

REVEGETATION AND REHABILITATION PLAN

1. PURPOSE

The purpose of the rehabilitation plan is to ensure that areas cleared or impacted during construction activities of the Majuba PV Solar Energy Facility are rehabilitated with a plant cover that reduces the risk of erosion from these areas as well as restores some ecosystem function. The purpose of the rehabilitation plan for the site can be summarised as follows:

- » Achieve long-term stabilisation of all disturbed areas to minimise erosion potential.
- » Re-vegetate all disturbed areas with suitable local plant species.
- » Minimise visual impact of disturbed areas.
- » Ensure that disturbed areas are safe for future uses.

This Revegetation and Rehabilitation Plan should be closely aligned with other site-specific plans, including the Erosion Management Plan, Soil Management Plan, Alien Plant Management Plan, and Plant Rescue and Protection Plan. Prior to commencement of construction, a detailed Rehabilitation Plan and Method Statement for the site should be compiled with the aid of a Rehabilitation Specialist.

2. RELEVANT ASPECTS OF THE SITE

The selected property falls within the original extent of the Amersfoort Highveld Clay Grassland (Unit Gm13) as defined by Mucina and Rutherford (2006), undulating plains with small scattered patches of dolerite outcrops. The vegetation in its natural state consists of a short closed grass cover, largely dominated by a dense *Themeda triandra* layer, with a relatively high diversity of grasses, herbs and geophytes (Mucina and Rutherford 2006). Many of the herbs resprout every year from below-ground storage tubers, usually early in the growing season before the grasses reach their full cover. Other common grasses include *Andropogon appendiculatus*, *Brachiaria serrata*, *Digitaria monodactyla*, *Eragrostis* species, *Elionurus muticus*, *Harpochloa falx*, *Heteropogon contortus* and *Setaria* species. The diversity of grasses and herbs is very high (Mucina and Rutherford 2006). Common patches of tall shrubs usually contain *Diospyros austro-africana*, *Diospyros lycioides* and a variety of lower shrubs, including *Anthospermum rigidum*, *Helichrysum melanacme*, *Chaetacanthus costatus* and *Gnidia* species.

Mucina and Rutherford (2006) regard this vegetation type as Vulnerable. Although it is not currently listed under NEMA:BA, none is currently protected, with some 25% already permanently transformed. Australian Black Wattle has

already invaded many outcrop- and stream areas, while overgrazing has led to an invasion of *Seriphium plumosum* (Mucina and Rutherford 2006).

A total of 954 indigenous plant species have been recorded in the Majuba area according to the SANBI database. Of these species recorded in the wider area, only 88 indigenous plant species in total could be identified, which is relatively low for grasslands. According to the SANBI-POSA species list, over 80 alien invasive plant species have been recorded up to date within the grid representative of Majuba. 20 of these species could be confirmed on the study site already (excluding exotic trees planted on the periphery of the study area).

Three vegetation associations could be identified:

- » Association 1: *Themeda triandra* – *Helichrysum pilosellum* Grasslands
 - Sensitivity: Medium
- » Association 2: Semi-natural Grasslands
 - Sensitivity: Low
- » Association 3: *Eucalyptus* – *Pennisetum clandestinum* Depression
 - Sensitivity: Medium

3. REHABILITATION METHODS

- » Immediately after replacing topsoils in disturbed areas, the soil surface must be revegetated with a suitable plant cover.
- » It is expected that soil seed banks of indigenous vegetation will be present to initiate initial vegetation cover. However, simply applying this topsoil to a well prepared rehabilitation site does not result in the same species richness and diversity as the surrounding areas. In some areas the natural regeneration of the vegetation may be poor and the application relevant of seed to enhance vegetation recovery may be required.
- » Where possible, seed should be collected from plants present at the site during plant rescue operations. Indigenous seeds may also be harvested for purposes of re-vegetation in areas that are free of alien or invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- » Seed collection should be undertaken by a suitably qualified specialist who is familiar with the various seed types associated with the plant species and rehabilitation in the area.
- » Seed collection may be done throughout the year as seed ripens, but can also be restricted to summer, when a large amount of the perennial seed should have ripened. The collection of unripe seeds will reduce the percentage germination thereby reducing the effectiveness of the rehabilitation efforts.

Seeds should be stored in paper or canvas bags dusted with insecticide, and sown at the onset of the rainy season.

- » Seed can be sown onto the soil, but should preferably be applied in conjunction with measures to improve seedling survival such as scarification of the soil surface or simultaneous application of mulch. Additional organic material may be added to the soil mix, if required, to assist with water retention during the early stages of seedling establishment.
- » It should be ensured that the seed mix is as diverse as possible in the first season. After the first season, when pioneer plant communities have successfully established, attempts should be made to re-sow and replant the area with more perennial and woody species. It is a process that will require several follow-ups.
- » Planting is dependent on species involved. Planting of species recommended for rehabilitation should be carried out as far as is practicable to coincide with the onset of the first significant rains. In general however, planting should commence as soon as possible after construction is completed in order to minimise the potential for erosion.
- » The final vegetation cover should resemble the original (non-encroached and indigenous) vegetation composition and structure as far as practicably possible.
- » Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed.
- » Once revegetated, areas should be protected to prevent trampling and erosion.
- » No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been vegetated.
- » Where rehabilitation sites are located within actively grazed areas, they should be fenced, this must be undertaken in consultation with the landowner.
- » Fencing should be removed once a sound vegetative cover has been achieved.
- » Any runnels, erosion channels or wash aways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.

4. MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the Environmental Officer (EO) and EPC Contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the Proponent will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle

and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that should be monitored:

- » Composition and density of replanted vegetation, distinguishing between species introduced for initial revegetation only and species that are part of the pre-determined desirable end state.
- » Associated nature and stability of surface soils
- » Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately.

The initial revegetation period post construction is estimated to be over a period of 6 months (minimum) to 12 months (maximum), or a time period specified by the rehabilitation specialist, particularly if planting of trees and shrubs occurs. The rehabilitation phase (including post seeding maintenance) should be at least 12 months (depending on time of seeding and rainfall) to ensure establishment of an acceptable plant cover is achieved (excluding invasive plant species or weeds).

As rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

- » Re-vegetated areas should be monitored every 4 months for the first 12 months following construction.
- » Re-vegetated areas showing inadequate surface coverage (less than 20% within 12 months after re-vegetation) should be prepared and re-vegetated;
- » Any areas showing erosion, should be re-contoured and seeded with indigenous grasses or other locally occurring species which grow quickly.

If the plants have not established and the acceptable plant cover is not achieved within the specified maintenance period, maintenance of these areas shall continue until an acceptable plant cover is achieved (excluding alien plant species or weeds). Additional seeding or planting may be necessary to achieve acceptable plant cover. Hand seeding may have to be considered as an option in this case.

Monitoring of rehabilitation success and follow-up adaptive management, together with clearing of emerging alien plant species should continue for as long as considered necessary.