

ALIEN ERADICATION PLAN FOR ALIEN INVASIVE SPECIES

Invaders and weed species are plants that invade natural or semi-natural habitats; especially areas disturbed by humans and are commonly known as environmental weeds. Weeds that invade severely disturbed areas are known as ruderal and agrestal weeds. Most of these weeds are annuals colonising waste sites and cultivated fields. These weeds only persist on recently disturbed areas and seldom invade established areas.

As per the Ecological Report, the study site was relatively free of declared invader and weed species except for the occasional occurrence of annual and ruderal species such as *Bidens bipinnata* and *Tagetes minuta*. *Achyranthes aspera* was the only declared weed observed from the mixed woodland units while the invader *Nicotiana glauca* was observed from the old landfill site (**Table 1**).

Table 1: A list of Exotic plant species observed on the study site.

Scientific Name	Vernacular Name	Family	Growth Form
<i>Achyranthes aspera</i> *	Burrweed	Amaranthaceae	Perennial Herb
<i>Bidens bipinnata</i> *	Spanish Blackjack	Asteraceae	Annual Herb
<i>Flaveria bidentis</i> *		Asteraceae	Annual Herb
<i>Nicotiana glauca</i> *	Wild Tobacco	Solanaceae	Shrub
<i>Tagetes minuta</i> *	Khaki Weed	Asteraceae	Annual Herb

The priority areas include the old dump area and the periphery of the site. During the construction phase the areas immediately adjacent to construction areas will require inoculation.

Establishment of Alien and Invader Taxa.

The clearing of vegetation will leave bare patches of soil, thereby enhancing the colonisation by ruderal weeds (mostly annual weeds) or declared alien species that will prohibit the natural succession during rehabilitation activities. Such soil disturbances (as well as the inappropriate handling of topsoil) could enhance the establishment or spread of *Melia azedarach* and *Nicotiana glauca* to natural systems adjacent of the development.

Declared Weeds and Invader Plants

Declared weeds and invaders have the tendency to dominate or replace the canopy or herbaceous layer of natural ecosystems, thereby transforming the structure, composition and function of natural ecosystems.

The amended Regulations (Regulation 15) of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) identify three categories of problem plants:

- Category 1 plants may not occur on any land other than a biological control reserve and must be controlled or eradicated. Therefore, no person shall establish, plant, maintain, propagate or sell/import any category 1 plant species.
- Category 2 plants are plants with commercial application and may only be cultivated in demarcated areas (such as biological control reserves) otherwise they must be controlled.
- Category 3 plants are ornamentally used plants and may no longer be planted, except those species already in existence at the time of the commencement of the regulations (30 March 2001), unless they occur within 30 m of a 1:50 year floodline and must be prevented from spreading.

Applicable Legislation

The following legislation is applicable to landowners and stipulates the legal obligation to control invader plants that occur on their property:

- The common law relating to neighbours and nuisance;
- Section 151(1) of the National Water Act 36 of 1998;
- Section 28 of the National Environmental Management Act, 107 of 1998;
- Section 31A of the Environment Conservation Act, 73 of 1989;
- Municipal by-laws and the National Veld and Forest Fire Act 101 of 1989; and
- The present legislation forms part of the Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983) (CARA). Regulations 15 and 16 under this Act, dealing with problem plants, were amended during March 2001.

Three-phased Control Programme

For any alien eradication programme to be successful a three-phased control approach should be followed:

- Initial control;
- Follow-up control; and
- Maintenance control.

Such a three-phased control programme makes use of a combination of chemical and mechanical control options. It is a high priority of any eradication programme that makes use of herbicides or power equipment to implement the correct safety procedures and to prevent chemical spillages. Strictly follow the specified treatment concentrations for the relevant herbicides as specified by the product label. Always ensure that all staff members are properly trained, and make them wear protective clothing when working with herbicides or other equipment (e.g. handsaws). The three control stages are summarised as follow:

Initial Control

Initial control requires an “aggressive” remedial approach with the aim to drastically reduce the number of alien invader vegetation to acceptable and manageable levels.

Follow-up Control

Follow-up control is vital to control any re-growth or new seedlings. Follow-up control methods may occur as soon as re-growth or seedlings are spotted. It may be in the same season or only in the following season depending on climatic conditions.

Maintenance Control

Continue to monitor the alien vegetation on a regular (preferably bi-monthly) basis to identify any re-growth or seedlings. It is expected that the infestation densities will have been reduced dramatically by this stage and that only individual specimens may appear from time to time. It is preferred that any alien re-growth be removed manually to exclude the unnecessary use of chemicals.

Integrated Control Strategies

An integrated control strategy uses a combination of control options for a number of species during a particular situation. It is based on ranking the study site into priority areas for control. Therefore, high priority areas should be controlled first. As a general rule, maintenance control should consider areas with low infestations first and then move to areas of higher infestation since control of these areas will be rapid and cost-effective. Also, the direction of control should be in a downstream direction, meaning that initial control should start upstream and terminate downstream. In addition, control measures should aim to remove alien infestation from the edge of a grove or patch to prevent any further spread.

Control Zones

Since the documented alien invasive species consist of Herbs and shrubs, it is the clearing of vegetation in preparation for construction that will leave bare patches of soil, thereby enhancing the colonisation by alien species that will prohibit the natural succession during rehabilitation activities. Such soil disturbances (as well as the inappropriate handling of topsoil) could enhance the establishment or spread of *Melia azedarach* and *Nicotiana glauca* to natural systems adjacent of the development.

The estimated working days required to control alien vegetation identified from the control zone are as follows:

1 to 2 days (2 men)

1 day (3 men)

The control team will consist of 2 members and a supervisor during initial control and two members during the follow-up control. The control team members will be responsible for applying foliar spray.

It is thus anticipated that initial control will take at least 1 day to complete. Follow-up control will commence within 1 month after initial control was completed, and anticipated to be completed within a day. However, in the event of very little re-growth, follow-up control should be postponed for at least another month. Should re-growth be vigorous, a second follow-up treatment may be necessary.

Maintenance control should be continual, and implemented on a monthly basis.

USEFUL CONTACT NUMBERS

The following can be contacted for recommendations on appropriate herbicides and applicable legislation.

- Ecoguard (Patrick) 083 6797775
- Ecoguard (Stewart Crawford) 083 6797774
- BASF (Richard Heathcote) (033) 343 4102
- Du Pont (Anthony Botes) 082 5655603
- Agricultural Research Centre (Jeremy Goodall) (033) 355 9416

REHABILITATION

Rehabilitation will include:

- the active re-vegetation of areas cleared of alien vegetation, and
- re-vegetation as part of the landscaping plan.

Phase 1

It is recommended that rehabilitation should follow eradication, and should entail:

- The sowing of grass seed (particularly the establishment of grass species native to the area) on soils left bare since eradication with the main purpose to bind the soil;
- The broadcast sowing of suitable grass seed;
- The covering of sowed areas with brushwood (the covering should not exceed 0.5 m). The brushwood will retain the soil moisture and prevent surface erosion during precipitation events;
- Mulch (e.g. straw or fine brushwood material) should be added to control erosion during seed germination, and to provide organic matter for plant growth.

The time frames for rehabilitation will depend on completion of the initial control phase. Initial control should occur or correspond with the first major rains. Otherwise, rehabilitation should only commence if sufficient rainfall occurred.

The success of rehabilitation must be evaluated through continual monitoring and should form part of the maintenance control.

Phase 2

Phase 2 deals with the actual landscaping of the study site and are as follows:

- The aesthetic appeal of the study site and those areas cleared of alien vegetation should be improved through landscaping with plant species indigenous to the study region.
- All plant specimens should be in good condition and free from pests and diseases.
- The potting materials and specimens to be used should be free from weeds and declared invaders;
- Indigenous plant material should be sourced within a radius of 50 km of the study site.

RECOMMENDATIONS & MITIGATION MEASURES

- The applied fertilisers should be of a type that is less prone to leaching and releasing nitrates and phosphates to reduce the possibility of surface and groundwater pollution. Suitable fertilisers should include organic as well as controlled release fertilisers that discharge smaller amounts of plant nutrients at a time. Smaller amounts of nutrients can then be immediately assimilated by the plants, which reduce the possibility for water pollution; and
- The proposed development will also involve an increase in the amount of hardened surfaces, which will result in increased stormwater runoff rates. In addition, a well designed stormwater management plan will be required to attenuate flood peak events and prevent erosion. Softer stormwater mitigation options (e.g. grass swales) would be a more ideal option.