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19 June 2025

Kathu Solar Park Alien Management Plan V03

Prepared for
Zutari (Pty) Ltd
On behalf of
Kathu Solar Park (Pty) Ltd
by
EndemicVision Environmental Services (Pty) Ltd

Directive

Project: KSP Alien Management
 Client: Zutari (Pty) Ltd
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Declaration of Consultant Independence

This report has been prepared by EndemicVision Environmental Services (Pty) Limited (EndemicVision) with all reasonable skill, care and diligence within the terms of the contract with the client. EndemicVision is a multidisciplinary environmental management and consulting company with more than 70 years of cumulative experience represented by its members.

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The author of this report, Chrizette Neethling, does hereby declare that she is an independent consultant on behalf of EV and has no business, financial, personal or other interest in the activity, application or appeal in respect of which she was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of the specialist performing such work. All opinions expressed in this report are her own.

Signed: **C.D. Neethling**

Dated: **19 June 2025**

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Definitions and Acronyms

AIP	Alien Invasive Plants
CARA	Conservation of Agricultural Resources Act (Act No. 43 of 1983)
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
GPS	Global Positioning System
KSP	Kathu Solar Park
LUSM	Land Use and Soil Management
EMPr	Environmental Management Programme
MSDS	Material Safety Data Sheets
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
GG	Government Gazette
GN	Government Notice

1. Introduction

The Kathu Solar Park (KSP) is required to manage the Alien Invasive Plants (AIP) on its property. Certain regulations are in place for the control of certain alien species under the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) as well as the Conservation of Agricultural Resources Act (Act No. 43 of 1983). Further conditions are set out in the Environmental Management Programme (EMPr) and Environmental Authorisations (EA) applicable to the specific developments on KSP.

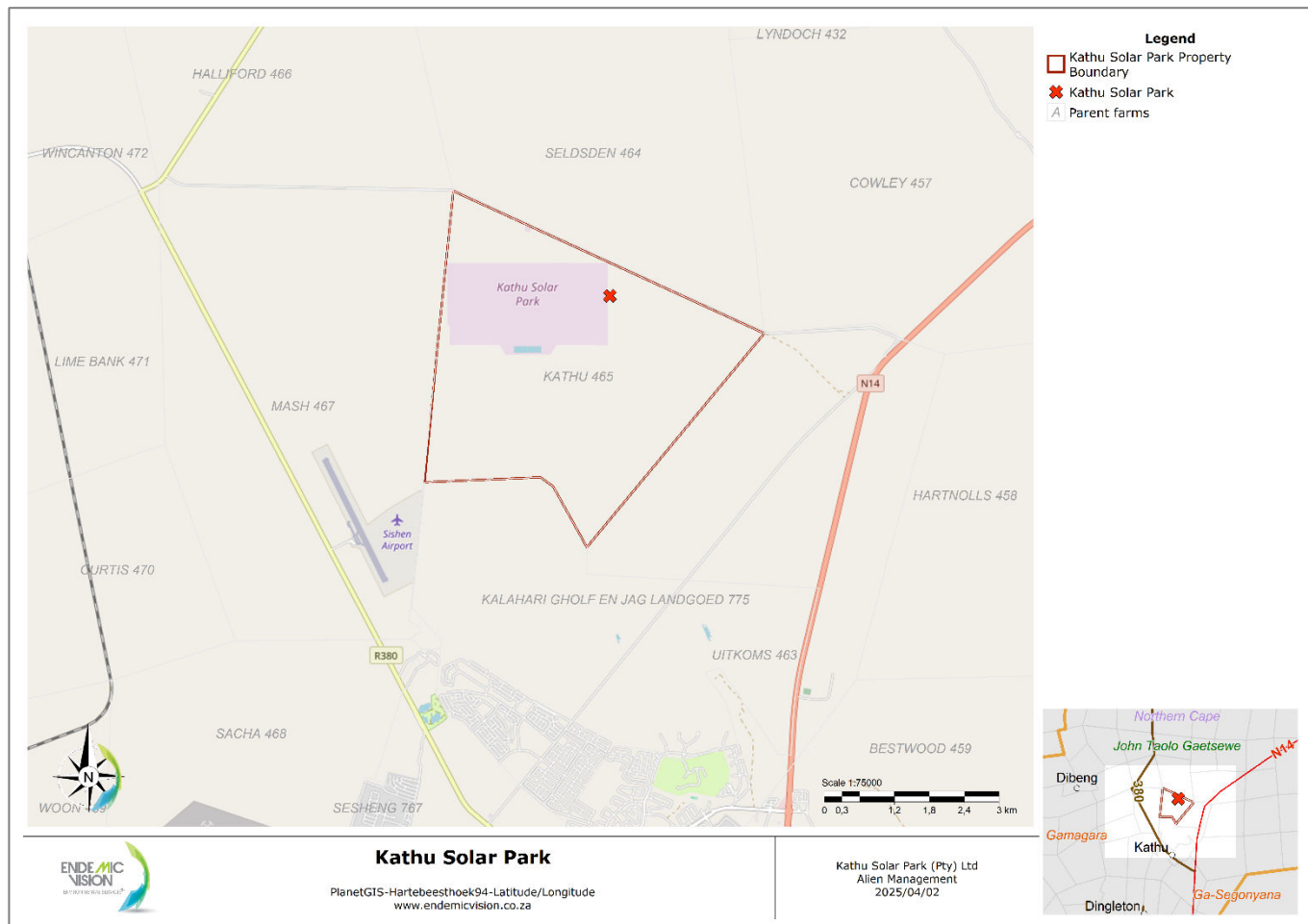


Figure 1: Kathu Solar Park

The purpose of this Alien Management Plan is to provide a framework for the management of alien species at KSP. Various alien and weed species are present on site, with the following Category 1 (CARA) and / or Category 1b (NEMBA) listed species confirmed:

- ▶ *Argemone ochroleuca* (White-flowered Mexican Poppy)
- ▶ *Cereus jamacaru* (Queen of the night)
- ▶ *Datura ferox* (Large thorn apple)
- ▶ *Datura inoxia* (Downy thorn apple)
- ▶ *Datura stramonium* (Common thorn apple)
- ▶ *Flaveria bidentis* (Smelter's bush)
- ▶ *Melia azedarach* (Syringa)
- ▶ *Nicotiana glauca* (Wild tobacco)
- ▶ *Opuntia aurantiaca* (Jointed prickly pear)
- ▶ *Opuntia humifusa* (Creeping prickly pear)
- ▶ *Pennisetum setaceum* (Fountain grass)
- ▶ *Tamarix ramosissima* (Pink tamarisk)

Prevention is the best long-term strategy that should be applied on site. Monitoring is an important tool for the early identification of alien invasive species on site and regular monitoring can ensure that these species get removed before they reproduce. Mechanical control is the preferred method used on site for the control of alien invasive plant species.

1.1. Legislative Terms of Reference

1.1.1 National Environmental Management: Biodiversity Act (Act No. 10 of 2004)

The National Environmental Management: Biodiversity Act (NEMBA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora.

Chapter 5 of NEMBA address specific objectives in terms of alien invasive species:

- To prevent the unauthorized introduction and spread of alien species and invasive species to ecosystems and habitats where they do not naturally occur.
- To manage and control alien species and invasive species to prevent or minimize harm to the environment and to biodiversity in particular.
- To eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.
- To ensure that environmental assessments for purposes of permits in terms of the Genetically Modified Organisms Act, 1997 (Act No. 15 of 1997), are conducted in appropriate cases in accordance with Chapter 5 of the National Environmental Management Act.

Alien and Invasive Species Regulations (GNR 1020; GG 43735; 2020)

Regulations for alien species have been published in GNR 1020 in accordance with NEMBA.

Alien and Invasive Species Lists (GNR 1003; GG 43726; 2020)

All regulated alien and invasive species are listed in GNR 1003 of 2020 under NEMBA. Notice 3 of GNR1003 provides the national list of invasive species in terms of Section 70(1)(a) and categorise the species as Category 1a, 1b, 2 and 3.

Category 1a:

- Species which must be combatted or eradicated.
- Person in control of species must immediately take steps to combat or eradicate the species.
- Allow authorised official to inspect the property and monitor, assist or implement the combatting and eradication.
- Must be combatted or eradicated according to Invasive Species Management Programme (if developed).

Category 1b:

- Species which must be controlled.
- Person in control of species must control the species.
- Allow authorised official to inspect the property and monitor, assist or implement the control.
- Must be controlled according to Invasive Species Management Programme (if developed).
- The Minister may require the development of a Control Plan.

Category 2

- Species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit.
- No person may carry out a restricted activity without a permit.
- Person in control of species or in possession of permit, must ensure that the specimens of the species do not spread outside of the land or the area specified.
- Any species listed as Category 2, that occurs outside the specified area, must be considered to be Category 1b and must be managed accordingly.

Category 3

- Species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of the Act.
- Any plant species identified as a Category 3 that occurs in riparian areas, must, for the purpose of these regulations, be considered to be a Category 1b and must be managed accordingly.

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

In terms of the amendments (2002) to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared alien invasive plant species must be effectively controlled. In terms of this Act, 198 alien species were listed as declared weeds and invaders and forms part 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.

1.1.3 Fertilizers, Farm feeds, Agricultural remedies and Stock remedies act, Act 36 of 1947

No pesticides may be applied by any individual or contractor who is not registered as a pest control operator.

1.1.4 Northern Cape Nature Conservation Act; 2009

The Northern Cape Nature Conservation Act; 2009 (NCNCA) regulates specific fauna and flora activities of the Northern Cape Province of South Africa.

Chapter 7 (55) of the NCNCA (2009) deals with invasive species:

1. No person may:

- a. Import, export, transport, possess or trade in an invasive species, including any specimen, carcass or derivative of such species.
- b. Cultivate a plant specimen of an invasive species; or
- c. Breed or keep an animal specimen of an invasive species.

2. The owner of land upon which an invasive species is found, must take the necessary steps to eradicate or destroy such species.

Furthermore, Schedule 6 of the NCNCA: Invasive Flora species lists, needs to be used during infield assessment and all listed alien species must be included in the AIPs Management Plan.

1.2. EA & EMPr Requirements

This is the third alien management plan for KSP. Previous versions are tabled below.

Table 1: Version history

Version	Title	Author	Date
01	Kathu Solar Park Alien Management Plan 2020	EndemicVision Environmental Services (Pty) Ltd	Jan 2020
02	Alien Invasive Plant Management Plan for Kathu Solar Park	The Biodiversity Company	Dec 2024
03	Kathu Solar Park Alien Management Plan 2025	EndemicVision Environmental Services (Pty) Ltd	Apr 2025

Specific objectives and mitigation measures for the developments at KSP are set out within the respective Environmental Management Programmes (EMPr) for each development. All mitigation measures with relevance to alien species management are considered.

1.2.1 Kalahari Concentrated Solar Power Facility EMPr (2016)

The Environmental Management Programme (EMPr) for the Kalahari Concentrated Solar Power facility (2016) lists the following mitigation measures for the control of AIPs:

Table 2: Alien management objectives (2016)

Objective	Minimize the establishment and spread of alien invasive species
Performance Indicator	For each alien species: number of plants and aerial cover of plants within project area and immediate surroundings.
Monitoring	- Ongoing monitoring of area by environmental manager. - Annual audit of project area and immediate surroundings by qualified botanist. The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. - Reporting frequency and duration depends on legal compliance framework.

Table 3: Alien management mitigation measures (2016)

Mitigation: Action/Control	Responsibility	Timeframe
Establish an on-going monitoring programme to detect and quantify any alien species that may become established and identify the problem species (as per the NEM: Biodiversity Act (No. 10 of 2004)).	O&M Operator	Operation
Avoid creating conditions in which alien plants may become established: - Keep disturbance of indigenous vegetation to a minimum. - Rehabilitate disturbed areas as quickly as possible. - Do not import soil from areas with alien plants.	O&M Operator	Operation
Weeds, alien plants and invasive vegetation will be removed should ingress into the site occur. Category 1 (declared weeds) and Category 2 (declared invader plants with a value) according to the Biodiversity Act (No. 10 of 2004) will be removed whenever possible.	O&M Operator	Operation
On-going alien vegetation clearing must be implemented.	O&M Operator	Operation
Immediately control any alien plants that become established using registered control methods.	O&M Operator	Operation

Mitigation: Action/Control	Responsibility	Timeframe
The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides. It must be ensured that WHO Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.	O&M Operator	Operation

1.2.2 Kathu Solar PV Augmentation Facility EMPr (2024)

The EMPr for the Kathu Solar PV augmentation facility (2024) lists the following mitigation measures for the control of AIPs:

Table 4: Alien management objectives (2024)

Objective	Reduce the loss of SCC flora and fauna species and local diversity
Avoidance Measures	 All indigenous species is retained as far as possible and where alien species are encountered, they are removed.
Objective	Manage alien invasive species
Avoidance Measures	 Remove alien invasive species from the area before topsoil stripping to limit alien infestation of the topsoil after stockpiling and storage.  Prevent and limit alien invasive species establishing on site by conducting concurrent rehabilitation and vegetating bare areas as soon as possible.
Reduction Measures	 Compile and implement an AIP management plan. The plan should indicate AIP distribution, preferred management methods, replacement of AIP with indigenous species and monitoring of AIP management success.
Remedial Measures	 Reintroduce local indigenous seed and species on all bare areas and topsoil if topsoil is not vegetating from topsoil seedbank.
Monitoring Measures	 Alien vegetation monitoring and maintenance plans should be in place for the site during operational and rehabilitation phase.
Objective	Manage interaction with fauna and flora during construction
Avoidance Measures	 All construction staff should undergo an environmental induction from a suitably qualified person regarding: - the importance of footprint and topsoil management - protected species identification and management - alien species identification and management - Reducing roadkill, illegal harvesting, uncontrolled dozing, illegal trapping.
Objective	Manage the KSP topsoil resource to ensure the best possible rehabilitation in the future
Monitoring Measures	 Maintain a topsoil register of stockpile volumes, demarcation, condition, source area and management interventions (sowing, erosion control, alien species removal).

Table 5: Alien management mitigation measures (2025)

Mitigation: Action/Control	Implementation Responsibility	Verification Responsibility	Timeframe	Frequency
All woody and herbaceous biomass arising from the site clearance should be reused on site in rehabilitation efforts, as far as possible. This may include chipped mulch or brush packing of previously disturbed areas, provided no alien invasive materials are present, for the ECOs approval.	Contractor, ESA	ECO	Pre-construction	Weekly

Mitigation: Action/Control	Implementation Responsibility	Verification Responsibility	Timeframe	Frequency
Alien vegetation growing on stockpiles must be eradicated.	Contractor, ESA	ECO	Pre-construction	Weekly
Herbicides shall not be used to remove alien vegetation unless approved by the ECO.	Contractor, ESA	ECO	Pre-construction	Weekly
Proliferation of alien and invasive species is expected within any disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the project footprint.	ECO	ECO	Construction	Throughout
Footprint areas should be kept as small as possible when removing alien plant species.	Contractor, ECO	ECO	Construction	Throughout
Edge effect control such as alien floral control needs to be implemented to ensure no further degradation outside of the proposed footprint area.	Contractor, ECO	ECO	Construction	Throughout
Manage edge effects such as alien floral invasion to ensure further loss of faunal habitat does not occur in the surrounding areas.	Contractor, ECO	ECO	Construction	Throughout
Alien and invasive vegetation control should take place throughout the operational phase of the development.	Developer	Developer	Operation	Weekly
After demolishing the structures, the footprint may not be left abandoned and unproductive as weeds and aliens will immediately invade the area	Contractor, Developer	Developer	Decommissioning	Once-off

1.2.3 Kathu Solar PV Augmentation Facility EA (2024)

The Environmental Authorisation (KSP EA) issued on 05 September 2024 (KSP EA - 14-12-16-3-3-1-2985) lists the following requirements for the control of AIPs:

16.6 - "An alien invasive management plan to be implemented during construction and operation of the proposed development. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken."

2. Management Areas

A desktop review of the site was done using aerial imagery. A map was compiled, dividing the applicable site into management areas/blocks. The site is divided into the following areas:

-  Plant
-  Outside entrance
-  Admin area
-  Solar Field (Block 1-8)
-  Roads
-  New Area – PV
-  New Area – KFNR Buffer

The solar field was further divided into eight blocks (Block 1-8). The perimeter roads were divided into NE, NW, SE and SW. The roads includes the roads and road verges around the solar field, as well as the road and berms outside of the solar field fence. Road SW includes the evaporation ponds to the south of the solar field.

The map below indicates the management areas.

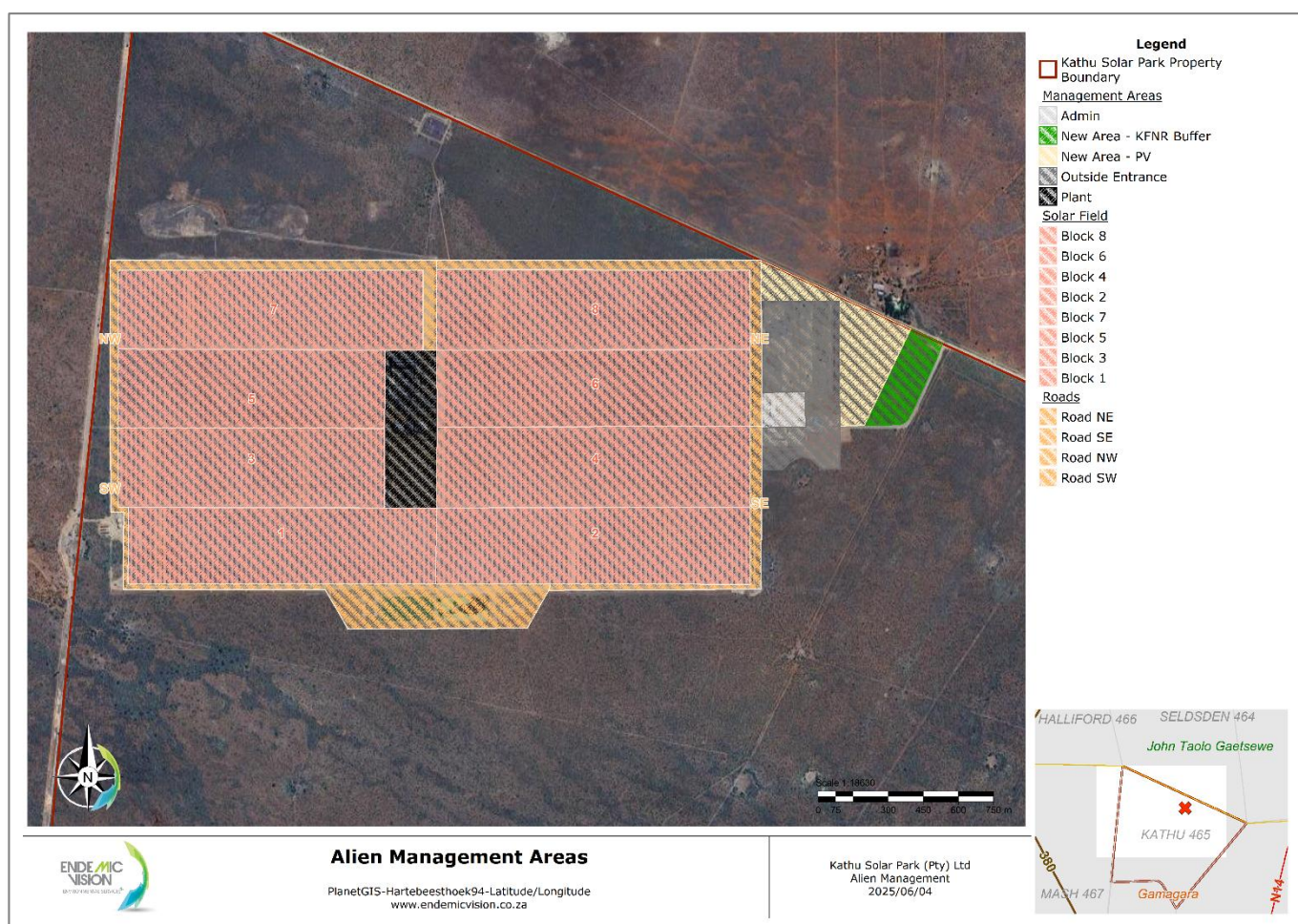


Figure 2: Alien management areas

3. Alien Invasive Plants

A comprehensive list of alien and weed species encountered within the management areas were compiled. Alien species listed in the Alien Invasive Plant Management Plan for Kathu Solar Park (Biodiversity Company, 2024), recorded during 2011 and 2024 are included. An initial assessment was done by EndemicVision in 2019 for the solar field, admin, outside entrance and plant. A baseline assessment for AIP within the new area was done in 2025 and new species encountered was added to the list. Hotspots were further identified within the solar field, roads, admin, plant and outside entrance area. The list of all alien species found on site, as well as their status as invasive species are presented below. Category 1 (CARA) and / or Category 1b (NEMBA) listed species are indicated in red.

Table 6: Alien species present on site

Species	Common Name (Eng)	Common Name (Afr)	CARA	NEMBA	Recorded
<i>Alternanthera pungens</i>	Creeping chaffweed				2019; 2025
<i>Amaranthus cruentus</i>	Red amaranth				2019; 2025
<i>Amaranthus praetermissus</i>		Misbredie			2019
<i>Amsinckia retrorsa</i>	Fiddlenecks				2019
<i>Argemone ochroleuca</i>	White-flowered Mexican poppy	Witbloudissels	1	1b	2011;2019;2024
<i>Cereus jamacaru</i>	Queen of the night		1	1b	2025
<i>Datura ferox</i>	Large thorn apple	Grootstinkblaar	1	1b	2011
<i>Datura inoxia</i>	Downy thorn apple	Harige stinkblaar	1	1b	2011
<i>Datura stramonium</i>	Common thorn apple	Gewone stinkblaar	1	1b	2011
<i>Dysphania ambrosioides</i>	Mexican tea				2019
<i>Dysphania carinatum</i>	Keeled goosefoot				2019
<i>Erigeron bonariensis</i>	Flax-leaf Fleabane	Armoedskruid			2019
<i>Flaveria bidentis</i>	Smelter's Bush	Smeltersbossie		1b	2022
<i>Melia azedarach</i>	Syringa	Sering	3	1b	2024
<i>Nicotiana glauca</i>	Wild tobacco	Tabakboom	1	1b	2019; 2022; 2024; 2025
<i>Opuntia aurantiaca</i>	Jointed prickly pear	Litjieskaktus	1	1b	2025
<i>Opuntia humifusa</i>	Creeping prickly pear		1	1b	2025
<i>Pennisetum setaceum</i>	Fountain grass	Pronkgras	1	1b	2019; 2022; 2025
<i>Physalis peruviana</i>	Cape gooseberry				2019
<i>Prosopis glandulosa</i>	Honey mesquite	Heuningprosopis	2	3	2011
<i>Solanum nigrum</i>	Black nightshade				2019; 2025
<i>Sonchus oleraceus</i>	Common sowthistle				2019; 2025
<i>Tamarix ramosissima</i>	Pink tamarisk	Perstamariske	1	1b	2025

The list of species and their dominant density (%) within each management area are detailed below. Densities provided are based on the results of the 2025 assessment of each management area. The dominant density reflects the density as a percentage of the area covered. Category 1 (CARA) and / or Category 1b (NEMBA) listed species are indicated in red. For a detailed list of all species observed, please refer to Appendix 1.

Table 7: Species occurrence and density

Area	Dominant Density (%)	Species
Admin	Present	<i>Amaranthus cruentus</i> <i>Sonchus oleraceus</i>
Area	Dominant Density (%)	Species
Outside Entrance	Present	<i>Amaranthus cruentus</i> <i>Sonchus oleraceus</i>
Area	Dominant Density (%)	Species
Plant	Present	<i>Amaranthus cruentus</i> <i>Pennisetum setaceum</i>
Area	Dominant Density (%)	Species
Road NE	10	<i>Nicotiana glauca</i>
	Present	<i>Sonchus oleraceus</i>
Area	Dominant Density (%)	Species
Road SE	Present	<i>Amaranthus cruentus</i> <i>Sonchus oleraceus</i>
Area	Dominant Density (%)	Species
Road NW	5	<i>Pennisetum setaceum</i>
	Present	<i>Melia azedarach</i> <i>Sonchus oleraceus</i>
Area	Dominant Density (%)	Species
Road SW	5	<i>Nicotiana glauca</i>
	Present	<i>Amaranthus cruentus</i> <i>Sonchus oleraceus</i> <i>Tamarix ramosissima</i>
Area	Dominant Density (%)	Species
Solar Field Block 1-8	Present	<i>Amaranthus cruentus</i> <i>Sonchus oleraceus</i>
Area	Dominant Density (%)	Species
New Area - PV	Present	<i>Alternanthera pungens</i> <i>Cereus jamacaru</i> <i>Opuntia aurantiaca</i> <i>Opuntia humifusa</i>
Area	Dominant Density (%)	Species
New Area – KFNR Buffer	Present	<i>Cereus jamacaru</i>

Although alien invasive species are present within the solar field, regular cutting takes place. Some of the unlisted alien species were observed but none of the listed species. Spread of these species to the road verges and outside berms also seem to be minimal.

Within the admin, outside entrance and plant areas, very little alien invasive species were observed. On the road verges some of the unlisted species were observed but almost none were observed outside of the solar field fence on the perimeter road or berms.

One hotspot for the wild tobacco tree (*Nicotiana glauca*) are however present on Road – NE, on the outside of the fence on the existing berms. This species are also prominent on the evaporation dam berms to the south of the solar field.

A high density of Fountain grass (*Pennisetum setaceum*) can further be found to the north of the solar field. These grasses are concentrated along the water trench and spread onto the road verge and the berm outside the solar field fence. Some specimens were found along the trench closer to the plant area.

Only one specimen of the pink Tamarisk (*Tamarix ramosissima*) were found at the evaporation dam and one specimen of the Syringa (*Melia azedarach*) outside the solar field on Road – NW.

Species of concern found within the new area (KFNR Buffer and PV area) were the Queen of the night (*Cereus jamacaru*), the Jointed prickly pear (*Opuntia aurantiaca*) and the Creeping prickly pear (*Opuntia humifusa*). These species spread from the farmstead across the gravel road into the natural field.

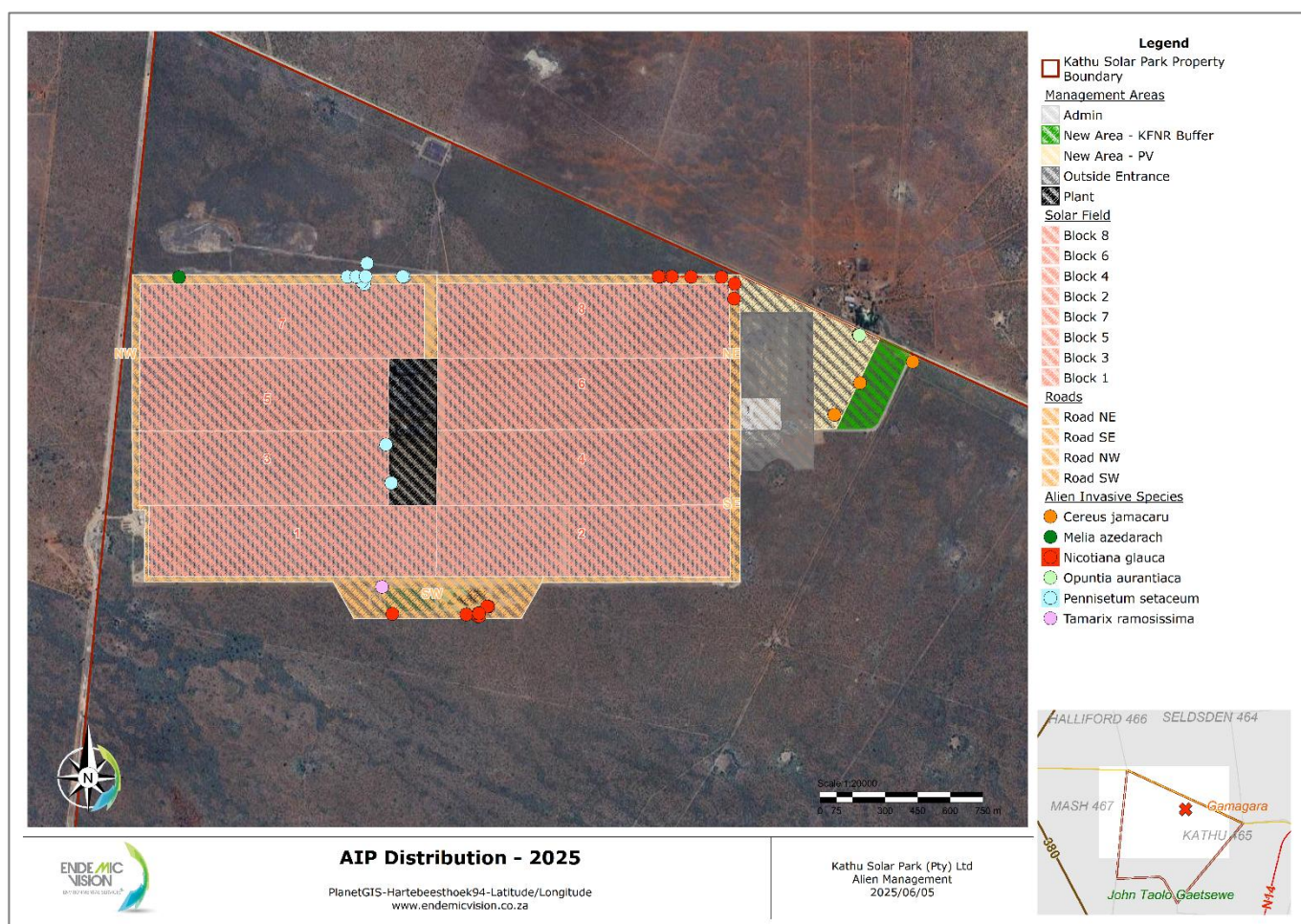


Figure 3: Presence of Category 1 listed alien invasive species as recorded in 2025

4. Control Methods

Prevention is the best long-term strategy that should be applied on site. Monitoring is an important tool for the early identification of alien invasive species on site and regular monitoring can ensure that these species get removed before they reproduce.

The following control methods are detailed below:

- Mechanical (Chainsaws or brush-cutters; hand tools; hand pulling)
- Chemical (Herbicide - Foliar or cut stump)
- Biological (Insects; mites; micro-organisms)

The preferred method used on site for the control of alien invasive plant species is the removal of individual plants by hand or shovel, root and all, before seeding commences. This is also more feasible as all areas cannot be accessed by machinery.

Follow-up removal will then be conducted as soon as re-growth is observed in previously cleared areas. The plants will be cut and dropped within the same area. With continuous removal being carried out in the identified areas, the growth of alien invasive plant species shall be controlled and managed effectively.

Depending on the amount and type of weeds that are growing, safe herbicides might be considered for the eradication of alien invasive species. The application will however be restricted as to prevent environmental degradation. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

Disturbance to the soil during the removal of alien invasive plant species shall be kept to a minimum in order to minimise re-growth. All clearing actions shall be monitored and documented to keep records of which areas are due for follow-up clearing. Furthermore, no alien species shall be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally occurring species shall be used.

4.1. Mechanical Control

Mechanical control refers to the physical action of removing the plant. There are several techniques that can be used, e.g. uprooting; mowing; ringbarking. Coppicing species will require additional treatment with herbicides following the mechanical control.

There are however some advantages and disadvantages applicable to this method which should be taken into account. These are summarized in the table below.

Table 8: Advantages and disadvantages associated with mechanical control (David Hoare Consulting cc: 2014)

Advantages	Disadvantages
- Effective in areas with low infestation. - High job creation and associated poverty alleviation potential. - No contamination of water with herbicides.	- Not an effective method for dense infestations, as the cost of clearing is extremely high, with little or no impact. - Time consuming. - If no herbicides are used, then the manual control techniques.

4.2. Chemical Control

Chemical control has harmful consequences for the natural environment and should only be used as a last resort. Should herbicides be applied as control method, there are some regulations that should be adhered to.

Chemical control can be applied in the following ways:

- Foliar (leaf) application; and/or
- Stump applications.

Some advantages and disadvantages associated with chemical control are summarized in the table below.

Table 9: Advantages and disadvantages associated with chemical control (David Hoare Consulting cc: 2014)

Advantages	Disadvantages
- Complements mechanical control methods, increasing the effectiveness of control activities. - Achieve results over short period (within 6 weeks of application). - Large areas can be treated quickly.	- May kill non-target plants or species. This is a very important consideration and poses risks for remaining natural areas on site. - Herbicides are expensive. - The use of herbicides may contaminate sites used for drinking water, for washing and for fishing, and can therefore threatened human and animal health. - Specialized training and certification is required for use of herbicides

4.2.1 Herbicides

Should herbicide applications be used, the following regulations and guidelines shall be adhered to:

- Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- South African Bureau of Standards, Standard SANS 10206 (2010).

It must be ensured that WHO recommended classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Agriculture, Forestry and Fisheries.

The precautionary measures specified by the manufacturers of the herbicides that will be used must be adhered to. Material Safety Data Sheets (MSDS) must also be kept on site.

The following general requirements applies to the application of herbicides:

- Herbicide with a persistent dye is to be applied immediately after cutting/felling. This type of herbicide must be used in conjunction with a wetting agent. Low oil content wetting agents are preferable.
- Herbicide mixing and refilling of knapsacks will be done in designated areas in order to ensure no damage to vegetation or contamination of watercourses or soil will occur. The use of a drip tray will be required for all refilling and for the mixing of herbicide.
- All herbicide containers are to be kept on a suitable ground sheet and away from direct sunlight. All used herbicide containers must be disposed of in the manner specified as per the supplier specifications.
- The mixing of herbicide is to take place on the same day that it will be applied.
- Only an amount sufficient for use that day should be mixed as the active ingredients in the herbicide deteriorate rapidly.
- No herbicide mixture mixed on a previous day should be used for application to alien vegetation, as it will not be effective.
- Properly trained herbicide applicators need to apply the product.
- All herbicide mixtures used must contain appropriate dye for identification of finished applied areas.
- No spraying is to occur in inclement weather conditions where there is a danger of contamination to the surrounding environment.

The preferred chemical control method, or specifically herbicide application, will be stem treatment and/or spot treatment depending on the species to be treated. These treatment techniques are more limited and has a lower impact on the surrounding environment.

The application of herbicides to control alien species have health and safety implications that require that eradication and chemical control of alien and invasive plant species may only take place by or under supervision of a qualified and registered pest control operator. The Pest Control sub-sector is governed by Act 36 of 1947. The act stipulates that a person shall be in possession of a pest control operator registration certificate in one or more fields of pest control in order to apply pesticides for reward.

4.2.2 Sensitive areas

The Kathu solar park is located amidst several ephemeral pans, therefore the use of chemicals should be limited and/or avoided. An artificial pan and stormflow is further located directly north of the solar field, a dry river to the south and a protected area (Kathu Forest Nature Reserve) to the east.

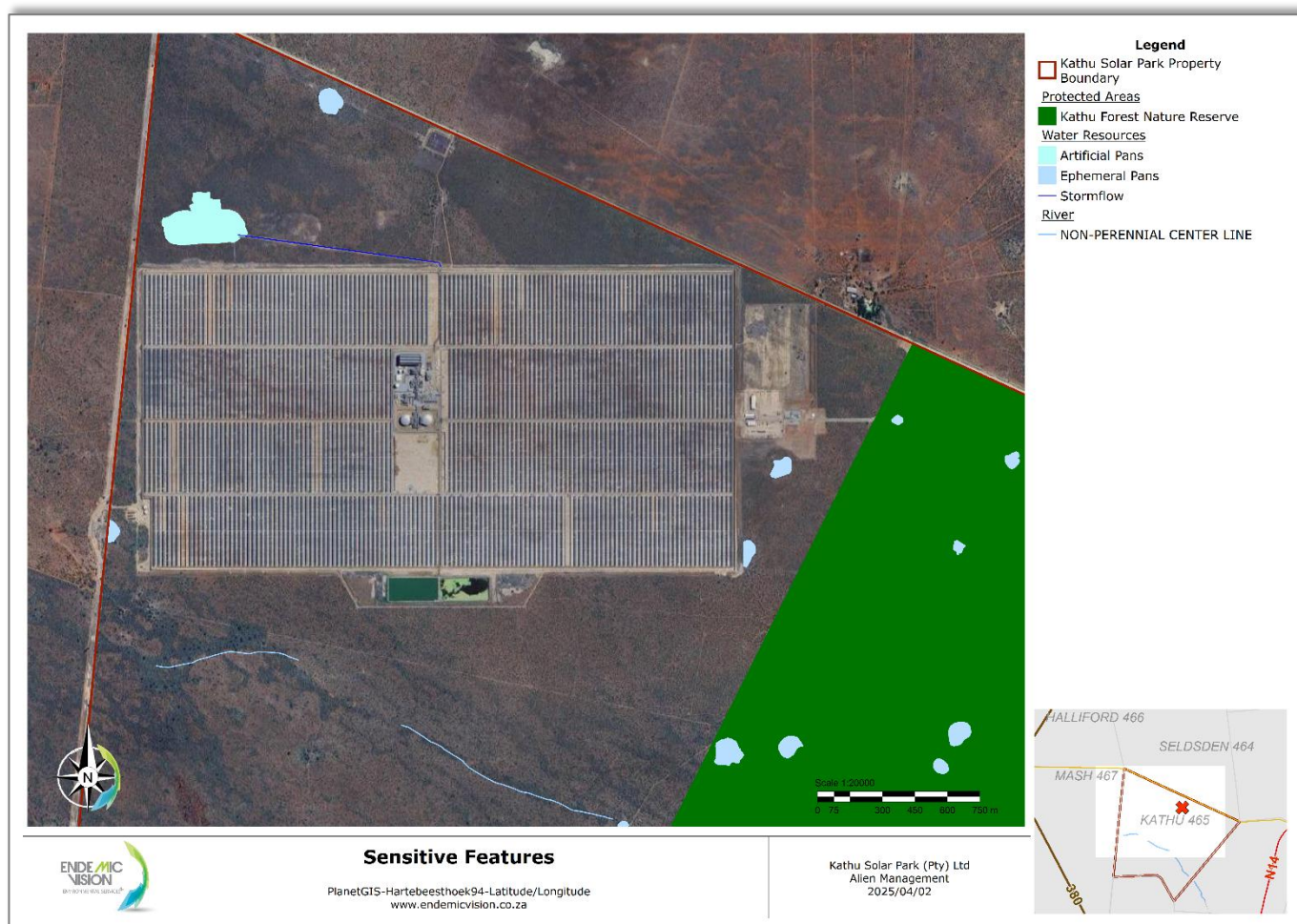


Table 10: Sensitive features

4.3. Biological Control

Biological control agents (insects, mites, and micro-organisms such as fungi or bacteria) are used to reduce the vigour or reproductive potential of alien plants. These biocontrol agents can however only be sourced from provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM); Department of Forestry, Fisheries and the Environment (DFFE). Some advantages and disadvantages associated with chemical control are summarized in the table below.

Table 11: Advantages and disadvantages associated with biological control (David Hoare Consulting cc: 2014)

Advantages	Disadvantages
- Most environmentally friendly and most sustainable of all control methods. - Usually does not require high or long-term maintenance. - Relatively low-cost implication over the long term.	- Generally slow, especially initially. - Low levels of infestation, with occasional outbreaks, will remain a feature of systems under biological control. - Any use of chemicals around biocontrol agent colonies may adversely affect the potency of this control method. - Cannot be used where the biocontrol agent would threaten commercial populations of the target species that may exist nearby. - Biocontrol agents are not available for all target species.

5. Area Specific Management

5.1. Sensitive areas

Ecologically sensitive areas should be prioritised for alien clearing. These include the ephemeral pans, dry rivers, protected Kathu Forest Nature Reserve as well as appropriate buffer areas to these sensitive features. A 175m buffer area is placed to the west of the Kathu Forest Nature Reserve to aid in the protection of this area. By keeping this buffer area clear of any alien invasive species, the spread of these species into the Kathu Forest Nature Reserve can be limited, thus keeping the functional integrity of the protected area intact. The current status of alien invasive species hotspots are mapped below, to indicate any immediate threat to the sensitive areas. Clearing of any alien invasive species within these sensitive areas should be prioritized.

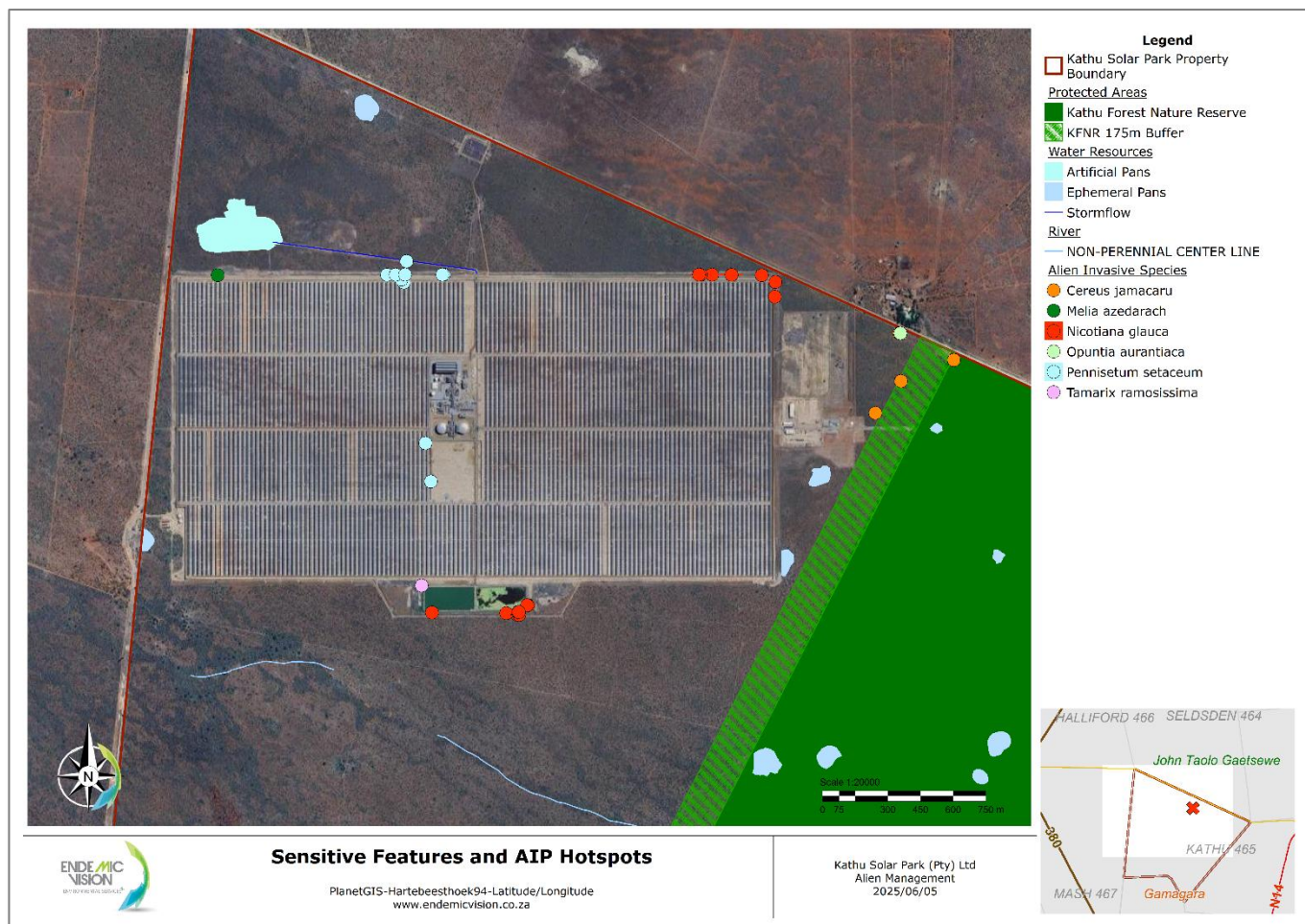


Figure 4: Alien invasive species hotspots with reference to sensitive features on KSP

5.2. All areas

Areas which have been treated previously and require follow-up should be prioritized above areas which require initial control and/or clearance. This is important in order to prevent the regrowth and/or further growth of these areas on which money have already been spent.

Areas with dense stands should be treated last as they would not densify as would the areas where the same species occurs in less dense stands. The less dense stands will also be less labour intensive and are easier for implementing follow-up treatments.

The site's natural gradient should also be considered when implementing alien management, the management should thus follow the natural gradient, e.g. the slope, of the site or area.

5.3. New Area and Outside Entrance

The areas indicated as new area - PV and outside entrance, are both included within the new Kathu Solar PV augmentation facility area. It is important to take all phases of development into account for this area when managing the alien and weed species.

- Alien species need to be completely removed from this area prior to topsoil stripping to limit alien infestation of the topsoil after stockpiling and storage.
- Bare areas need to be revegetated as soon as possible (for applicable areas) after construction to limit establishment of alien species.

6. Species Specific Management

Category 1 (CARA) listed species as well as Category 1b (NEMBA) listed species need to be prioritised since KSP have a legal obligation to control these species.

The following Category 1 / 1b species are present at KSP:

- *Argemone ochroleuca* (White-flowered Mexican Poppy)
- *Cereus jamacaru* (Queen of the night)
- *Flaveria bidentis* (Smelter's bush)
- *Nicotiana glauca* (Wild tobacco)
- *Opuntia aurantiaca* (Jointed prickly pear)
- *Opuntia humifusa*. (Creeping prickly pear)
- *Pennisetum setaceum* (Fountain grass)

6.1. Trees and Shrubs

Depending on the age of the undesired specimens, the best control may vary. Some of these controls include:

- **Cut & Paint**
 - ✋ This method entails the mechanical cutting of the plant close to the ground, and then painting the cut stump with an herbicide. This method is favoured for the removal of smaller trees and shrubs and particularly for resprouters.
 - ✋ It is important that the cut is made in a straight flat fashion and the herbicide is applied within 30 seconds after cutting. Herbicide can be applied by brush and/or with a squeeze bottle.
- **Pellets**
 - ✋ Herbicide in the form of concentrated pellets can also be used for the control of undesirable woody plants. This entails applying a certain dosage of pellets to the stem of the undesired woody plant.
- **Tree Poppers**
 - ✋ A tree popper is a manual tool used to remove undesired woody species root and all. It is a simple tool to use which entails gripping the plant's base and tilting the handle to lever the plant from the ground.
 - ✋ The tree poppers can however not be applied as easily to species that does not have a hard wood stem as the stem would snap off when it is gripped.
- **Ring barking**
 - ✋ Ring barking entails stripping the bark and hence destroying the flow channels of the plant's sapwood, causing the plant to die.
 - ✋ Ring barking is not effective for the control of resprouters.

Spraying is an alternative to pellets and/or cutting and painting. Since it is a less controlled method, it will be regarded as a last resort and is not suggested as a control method for the Kathu Solar Park. The stands of woody species on the site are not dense and hence the alternatives can easily be applied.

The use of tree poppers is the recommended approach as this method removes the plant entirely from the system without having any negative effects on the surrounding environment. This method requires no chemical control. If tree poppers cannot be used, e.g. for species with a soft stem, ring barking and/or the cut and paint control can be applied. Pellets will be applied if all the other methods proved unsuccessful since it has the biggest sphere of influence on the surrounding environment and affects both groundwater and soil quality.

6.2. Forbs and Herbs

Forbs and herbs can be removed by hand on site, either by hand pulling or shovelling, and as far as possible before seeding. Follow-up removal will be conducted as soon as re-growth is observed in previously cleared areas. The plants will be cut and dropped within the same area.

7. Removal / Disposal

All cleared alien or weed specimens with a spreading potential and/or viable seed should be disposed of in sealed plastic bags at Kathu's Municipal Garden waste dump. These remains may also be burned as an additional control method to the initial control method applied.

8. Restoration

Conditions in which alien plants may become established should be avoided.

- Bare areas need to be revegetated as soon as possible after construction to limit this possibility.
- Areas cleared of invasive species should also be considered as a disturbed area and should also be rehabilitated as soon as possible after clearance.
- Topsoil that is not vegetating from the topsoil seedbank should also be considered for revegetation.

Only local indigenous seeds and specimens may be used for revegetation purposes. The KSP Rehabilitation Management Plan (V01, 2025) should be referenced for implementation details.

9. Alien Monitoring

The impact of alien management must be monitored to ensure continuous improvement of the alien management plan.

The following principles apply to monitoring during the operational phase:

- Photographic records shall be kept of areas to be cleared before and after it has been cleared from alien invasive species.
- Alien invasive plant distribution will be documented every rainy season when and if observed. This will also determine the effectiveness of the methods implemented to remove/clear the plants.
- Rehabilitation processes shall also be monitored closely for alien invasive species.
- Simple records must be kept of the area area/location cleared and if ever used, the amount of herbicide that was used.
- Any observed alien invasive plant species will lead to immediate clearing action.

10. Detailed schedule

Table 12: Alien management team

Responsibility	Person	Company	Position
Responsible Person	Chantal Richardson	Kathu Operations Pty (Ltd)	HSE Manager
Accountable Person	Patrick Mokgobo	Kathu Operations Pty (Ltd)	Plant Manager

Table 13: Detailed alien management schedule

Action	Details	Area	Priority	Period	Frequency	Accountable Person	Responsible Person
Monitoring	Initial assessment	New area - PV & outside entrance	-	Prior to top soil stripping	Once-off	Plant Manager	HSE Manager
	Full assessment	Sensitive Areas	1	Rainy Season	Yearly	Plant Manager	HSE Manager
	Full assessment	All other Areas	2	Rainy Season	Yearly	Plant Manager	HSE Manager
	Observations of category 1 species to be reported immediately	All	-	On-going	Daily	Plant Manager	HSE Manager
Control	Initial control	New area - PV & outside entrance	-	Prior to top soil stripping	Once-off	Plant Manager	HSE Manager
	Follow up control	Sensitive Areas	1	Rainy Season	Yearly	Plant Manager	HSE Manager
	Follow up control	All other Areas	2	Rainy Season	Yearly	Plant Manager	HSE Manager
	Targeted control of any category 1 species	All	-	As soon as possible after observation	When applicable	Plant Manager	HSE Manager

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