, indicating the intact microbial and chemical relationships between the soil and the plant (Yee *et al,* 2021). These need to be maintained through the transplant operation.

- Protected herbaceous plant species should be re-established from seed during the post-construction re-vegetation and rehabilitation phase. An option for woody species is to replace them with nursery-grown plants where post-planting care is feasible.

- Plant translocation should take place in areas that are accessible to hand-irrigation, particularly where rainfall is erratic and unpredictable.
- Translocation sites should preferably be degraded and in need of restoration. Intact, undisturbed vegetation communities should be avoided to prevent the introduction of physical disturbance and disruption to prevailing ecological processes. This also avoids interference with natural species distribution patterns and populations caused by intra- and interspecific competition.
- Rescue plants, if re-planted back in the wild, should be placed as close as possible to where they were originally removed.
- Translocation should take place after heavy rain (or irrigation) when the soil has been wet to a depth of 20-30 cm because the plants are easier to dig out with roots intact, and less water will be required after planting.
- A suitable site for translocation should be identified prior to the plant's removal. The translocation site should be in the same soil type, depth, aspect and micro-habitat as the donor site. This should be undertaken by an experienced botanist.
- A permit should be issued by the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA).

4.2 GENERIC GUIDELINES TO IMPROVE TRANSPLANTING SUCCESS

- Training is essential. The manager of the translocation work should be familiar with the types of plants that can be translocated, and the method of translocation. The procedure should be demonstrated to the work team before the translocation work starts, and subsequent work should be closely monitored by supervisors.
- Leaf and stem succulents should be dug out saving as much of the roots as possible. The roots are the most important parts of the plant for survival in a semi-arid system.
- Bulbs and corms bust be dug out complete with their roots. If the base of the bulb breaks off the plant will not survive.
- Do not shake soil off the roots. As much soil as possible should be kept as a protective insulation around the roots. More importantly, this keeps the soil microbial networks surrounding the roots intact, a key factor in the plants survival.
- Avoid damage to the stems and leaves of succulents.
- Avoid leaving the salvaged plants in the sun.
- Do not immerse the salvaged plants in buckets of water.
- Plants should be planted in a similar position and micro-habitat as the place from whence they were removed. For example, a plant growing in the shade of a shrub or rock should be translocated to a similar position and similar aspect in the shade of a similar shrub or rock.
- Do not bend or fold the roots when planting. Rather enlarge the planting hole to accommodate the entire rhizosphere.
- Ensure that the plant is planted to the right depth, and that the root mass is covered by soil.
- Bulbs and corms that were deeply buried must be equally deeply buried must be deeply planted, and only the green part of the leaves must show above ground.
- The soil must be pressed down around the plant to stabilise it in the soil. If rocks and pebbles are available pack these around the base of the plant to prevent soil erosion.
- Hand-water the plants well after transplanting to settle the soil and encourage root growth.

- Excavated succulents and bulbs can be stored in cool, dry conditions for up to two weeks.

4.3 POTENTIAL FOR RELOCATION OF PLANTS

Ammocharis coranica

- Bulbs that have been moved or disturbed usually take a long time, up to 2 years, to re-establish themselves.
- They transplant easily.
- Although slow-growing, they are relatively easy to cultivate and are available from commercial nurseries.
- They are hardy, and tolerant of a wide range of soil and climatic conditions. They are drought and heat tolerant and frost-hardy.
- They grow easily from seed but take up to 8 years to reach reproductive maturity. **This makes them good candidates for translocation**. The seeds germinate rapidly but lose viability quickly.

Pentzia oppositifolia

- As a woody species, the potential for successful rescue and translocation is poor.
- There are large populations of this species within the proposed development site. The shifting of the proposed development footprints to exclude these areas should maintain several metapopulations within the immediate landscape, provided the key ecological processes are maintained by management practices.
- The species appears to have specific habitat requirements that restrict its range. The soil requirements include: a high clay content within sandy loam soil texture (linked to occurrence of clumped termitaria near larger colonies); doleritic soils overlying calcrete, these mostly situated in the drainage systems feeding salt pans; a short grass sward. The species seems to thrive where the grass sward is short, such as where the site is overgrazed, or if the soil is shallow overlying hard rock or hard plinthite.
- The species is able to spread vegetatively. The *Pentzia* suite of species are an important part of the karroid bush component of the vegetation type. These are in dynamic competition with the grass component, able to spread and outcompete the grasses during dry cycles, and then being out-competed by grasses and retreating when wetter rainfall cycles return (SANBI, 2013). This implies that the species is able to reproduce easily from seed provided the soil and environmental conditions are suitable.
- The approach advocated is an integrated one, where the developer contributes to a local species management plan whereby several metapopulations within the district are secured and managed with the goal being the long-term persistence of the species in the local landscape.
- There is also the opportunity to test the extent to which it is possible to translocate mature individuals of this species. Several potential translocation sites should be identified by an experienced botanist. There are several areas of degraded grassland within and surrounding the proposed Klipfontein development area that may provide suitable translocations sites. A representative portion of the population may be earmarked for translocation and moved ensuring that the entire rhizosphere of the plants is translocated as well. These should be planted randomly and in clumps of various sizes, with the necessary husbandry available to give the plants every chance of success. All aspects of the translocation should be recorded, together with success and failure over the next 2 years.
- 15 *Ammocharis coranica* plants and an estimated several thousand *P. oppositifolia* plants were identified within the 7,3ha (12 300m x 6m) of the transects. Assuming that the areas of highest density

of these plants are excluded from the final development footprint, a permit for the translocation of 500 plants may be suitable for plants of this species that are found within the final development footprint.

5. PLANT RESCUE AND PROTECTION PLAN

A priority for replanting is to maintain the ecological integrity of the areas where the plants will be replanted. The aim would be to replant the rescued plants (i) within the same Klipfontein development site; (ii) preferably as close as possible to the site of removal; (iii) in the same habitat, although degraded, as the one the rescued plants were growing in; and (iv) in the same orientation as their original position. It is undesirable to replant the rescued plants in intact habitats where the ecological integrity is currently uncompromised, and preferable to locate habitat that has been disturbed or degraded. The plant rescue and protection plan should consist of the following steps:

5.1 PRE-CONSTRUCTION

1. *Mark footprint of proposed construction area prior to breaking ground.*

The development footprint should be marked out with hazard tape. It is assumed that vegetation removal will follow a phased approach and that not all areas will be marked simultaneously. Once the final development footprint has been decided, a detailed walkthrough should be undertaken by an experienced botanist. This should happen during the flowering season at the site, coinciding with spring and early summer and in accordance with the start of the rainy season. All plant ToPS should be clearly logged and marked. Appropriate translocation sites should also be identified by the botanist during this stage. The next phase would be the removal (rescue) of relevant plants from the development footprint. Once all plants needing rescue have been removed clearing may commence on the site.

2. *Establishment of nursery and permitting*

It may be necessary to erect a temporary nursery in close proximity to the construction area, and in non-sensitive areas such as existing abandoned borrow pits or old lands. Rescued plants should be housed within the temporary nursery and transplanted out into rehabilitated areas during the rehabilitation process. Water should be supplied by contractors. This is a contingency measure, but ideally the plants would be removed (together with the soil surrounding the roots) and transplanted directly into the already identified receiving site.

Permits to collect, relocate and propagate plant material and to collect seed or cuttings for the contract must be obtained from the relevant authorities. This should be a single permit application that covers all components of the project.

5.2 CONSTRUCTION

3. Plant rescue

For all plants that are rescued, relevant information should be collected, as determined by the ecologist, for reporting and monitoring purposes. The plants should be marked to indicate their orientation, this to ensure that this orientation is replicated when the plants are replanted.

Habitats that are currently disturbed/transformed and that are outside the development footprint are possible sites for rehabilitation where a positive biodiversity outcome can be locally achieved. Where rescued plants are to be stored, they should be planted into a suitably-sized bag together with their entire rhizosphere. They should be planted out within a maximum of a month from rescue.

The bulbs can either be planted into suitable donor sites in natural grassland or into rehabilitated areas. If planted into natural habitat, the plant must be protected from construction activities and monitored to ensure survival. Where appropriate, it may be possible to directly transplant individuals from areas about to be cleared backwards to areas that are already undergoing rehabilitation.

4. Control of impacts on adjacent areas

Any listed plants close to the development that will remain in place may not be defaced, disturbed, destroyed or removed. The ecologist must cordon off the extent of the disturbance area with hazard tape prior to commencement of development work. A qualified ECO should be appointed to monitor that vegetation clearing only happens once all search and rescue operations have been completed. The ECO must monitor construction activities to ensure that construction activities remain within the designated areas.

6. MONITORING PLAN

The following monitoring activities are recommended as part of the plant rescue plan:

- Post-relocation monitoring of plants relocated during search and rescue to evaluate whether the intervention was successful or not. Ideally this should be undertaken on a three-monthly basis over a period of two years in order to evaluate the success thereof.
- Provision of a detailed records, including photographs, that indicates the success of the plant rescue operation.
- A target of 50-80% survival rate of translocated plants is desirable, based on the probable survival rate of grassland species.

7. CONCLUDING REMARKS

- While 11 protected plant species may potentially be found on the site, because they have been recorded historically from the local landscape, one plant ToPS was identified during the original specialist fieldwork (in 2014) and two during the subsequent terrestrial ecological walkthrough survey (in 2022). These were *Ammocharis coranica* and *Pentzia oppositifolia*.
- The plant species in question are protected within the Free State province, and not at a national level.
- *P. oppositifolia* is protected because it has a restricted range, has a narrow set of habitat requirements, and is perceived to have a wild population of mature plants that is less than 10 000. Given the numbers of this plant in the area round Dealesville, it is likely that this plant has been substantially under-surveyed. A translocation programme is recommended, together with in situ protection of existing populations, to ensure the persistence of the species.
- The other species are protected either:
  - because they have intrinsic economic value. They are not rare or endangered, but their value creates the potential for rapid decline due to the exploitation of wild populations, or
  - their geographical range extends slightly into the Free State province. They are hence common within their core range but less common on their fringes.
- A focussed search and rescue operation to locate, identify and mark all ToPS plant species within the final development footprint is recommended. Once marked these may be translocated to suitable identified rehabilitation or translocation sites. This should be done by appropriately trained and qualified people and monitored by the ECO.
- When transplanting rangeland ToPS, the rhizosphere should also be removed and replanted with the plant. This is to ensure that existing microbial relations within the soil root zone are maintained.

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9. APPENDIX A: POTENTIAL TOPS PLANT SPECIES ASSOCIATED WITH THE DEVELOPMENT SITE

9.1 AMMOCHARIS CORANICA

Ammocharis coranica (**Figure 9.1**) is widespread and relatively common throughout the interior of South Africa. It is however, recognized as being threatened in the Free State (Todd and Skowno, 2015; Gotze, 2018), although it has been excluded from the Free State Biodiversity Management Plan, which provides detailed information on all other threatened plant species in the province (Collins, 2016). The document indicating that it is regionally protected dates back to the late 1960's (FSNCO, 1969). It is a member of the *Ammaryllis* family, and as such is protected. The plant occurs in gaps in the sward where it is able to spread its broad, fleshy leaves across the soil surface with minimal competition from grasses. They are often found in loose colonies where they are able to exploit localised bare patches that fulfil their habitat requirements. No *A. coranica* plants were located along the walked transect, although this does not preclude the likelihood of them being present. One can conclude, however, that their abundance is low.

Figure 9.11. *Ammocharis coranica*, showing bright red and pink flowers and flat, fleshy leaves usually colonising bare soil patches. Photograph credits: Sheila Gregory, Kew Botanical Gardens (left); Bernard Dupont (right).

9.2 PENTZIA OPPOSITIFOLIA

Pentzia oppositifolia (**Figure 9.2**) was split from the common and widespread *P. incana* in 2012 (Magee and Tilney, 2012). While it is not threatened with extinction, it is protected both nationally and regionally because:

- It has a restricted distribution, this being the western Free State and Northern Cape.
- It has specific habitat requirements, the strongest association being with shallow soils in the catchments of salt pans.
- Excluding this study, it has only been recorded at two other sites.
- Excluding this study, its population in the wild is estimated to be less than 10 000 mature individuals (Collins, 2016).

Figure 9.2. *Pentzia oppositifolia* showing fleshy, oppositely-arranged leaves (left) and growth form (right). Photographs: Doug McCulloch.

P. oppositifolia is an indicator of localised veld degradation from heavy utilization and is found in small groups to large colonies on exposed soils. *Pentzia* species can root where the branches touch the soil, leading to clonal spread (Esler, 1999). Overgrazing has caused a reduction in sward height and basal vigour, and this species has been able to colonise the gaps. They are strongly associated with shallow soils over dolerite or hard plinthite and multiple termite mounds. The species was not found in large numbers within the Klipfontein site, and the Vaal Vet Sandy Grassland is likely to be marginal habitat due to the deep soils and taller, more robust sward.

9.3 NERINE LATICOMA

Figure 9.3. *Nerine laticoma*, showing conspicuous flowers and sandy red, soil habitat. (Photo: Sheila Gregory, Kew Botanical Gardens).

Family: Amaryllidaceae
Status: LC – Provincially Protected
Habitat: deep red sandy soils. Dormant during winter when it dies back. Flowers in summer.

9.4 HELICHRYSUM DREGEANUM

Figure 9.4. *Helichrysum dregeanum* (Photos: SAplants (left); Jan-Hendrik Keet, iNaturalist (right)).

Family: Asteraceae
Status: LC – Provincially Protected
Habitat: Dry stony grassland. Readily becomes a weed along roadsides and in overgrazed places.

9.5 HELICHRYSUM PENTZIOIDES

Figure 9.5. *Helichrysum pentzioides* (Photos: Kevin Koen (left); Nick Helme (right).

Family: Asteraceae
Status: LC – Provincially Protected
Habitat: Rocky outcrops and along drainage lines.

9.6 HELICHRYSUM LUCILOIDES

Figure 9.6. *Helichrysum luciloides* (Photo: unknown, https://keys**.lucidcentral.org)**

Family: Asteraceae
Status: LC – Provincially Protected
Habitat: Rocky or stony hills and karroid plains. Widely distributed.

9.7 HELICHRYSUM CAESPITITIUM

Figure 9.7. *Helichrysum caespititium* (Photo: F. Lagarde)

Family: Asteraceae
Status: LC – Provincially Protected
Habitat: Forms large mats on bare or sparsely grassed areas, often on disturbed sites in grasslands and savannas. It is widespread, common and not in danger of extinction (SANBI Red List of South African Plants, 2016).

9.8 EUPHORBIA RECTIRAMA (OR E. SPARTARIA)

Figure 9.8. *Euphorbia spartaria* (Photos: S. Rugheimer)

Family: Euphorbiaceae
Status: LC – Provincially Protected
Habitat: arid grasslands.

9.9 EUPHORBIA ARIDA

Figure 9.9. *Euphorbia arida* (Photo: Frank Vincentz)

Family: Euphorbiaceae
Status: LC – Provincially Protected
Habitat: Sheltered under shrubs in karroid shrublands.

9.10EUPHORBIA INAEQUILATERA (VAR. INAEQUILATERA)

Figure 9.10. *Euphorbia inaequilatera var. inaequilatera* (Photos: B.Strohbach (left); and Roger and Alison Heath (right))

Family: Euphorbiaceae
Status: LC – Provincially Protected
Habitat: A weedy species in open patches in gravelly, sandy or clay soils, often on seasonally wet ground. Also found on roadsides and grazed areas. A weed of cultivation, and sides of irrigation channels.

9.11OLEA EUROPAEA SUBSP. AFRICANA

Figure 9.11. *Olea europa subs. africana* (Photos: Khumbula Indigenous Garden)

Family: Oleaceae
Status: Nationally protected under the National Forest Act.
Habitat: Within the context of the proposed development area, it is found on rocky hillsides. The development area contains areas of rocky habitat, and there isa moderate probability of individuals of this species occurring there. This warrants confirmation prior to construction.

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