ALIEN INVASIVE & OPEN SPACE MANAGEMENT PLAN

1. PURPOSE

Invasive alien species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Invasive and Open Space Management Plan is to provide a framework for the management of alien and invasive plant species and the integrated management of the natural and semi-natural areas within the development area during the construction and operation and operation of the Komsberg East Wind Energy Facility. The broad objectives of the plan includes the following:

- Ensure alien plants do not become dominant in parts or throughout the whole site in project areas through the control and management of alien and invasive species presence, dispersal and encroachment.
- Managing and maintaining the ecosystem in a near-natural state and restoring and/or rehabilitating the ecosystems to such a state.
- Develop and implement a monitoring and eradication programme for alien and invasive species.
- Promote the natural re-establishment and planting of indigenous species in order to prevent erosion and alien plant invasion.

2. LEGISLATIVE CONTEXT

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared aliens must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. In terms of this Act, 198 alien species were listed as declared weeds and invaders and ascribed to one of the following categories:

- Category 1: Prohibited and must be controlled.
- Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
- Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

3. RELEVANT ASPECTS OF THE SITE

3.1 Problem Outline

Alien plants replace indigenous vegetation leading to severe loss of biodiversity and change in landscape function. Potential consequences include loss of biodiversity, loss of grazing resources, increased fire risk, increased erosion, loss of wetland function, impacts on drainage lines, increased water use etc.

In addition, the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA), as amended in 2001, requires that land users clear *Declared Weeds* from their properties and prevent the spread of

Declared Invader Plants on their properties. This is also a requirement in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), which provides an updated national list of alien and invasive species.

Table 3 of CARA lists all declared weeds and invader plants. Alien plants are divided into 3 categories based on their risk as an invader.

» Category 1 - These plants must be removed and controlled by all land users. They may no longer be planted or propagated and all trade in these species is prohibited.

» Category 2 – These plants pose a threat to the environment but nevertheless have commercial value. These species are only allowed to occur in demarcated areas and a land user must obtain a water use licence as these plants consume large quantities of water.

» Category 3 – These plants have the potential of becoming invasive but are considered to have ornamental value. Existing plants do not have to be removed but no new plantings may occur, and the plants may not be sold.

The following guide is a useful starting point for the identification of alien species: Bromilow, C. 2010. *Problem Plants and Alien Weeds of South Africa*. Briza, Pretoria.

2.1.1 Vulnerable Ecosystems and Habitats

Certain habitats and environments are more vulnerable to alien plant invasion and are likely to bear the brunt of alien plant invasion problems at the site. In addition, construction activities and changes in water distribution at the site following construction are also likely to increase and alter the vulnerability of the site to alien plant invasion.

Areas at the site which are likely to require specific attention include the following:

» Wetlands, drainage lines and other mesic areas;
» Cleared and disturbed areas such as road verges, crane pads and construction footprints etc.; and
» Construction camps and lay-down areas which are cleared or are active for an extended period.

2.1.2 Wetlands, drainage lines and other mesic areas

There are a relatively large number of drainage lines at the site as well as a smaller number of artificial wetlands. Disturbance within these areas can often result in alien plant invasion on account of the greater water and nutrient availability in this habitat. Although there are no turbines within such areas, numerous road crossings will be required. The disturbance footprint within such areas should be minimized and these areas should be checked for alien species more than the surrounding landscape.

2.1.3 Cleared and disturbed areas

Cleared and disturbed areas are clearly vulnerable to invasion on account of the lack of existing plant cover to resist invasion as well as the disturbance created during construction which promoted the germination and establishment of alien plant species.

2.1.4 Construction camps and laydown areas

Construction camps and lay down areas are either cleared of vegetation or prolonged activities in these areas result in negative impact on indigenous vegetation. In addition, repeated vehicle and human activity

in these areas usually results in the import of alien plant seed on clothes, dirty vehicles or with construction machinery and materials

2.2 General Clearing and Guidance Principles

Alien control programs are long-term management projects and should include a clearing plan which includes follow up actions for rehabilitation of the cleared area. Alien problems at the site should be identified during pre-construction surveys of the development footprint. This may occur simultaneously to other required reaches and surveys. The clearing plan should then form part of the pre-construction reporting requirements for the site.

The plan should include a map showing the alien density & indicating dominant alien species in each area.

Lighter infested areas should be cleared first to prevent the build-up of seed banks.

Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently.

Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of aliens are easily dispersed across boundaries by wind or water courses.

All clearing actions should be monitored and documented to keep track of which areas are due for follow-up clearing.

2.3 Clearing Methods

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both.

However, care should be taken that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum. Fire is not a natural phenomenon in the area and fire should not be used for alien control or vegetation management at the site.

The best-practice clearing method for each species identified should be used. The preferred clearing methods for most alien species can be obtained from the DWAF Working for Water Website. http://www.dwaf.gov.za/wfw/Control/.

2.4 Use of Herbicide for Alien Control

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien invasion and may also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

» Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.

» All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.

» Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable site.

» To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.

» Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.

» The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.

For all herbicide applications, the following guidelines should be followed:

Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.

2.5 Alien Plant Management Plan

2.5.1 Construction Phase Activities

The following management actions are aimed at reducing soil disturbance during the construction phase of the development, as well as reducing the likelihood that alien species will be brought onto site or otherwise encouraged.

Construction Phase Action	Frequency
The ECO is to provide permission prior to any vegetation being cleared for development.	As required
Clearing of vegetation should be undertaken as the work front progresses – mass clearing should not occur unless the cleared areas are to be surfaced or prepared immediately afterwards.	Weekly
Where cleared areas will be exposed for some time, these areas should be protected with packed brush, or appropriately battered with fascine work. Alternatively, jute (Soil Saver) may be pegged over the soil to stabilise it.	Weekly
Cleared areas that have become invaded can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Residual herbicides should not be used.	Weekly
Although organic matter is frequently used to encourage regrowth of vegetation on cleared areas, no foreign material for this purpose should be brought onto site. Brush from cleared areas should be used as much as possible. The use of manure or other soil amendments is likely to encourage invasion.	Weekly
Clearing of vegetation is not allowed within 32 m of any wetland, 80 m of any wooded area, within 1:100 year floodlines, in conservation servitude areas or on slopes steeper than 1:3, unless permission is granted by the ECO for specifically allowing construction activities in these areas or as per the permits obtained to do so.	Weekly
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment.) Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.	Weekly
Alien vegetation regrowth on areas disturbed by construction must be controlled throughout the entire site during the construction period.	Monthly
The alien plant removal and control method guidelines should adhere to best-practice for the species involved. Such information can be obtained from the DWAF Working for Water website.	Monthly

Clearing activities must be contained within the affected zones and may not spill over into demarcated No Go areas.	Daily
Pesticides may not be used. Herbicides may be used to control listed alien weeds and invaders only	Monthly
Wetlands and other sensitive areas should remain demarcated with appropriate fencing or hazard tape. These areas are no-go areas (this must be explained to all workers) that must be excluded from all development activities.	Daily

2.5.1.1 Monitoring Actions - Construction Phase

The following monitoring actions should be implemented during the construction phase of the development.

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien species	Pre-construction
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluation of control success rate	Decline in documented alien abundance over time	Biannually

2.5.2 Operational Phase Activities

The following management actions are aimed at reducing the abundance of alien species within the site and maintaining non-invaded areas clear of aliens.

Operational Phase Action	Frequency
Surveys for alien species should be conducted regularly. Every 6 months for the first two years after construction and annually thereafter. All aliens identified should be cleared.	Every 6 months for 2 years and annually thereafter
Where areas of natural vegetation have been disturbed by construction activities, revegetation with indigenous, locally occurring species should take place where the natural vegetation is slow to recover or where repeated invasion has taken place following disturbance.	Annually for first two years or as needed (but revegetation should take place at the start of the rainy season).
Areas of natural vegetation that need to be maintained or managed to reduce plant height or biomass, should be controlled using methods that leave the soil protected, such as using a weed-eater to mow above the soil level.	When necessary
No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally occurring species should be used.	When necessary

2.5.2.1 Monitoring Actions - Operational Phase

The following monitoring actions should be implemented during the construction phase of the development.

Monitoring Action	Indicator	Timeframe

Document alien species distribution and abundance over time at the site	Alien plant distribution map	Every 6 months for 2 years and annually thereafter
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site	Every 6 months for 2 years and annually thereafter
Document rehabilitation measures implemented and success achieved in problem areas	Decline in vulnerable bare areas over time	Every 6 months for 2 years and annually thereafter

2.5.3 Decommissioning Phase Activities

The following management actions are aimed at preventing the invasion, by alien plant species, of the re-vegetated areas created during the decommissioning phase. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to operation.

Decommissioning Phase Action	Frequency
All damaged areas shall be rehabilitated if the infrastructure is removed and the facility is decommissioned	Once off
All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction.	Once off, with annual follow up re-vegetation where required
Maintain alien plant monitoring and removal programme for 3 years after rehabilitation.	Every six months for three years.

2.5.3.1 Monitoring Actions - Decommissioning Phase

The following monitoring and evaluation actions should take place during the decommissioning phase of the development.

Monitoring Action	Indicator	Timeframe
Monitor newly disturbed areas where infrastructure has been removed to detect and quantify any aliens that may become established for 3 years after decommissioning and rehabilitation	Alien plant surveys and distribution map	Biannually (every 6 months) until such time as the natural vegetation has recovered sufficiently to resist invasion.
Monitor re-vegetated areas to detect and quantify any aliens that may become established for 3 years after decommissioning and rehabilitation	Alien plant surveys and distribution map	Biannually for 3 years
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien	Annually for 3 years

	distribution and cover over time at the site	

4 SPACE MANAGEMENT PLAN

The objective of open space management is to restore, enhance and rehabilitate open spaces, improve climate change adaptations through the minimisation of biodiversity loss, and mitigate against environmental degradation. Management actions consider open spaces and natural areas as well as community perceptions of these.

In the context of the proposed WEF, the primary purpose of the open plan management plan is to:

» Minimise visual impact on the character of the area; and
» Maintain biodiversity within the area to ensure that no long-term negative impacts occur on the local environment.

The proposed WEF has the potential to impact negatively on the character of the area, as identified in the Visual Impact Assessment conducted during the EIA phase. The following actions must be implemented to minimise this visual impact:

» Substation to be sited in unobtrusive lower-lying areas, away from roads and habitations, and screened by berms and/or tree-planting where feasible if recommended by the visual specialist.
» Operations and maintenance buildings and parking areas to be located in an unobtrusive area and consolidated to avoid sprawl of buildings in the open landscape.
» Access roads to be in sympathy with the contours, and kept as narrow as possible.
» Access and haul roads to use existing farm tracks as far as possible.
» Construction camp, stockpiles and lay-down area to be located out of sight of district roads, possibly in the vicinity of the proposed substation and O&M buildings.
» Disturbed areas rather than pristine or intact land to preferably be used for the construction camp. Construction camp and laydown areas to be limited in area to only that which is essential.
» Measures to control wastes and litter to be included in the contract specification documents.
» Provision to be made for rehabilitation/ re-vegetation of areas damaged by construction activities.

In order to maintain biodiversity the Alien Invasive, Plant Rescue and Protection and Re-vegetation and Habitat Management Plans must be adhered to.

In addition the following actions should implemented by the Contractor and Project Company:

» Promote environmental awareness in all employees and sub-contractors and create an understanding of the environmental sensitivities of the project site;
» No waste, including organic matter may be disposed of anywhere on site, except in provided bins placed at convenient locations, especially during the construction period. Disciplinary actions should be taken against littering;
» Open spaces are to be kept free of alien plants and weeds;
» Indigenous plants may not be collected or removed from the site;
» Access to the facility should be strictly controlled;
» All visitors and contractors should be required to sign-in; and
» Signage at the entrance should indicate that disturbance to fauna and flora is strictly prohibited.

The following activities should not be permitted by anyone except the landowner or his representatives:

- No fires within the site;
- No hunting, collecting or disturbance of fauna and flora, except where required for the safe operation of the facility and only by the Environmental Officer on duty and with the appropriate permits and landowner permission;
- No driving off of demarcated roads; and
- No interfering with livestock.

4.1 Grazing Management

The development of the wind energy facility will not prevent the site from being used for its current landuse of low-density extensive livestock production. Extensive livestock grazing is compatible with biodiversity maintenance provided that it is implemented according to the basic principles of sustainable grazing management.