

# REVEGETATION AND REHABILITATION PLAN

---

## 1. PURPOSE

The purpose of the Revegetation and Rehabilitation Plan is to ensure that areas cleared or impacted during construction activities within the development footprint for Geelstert 1, and that are not required for operation, are rehabilitated to their original state before the operation phase commences, and that the risk of erosion from these areas is reduced. The purpose of the Rehabilitation Plan for the site can be summarised as follows:

- » Achieve long-term stabilisation of all disturbed areas.
- » Re-vegetate all disturbed areas with suitable local plant species.
- » Minimise visual impact of disturbed areas.
- » Ensure that disturbed areas are rehabilitated to a condition similar to that found prior to disturbance.

This Revegetation and Rehabilitation Plan must be read in conjunction with other site-specific plans, including the Erosion Management Plan, Soil Management Plan, Alien Invasive Management Plan and Plant Rescue and Protection Plan. Prior to the commencement of construction, a detailed Revegetation and Rehabilitation Plan and Method Statement for the site must be compiled with the aid of a suitably qualified and professionally registered specialist (with a botanical or equivalent qualification).

## 2. RELEVANT ASPECTS OF THE SITE

The vegetation of the development area consists of an arid, open grassland on shallow soils. There is gradient evident across the site, with shallow, more gravelly soils present in the north towards the base of the Gamsberg along the Loop 10 Road, which give way to somewhat deeper more sandy soils as one moves towards the Koa River Palaeovalley south of the development footprint. The Koa River Palaeovalley itself consists of an extensive dune system as well as broad plains with deep red soils, classified as Bushmanland Sandy Grassland.

The vegetation associated with the development area for Geelstert 1 is homogenous and consists of *Stipagrostis* grasslands with occasional areas of more shrubby vegetation. The diversity of the vegetation is low, and while rainfall temporarily increases the abundance of forbs and annuals, diversity is never very high. Dominant and typical species include grasses such as *Stipagrostis ciliata*, *S.obtusa*, *S.anomala*, *Aristida adscensionis* and *Enneapogon scaber*, and low woody shrubs such as *Hermannia spinosa*, *Lycium cinereum*, *Salsola rabieana*, *Asparagus capensis*, *Galenia africana*, *Tetragonia arbuscula*, *Melolobium candicans*, *Eriocephalus spinescens*, *Zygophyllum retrofractum*, *Pteronia glomerata*, *Rhigozum trichotomum* and *Aptosimum spinescens* as well as forbs such as *Zygophyllum simplex*, *Tribulis zeyheri*, *Leysera tenella*, *Galenia sarcophylla*, *Hypertelis salsoloides*, *Sesamum capense*, *Cucumis myriocarpus*, *Gazania lichtensteinii*, *Augea capensis* and *Mesembryanthemum crystalinum*. The abundance of listed or protected species within the development area is low and apart from a low density of *Hoodia gordonii*, no other significant species were observed.

### 3. REHABILITATION METHODS AND PRACTISES

The following general management practices should be encouraged or strived for:

- » Clearing of invaded areas must be conducted as per the Alien Management Plan, included in the EMPr.
- » No harvesting of vegetation may be undertaken outside the area to be disturbed by construction activities.
- » Indigenous plant material must be kept separate from alien material.
- » Indigenous seeds may be harvested for purposes of revegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- » Topsoil must be reserved wherever possible on site, to be utilised during rehabilitation.
- » Sods used for revegetation must be obtained directly from the site, but not from the sensitive areas. Sods must contain at least a 50mm topsoil layer and be minimally disturbed, in particular to existing root systems. Sods must ideally be obtained from areas as close as possible to the region that is to be rehabilitated.
- » Water used for the irrigation of re-vegetated areas must be free of chlorine and other pollutants that might have a detrimental effect on the plants.
- » All seeded, planted or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals.
- » On steep slopes and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed.
- » In areas where soil saver is used, it must be pegged down to ensure that it captures soil and organic matter flowing over the surface.
- » The final rehabilitated area must resemble the current composition and structure of the soil as far as practicably possible.
- » Progressive rehabilitation is an important element of the rehabilitation strategy and must be implemented where feasible.
- » No construction equipment, vehicles or unauthorised personnel must be allowed onto areas that have been rehabilitated.
- » Where rehabilitation sites are located within actively grazed areas, they must be fenced off, this must be undertaken in consultation with the landowner.
- » Any runnels, erosion channels or wash-aways developing after revegetation must be backfilled and consolidated and the areas restored to a proper stable condition.
- » Re-vegetated areas must be monitored frequently and prepared and revegetation from scratch should inadequate signs of surface coverage or growth be evident after two growth seasons. Adequate recovery must be assessed by a qualified botanist or rehabilitation specialist.
- » The stockpiled vegetation from the clearing operations must be reduced to mulch where possible and retained along with topsoil to encourage seedbank regrowth and soil fertility.
- » Mulches must be collected in such a manner as to restrict the loss of seed.
- » Mulch must be stored for as short a period as possible.
- » Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
- » Where herbicides are used to clear vegetation, species-specific chemicals must be applied to individual plants only. General spraying must be strictly prohibited, and only the correct herbicide type must be applied.

- » Once rehabilitated, areas must be protected to prevent trampling and erosion.
- » Fencing must be removed once a sound vegetative cover has been achieved.

#### **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 Developer 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 must be monitored:

- » Associated nature and stability of surface soils.
- » Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately, as per the alien management plan and mitigation measures contained within the EMPr.

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

- » Rehabilitation areas must be monitored every 4 months for the first 12 months following construction, or as per the recommendations of specialist.
- » Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
- » Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the timeframe between construction activities and rehabilitation must be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control and rehabilitation strategy.
- » Any areas showing erosion, must be adaptively managed with particular erosion control measures, depending on the situation.

If the current state of the environment prior to construction (which will be disturbed during the construction phase) is not achieved post impact, within the specified rehabilitation period, maintenance of these areas must continue until an acceptable state is achieved (excluding alien plant species or weeds). Additional rehabilitation methods may be necessary to achieve the current state before construction commences.

Monitoring of the rehabilitation success, as well as follow-up adaptive management, combined with the clearing of emerging alien plant species must all continue for as long as is considered necessary, depending on regrowth rates.