

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 Hopefield Small Wind Farm 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 site is considered to be part of the Southwest Fynbos bioregion and forms part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and is the only one largely confined to a single country (the Succulent Karoo component extends into southern Namibia). It is also by far the smallest floristic region, occupying only 0.2% of the world's land surface, and supporting about 11500 plant species, over half of all the plant species in South Africa (on 12% of the land area). At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments.

The study area lies right at the eastern edge of what is generally known as the Sandveld, on the western edge of the Swartland. The Sandveld and the adjacent parts of the Cederberg were identified by Raimondo *et al* (2009) and the C.A.P.E. (Cape Action for People and the Environment) project as an area under heavy transformation pressure, primarily from agriculture, and the latter consequently

initiated (via CapeNature) a Fine Scale Vegetation Mapping and Conservation Planning project (FSP) in order to identify key conservation priorities in the region. The vegetation mapping component of this project was completed in 2007 (Helme 2007), and the conservation planning component in 2008 (Pence 2008). The FSP has identified key conservation areas that are needed to meet species, habitat connectivity and process targets in the Sandveld – these are known as Critical Biodiversity Areas (CBAs). However, the Saldanha Municipality Critical Biodiversity Area (CBA) map actually ends literally hundreds of metres west of the study area, and is thus not relevant to the current study.

The SA vegetation map (Mucina & Rutherford 2006) shows that Hopefield Sand Fynbos and Swartland Silcrete Renosterveld would originally have been present in the study area. The Saldanha Fine Scale Vegetation Map (Helme & Koopman 2007) shows a similar pattern, although with the addition of Swartland Shale Renosterveld and a further Sand Fynbos type (Bergrivier Sand Fynbos). There is however no evidence of Renosterveld anywhere in the study area, all Renosterveld having been ploughed up for cereal cultivation. Thus all remaining natural vegetation in the study area may be considered to be Hopefield Sand Fynbos.

3. Recommended plant species to use for rehabilitation

Only local indigenous species should be used for rehabilitation of disturbed areas of natural vegetation. Because many of the species in the area are not commercially available it would be better to suggest that whomever is responsible for the rehabilitation should approach the ecologist with a list of potential species that they can source, in order to check that they are suitable for the site. Suitable species that are likely to be available include *Arctotis stoechadifolia*, *Senecio arenarius*, *Othonna coronopifolia*, *Metalsia densa*, *Salvia lanceolata*, *Salvia africana-lutea* and *Hermannia pinnata*.

4. 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 ways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.

5. 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) of the 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 46 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.