

**APPROVED  
EMP  
ZULULAMI**

**10 MARCH 2009**



KZN Agriculture and Environmental Affairs

*uMnyango:*  
*weZolimo neZemvelo*  
**ISIFUNDAZWE SAKWAZULU-NATALI**

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Ref: EIA / 4774  
Date: 10 March 2009

**Attention:** Mr. David Styles  
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**Re: APPROVAL OF THE DRAFT ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED DEVELOPMENT OF THE ZULULAMI RESIDENTIAL ESTATE: EIA/4774.**

The Environmental Management Plan (EMP) for the proposed Zululami Residential Estate development (Ref. EIA/4774), dated 2 February 2009, has reference.

The KwaZulu-Natal Department of Agriculture and Environmental Affairs hereby **approves** the Draft EMP, subject to the following:

- The EMP must be updated in future if further significant environmental impacts related to the development are identified and need to be managed.
- The Developer and Home Owners Association must ensure that each purchaser of a property in the Zululami Residential Estate is given a copy of the EMP at the time of signing the Deed of Sale. The purchaser must sign acknowledgement and acceptance of the content of the EMP. The purchasers must be made aware of the restrictions on their erven in terms of this EMP, especially with regards to landscaping and buffer zones as per **condition 10.27** of Record of Decision for EIA 4774 dated 27 January 2005.
- In accordance with **condition 10.40** of Record of Decision for EIA 4774 dated 27 January 2005, a full archaeological survey must be conducted when the sugarcane has been cut and **before** the commencement of construction. The findings of this survey must be submitted to Amafa KwaZulu-Natali and authority to proceed obtained **prior** to any construction activity on site.
- The EMP is considered to be an extension of the Conditions of authorisation as set out by this Department in the Record of Decision for EIA 4774 issued on 27 January 2005.
- The EMP will be made binding to all parties operating on the site.
- Non-compliance with the EMP shall constitute non-compliance with conditions contained therein.
- Such failure in compliance will be dealt with in terms of the relevant sections of the National Environmental Management Act (Act No. 107 of 1998) as amended, and any other appropriate legislation.

- This Department reserves the right to review the EMP during the construction and operational phases of the above-mentioned activity and amend/add any condition as it is deemed necessary. Furthermore the applicant is reminded of its responsibility in terms of compliance with the provisions for *Duty of Care and Remediation* of environmental damage contained in Section 28 of the National Environmental Management Act, 1998, as amended.
- This Department requires a detailed Storm Water Management Plan to be submitted to the Department of Water Affairs and Forestry (DWAF) for comment and to this Department for approval, **prior** to the commencement of construction activities.

Yours sincerely



Mr. D. Naidoo

**Assistant Manager: Compliance, Monitoring & Enforcement: Ilembe**

**Environmental Management Plan for the  
development of:**

**Zululami**

**Remainder of Erf 290 (of 38) of Lot 61 No. 1521**

**EIA: 4774**

**Prepared for: Zelpy 2074 (Pty) Ltd**



**DAVID STYLES**

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*DRAFT*

## Glossary

**Amafa** – Amafa aKwaZulu-Natali (Heritage KwaZulu-Natal). Amafa is KwaZulu-Natal's heritage authority, vested with powers under the National Heritage Resources Act (25 of 1999) and KwaZulu-Natal Heritage Act (10 of 1997).

**Construction phase** – The period of the development beginning with physical disturbance to the land, and which ends with the completion of construction.

**Contractor** – Persons/organizations contracted by the developer to carry out work for the development.

**DAEA** – KwaZulu-Natal Department of Agriculture and Environmental Affairs

**DoT** – KwaZulu-Natal Department of Transport

**Developer** – Santoro Developments (Pty) Ltd, which assumes ultimate responsibility for the development.

**ECO** – Environmental Control Officer. An independent person appointed by the developer who monitors and assists the development in respect of compliance with the EMP, RoD and environmental good practice generally, and who makes regular reports to the DAEA in this regard.

**EKZNW** – Ezemvelo KwaZulu-Natal Wildlife, KwaZulu-Natal's conservation authority

**Homeowners Association** – The governing organization to which all homeowners belong. In terms of this EMP the Homeowners Association shall also be meant to be any similar organization, such as a Body Corporate, established to represent homeowners and regulate their and other activities within the development's boundaries.

**House Rules** – Rules which bind homeowners and activity within the development's boundaries during the development's operational phase.

**NEMA** – National Environmental Management Act (107 of 1998)

**Operational phase** – The period following the end of construction, in which the development is operational and homeowners are in residence. There is often some overlap in phases, as some construction may be continuing while some homeowners have taken occupation of completed homes.

**Pre-construction Phase** – The period in which activities associated with preparation for the construction phase are undertaken.

**Project Manager** – Person or organization appointed to oversee the work of the contractor.

**RoD** – Record of Decision. The RoD is the DAEA’s legal authorization of the development, in which various conditions of authorization are set out.

**Site Manager** – Person who acts for the contractor, responsible for all on site management of the contractor’s activities, including staff.

## **PART 1**

### **1. Introduction**

Zelpy 2074 (Pty) Ltd is to undertake the development of the Zululami Residential Development, which will comprise 255 free-standing and 413 medium-density housing units.

The development will also include:

- A 60 bedroom lodge with restaurant and associated amenities;
- Roads and other services, including 2 parking areas with pedestrian access through Sheffield Beach to the beach;
- A system of private open space linking with neighbouring developments.

The KwaZulu-Natal Development Tribunal, and Department of Agriculture and Environmental Affairs (DAEA) has by its Record of Decision (RoD) authorized the development, subject to conditions.

One of the conditions of authorization is that an Environmental Management Plan (EMP) be compiled for this development.

The EMP is meant to guide development according to the conditions of authorization, recommendations made in the scoping and specialist reports produced during the Environmental Impact Assessment (EIA) process, and environmental good practice generally.

The conditions of the RoD and the EMP are binding on the properties and all current, immediate, future and long term actions pertaining to this property, by both the developer, any successor in title and their agents, and in due course by a Homeowners Association or similar body and individual homeowners. Although the EMP may be updated in future, any amendments must be approved by the DAEA.

### **2. Preconstruction phase**

In terms of the conditions of authorization the following must be attended to before any construction-related activity can commence.

- 2.1** An independent and suitably qualified Environmental Control Officer (ECO), acceptable to the DAEA, must be appointed to monitor and assist the development. The ECO must submit monthly audit reports to the DAEA during the construction phase of the development.
- 2.2** All storm water controls and erosion control mechanisms must be established prior to the commencement of construction.

A storm water management plan, including temporary measures must be produced by an engineer. The plan must be developed in consultation with a wetland specialist according to objectives described in Section 2 of this EMP.

The RoD otherwise requires that it:

- Use vegetation to retain, recharge and purify storm water where possible;
- Allow for extended retention time of storm water in pervious areas so as to increase percolation and recharge to underlying aquifer(s) where present;
- Preserve existing stable drainage patterns;
- Involve use of structures such as gabions to hinder water flow where necessary (see Section 2 of this EMP);
- Prevent erosion on site and sedimentation of wetlands and swamp forest, including swamp forest off site.

This plan must, once approved, be appended to and become part of the EMP.

- 2.3 Rehabilitation of wetlands, involving a wetland specialist, should have already begun.
- 2.4 Due to issues identified during a preliminary geotechnical investigation by Groundwork Geotechnical Solutions, a detailed geotechnical investigation is required for each site of construction and along the route of the internal road network.

Recommendations by a geotechnical engineer must be adhered to.

- 2.5 A heritage practitioner was appointed during the EIA process to conduct a heritage assessment of the site but concluded due to cover by sugar cane this could not properly occur.

Before any construction related activity can take place, the cane must be cut and a full archaeological survey must be carried out by a heritage practitioner acceptable to Amafa. The findings must be conveyed to Amafa who should give authority to proceed before any further construction related activity takes place.

The ECO shall otherwise at any time have the right to stop earthmoving operations through the Site Manager or his designated representative, if deemed necessary to salvage any material.

Should the Contractor or workers discover items of cultural or heritage value work must immediately be stopped and the ECO informed, so that he can make a report to Amafa. Such items could include stone artefacts, foundations, clay ware, jewellery, human remains and fossils. The site of discovery should be treated as per the directions of Amafa.

**2.6** A license must be obtained in terms of Section 21 of the National Water Act from DWAF prior to construction of the road crossings over any watercourse.

**2.7** Suitable sites for any construction camp/s and storage area/s for materials must be confirmed with the Project Manager and the ECO. Requirements for these areas are described further in this EMP.

Working areas must be demarcated so that non-working areas remain intact.

**2.8** Sensitive areas including conservation and wetland areas and any swamp forest must also be identified, demarcated and signage erected, so that they are clearly evident to the general public. Persons working on the site must remain out of these areas, and the ECO must be able to levy strict penalties for transgressions into, and disturbance in these areas.

**2.9** The EMP and conditions of authorization represented in the DAEA's Record of Decision must be made binding on contractors in contracts entered into with contractors.

**2.10** A separate Issues and Complaints Register shall be maintained at the site office, under the control of the person who assumes overall on-site management, according to the ECO's advised format. The ECO will inspect this register on a regular basis, but the site manager must also inform the ECO by telephone of any transgression which can reasonably be considered serious, or upon receipt of a complaint or query from a member of the public.

**2.11** The Contractor must prepare a source statement indicating the source of origin of all materials (including sand, topsoil, gravels, crushed stone, asphalt, clay liners etc.) and submit them to the Project Manager for approval. Materials must be sourced in a legal and sustainable way to prevent off site degradation.

**2.12** Notices of the proposed development should be placed in prominent positions to advise the general public of proposed construction activities, any disruption of traffic, presence of construction vehicles, and interruptions of electricity, before this occurs.

### **3. The ECO**

The ECO must visit the development on a regular basis, which shall be no less than once a month during the construction phase. Sufficient days must be allowed for during any month, by both the ECO and developer, for the ECO to ensure that responsibilities, terms and conditions set out in the EMP and RoD are met, and to be able to report properly on the same.

Notwithstanding any arrangement put in place between the developer/Homeowners Association on one hand, and the ECO on the other, the DAEA may direct that the ECO visits the site at frequencies and to the extent it believes otherwise suitable, or necessary to achieve objectives consistent with the RoD, the EMP or environmental good practice, and that audit or other reports are supplied which address specific issues.

If the appointed ECO is unable for any reason to continue with his duties, another person shall be appointed according to the above criteria.

The DAEA may request replacement of the ECO if it believes that this role is not being satisfactorily performed.

### **4. The EMP and the importance of monitoring**

The Contractor and in due course any Homeowners Association must retain a copy of the EMP on site at all times.

The EMP outlines the measures to be taken prior to construction commencing, during construction and the operational phase of the development, in order to control, minimize or avoid any adverse environmental impacts caused by the development, while optimizing positive features.

Monitoring, carried out in the first instance by the ECO and beginning in the preconstruction phase, forms an integral part of the environmental process, and has the following purposes:

- To ensure compliance with the development's conditions of authorization, EMP and other environmental management documents which may be produced, environmental components of contracts, and environmental good practice generally by persons involved with the development.
- It is used as a feedback mechanism to keep track of potential environmental impacts associated with the development, to assess the effectiveness of mitigation measures, and make changes accordingly.
- To develop a rapport between the professionals who might or may be engaged on the project and the Environmental Control Officer (ECO). It ensures that any unforeseen environmental issues that develop during the contract / contracts are resolved quickly and in the interest of both the environment and the development.

There is non-compliance with the EMP if:

- There is evidence of contravention of clauses.
- If environmental damage ensues due to negligence.
- The Contractor fails to comply with corrective actions of the ECO, Project Manager, municipality or DAÉA within a specified time.
- The Contractor fails to adequately respond to complaints from the public.

Unless otherwise agreed by the DAÉA, monthly audit reports must be supplied to the DAÉA during the construction phase, which must also be copied to the developer, the Project Manager and Contractor.

The ECO is nonetheless required to report to the DAÉA on a more immediate basis, if there is transgression of conditions of authorization or gross transgression of terms of the EMP and environmental good practice generally.

The agents contracted to market the development must be made aware of the environmental sensitivity of the site and of the conditions of authorization and terms of the EMP, in order to avoid any sales misrepresentations.

House Rules must give force to the provisions of the EMP, and homeowners should be provided with these rules, RoD and the EMP at the time of purchase.

In particular homeowners must be informed:

- That indigenous plants should be used in gardens;
- That management towards improvement of natural areas will be ongoing, that this may include burning, and that this rehabilitation and management will need to be funded by the Homeowners Association.
- Dogs shall be kept within a fenced or enclosed area around a dwelling, and only if is feasible for a fence or enclosed area to be established around a particular dwelling.

This shall be durable and entirely effective in keeping any small dog confined within this area, and it is incumbent on the Homeowners Association to ensure that this is so. The fenced or enclosed area shall also be to a specification acceptable to the Homeowners Association.

It should be noted that there shall be penalties if dogs are let out or find their way out of fenced or enclosed areas (see **Section 38 – Penalties for Environmental Contraventions**) which are sufficient to

effectively deter such occurrences, and the Homeowners Association must continue to uphold and enforce such penalties.

- The development is situated within and adjacent to a natural area, and homeowners therefore have responsibilities in reducing impacts on the same.

## **5. Sewage and services**

Only waterborne sewage is to service the proposed development. Disposal of sewer wastewater by means of subsoil percolation systems, septic or conservancy tanks is not allowed.

All services other than the bulk sewer shall be confined to an omnibus servitude adjacent to the road network or midblock between erven.

The main collector sewers may not be laid within the permanent wetland areas other than where the arterial road crosses the stream and where the sewers meet the southeastern boundary of the property to connect into Siza Water.

This should be designed so as to impact on the functioning of wetlands or natural water flow as little as possible.

Any trenches must not exceed 2 metres in width, and the associated work must be contained within 5 metre wide buffer. Vehicle traffic should be confined to the immediate trenching area.

All outfall sewers should be at least 200 mm in diameter, at a minimum grade of 1:150 to prevent blockages.

Services must be installed so as to avoid obstruction of water flow (such as no linear heaps of soil) and at depths sufficient not to be susceptible to fire (i.e. burning of any vegetation must not be able to damage cables or plastic piping etc.).

Occupancy of residential units and the lodge can only take place once all bulk services, including sewerage, are installed and functioning properly.

## **6. Internal and external roads**

Portions of the road network may traverse wetland areas, as shown in Annexure A.

However this should be mitigated as far as possible by:

- Modifying the road to hold it more entirely outside wetland areas, which may then require realignment of the road network;
- Minimizing the width of the road running surface;

- Using free draining granular material for the construction of any fills in wetlands;
- Inclusion of culverts to maintain necessary water flows. These culverts will then need to be maintained, especially keeping the culverts unblocked and free of detritus and sediments;
- Elevating the road above the wetland which may include the construction of a bridge. This would eliminate many of the hydrological concerns or impacts;
- Designing road drainage in the temporary wetland areas to provide cross drainage if the wetland during both flooded and low water conditions.

Roads should otherwise follow natural contours to reduce erosion, have as little cut and fill as possible, and widths and radii of curves should be reduced to the minimum.

Agreed turning areas are to be formalized and used by the Contractor. No turning manoeuvres other than at designated places should occur.

Substances used in construction of roads, such as asphalt, bitumen products or polymer resin should be stored in one designated locality, preferably within a construction camp; extraction of any borrow pit material for the road works shall preferably not be on site.

Any substance decided on for road surfacing must be handled and stored according to the applicable safety and environmental requirements (SABS, ISO etc.). See also the section of this EMP which relates to **Hazardous Substances**.

Unreasonable fouling of road surfaces outside the development must be prevented, with mud being cleaned up timeously and that access and egress from the construction site by heavy vehicles managed by a traffic safety control officer to ensure that approaching motorists are warned.

The recommendations and proposed measures as contained in the document 'Proposed Brettenwood and Zululami Estates – Traffic Impact Assessment, June 2004 – Draft' should be adhered to.

## 7. **Other development restrictions**

Apart from exclusions relating to roads and the sewer line in Sections 5 and 6 above, no other development is allowed within wetland areas and ecological buffer zones.

**8. Alien plant control**

An alien control programme must continue to be carried out on the properties during the construction phase. This is addressed in more detail in Part 2 of this EMP.

**9. General**

Vegetation of significance as identified by the ECO must be protected.

Only vegetation within construction footprints may be removed. Unnecessary damage should not be caused to adjacent vegetation.

During construction, indigenous trees may only be cut or trimmed with the permission of the ECO.

Damage to indigenous vegetation must be rehabilitated as per the directions of the ECO, or if necessary a suitably qualified vegetation specialist.

**10. The construction phase: responsibilities and general matters**

Miscellaneous environmental matters and the relationships between the Project Manager, Contractor, ECO and other members of the professional team are outlined in this section.

**10.1 Acceptance of the EMP**

All contracts entered into by the Developer and Contractor must reference and impose compliance with the EMP and conditions of authorisation as set out in the DAEA's RoD.

Acknowledgement and acceptance of the terms and conditions of the EMP is to be signed by the Developer, the Project Manager and the Contractor. Copies of this acknowledgement are to be retained by the Developer, and provided to the ECO on request.

The ECO in conjunction with the Project Manager must ensure that persons involved in construction have knowledge of this EMP.

The ECO in conjunction with the Project Manager must otherwise also ensure that a staff education process is put in place so that persons working on the site are aware of the contents of the EMP, their environmental responsibilities, penalties and their rights in terms of National Environmental Management Act (NEMA).

In due course contracts entered into by the Homeowners Association and contractors must impose similar compliance, and similar signed acknowledgement and acceptance obtained from such contractors.

## **10.2 The Project Manager**

The Project Manager, as appointed by the developer, shall be in overall charge of the contract and Contractor, and adjudication of contract conditions.

The monthly site minutes shall have an environmental section.

## **10.3 The ECO**

The ECO is to have access to the development at all times, for the purposes of inspecting that the environmental conditions of the contract are being implemented and adhered to, and shall be provided with any information requested.

The Contractor and any other building contractor/s shall have access to the ECO via the Project Manager for advice on the environmental aspects of contracts, and for environmental inspections at specific phases of work done.

In the event of a dispute between the Contractor and the ECO, the Project Manager shall decide the matter. Major conflict must be submitted for external arbitration. If the conflict involves contraventions of the EMP or RoD, this must be referred to the DAEA for final decision.

## **10.4 Penalties**

In the event of contraventions of the EMP or RoD, apart from informing the DAEA, the ECO shall prepare a report and recommendations, in conjunction with the Project Manager, for implementation.

The Project Manager and ECO shall agree on specific environmental clauses contravened and the penalties per contravention.

Penalties shall be according to the schedule attached to this EMP unless otherwise agreed by the Project Manager and ECO, in which case the attached schedule must be updated.

Following the completion of construction, the Homeowners Association shall also be able to amend this schedule, providing such amendments still comprise effective sanctions and have neither the intention nor effect of downplaying the seriousness of environmental contraventions.

## **11. Water and sanitation**

Water fit for human consumption shall be supplied to construction camps and work areas.

Sanitation for staff shall be in the form of chemical toilets serviced daily. Toilets may not be sited within 100 metres of any wetland area, unless otherwise agreed by the Project Manager and ECO.

Under no circumstances may open areas, surrounding bush or neighbouring properties be used as toilets.

Grey-water (domestic) effluent can be disposed of by means of sub-soil drains lined with grease traps and should be situated at least 100 metres away from any wetland area, unless otherwise agreed by the Project Manager and ECO.

## **12. Construction camps**

A construction camp generally contains the site office, ablution facilities, designated first aid area, eating areas, storage areas, equipment and machinery as required, and maintenance areas if required.

There shall be no more than one construction camp per property.

The area required for the construction camp shall be kept to a minimum. When establishing the camp cut and fill should be avoided if possible.

One access route should be provided to any construction camp, demarcated and maintained in satisfactory condition.

The construction camp shall be fenced and secured, and should also accommodate adequate parking for staff and visitors.

The construction camp shall not be sited within 100 metres of wetland areas and conservation areas, unless otherwise agreed by the Project Manager and ECO.

The Contractor must attend to drainage of the camp site to avoid ponding and sheet erosion.

The Contractor should make arrangements to obtain electrical power and lighting for the camp site. Any lighting set up on the properties should not pose a nuisance or hazard to neighbours or road users.

The camp should be maintained in a neat state and be characterized by 'good housekeeping'.

Apart from exceptions noted below, vehicle and machinery servicing should only be undertaken in the construction camps.

If otherwise difficult, servicing of heavy earthmoving equipment 'in field' or in the case of mechanical breakdown, can occur provided suitable measures are employed to prevent the spillage of oils, fuels and other hazardous substance e.g. oil and drip pans for hydraulics and engine/gearbox oils

changes etc. These substances must be removed to the containers in the official camp site.

Should it be necessary to establish accommodation on the site for a night watchman or security personnel, it must be suitable and approved of as such by the Project Manager and ECO.

### **13. Waste management**

The KwaDukuza Municipality will on a weekly basis collect refuse from covered, scavenger-proof vessels placed in service yards to be constructed.

These service yards and any temporary waste collection site/s put in place before this shall be developed as follows:

Refuse must be placed in refuse bags before being placed in containers to minimise odours and spillage.

Service yards must be roofed and fenced or enclosed to prevent scavenging, particularly by animals such as monkeys.

Service yards and temporary storage sites require a storm-water management plan. A berm should be built around any temporary site to avoid the contamination of storm-water.

Contaminated waste and non-recyclable building waste such as rubble and concrete may instead be stored in skips which must be disposed of only to a waste disposal sites registered for this purpose. Private contractors used shall retain weighbridge receipts as proof of this, and provided these to the ECO or Homeowners Association for inspection.

Apart from organic matter, no waste may be buried on the site, and there shall be no burning of waste except as may be needed to destroy alien plant material which can re-establish from such material.

The ECO shall monitor work and construction camp areas for cleanliness.

Employees of the Contractor and other persons may not litter. All other persons, including in due course homeowners and visitors, may not litter. A fine for littering is set out in **Section 35 – Penalties for Environmental Contraventions**.

### **14. Storage**

Storage areas must be fenced off and secure. Impervious and/or roofed surfaces must be provided where necessary. Fire fighting equipment must be maintained next to storage areas, particularly if flammable materials are stored.

## 15. Hazardous substances

Hazardous substances may be poisonous to humans or the natural environment, flammable or carcinogenic. Examples of such substances are explosives, fuels, lubricants, bituminous products, compressed gas, drilling fluids, cements, solvents, solvent-based paints, and pesticides and herbicides.

Hazardous substance storage areas should be signed, restricted access areas within a construction camp, at least behind a fence, and be kept under lock and key.

If situated or adjacent to vegetation, a fire break must be maintained around such storage areas.

The requirements of the Hazardous Substances Act (Act No. 15 of 1973) must be noted.

The Contractor must obtain Material Safety Data Sheets (MSDSs) for all potentially hazardous substances. The required precautions for storage and handling must be implemented.

The Contractor must ensure that staff handling hazardous materials are aware of their impacts and know the health risks associated with handling such substances. Staff must follow appropriate safety measures and be provided with appropriate protective clothing and equipment while working with them.

The Contractor must submit a method statement to the Project Manager and ECO for approval for bunding of areas on which hazardous materials are stored.

As a general recommendation, hazardous substance storage areas must be kept on a hardened surface, graded to the middle and bunded with a suitably dense impermeable liner to prevent contamination of ground or water. Bund walls should accommodate 110% of the volume of the stored material. No damp course must be provided in the bund walls, and there must be no drainage outlet.

It must be ensured that all construction equipment is free of leaks of oil, fuel, and hydraulic fluids, and is cleaned in an area with suitable controlled runoff.

Any spillage inside or outside of bunded areas must be reported to the Project Manager and ECO, contained and cleaned up. Any water containing waste generated as a result of the spillage and associated clean up must be disposed of correctly and safely. Spillages may not be discharged into the storm water system, sewer system or the environment.

Any soil contaminated with hazardous substances must be removed and stored in a sealed container.

All hazardous waste, including empty containers unless retained for refilling with the same substance, must be disposed of at a DWAF approved hazardous waste disposal facility.

All significant spills must be reported to DWAF and other relevant authorities.

#### **16. Fuel storage**

Although construction vehicles could refuel at off-site fuel stations, temporary storage of diesel may be needed during the construction phase.

Fuel storage tanks must comply with the relevant SABS standards. They should be suspended above ground level so that leaks can be detected, with appropriately constructed impervious bunds beneath. Bund walls should accommodate 110% of the maximum volume of the stored material.

Any tank should also be fitted with an overfill protection device.

The condition of the bund wall, tank and associated piping must be inspected on a regular basis. The tank and product lines must be pressure tested prior to commissioning.

Appropriate fire-fighting equipment must be stored in proximity to the fuel storage area.

A best practice procedure for decommissioning of any tank should be obtained from the supplier and contractor and implemented when due.

#### **17. Concrete**

Only municipal or dam water may be used in mixing of concrete.

Concrete mixing should be restricted to certain areas within the construction zone and be set well back from any drainage lines and wetland areas.

Mixing must occur on liners to avoid soil contamination, in places that will not be vegetated in future. In the case of cement mixing for particular house, mixing should occur in only one place in the proximity to the house under construction.

Cleaning of cement mixing and handling equipment shall only be done using proper cleaning trays.

Ready mix concrete should be used where possible, where agreed by the Project Manager, and in accordance with specification requirements.

Cement contaminated water must not be allowed to enter the water system as this affects soil acidity and plant growth.

Should a batch plant be established on site, wastewater must be contained in this area and arrangements for its removal must be made.

No vehicles transporting concrete, asphalt or any other bituminous product may be washed on site.

**18. Servicing and management of vehicles, equipment and machinery (see also *Hazardous substances*)**

It must be ensured that all construction equipment is free of leaks of oil, fuel, and hydraulic fluids.

Major vehicle and machinery servicing shall only be undertaken in the construction camp.

Vehicles and machinery may only be serviced (including minor services and major repairs) in a specifically designated area, on a concrete floor with a central sump to collect oils and spilled substances.

The oils, fuels and spilled substances are to be removed from the above sump weekly and recycled or disposed of at a hazardous waste disposal facility.

The supplier of hired machinery must be made aware of the requirements of this section in the EMP.

**19. Stockpiles**

Any trench excavation material classified by the Project Manager or engineer as unsuitable for use as backfill must be spoiled on site at a spoil area designated by the Project Manager or engineer.

Topsoil (200 mm) shall be conserved from the footprints of built areas and stockpiled to the extent that it can be reused for rehabilitation of disturbed areas, or at the discretion of the Civil Engineering Consultant or ECO.

Stockpiles of topsoil should be stored in the footprint areas of proposed construction.

Stockpiling should not occur close to any wetland area or conservation area, or area comprising good natural vegetation that will remain as such at the end of construction. Stockpiles should also not be located on steep gradients or in the path of drainage.

Stockpiles should not exceed two metres in height, or remain for more than six months.

Soil which is to be stockpiled for more than one month should be grassed only with indigenous species as per the ECO's specification and maintained in weed free condition.

**20. The management of air pollutants**

The requirements of the Atmospheric Pollution Prevention Act (Act No. 45 of 1965) must be noted.

All vehicles must be in good working order.

Dust must be controlled in a reasonable and responsible manner.

Dust must be specifically controlled in dry, windy months, particularly given the high wind velocities common in the region. Water may be used, but shall not be extracted from watercourses for this purpose.

Stockpiles of soil must be dampened on a regular basis, or if vegetated dampened until vegetation cover establishes.

All dirt road surfaces must be dampened on a regular basis to suppress dust.

**21. Workable areas and access**

Wetland areas and ecological buffer zones are 'no-go' areas for those involved in construction, except insofar as permissible services and roads may need to cross them.

Working spaces to be worked at any one time must be demarcated by a surveyor.

The movement of earth-moving machinery shall be restricted to these areas of work and footprint areas, unless it is necessary to operate outside these areas for a specific reason and is approved by the Project Manager and ECO.

**22. Erosion control**

A staged approach must be used when stripping areas to be developed of vegetation.

Any cuts and fills must be stabilised, and grassed or vegetated as soon after completion as possible. Only indigenous grass or other species may be used, as per the ECO's specification.

For fill embankments the ground must be stripped of vegetation and topsoil must be removed and stockpiled. Final platform levels should be evenly graded.

After construction, any other bare or denuded areas remaining should also be grassed or vegetated as soon as possible. Only indigenous grass or other species may be used, as per the ECO's specification.

It would be beneficial if large-scale earthmoving and working operations could be scheduled for months that have a lower mean rainfall, but it is accepted that this is not always practically possible.

No liquid waste, rock, silt, cement, grout, asphalt, petroleum product, timber, vegetation, domestic waste, or rubble and metal discards must be placed in or allowed to disperse into wetland areas or their buffers, or conservation areas, or the storm water system or sewage system.

Concentrated flows across unprotected surfaces and ponding must be prevented. In addition to contouring and use of vegetation, other temporary control measures may include berms and use of sandbags.

More information on storm water management controls is provided in the storm water management plan attached to this EMP.

### **23. Health and safety and behaviour of construction staff**

The contents of the Occupational Health and Safety Act (Act No. 85 of 1993) must be noted.

A complete first aid kit must be present on site and in the construction camp or camps as the case may be, at all times.

Due to possibility of staff working in areas inhabited by venomous snakes (puff adders, mambas, and boomslang), advice from the local medical care institutions is recommended prior to the contract.

A qualified First Aid person must be a permanent member of staff.

The necessary precautions and equipment to combat fire should be present.

Kitchen facilities for construction staff must be provided in designated areas.

A general regard for the environment and neighbouring residents is expected of site staff.

Workers should be made aware of the following rules:

- No alcohol or drugs on the site.
- No firearms to be brought to the site.
- Trespassing onto neighbouring properties, even if vacant, is forbidden.
- No excessive or unnecessary noise (such as shouting) is to be created on site or directed towards neighbours.
- Pets or animals are not to be brought onto site.

Employees must undergo safety training and wear safety clothing as may be required for particular work.

No worker may be forced to do work that is potentially dangerous or he or she has not been trained to do.

**24. Other safety measures**

The Contractor shall control access by the general public including hawkers to the development and work areas, as approved by the Project Manager.

Excavations should be clearly demarcated and backfilled as soon as possible.

No open fires or burning of rubbish is allowed, except to dispose of alien plant material or as otherwise authorized by the ECO and Project Manager, in which case permission must be obtained from the relevant authority. Persons involved with construction work should not cook with exposed primus stoves, gas burners or braais.

**25. Noise**

Standard mufflers are to be fitted to construction vehicles and machinery and kept in good working order.

Activities associated with high noise levels must be restricted to normal working hours.

**26. Fencing**

Fencing must be permeable to animals up to at least the size of Grey Duiker.

EKZMW will be consulted on game permeable fencing alternatives and the solution and specification shall be acceptable to EKZMW, before any solution is approved or installed. Should any part of the fence or specification be changed in future this must also be approved by EKZMW.

Berms shall be established along maintenance paths where necessary, to prevent erosion.

Where ground is exposed in consequence of fence construction activity, it should be vegetated with indigenous grass or other vegetation cover to the ECO's specification.

Mowing the maintenance paths must be considered where possible; herbicide for invasive plants should be used where mowing is not practicable.

The natural vegetation next to the maintenance paths must be regularly checked for invasion of alien species. Any alien species must be combated.

Whether during the construction or operational phase of the development, should larger animals such as Bushbuck and Bushpig become trapped within entirely fenced areas of the development, EKZWN should be immediately contacted for advice and all efforts must be made to relocate animals to outside of the confined area. Should EKZWN not be able to do so, a competent contractor acceptable to EKZWN must be utilized. Any costs incurred in doing so shall be for the Developer's account during the construction phase and the Homeowners Association during the operational phase.

Should any wild animal be found injured within the Development, whether human agency is involved in the injury or not, or the person responsible can be identified or not, the ECO and EKZWN must be immediately contacted and the animal treated and rehabilitated without delay, according to the extent deemed necessary by EKZWN and veterinary advice. Any cost in doing so shall be met by the Developer or Homeowners Association, with clause 37.4 of this EMP applicable.

During construction there shall be no internal fencing except around camp sites, storage areas, and waste storage and collection sites.

## **27. Rehabilitation**

The ECO shall inspect the various contract sites prior to practical completion being given to the contractor, and an environmental snag list shall be compiled for the Project Manager. The snag list shall form the base of measurement and monitoring for the closure of the contract period.

After the civil works are complete, all sites not to be built on immediately but barren, shall be grassed or provided with a suitable ground cover, in order to prevent soil erosion.

Rehabilitation of civil contract sites can begin as soon as service installations are complete.

On completion of works requiring maintenance of any construction camp the construction camp and storage structures should be dismantled and removed, and any hardened surfaces ripped.

The area should be checked for any spills of harmful substances and any should be cleaned up.

All foreign debris, wastes, tailings and any foreign matter associated with the contract shall be removed from construction camp/s and the properties and disposed of in a responsible manner.

All disturbed sites within the development area must be rehabilitated, if necessary by means of shaping/profiling and top soiling with the stockpiled topsoil, and sown with appropriate indigenous grass or other indigenous ground cover, as specified by the ECO.

All alien vegetation which may have established as a result of disturbance caused by construction must be destroyed.

Any disturbance in forest margins must be rehabilitated as specified by the ECO.

## **28. Building of houses/buildings**

All the relevant considerations set out above applying to the construction phase, as set out above, apply to the building of houses, whether by the developer or individual homeowners. All relevant provisions of this EMP also apply to the building of houses by individual homeowners.

Homeowners are deemed responsible for the actions of their contractors on their stands and elsewhere on the properties.

As with the developer, homeowners shall ensure that their contractors are aware of and accept the terms and conditions of this EMP, including that they are liable for penalties if there are contraventions. Their contractors shall sign a declaration confirming the same, which shall be lodged with the Homeowners Association or the developer if a Homeowners Association is not yet in place.

The ECO shall be notified prior to construction of particular houses and shall monitor construction.

The footprint of hard structures must as far as possible accommodate indigenous trees and natural vegetation.

Any indigenous trees on an stand or in proximity to a house should be identified to species, surveyed into and shown in a site plan so that it can be seen which trees will be affected. The assistance of a vegetation specialist should be obtained, if the ECO cannot identify and assess the conservation significance of particular trees or vegetation which may be affected by construction.

Following this, and in consultation with the ECO, positioning should as far as possible be made to accommodate trees and sensitive vegetation.

Apart from this, only indigenous trees or vegetation within the footprint area which cannot be accommodated may be damaged or destroyed. Contractors must ensure that all other indigenous trees which are to be retained are protected during construction.

Indigenous vegetation in footprint areas designated as significant by the ECO and liable to be damaged by construction must be relocated to non-footprint areas or elsewhere on the properties. This must be done under supervision of a qualified vegetation specialist or horticulturalist, and shall be maintained as necessary.

The site clearance means appropriate removal, and/or termination of alien vegetation over the area of the site where the building activity will take place.

Following construction, any land adjacent to hard structures which is disturbed shall be rehabilitated with indigenous vegetation cover as per the ECO's recommendations.

In respect of each house the following should occur:

- The position of footprint, including access should be identified and pegged.
- A screen of shade cloth at least 1,8 metres high should be erected outside the construction area, to enclose the footprint, up to the access entrance. The screen is to prevent the spread of building materials and waste across the site; to prevent wind erosion and dust being blown from the property; to prevent percolation of any materials or pollutants outside of the construction area; to prevent any disturbance of indigenous plant material and for privacy where the owner of an adjacent property may be in residence.
- Unless otherwise agreed by the ECO, any temporary site office or structure, temporary toilet facilities (which must be provided) and storage facilities must be positioned within the screened area.
- The builder must retain a register on site as per the ECO's specification and record any contravention or issue in respect of the EMP. Upon making such a record, he must also inform the ECO by telephone of the same.

For all other construction of houses, whether by the developer or an individual homeowner, the following applies:

- The supply of fittings for the water supply is to be in accordance with the SABS requirements. There must be no leakage seepage, erosion or soil loss due to lack of water controls during the construction period.
- Solid waste, debris and refuse connected with the building of any house must be well controlled. Litterbins should be positioned in proximity and there should also within this area be collection point such as a skip for building waste. There shall be regular removal of building waste to a registered landfill site. Unless otherwise agreed by the ECO or in due course the Homeowners Association any litterbin, waste collection point or skip shall be within the screened area.

## **29. Earthworks and site stability**

Where individual homeowners are building houses, they assume responsibility and cost for the following.

All earthworks including cut and fill operations, platforming and engineered walls must be approved by an engineer or geotechnical engineer.

All earthworks including cut and fill operations must be monitored and supervised to ensure that the topsoil screed (the top 20 mm) is removed and stored during any leveling, or cut and fill operations. The reserved topsoil must be returned to any banks or slopes, garden areas or elsewhere on the site as will benefit from this addition.

The topsoil of the area to be covered by hard structures shall be removed and stockpiled. After the hard structure has been built, the topsoil shall be used to supplement topsoil in garden areas, or elsewhere under the direction of the ECO.

Excess sub-soil materials not required on site, or surplus topsoil which cannot be accommodated must be responsibly disposed of off site. No excess soil material may be dumped within the Zululami Estate.

Wherever possible, bank re-planting and stabilization must take place as soon as possible.

The builder must advise the appointed professional team without delay of any erosion re-occurrence with breaching of the bank and slopes, or adverse storm-water problems affecting a particular building site.

Retaining wall systems must be put in place without delay, and in accordance with the engineered design to prevent collapse or subsidence of sub-soil deposits.

All engineered banks and retaining wall systems require certification by an Engineer.

## **30. General matters: buildings**

Builders or contractors building buildings/houses must obtain a suitable fire extinguisher, which is to be retained on the site on which construction is occurring or in proximity thereto, to be used against any spot ignition of flammable material.

Mixing cement shall occur on an impermeable surface so as not to come into contact with the soil.

Cement spoil shall be removed completely at the end of the construction of that house or structure, and disposed of to a registered landfill site.

An effort shall be made to aggregate cement spoil and any other building waste prior to removal, so that it is not widely spread around a construction area.

Persons involved in building houses/ buildings must make themselves available for meetings with the ECO, if required.

On completion of houses/buildings, sites on which this construction has occurred must be cleared of all waste and other polluting material, and inspected by the ECO for compliance with the EMP, whose approval shall be required prior to the final payment being made to any builder or contractor.

### **31. Rules for both construction and operational phases**

The following rules apply to both construction and operational phases of the development.

There shall be no removal of bark from any indigenous tree species.

There shall be no removal, excavation or harvesting of any other indigenous plant material from the properties, unless of material cleared to make way for construction, or required in terms of the developments approved wetland and other rehabilitation plans, or for bone fide scientific study or research.

There shall be no disturbing, harassing, hunting or capturing (by trapping, snaring, shooting or by any other means) of any fauna on any part of the properties or adjacent areas, with the exception of Indian Mynahs and European Starlings.

Moles have right of way through lawns and gardens and may not be destroyed.

Wild animals may only be harmed if they pose a clear and present danger to a person. The mere presence of a snake is not considered to pose such a clear and present danger. If a snake enters a dwelling, the appropriate course of action is for homeowners not to interfere with snake themselves, but contact the ECO or Homeowners Association.

The ECO or Homeowners Association should then arrange for an appropriately qualified person to safely remove the snake and preferably return it unharmed to a natural area on the properties.

There shall be no feeding of fauna, particularly monkeys.

### **32. The implementation/operational phase**

#### **32.1 House Rules and funding of environmental commitments**

The Homeowners Association and homeowners must continue to implement the provisions of the EMP, including rehabilitation as set

out in Section 2 of natural and wetland areas on the property on a year-to-year basis, and must budget sufficient funds for this.

The EMP can be updated and changed provided changes find the approval of the DAEA.

As noted, from the outset House Rules must give force to the provisions of the EMP. House Rules may not thereafter be changed to contradict the EMP, or to void or enfeeble any of its provisions, unless with prior approval of the DAEA.

### **32.2 Refuse removal**

Refuse removal shall be the responsibility of the Homeowners Association. Waste must be collected internally by the Homeowners Association or its contractor and deposited at a service yard for weekly collection by the municipality.

A culture of recycling and re-use must be promoted amongst the homeowners.

Any non-recyclable material which may not be accepted by the municipality for disposal, such as building waste or rubble, shall be disposed of to a registered landfill site.

The Homeowners Association and homeowners must ensure that monkeys and other wildlife do not have access to refuse, including when it is put out for collection.

Refuse holders or receptacles which will prevent this must be placed outside each house, for the temporary storage of refuse bags on days of internal refuse collection.

It is again noted that littering, including by contractors, staff, homeowners and visitors, is forbidden, and a fine for littering, which must be enforced, is set out in **Section 38 – Penalties for Environmental Contraventions**.

### **32.3 Pets**

Dogs must not create a nuisance to other residents by loud or excessive barking. The Homeowners Association shall investigate any complaint of such nuisance by any homeowner or guest and shall provide and enforce fines which are sufficient to deter such nuisance.

The Homeowners Association shall order any homeowner or owner of a dog to permanently remove any dog from the Development should any dog constitute a persistent nuisance. Should any dog repetitively, and after any fine or due warning has been raised, find its way out of a fenced or enclosed area the Homeowners Association shall likewise

order permanent removal of the dog from the Development and any homeowner or owner of such a dog shall comply with such an instruction.

Fines for these contraventions are set out in **Section 38 – Penalties for Environmental Contraventions.**

**34. Environmental auditing during the operational phase**

Following completion of construction of all infrastructure and buildings, the development must be audited by a suitably qualified independent ECO, acceptable to the DAEA, on an annual basis or as otherwise required by the DAEA. The ECO must, following the audit, present a report to the DAEA and EKZNW on compliance with the EMP, RoD and environmental good practice within the development generally, including management of and rehabilitation of wetlands and natural areas as described in Section 2.

This shall be copied to the Homeowners Association. The Homeowners Association must then remedy identified deficiencies in compliance, consider any recommendations reasonably made, and follow advisements made by the DAEA and EKZNW.

**35. Penalties for Environmental Contraventions**

Penalties raised for environmental contraventions must be utilized for environmental rehabilitation work/alternately to benefit the environment within the development area. If penalties have accumulated more than sufficiently to achieve this purpose any excess may also be provided towards another other conservation-significant purpose which finds the approval of EKZNW.

Any person involved with the development, whether a contractor, employee, homeowner, invitee, guest or other person, who transgresses the EMP or House Rules insofar as they give force to the EMP, shall be liable for the following penalties. In the event of being unable to recover penalties from an employee, guest or invitee, such penalties may be instead recovered from the employer or the homeowner or other person who allowed, invited or otherwise brought the offender into the Development.

Fines may be raised by the ECO and Project Manager, or in due course the Homeowners Association.

Fines must be reviewed from time to time by the Developer and in due course the Homeowners Association to ensure that the amounts do not in real terms diminish due to inflation. Any amended or updated schedule of fines must be attached to this EMP.

Persons aware of contraventions of the EMP have a duty to report these, and not doing so or withholding information about a contravention shall also constitute an offence, which may be fined under Section 38.12.

Fines are set out according to categories below.

- 35.1** Damage to or destruction of any protected tree without obtaining authorisation from DWAF: R10 000 per tree. In addition the ECO or Homeowners Association will be obliged to report this offence to DWAF.
- 35.2** Wilful or negligent damage or destruction of any other indigenous tree or closed canopy area within the development area, contrary to provisions of the EMP: Up to R5 000 per tree, to a maximum of R50 000, subject to further such acts, after warning by the ECO or Homeowners Association or raising of fines, being liable to attract such penalties anew. In addition, in the case of any damage or destruction to a closed canopy area the ECO or Homeowners Association will be obliged to report this offence to DWAF.
- 35.3** Wilful or negligent damage or destruction of smaller indigenous plants within the development area, contrary to provisions of the EMP: Up to R500 per plant to a maximum of R10 000, subject to further such acts, after warning or levying of fines, being liable to attract such penalties anew.

Notwithstanding these penalties, any person responsible for damaging or destroying indigenous vegetation in this fashion shall also and additionally be liable for the costs of any replacement or rehabilitation measures.

- 35.4** Chasing, harassing, or capturing (unless for reason of removing from inside a dwelling) or deliberately or negligently harming or killing any wild mammal, bird, leguaan or monitor lizard, or snake, provided that such an animal did not at the time pose a clear and present danger to any person: R10 000 per animal.

In the case of any deliberate, negligent or accidental harm to any wild mammal, bird, leguaan or monitor lizard, or snake (and separately if caused without deliberate purpose or negligence), EKZMW shall be immediately informed and the person responsible shall also be liable for any costs required for the veterinary treatment and rehabilitation of such injured wild animal.

Veterinary treatment and rehabilitation shall be to the extent deemed necessary by EKZMW and the competent veterinarian treating the animal.

If there will be any delay in securing funds from the person responsible, which prevents immediate treatment or subsequent rehabilitation of the injured animal, the Developer (during the construction phase) or Homeowners Association (during the

operational phase) must meet these costs, but shall then be able to recover these from the person responsible.

Should this be necessary during overlap of the construction and operational phases, the ECO shall direct the Developer to obtain and fund treatment and rehabilitation, if the person who caused the injury is connected with the Developer or Contractor, or order the Homeowners Association to do so if the person responsible is a Homeowner, or connected with a Homeowner or the Homeowners Association. If he is not able to make an immediate and clear determination in this regard, ECO shall also at his sole discretion, and in the interests of obtaining swift treatment, order either one do so, in which case the designated party must comply.

- 35.5 Chasing, harassing, capturing (unless for reason of removing from inside a dwelling) or deliberately or negligently harming or killing any crustacean, amphibian or other reptile: R1 000 per animal.
- 35.6 The entering of any person working in the development area, without good reason in the opinion of the ECO, Project Manager or Homeowners Association, into ecological buffer zones: Up to R2 000 with the amount determined at the discretion of the ECO and Project Manager, or the Homeowners Association.
- 35.7 Feeding of monkeys: R1 000.
- 35.8 Planting of any alien plant species: Up to R1 000 with the amount determined at the discretion of the ECO and Project Manager, or the Homeowners Association, subject to repeat plantings being liable to attract such fines anew. In addition the alien plant species must be destroyed or removed from the development area by or at the cost of the person responsible.
- 35.9 Littering: Up to R1 000 per incident, with the amount determined at the discretion of the ECO and Project Manager, or the Homeowners Association.

In addition the person responsible shall meet the costs of any clean up required.

- 35.10 Dogs finding their way out of enclosed or fenced areas around any home, or posing a nuisance to other residents by barking: R1 000, subject to repeat behaviour being liable to attract such fines anew. In addition the Homeowners Association may require that dogs constituting a persistent nuisance be permanently removed from the Development, and the homeowner or dog owner concerned must comply with such an instruction.

If, after a fine or due warning has been raised, any dog repetitively finds it way out of any fenced or enclosed area around a dwelling, the

Homeowners Association shall require that such a dog also be permanently removed from the Development. Any homeowner or dog owner shall comply with such an instruction.

If any dog, after finding its way out of any fenced or enclosed area around a dwelling kills, injures, chases or harasses any wild animal, clauses 37.4 and 37.5 will also apply to the homeowner or person concerned, if the dog was let out deliberately, or otherwise escaped due to negligence. Negligence shall also be considered failing to erect a proper fence or enclosure, or keeping the same in good repair.

**35.11** Persons otherwise creating noise which constitutes a nuisance, or otherwise disturbing the peace, as would be apprehended as such by a reasonable person: Up to R1000, subject to repeat behaviour being liable to attract such fines anew. In addition the Homeowners Association shall be able to require homeowners to instruct tenants constituting a persistent nuisance to permanently vacate the development. In the event of the Homeowners Association being unable to recover a fine from any occupant or guest within a specified time, the Homeowners Association shall be able to instead recover the fine from the homeowner concerned.

**35.12** Any other contravention of EMP or environmental clauses of House Rules, as considered such by the ECO and Project Manager, or the Homeowners Association: Up to R10 000 per infraction with the amount determined at the discretion of the either the ECO and Project Manager, or the Homeowners Association.

In addition the person responsible may also be required to meet the costs of remedial or rehabilitation measures as deemed necessary.

**35.13** Any person performing work within and for the development, or any visitor may be excluded from the development for contravention of the EMP, if in the opinion of the Project Manager and the ECO this is in the interests of the development or the environment. The Homeowners Association may also exclude such a person, visitor or guest on the same grounds.

**ANNEXURE A: Site Plan**

*(Copy of Final Detail Layout to be inserted)*

**ANNEXURE B**

<b>ENVIRONMENTAL ISSUES AND COMPLAINTS REGISTER</b>		<b>Entry no.</b>	
<b>Date:</b>		<b>Time:</b>	
<b>Reported by (name):</b>			
<b>Telephone:</b>		<b>Address:</b>	
<b>Affiliation:</b>			
<b>Issue or complaint:</b>			
<b>Action taken:</b>			
<b>Action taken by:</b>			
<b>Date action taken:</b>			
<b>Reported to ECO</b>	<b>Date:</b>		<b>Time:</b>

## PART 2

### 36. Introduction

The land which is to be developed is presently cultivated for sugar cane. Wetland areas occur on the land, but these have been impacted upon by farming activity, in and in places cultivation extended into them.

Small amounts of indigenous vegetation persist outside cultivated areas and wetland areas, which comprises degraded hygrophilous vegetation, secondary grassy growth or scrub.

The Zululami Estate also abuts a significant remnant of swamp forest, some of it in good condition.

Part 2 of the EMP is intended to provide a framework for rehabilitation of the property on which the Zululami Estate is to be developed, as follows:

- Destruction of sugar cane and alien vegetation.
- Establishment in its place of secondary grass cover.
- Differentiation of secondary grass cover in conservation and open space areas to more species-rich grassland, and woody vegetation, including to patches of swamp and coastal forest.
- Rehabilitation of wetlands.
- Landscaping and gardening of areas outside of conservation areas.
- Guidelines which are relevant to civil works and other construction insofar as this will assist all of the objectives above.

During the construction phase of the development this rehabilitation plan must be carried out by the Developer. However, during the operational phase this plan, insofar as any objectives are outstanding, must be carried out by the Homeowners Association on a year-to-year basis.

### 37. Destruction of sugar cane

Sugar cane must be destroyed by herbicide application.

Depending on the herbicide used, and if glyphosphate, at the point at which it is evident that cane is dead it will be safe to begin re-vegetation.

As an alternative to burning of cane, plants can be cut down and aerial parts stacked in continuous lines along contours, to prevent erosion.

## 38. Plant Establishment

Wherever possible grass cover should be cultivated parallel to contours.

Ground should also, where possible, be prepared for seeding. Plants with small seeds such as grasses establish on a fine seedbed best. However, a rougher seedbed should be prepared where the risk of soil dispersion or erosion is high, such as on most of this site, by scarifying to a depth of about 50 mm to 75 mm. Compacted soils require ripping to a depth of 300 mm.

Seeding can be accomplished in the following ways. In all cases, if seeding is not followed by regular rain, follow-up watering should occur to aid germination and quick establishment. Irrigation is essential if establishment is attempted during dry times of the year.

Furthermore, whatever the method used, treated areas shall be inspected and monitored afterwards and periodically thereafter. Areas which fail to establish cover adequate to prevent erosion shall be reseeded and re-mulched as soon as such areas are identified.

**38.1 Broadcasting** involves using a simple hand spinner or tractor implements and is useful mainly for very small areas (<1 ha) or lands that are inaccessible to conventional implements. Generally, broadcasting should be limited to slopes no steeper than 1:3. Broadcasting should not occur in high wind conditions. Even cover can be best achieved by applying half of the total mix in one direction and the second half of mix in direction perpendicular to first half. Sand can be added to the mix to assist with even spread. Soil should be harrowed after seed has been applied.

Germination and establishment will be assisted by applying a mulch or weed-free straw at a rate of two tons per acre immediately after applying seed. In order to prevent winnowing out of straw cover, it should be crimped into the ground to a depth of 50 mm using a crimping disc or similar device.

As an alternative to crimping, a tackifying or bonding agent may be applied using hydroseed equipment at a rate of 50 kg/acre, or at the manufacturer's advised specification.

**38.2 Drill seeding** is carried out by tractor. Seed (and fertiliser) is injected into the ground via a disc or tine in a single pass application to a depth of about 7 to 15 millimetres. This provides better establishment, and reduced seed loss to birds and insects. This is usually the most cost effective method of establishing plants from seed.

**38.3 Hydraulic seeding** is quick and effective especially on steep, critical slopes and inaccessible areas that cannot practically be seeded by other methods. Including a tracking dye with the tackifier will visually aid uniform application.

**Hydroseeding** includes seed, water, fertilizer and a small amount of mulch in a slurry transported in a tank, either truck or trailer mounted and sprayed over prepared ground in a uniform layer. A tracking dye may be included to visually aid uniform distribution. The mulch in the hydroseed mixture helps maintain the moisture level of the seed and seedlings.

Although hydraulic planting is more expensive than manual seeding and mulching, it has many benefits. Compared to broadcasting the seed blend can be distributed uniformly, the added mass increases accuracy and throw distance, especially in exposed, windy areas, while pre-soaking and water accelerates germination and enhances the chance of survival.

Compared to hydromulching (see below) it is better suited to flatter land. Like other forms of seeding it should be carried out in suitable weather conditions.

**Hydromulching** is essentially the same operation as hydroseeding, but includes a much higher mulch rate and usually has other ingredients including fertilizer, dye and tackifying agents (water soluble binders) which bond the application to the soil surface.

Hydromulching is useful where:

- Areas cannot be accessed by machinery, such as tractors.
- Slopes are steeper than 1:3 or otherwise are of such gradient and consistency that they cannot receive adequate seedbed preparation and mulch is difficult to anchor.
- Slopes have irregular surfaces, with large clods, stones or a high percentage of rock.
- Conditions such as irregular soil surfaces, existing vegetation and shallow soils preclude the installation of erosion control blankets and mats.
- Soil stabilization, seeding, and mulching will cause unacceptable levels of disturbance.
- It is desirable to apply water, seed, mulch and tackifiers in one or more quick operations.
- Dust control is also needed.

Before applying, the soil surface should be roughened without removing topsoil, such as by careful scarifying with a grader comb blade, and the soil is saturated with water.

The mulch should be mixed with seed, water and any other additives as specified and applied at a rate recommended by the manufacturer/s in order to achieve uniform, effective coverage.

Mulches used in these operations typically include wood or paper fibre or combinations of both, vegetative mulches such as from sugar cane or flax, or polyester and/or polypropylene fibres. Paper and wood based mulch is generally inferior to vegetative and polyester/polypropylene products, with vegetative mulches offering superior biodegradability.

A robust class of products is designated as Bonded Fibre Matrix. This is a term used within the erosion control industry to categorize hydraulically applied products which are designed to match or exceed the performance of erosion control blankets.

After application the matrix dries as continuous layer of elongated fibre strands held together by a water-resistant bonding agent, with a tackifier which binds the cover to the soil surface. The matrix has no holes greater than one millimetre and so prevents raindrops from hitting the soil, while allowing water to percolate through. It has high water-holding capacity, does not form a crust that inhibits plant growth, and harmlessly biodegrades.

Fertilizer and seed are accommodated into the mix at the manufacturer's specification and may need to be applied at rates of 6 tons/hectare.

Two applications may be needed to prevent shadowing on rough ground.

**38.4 Turfing** should be applied where immediate cover is required for stabilisation. Particular candidates are drainage channels and steep banks.

Turf should be:

- placed on a bed of fertilised topsoil of a minimum depth of 75 mm;
- laid parallel to the contour on sites with steep slope gradients;
- under or over a pegged artificial mesh (e.g. a light polypropylene, UV stabilised mesh with about 20mm openings) in areas of very high water velocity;
- Tamped immediately as laid;
- where necessary, pegged to the soil at 1 to 2 metre centres;

- watered immediately to enhance establishment;
- watered regularly for the first seven days or as required to effect establishment.
- Where conditions do not require uniform turfing, grass plugs may be established between lines of turf.

**38.5** **Mulches** provide a protective cover for the soil surface to prevent erosion of loose soil/fertiliser and help the establishment of plants by reducing evaporation and increasing water infiltration. Mulching is not well suited to very steep slopes or sandy soils.

Mulches should be 30 to 40 millimetres thick as thicker mulches (75 to 100 millimetres) inhibit germination, but do control weeds.

Mulches are easily washed away and may need anchoring. Applied hydraulically, bitumen emulsions are often used to bind mulches such as straw or cane toppings. These products are environmentally inert and are not toxic or hazardous to plant or animal life.

As they add to the nutrient and oxygen demand load, mulches are used adjacent to streams or other drainage should be stabilized with netting and/or a sediment fence should be set in place on sloping sites to capture dislodged material before it enters any waterway

**38.6** **Compost blankets** may be useful in small areas. They provide a layer of loosely composted organic material placed on bare ground in disturbed areas to prevent erosion and retain sediment resulting from sheet-flow runoff. It is a topsoil supplement and, so can be used on poorer soils.

They can be used in place of traditional sediment and erosion control tools such as mulch, netting, or chemical stabilization. When properly applied, the erosion control compost forms a blanket that completely covers the ground surface. This blanket prevents storm water erosion by:

- Presenting a more permeable surface to the oncoming sheet flow, thus facilitating
- infiltration;
- Infilling in small rills and voids to limit channelized flow; and
- Promoting establishment of vegetation on the surface.

**38.7** **Geotextiles** (also referred to as erosion control blankets or mats) are any permeable textile material that is used to holding seed, fertilizers

and/or topsoil in place, or holding disturbed soil on steep slopes and graded sites, in order to prevent erosion. They are also often used in constructed channel ways.

In contrast, a geomembrane is a continuous membrane-type liner or barrier which has low permeability. A geotextile is designed to be permeable to allow the flow of fluids through it or in it, while a geomembrane is designed to limit water flow.

Good surface preparation is critical, as the soil surface should be relatively smooth and without projections. The blanket or mat should extend beyond the edge of the area to be covered, with the top end buried in a trench at least 10 centimetres deep by 20 centimetres wide. The mat or blanket will need to be further secured with staples. There must be maximum soil contact to prevent erosion underneath.

Although geotextiles have historically been made of natural plant materials, geotextiles are increasingly made from a synthetic polymer or a composite of natural and synthetic material.

Plant fibre-based geotextiles are subject to decomposition and have a limited durability. However they may be left in place to form an organic mulch to help in establishment of vegetation. Different fibres will degrade at different rates. Coir geotextiles degrade in 2-3 years while jute degrades in 1-2 years. Coir is therefore useful in situations where vegetation will take longer to establish, and jute is useful in low rainfall areas because it absorbs more moisture.

The synthetic polymers have the advantage of not decaying under biological and chemical processes, products are better suited to reuse, but being a petrochemical-based product if left to decay may cause environmental pollution.

Ideally, vegetation is the best form of erosion control, with geotextiles only used for temporary stabilization purposes until this can establish. In coastal areas, geotextiles are only superior to hydromulching in the following situations:

When the growing season is short or unfavourable and plants cannot stabilize a slope quickly;

When surfaces are so unstable or contours so channelled that a heavy rain could result in significant and costly erosion damage.

Due to ease of use and low maintenance, geotextiles may be used in situations where hydromulching is a more appropriate choice. Geotextiles can be ineffective when flows can get beneath the blanket/mat, and they may also mask slope failures until erosion is too

far advanced to effectively and cheaply remediate the slope. In contrast where hydraulic applications fail damage is visible early.

### **39. Scheduling and turnarounds**

Eradication of cane and re-vegetation should occur on the basis that lands are exposed to forces of soil erosion for minimum time.

After cutting down or burning of sugar cane, re-vegetation should occur according to the following guidelines:

Watercourses, drainage lines and slopes with a gradient greater than 1:3: Good germination of grass cover over at least 70% of the treated area within two weeks.

All other areas: Good germination of grass cover over at least 70% of the treated area within one month.

No larger area of sugar cane should be destroyed in any one of these cycles than possible to so convert within these time frames, with the resources available. In other words, don't bite of more at once than one can properly chew.

If this approach is not followed, areas of the property will remain denuded of vegetation for longer periods, resulting in avoidable erosion and degradation of wetlands, which may be more difficult or expensive to remediate than to avoid in the first place.

First compartments should be identified for sequencing within the grassing programme, which as this continues will steadily diminish the cane covered area.

On long, erosion-critical slopes compartments should form longitudinal bands interspersed with cane.

Once good closed grass cover has established in the planted bands, intervening sugar cane can be destroyed and also replanted with grass cover.

These bands should be wide enough to allow machinery to work quickly and easily, but taking this into account narrower bands with greater interspersal of cane corridors should occur.

Establishment of plants should not be attempted during hot, dry periods unless sufficient water can be applied artificially.

Following sowing there must be monitoring and maintenance. A water truck is unlikely to be able to keep up watering requirements in dry periods for anything but small areas (such as one acre) and over larger areas a sprinkler or drip irrigation system will probably be needed. There should be spot-treatment of recalcitrant cane or alien plant, and failure replacement.

The developer and contractor must, in consultation with the ECO, input these principles into a work plan which schedules particular areas for transformation, identifies best practice methods and corresponding resources needed for each area, all within an overall time frame for total transformation of cane land on the estate to secondary grassland. This work plan must find the ECO's support.

#### **40. Watercourses and drainage lines**

Wetlands, watercourses and lines of drainage lines are likely to be the major sources of erosion and sediment flow. Sugar cane cultivation extends into these areas. These areas should be prioritised for replacement of sugar cane with grass cover.

Following destruction of sugar cane in or alongside these areas, in addition to any planting, temporary, non-vegetative anti-erosion measures must also be implemented. These areas should also be prioritised for follow-up monitoring and attention.

#### **41. Grass mixes**

No invasive, alien grass species should be used on the Zululami Estate. Grasses in this category include Kikuyu (*Pennisetum clandestinum*) and Buffalo Grass (*Stenotaphrum secundatum*).

Cultivars of naturally occurring species such as *Cynodon dactylon* (Couch Grass) and *Dactyloctenium australe* (LM Grass) may be used in lawns.

Providing these are available, grasses sown in the natural area should preferably comprise suitable species which would naturally occur in coastal grassland north of Durban.

Seed should be obtained from a reputable supplier, according to relative availability and confirmed as suitable for growing conditions, namely establishing a good ground cover inside or outside of wetland areas.

Species listed below are common constituents of grassland on this part of the coast. Although grassland in the natural area should be comprised of as many species as possible, practically, and particularly in the aftermath of destruction of cane, for reasons of practicability and availability, a more limited number will be used.

These lists are intended as a guide and is neither prescriptive nor exhaustive. In other words, provided this is done on a well-considered basis, other grass species may be used or substituted, including cultivars of the naturally occurring species such as mentioned above, if not available.

*Species recommended for dryland grassland:*

- *Aristida junciformis* subsp. *junciformis*
- *Bothriochloa inculpta*
- *Chloris virgata*
- *Digitaria eriantha*
- *Eragrostis curvula*
- *Eragrostis plana*
- *Hyparrhenia* species
- *Perotis patens* (especially in dry sandy places)
- *Setaria flabellata*
- *Sporobolus africanus*
- *Sporobolus pyramidalis*
- *Themeda triandra*

An effort should be made to include *Themeda triandra* as a large component in the mix, wherever possible. Although disliked by farmers due to unpalatability, and with a tendency to become dominant in response to overgrazing and over-burning, *Aristida junciformis* subsp. *junciformis* is a valuable and tough ground cover, while *Digitaria eriantha* and *Hyparrhenia* species are often very common constituents of grassland in the coastal area.

*Species recommended for damp to wet areas:*

The following species occur in damp and wet areas. *Themeda triandra* can again form part of the mix. *Hyparrhenia filipendula* and *Imperata cylindrica* are common in damp grassland in the coastal area.

- *Acroceras macrum*
- *Andropogon eucomus*
- *Bothriochloa bladhii*
- *Hemarthria altissima*
- *Hyparrhenia filipendula*
- *Imperata cylindrica*
- *Leersia hexandra*
- *Paspalum scrobiculatum*
- *Setaria sphacelata*

The Environmental Control Officer, if necessary working with a vegetation specialist, should determine the final compositions of mixes applied in various parts of the natural area. The aim, following the destruction of sugar cane, is to establish an erosion-resistant base of indigenous grass cover across the Estate, which can thereafter be managed to more diverse state.

#### **42. Follow-up plantings**

Following the establishment of base indigenous grass cover, the ECO and any vegetation or other specialist so contracted by the developer must formulate and agree on a detailed work plan for creating a more diverse and wildlife-productive natural area on the Zululami Estate.

Under this plan, the base grassland cover will be differentiated to the following:

- More diverse dryland (rain-fed) grassland, in which trees and small aggregations of trees may be planted;
- More diverse wetland grassland (grassland in wetland areas), in which trees and small aggregations of trees may be planted;
- Small patches of swamp forest;
- Small patches of coastal forest.

Grassland and open communities should still, however, remain dominant.

Suggested palettes of species suitable for these components are set out in Annexure C. Key elements of the work plan will involve identifying the areas to be so differentiated and diversified, taking topography and wetland boundaries into account.

The key elements of the plan will be spatial and involve identifying areas, by location and size, which can best be further planted up or transformed towards the vegetation and habitat types set out above, according to the species palettes suggested in Annexure C.

#### **42.1 Dryland grassland**

It is very difficult to return former cultivated land to primary grassland, but some progress along this path can be made.

In addition to introduction of a greater range of grass species, through broadcasting of seed of species not present, but which might be expected to naturally occur in the area, forbs and geophytes should be planted. These include commercially available common species in coastal grassland as *Barleria obtusa*, *Chrysanthemoides monilifera*, *Helichrysum cymosum*, *Helichrysum kraussii* and *Leonotis leonorus*.

No directive is made as to uniform treatment of the base grass cover in this way, which would be a very large task and result in a wide but likely sparse presence of additional species. Instead, smaller foundational 'focus areas' should be identified, which can be planted up at some density, from which a more diverse community can establish and expand naturally in time into other secondary grassland areas.

Attention should also be given, during the development's construction and operational phases, to the possibility of rescuing plants occurring in coastal grassland north and south of the site, from other development. Such events will provide opportunities for introducing or

reintroducing species which are typical of this grassland type but which are unavailable commercially.

The ECO should attempt to identify any such sites, and the developer should, during the construction phase, or the Homeowner's Association, during the operational phase should support such relocation, and be willing to fund this to a reasonable degree.

Furthermore, while cultivation of sugarcane on the Zululami Estate has mostly eliminated the former indigenous vegetation, a residue persists in wetland areas and on adjoining properties. Some of these species will be able to colonize the post-cane grassland.

Scattered free-standing trees or aggregations of trees which occur naturally in grassland on this part of the coast, should also be planted in the dryland grassland matrix, in order to increase habitat, improve aesthetics and biodiversity.

#### **42.2. Wetland grassland and open wetland areas**

Wetland areas have been severely impacted upon by agricultural activity. This is also manifest by the degraded vegetation which occurs in these wetland areas.

Rehabilitation of wetlands on the Zululami Estate should involve increasing the area covered by hygrophilous vegetation, not only by creating conditions which allow for natural expansion of the residue which persists, but by planting up of similar foundational 'focus areas' as envisaged for the dryland grassland.

Greater establishment of reeds and sedges to aid water filtration should be a priority.

Prospects for returning wetland grassland and open wetland areas to more primary state are better than for dryland grassland for various reasons:

- The range of species occurring in these areas tends to be more limited;
- There is some commonality of species in wetlands in the coastal area (i.e. the same species may be encountered), even though these areas may be widely dispersed;
- They tend to lack substantial underground woody rootstocks, and rooting in of relocated material is often easy;
- Due to posing an obstacle to farming, parts retain some residue of naturally occurring wetland species;

- Once more diverse foundational areas have been planted up and established, introduced wetland species will tend to spread to adjoining parts of wetland corridors.

Typical species which can be utilized for foundation plantings in wetland areas are set out in Annexure C.2.

A challenge however, is that few wetland species are available commercially and creative methods will need to be considered for obtaining this material. This will include sustainable harvesting and transplanting of rhizomes (in the case of sedges and reeds) from parts of the wetland system where they occur in numbers, and sustainably from other wetlands on the KwaZulu-Natal Coast. Where necessary there should be either in-house cultivation of certain target species, or contracting of an indigenous nursery to purpose-grow target species from fruit or seed.

#### **42.3. Swamp forest**

As noted, good quality swamp forest occurs on the adjoining property abutting the Zululami Estate. This is an Endangered vegetation type.

A particular responsibility rests on the Zululami Development to maintain the boundary closest to this swamp forest in good and alien-free condition.

It is also possible to recreate swamp forest on the Zululami Estate on a reduced scale, by planting small communities of typical swamp forest trees and associated herbaceous plants in degraded wetland areas which do not retain any significant residue of other wetland plants which will then be shaded out.

Many of these swamp forest species can be obtained commercially, however consideration again should be given to purposeful growing certain target species, such as by contracting a nurseryman to do so. To this end fruit or seed can be harvested from adjacent swamp forest, provided this is done on a sustainable basis and with the permission of the landowner.

It should be noted that a common species in the herbaceous layer of the adjoining swamp forest is *Plectranthus ciliatus*. This species is frequent in horticulture, but there is variability across its range of distribution. While it would be worthwhile to introduce this species into the herbaceous layer of any swamp forest patch created on the Zululami Estate, introducing a different variety from horticulture may contaminate the local genome. This species is easily grown from cuttings and sustainable harvesting from the adjoining property insofar as necessary, and with the landowners permission, should be considered.

A list of typical swamp forest species is provided in Annexure C.3.

#### **42.4 Coastal forest**

Coastal forest comprises species which are not water dependent, but which often occur on the edge of swamp forest, beyond the occurrence of wetland conditions. Again, this adds to the diversity of habitats and the range of flowering and fruiting plants on the Zululami Estate.

Small communities of trees comprising species typical of this forest type, should also be planted up in the conservation and open space area of the Zululami Estate.

Development of the herbaceous layer should not be neglected. It is important for there also to be plantings which can in time form the herbaceous layer under trees. Coastal forest along the KwaZulu-Natal coast is often dominated by the tall herb *Isoglossa woodii*, which may form pure stands. The leaves are particularly favoured by antelope, and consumed by insects which are also attracted to the flowers. It also provides cover for birds and mammals. It should therefore be introduced into forest patches, where shade conditions permit on the Zululami Estate.

#### **43. Use of the open space system, including the natural area**

Although much of this rehabilitation effort has a biodiversity objective, aesthetics should not be overlooked. The aim should also be to create a pleasing natural environment for the residents and visitors of the Zululami Estate.

A trail system should be developed, according to best management practice principles (obtainable from EKZNW), allowing residents and visitors to the estate to enjoy the open and natural surrounds, and participate in activities such as bird-watching. The trail system should lead through or past different established habitats, but also allow for areas of exclusion, in which wildlife will not come into regular contact or disturbance from people.

#### **44. Management of the natural area**

A distinct visual boundary should be maintained between parts of the property that will be formally developed and open space areas. Markers can include low level poles to show the boundary between more formal parts of the Zululami Estate and the managed natural area.

Creation of these habitats on the Zululami Estate must occur against in a more general management context.

With the exclusion of fire and without other disturbance, there is a natural trend for woody vegetation to establish and in time assume a more diverse and consolidated character.

Grassland can therefore only be maintained through mowing or burning. Burning should occur where feasible, on a rotational basis and at intervals, as determined in consultation with Ezemvelo KwaZulu-Natal Wildlife. Mowing shall occur where not so.

Herbicide treatment and mechanical removal of alien invasive species (see Annexure E) must continue throughout the life cycle of the development, and on a year-to-year basis. This shall begin in the construction phase, and continue so that the Zululami Estate become free or nearly free of alien plants.

Application of herbicide treatments may be paused in the winter months, however, when problem plants are not actively growing and herbicides are therefore less effective.

No contractor shall be utilized who does not have good knowledge of both alien and indigenous plants, and is able to well distinguish between them. As with contractors and their staff, if workers are employed directly by the Developer or Homeowners Association to undertake alien plant control work, it is incumbent upon them ensure that workers are can correctly recognize problem plants and, while controlling these, avoid damage to indigenous plants.

On no basis may earth-moving equipment be used to destroy alien plant growth as this may temporarily remove plants, but disturbs soil, creating conditions in which such plants can aggressively establish, while making it more difficult for good natural vegetation to re-establish.

It is important that Material Data Safety Sheets are kept on site for herbicides being used. Workers must be aware of the hazards of working with herbicides and be equipped with appropriate protective measures such as full body clothing, gloves, boots and filter masks.

#### **45. Structural interventions to rehabilitate wetlands**

Wetlands perform a number of ecosystem services such as:

- Flood attenuation
- Stream flow regulation
- Sediment trapping
- Phosphate assimilation
- Nitrate assimilation
- Toxicant assimilation
- Erosion control
- Carbon storage
- Biodiversity maintenance

Development is set back at least 20 metres from wetlands in order to mitigate possible impacts, but this is often only one of several measures needed to prevent degradation of these functions.

Increased hardening of surfaces around wetlands will result in increased runoff from the site.

A suitably qualified wetland specialist must be consulted to assist in or oversee rehabilitation of wetland areas.

Although vegetation issues will form a large part of the rehabilitation, a critical part of this is making input into the storm water management plan which will be prepared by a professional engineer which will, where necessary, cater for structural interventions which result in:

- Mimicking of natural peak flows;
- Diffuse flow and prolonged residence time of water within the wetland areas;
- Raising of the water table in order to promote hydric soil conditions for biogeochemical processing and environmental conditions suitable for plant growth;
- Preventing erosion along any existing drains and gullies.
- Prevention of degradation of swamp forest off site.

The wetland may also already have suffered erosion and other damage (such as creation of agricultural drains), which can be remediated.

Typical structural interventions for which this wetland should be assessed, by the wetland specialist working in conjunction with the engineer, are gabion baskets and earthen berms or plugs, and the positioning and extent thereof, including. Concrete structures may also need to be recommended where flows and a long-lasting solution warrant.

Any structures implemented will need to be maintained into the future.

The degree of expertise required of such a wetland specialist in this regard extends beyond usual competencies of assessment of wetland boundaries and functionality. This assessment and any plan proposed to mitigate impacts or improve the wetland area should be appended to and become an extension of this EMP once complete.

#### **46. Landscaping public areas**

Outside of open space areas, and only in areas of formal landscaping or gardening, a mix of indigenous and non-native garden plants may be used.

Any landscapers or garden contractors used must, however, be able to demonstrate good knowledge of indigenous plants.

An effort should also be made to ensure that indigenous species comprise no less than 70% of the mass of plantings. Where a non-native garden plant is suggested, consideration should be given as to whether there is an indigenous analogue which might create similar effect.

No non-native species may be used in landscaping or in gardens if it has known invasive potential. This includes not only species listed in Annexure E, but those which the ECO, developer, Homeowner's Association or horticultural or botanical consultant acting for the latter two parties may have any reason to believe to be invasive, or which is otherwise known to escape from gardens and establish in natural areas.

Should any species be identified by amongst any plantings, whether on the prohibited list or not, they shall be removed at the cost of whoever caused them to be brought onto the Zululami Estate.

Plants material brought onto the Zululami Estate should also not contain any other invasive or hard to eradicate problem weeds, particularly *Nothoscordum gracile* (Onion Weed), and it incumbent on those bringing plants onto the Estate to check that this is so. Suppliers or providers of plants also contaminated by these plants may be fined and/or blacklisted.

Annexure E may be added to at the discretion of the ECO or Homeowners Association from time to time.

#### **47. Homeowners and the landscaping and development of private areas**

All comments made in the section above also apply to this section.

Before any garden is established or significant landscaping occurs on any stand, a homeowner must submit a landscaping plan and list of proposed species, according to the developer's or Homeowners Association's standard.

This must then be approved by the ECO or if necessary any other horticultural consultant who may be retained by the developer or Homeowners Association to review such applications. Any changes required by the ECO, developer or Homeowners Association must be complied with.

Garden establishment and landscaping may only be implemented by a professional landscaper or gardening contractor, and any such contractor must have good knowledge of indigenous plants. Contractors must be approved of by the ECO, and if in inception, the Homeowners Association, before they can undertake work for any homeowner.

The ECO must be satisfied with the contractor's credentials in this regard. Once construction of the development is complete the Homeowners Association must also ensure that any such contractor working for any homeowner or Homeowners Association is similarly so suitable.

No plants may be utilized in gardens that have been removed from the wild, unless these are plants which have been relocated in order to save them from damage and destruction, in which case all permitting and legal requirements are in order. The ECO or Homeowners Association shall have the right to investigate the origin of any plant brought into the development and may at their discretion refuse or order removal of any such relocation if they have concerns about whether any plant may have been originally collected the wild, or otherwise gathered or supplied unlawfully.

Cycads in the genus *Encephalartos* or *Stangeria* may not be planted in gardens or brought onto the Zululami Estate.

While there is only a small presence of indigenous plants in proposed footprint areas, where this occurs there is latitude for more careful and considered final positioning of structures so as to accommodate any trees and bush clumps.

Homeowners should therefore survey any indigenous trees on their stands into their site plans and attempt to accommodate them. In the event that any indigenous tree cannot be so accommodated, this must be approved by the ECO.

**48. Ezemvelo KwaZulu-Natal Wildlife (EKZNW)**

Although EKZNW may not wish or be able to do so, a representative of EKZNW, either the organization's District Conservation Officer or another suitable person, shall be invited to the development on an annual basis, and advice sought on the state of rehabilitation and alien control within the development area, in the context of this management plan. Any advisements received must be faithfully noted and retained in written form by the ECO and/or Homeowners Association.

Reasonable advisements provided by EKZNW should be implemented.

**49. Auditing**

The ECO must, as part of environmental auditing, inspect and report on the state of rehabilitation and alien control work on the Zululami Estate.

Reports by either must confirm whether EKZNW was invited to the development, and if any advice was received, accurately note the advice, and measures taken or that will be taken in respect of this advice.

If during the development's operational phase, verbal advisements were not received directly by the ECO, the ECO must contact the EKZNW representative who made advisements directly to confirm the same, and discuss the state of alien control and rehabilitation work within the development before finalizing any report.

**50. Damage to vegetation outside of private areas**

Homeowners may not cut down or damage indigenous vegetation outside of their own properties without the permission of the ECO or Homeowners Association.

**Annexure C – List of plants suitable for use in natural areas**

**C.1 Dryland grassland**

Grasses:

*Chloris gayana*  
*Digitaria eriantha*  
*Panicum maximum*  
*Setaria megaphylla*  
*Sporobolus africanus*  
*Sporobolus pyramidalis*  
*Themeda triandra*

Herbs:

*Asystasia gangetica*  
*Barleria obtusa*  
*Helichrysum cymosum*  
*Helichrysum kraussii*  
*Justicia betonica*  
*Justicia protracta*  
*Leonotis leonorus*

Shrubs:

*Chrysanthemoides monilifera*  
*Rhus dentata*  
*Rhus nebulosa*

Trees:

*Acacia natalitia*  
*Acacia nilotica* (Scented Thorn)  
*Acacia robusta*  
*Albizia adianthifolia* (Flatcrown)  
*Antidesma venosum* (Tassel Berry)  
*Brachylaena discolor* (Coast Silver Oak)  
*Bridelia micrantha* (Mitzeerie or Coastal Goldenleaf)  
*Burchellia bubalina* (Wild Pomegranate)  
*Canthium inerme* (Common Turkey Berry)  
*Clerodendrum glabrum* (White Cat's Whiskers)  
*Cussonia spicata* (Common Cabbage Tree)  
*Erythrina lysistemon* (Coast Coral Tree)  
*Ficus burkei* (Common Wild Fig, previously incorrectly called *F. thonningii*)  
*Phoenix reclinata* (Wild Date Palm)  
*Protorhus longifolia* (Red Beech)

*Strelitzia nicolai* (Wild Banana)  
*Syzygium cordatum* (Umdoni)  
*Trema orientalis* (Pigeonwood)  
*Trichilia emetica* (Natal Mahogany)  
*Ziziphus mucronata* (Buffalo Thorn)

In spite of the fact that *Dodonea angustifolia* (Sand Olive) is a common pioneer on the coast, it should not be planted as it tends to form closed stands which exclude other species.

### **C.2 Open hygrophilous (wetland) vegetation**

*Phragmites australis* (Common Reed)  
Sedges (Cyperaceae)  
*Typha capensis* (Bulrush)  
Rushes (Juncaceae)

### **C.3 Swamp forest**

Trees:

*Barringtonia racemosa* (Powder-puff Tree)  
*Bridelia micrantha* (Mitzeerie/Coastal Goldenleaf)  
*Ficus sur* (Broom Cluster Fig)  
*Ficus trichopoda* (Hippo Fig)  
*Hibiscus tileaceus* (Lagoon Hibiscus)  
*Macaranga capensis* (Wild Poplar)  
*Rauwolfia caffra* (Quinine Tree)  
*Syzygium cordatum* (Umdoni)  
*Tarenna pavettoides* (False Bride's Bush)  
*Voacanga thouarsii* (Wild Frangipani)

Herbaceous layer elements:

*Crinum moorei*  
*Isoglossa woodii*  
*Plectranthus ciliatus* (only from cuttings grown on from plants occurring in adjacent swamp forest)  
*Scadoxus multiflorus* subsp. *katharinae*

#### C.4 Coastal Forest

##### Trees:

*Allophyllus natalensis*  
*Apodytes dimidiata*  
*Carissa macrocarpa*  
*Cussonia sphaerocephala*  
*Deinbollia oblongifolia*  
*Dovyalis rhamnoides*  
*Dovyalis longispina*  
*Dracaena aleytriformis*  
*Englerophytum natalense*  
*Ekebergia capensis*  
*Ficus burkei*  
*Ficus burtt-davyi*  
*Ficus lutea*  
*Ficus natalensis*  
*Ficus polita*  
*Ficus sur*  
*Harpephyllum caffrum*  
*Mimusops caffra*  
*Mimusops obovata*  
*Pavetta revoluta*  
*Pittosporum viridiflorum*  
*Phoenix reclinata*  
*Sideroxylon inerme*  
*Tabernaemontana ventricosa*  
*Trema orientalis*  
*Trichilia dregeana*  
*Xylothea kraussiana*

##### Herbaceous elements:

*Isoglossa woodii* is an often dominant herb in coastal forests and should be planted where shade conditions permit.

*Plectranthus* species are also often found in the herbaceous layer of forest, and could also be introduced. Species which might be expected to occur in this part of southern KwaZulu-Natal, this close to the coast are:

*Plectranthus ciliatus* (only from cuttings grown on from plants occurring in adjacent swamp forest)  
*Plectranthus ecklonii*  
*Plectranthus fruticosus*  
*Plectranthus petiolaris*

##### Other herbaceous elements:

*Crocosmia aurea* (forest edges)  
*Dicliptera clinopodia* (forest edges)  
*Dicliptera heterostegia*  
*Dietes grandiflora*  
*Dietes iridoides*  
*Isoglossa cooperi*  
*Justicia petiolaris*  
*Rhinacanthus gracilis*  
*Scadoxus puniceus* (forest edges)

**Annexure D – List of alien invader plants which either occur on the Zululami Estate or on the KwaZulu-Natal North Coast**

Plants already recorded from the Zululami Estate or the close surrounds are marked in **bold**.

*Ailanthus altissima* Tree-of-heaven  
***Achyranthes aspera*** Burweed  
*Acacia longifolia* Long-leaved wattle  
*Acacia mearnsii* Black wattle  
*Acacia melanoxylon* Australian blackwood  
*Acacia podalyriifolia* Pearl acacia  
*Agave sisalana* Sisal  
*Ageratina adenophora*  
***Ageratum conyzoides***  
***Ageratum houstonianum***  
*Albizia lebbek* Lebbeck tree  
*Anredera cordifolia* Madeira vine, Bridal wreath  
*Araujia sericifera* Moth catcher  
*Argemone* species Mexican poppys  
***Arundo donax*** Giant reed, Spanish reed  
*Bauhinia* (all species of alien origin) Camel's Foot trees  
*Bryophyllum delagoense* Chandelier plant  
*Caesalpinia decapetala* Mauritius thorn  
*Campuloclinium macrocephalum* Pom Pom Weed  
***Canna indica* and other ornamental *Canna* species and hybrids**  
***Cardiospermum grandiflorum*** and other *Cardiospermum* species Balloon vine  
*Casuarina cunninghamiana* Beefwood  
***Casuarina equisetifolia*** Horsetail tree  
***Cestrum laevigatum*** and other *Cestrum* species Inkberry  
***Chromolaena odorata*** Chromolaena, Triffid Weed  
*Cinnamomum camphora* Camphor Tree  
***Cirsium vulgare*** (=C. lanceolatum) Scotch thistle, Spear thistle  
*Convolvulus arvensis* Field bindweed, Wild morning-glory  
***Datura ferox*** Large thorn apple  
***Datura innoxia*** Downy thorn apple  
***Datura stramonium*** Common thorn apple  
*Egeria densa* Ditch moss, Water thyme  
*Echinopsis spachiana* Torch Cactus  
*Eichhornia crassipes* Water Hyacinth  
*Elodea canadensis* Canadian water weed  
*Eriobotrya japonica* Loquat  
***Eucalyptus grandis*** Saligna gum  
*Grevillea* species Australian Silky Oaks  
*Gleditsia triacanthos* Honey locust  
*Harrisia* species

**Hedychium** species

*Hypericum perforatum* St John's Wort

**Ipomoea indica** Morning glory

**Ipomoea purpurea** (Morning glory)

*Jacaranda mimosifolia* Jacaranda

**Lantana camara** Lantana, Tickberry

*Leucaena leucocephala* Leucaena

*Ligustrum* species Privets

*Lilium formosanum* Formosa Lily

*Litsea glutinosa* Indian Laurel

*Macfadyena unguis-cati* Cat's claw creeper

**Melia azedarach** Syringa, Persian lilac

*Mimosa pigra* Giant sensitive plant

**Montanoa hibiscifolia** Tree Daisy, Montanoa

**Morus alba** White mulberry, Common mulberry

*Myriophyllum aquaticum* Parrot's feather

*Myriophyllum spicatum* Spiked water-milfoil

*Nephrolepis exaltata*

*Nerium oleander* Oleander

*Nicotiana glauca* Wild tobacco

**Opuntia** species (Prickly Pears)

*Parthenium hysterophorus* Demoina Weed

*Passiflora* species Granadillas, Passion Flowers

*Pennisetum clandestinum* Kikuyu grass

**Pennisetum purpureum** Elephant grass

*Pennisetum setaceum* Fountain grass

*Pennisetum villosum* Feathertop

**Pereskia aculeata** Barbados gooseberry

*Pinus elliotti* Slash pine

**Pinus** species **Pines**

*Pistia stratiotes* Water lettuce

*Plectranthus comosus* Woolly Plectranthus

**Pontederia cordata**

*Populus x canescens* Grey poplar

**Psidium guajava** (and hybrids) Guava

*Psidium guineense* Brazilian guava

**Psidium littorale** Strawberry guava

*Pyracantha* species Firethorns

**Ricinus communis** Castor-oil plant

*Rivina humilis* Bloodberry/Rivina

*Robinia pseudoacacia* Black locust

*Rorippa nasturtium-aquaticum* Watercress

*Rosa rubiginosa* Sweetbriar/Elegantine

**Rubus** species (and hybrids) Brambles

*Salix* species of alien origin Willows

*Salvinia molesta* (and other species of the Family Salviniaceae) Kariba weed

**Schinus terebinthifolius** Brazilian pepper tree

**Senna didymobotrya** Peanut butter cassia

**Sesbania punicea** Red sesbania, Brazilian glory pea

*Solanum elaeagnifolium* Silver-leaf bitter apple

*Solanum mauritianum* Bugweed  
*Solanum seafortianum* Potato creeper  
*Tamarix* species Tamarisks  
*Tecoma stans* Yellow bells  
*Tithonia diversifolia* Mexican sunflower  
*Toona ciliata* Toon Tree  
*Tipuana tipu* Tipu tree  
*Tradescantia* species

Nuisance weeds:

*Bidens pilosa*  
*Centella asiatica* (debatably alien)  
*Conzuya bonariensis*  
*Hypochaeris radicata*  
*Lactuca indica*  
*Oxalis corniculata*  
*Oxalis latifolia*  
*Richardia brasiliensis*  
*Tagetes minuta*

Other garden plants with invasive potential which may not be planted on the Zululami Estate:

All other Australian *Acacia* species  
All members of the family Acanthaceae not of South African origin  
*Agave* species  
*Ageratina adenophora* Crofton Weed  
*Ardisia crenata*  
*Aristolochia elegans*  
*Bidens formosa*  
*Bougainvillea* species and hybrids  
*Callisea repens*  
*Catharanthus roseus* (*Vincus roseus*) Madagascar Periwinkle  
*Cereus jamacaru* Queen-of-the-night  
*Coreopsis lanceolata*  
*Cotoneaster* species Cotoneasters  
All *Dracaena* species not of South African origin  
*Eugenia uniflora*  
*Euphorbia* (all species of alien origin, including Poinsettia, Codiaeum species or Crotons, and Acalypha species)  
All *Lantana* species of alien origin  
All members of the family Malvaceae (including the genus *Hibiscus*) not of South African origin  
*Mangifera indica*  
All other Australian members of the family Myrtaceae, including any other members of the genus *Eucalyptus*  
All *Plectranthus* species not of South African origin  
*Plumeria* species  
*Pontederia cordata* Pickerel Weed

*Pyrostegia* species  
*Rhus succedanea* Japanese Waxberry  
*Schefflera actinophylla* (and other ornamental *Schefflera* species, but not including the indigenous *Schefflera umbellifera*)  
*Senna* (all alien species)  
*Spathodea campanulata* African Flame Tree  
*Sphagneticola trilobata* (also called *Widelia trilobata*) Singapore Daisy  
All *Stachys* species of alien origin  
*Syngonium* species  
*Syzygium cuminii* and other *Syzygium* species of alien origin, including *Syzygium paniculatum* (*Eugenia myrtifolia/paniculata/australis*)  
*Yucca* species

## Annexure E: Control Methods for Alien Plants

For most alien species, unless plants are entirely removed (i.e. dug out of the ground) physical or mechanical methods (such as cutting down or ring-barking) should be combined with application of herbicide. If this is not done plants coppice and/or regrow.

Herbicide can be applied to plants on this site in three main ways.

1. **Foliar application** – spraying of leaves and stems. In the case of some species (such as *Chromolaena* and Napier Fodder) spraying can occur after plants have been cut down and regrowth has reached between 50 and 100 cm in height. However, in the case of *Chromolaena*, where thickets are not too closed or tall, prior cutting down is not necessary.

The main problem with closed thickets comprising alien vegetation which are susceptible to foliar spraying is not that there isn't enough leaf material present to spray, but that it is difficult to penetrate and obtain access into these thickets. Cutting down of plants is rather meant to create conditions in which workers can obtain access rather than encourage regrowth.

2. **Basal stem application** – painting or spraying stems. In the case of trees stems should be ring-barked or 'frilled' (making of many deep cuts in the stems) with the main application being to the area ring-barked or frilled.
3. **Application to stumps** – usually with a brush to the freshly cut stumps of felled plants.

Diesel should not be used as a mixture in foliar applications.

In the case of trees, application to stems or trunks should always occur soon after ring-barking or frilling has occurred.

For some species simultaneous use of a 'wetting' agent is advised. A wetting agent ensures that the herbicidal application adheres well to its target.

It is very important, once a presence of alien plants has been dealt with, for there to be follow-up. Not every individual in a population will succumb, and monitoring should occur until the alien plant seed bank is exhausted. Without regular follow-up land may revert to previous invaded state, or worse.

### E.1 – Commonly available herbicides

Name of herbicide	Active ingredient
Brushoff Climax	Metsulfron
Chopper Hatchet	Imazapyr
Garlon4 Tricion	Triclopor

Timbrel	
Roundup Mamba Springbok	Glyphosphate @ 360gm/L

## E.2 – Herbicide applications for alien plant species present on the site

Note also that this list is not exhaustive as some alien species may still need detection, in which case an appropriate control will be recommended, or this schedule will be updated.

Plants in the list below either occur on the site, or if shown with an asterisk \*, could occur on the site now or in the future, as they have been encountered elsewhere on the KwaZulu-Natal South Coast.

Although the applications below are recommended for particular species, they may be varied or substituted with other applications by the ECO or Homeowners Association, if on good advice an alternative or other application is recommended.

Species	Description	Control
<i>Acacia mearnsii</i> (Black Wattle) *	Tree	Larger trees require application to stems or stumps with 20% Mamba in water or 3% Garlon4 in water. Seedlings and coppice growth can be foliar treated with 0.75% Garlon4 in water
<i>Achyranthes aspera</i>	Herb, sometimes also invading the herbaceous layer of disturbed forest	Foliar application: Garlon4 @ 4% in water or Roundup @ 10% in water
<i>Ageratum conyzoides</i> (Blue Weed)	Herb with pale purple flowers	Foliar application: Garlon4 @ 5% mixture with water or Roundup at 10% mixture with water
<i>Anredera cordifolia</i> (Madiera Vine) *	Succulent climber with glossy leaves	Difficult as plants grow from aerial tubers. As much of the plant must be removed as possible and if possible burnt. Garlon4 at 0.5% in water may be used for either stalk immersion or as a foliar application.
<i>Arundo donax</i> (Giant or Spanish Reed)	Large reed up to 6 metres tall with spear-	Cut plants down to ground level and apply

	shaped inflorescence	Garlon4 @ 1% in water or Roundup at 2% in water to regrowth
<i>Canna indica</i> (Canna)	Garden herb with red or yellow flowers, particularly invading open, damp places	Control is difficult. Plants must be dug up and the rhizomes (root system) removed in its entirety. A cut stump application of Brushoff at 1 gram per litre may be tried. Follow-up is essential
<i>Cestrum laevigatum</i> (Inkberry)	Shrub or small tree	Cut stump: Garlon4 in a 1% mixture with water or Chopper in 2% mixture with water
<i>Chromolaena odorata</i>	Shrub which may scramble up into trees	Foliar spray: Garlon4 @ 3.75% in water, Chopper @ 2% in water or Roundup @ 10% in water. Follow up is usually required
<i>Eucalyptus grandis</i> (Saligna Gum)	Tree	Basal stem: Garlon 4 @ 4% in diesel. Cut stump: Chopper @ 5% in water
<i>Hedychium</i> species (Ginger Lilies) *	Herb	Control is difficult. Plants must be dug up and the rhizomes (root system) removed in its entirety. A cut stump application of Brushoff at 1 gram per litre may be tried. Follow-up is essential
<i>Ipomea</i> species	Climber	Foliar spray: Garlon4 @ 4% in water or Roundup @ 10% in water
<i>Lantana camara</i> (Lantana)	Shrub	Cut stump: Chopper @ 2% in water or Roundup @ 3% in water. Coppice and regrowth: Roundup @ 3% in water or Chopper @ 2% in water.
<i>Litsea glutinosa</i> (Indian Laurel)	Tree	Same comments apply as with

		Guava
<i>Mangifera indica</i> (Mango)	Tree	Basal stem: Garlon 4 @ 4% in diesel. Cut stump: Chopper @ 5% in water
<i>Melia azedarach</i> (Syringa)	Tree	Basal stem or cut stump: Garlon 4 @ 2% in diesel or Chopper @ 3% in water
<i>Montanoa hibiscifolia</i> (Montanoa) *	Semi-woody shrub up to 6 metres tall	Seedlings and saplings can be removed from moist soil by hand. Larger plants can be cut and the stumps treated with Choper 2%.
<i>Morus alba</i> (Mulberry)	Tree	Basal stem: Garlon 4 @ 4% in diesel. Cut stump: Chopper @ 5% in water
<i>Nephrolepis exaltata</i> (Sword Fern)	Fern	Foliar application: Brushoff at 2.5 grams per 10 litres of water. A wetting agent such as Actipron at 50 ml per 10 litres of water should be simultaneously used
<i>Pennisetum purpureum</i> (Napier Fodder)	Large reed up to 5 metres tall	Cut plants down to ground level and apply Garlon4 @ 1% in water or Roundup at 2% in water to regrowth
<i>Pinus elliotii</i> (Pine Tree)	Tree	Seedlings and saplings can be removed by hand from moist soil. Mature plants can be ring-barked or felled. Herbicide treatment is not necessary.
<i>Pereskia aculeata</i> (Barbados Gooseberry) *	Succulent spiny vine	Control is difficult. Try a cut stump application of Garlon4 @ 2% in water or for large infestations slash the plant down to two metres and apply a foliar spray of Garlon4 @ 0.5% in water. All

		cut pieces must be collected up and burned as they often root if they touch the ground.
<i>Plectranthus comosus</i>		Foliar application: Brushoff at 2.5 grams per 10 litres of water. A wetting agent such as Actipron at 50 ml per 10 litres of water should be simultaneously used. As an alternative Garlon4 @ 5% mixture with water or Roundup at 10% mixture with water. Plants can also be manually dug out and removed but all material must then be burned as dropped pieces may root to form new plants
<i>Psidium guajava</i> (Guava)	Tree	Plants coppice strongly and are resistant to foliage herbicide applications. If plants cannot be dug out of the ground entirely cut stumps can be treated with Chopper at a 12.5% mixture in water. Follow-up is essential
<i>Pyrostegia venusta</i> (Golden Shower)	Garden escape. An ornamental climber with orange, tubular flowers and two or three-foliolate leaves	Foliar application: Roundup @ 2% in water. Cut stump: Roundup @ 3% in water
<i>Ricinus communis</i> (Castor Oil Bush)	Many-branched shrub or small tree	Uproot or cut off stem below ground level or apply Chopper to cut stumps @ 3% in water.
<i>Rubus cuneifolius</i> (Bramble)	Thorny sprawling shrub	Foliar application: Brushoff at 2.5 grams per 10 litres of water or Garlon4 @ 5% mixture with water or Roundup at 3% mixture with

		water
<i>Schinus terebinthifolius</i> (Brazilian Pepper/Pepper Tree)	Smaller tree	Avoid cutting as it coppices easily. Apply 2% Garlon4 in diesel to basal stems.
<i>Senna didymobotrya</i> (Peanut-butter Cassia)	Shrub	Plants should be manually removed (dug out of ground)
<i>Sesbania punicea</i> (Red Sesbania)	Shrub or small tree usually invading damp places	Cut stump treatment with 2% Chopper in water.
<i>Solanum mauritianum</i> (Bugweed)	Smaller tree	Foliar application: Garlon4 @ 0.5% in water or Roundup 3% in mixture of water. Cut stump: Garlon4 @ 0.2% in diesel or Roundup 3% in mixture of water. Basal stem: Garlon 4 @ 2% mixture in diesel
<i>Solanum seaforthianum</i>	Climber with purple flowers and red berries	Foliar application: Garlon4 @ 0.5% in water or Roundup 3% in mixture of water
<i>Stenotaphrum secundatum</i> (Buffalo Grass)	Lawn grass which invades indigenous grassland	Apply Garlon4 @ 1% in water or Roundup at 2% in water to regrowth
<i>Tecoma stans</i> (Yellow Bells) *	Shrub or tree with yellow, trumpet-shaped flowers	Foliar application: Roundup @ 2% in water. Cut stump: Roundup @ 3% in water
<i>Tithonia diversifolia</i> (Mexican Sunflower) *	Soft, herbaceous shrub up to three metres with yellow flowers like sunflowers	Clumps are resistant to herbicides and should be manually removed. Garlon4 at 0.5% or Roundup at 1.5% in water may be tried on seedlings.
<i>Wedelia trilobiata</i>	Groundcover with yellow daisy-like flowers which has escaped from gardens and which often invades watercourses. Follow-up is	Foliar application: Brushoff at 2.5 grams per 10 litres of water. A wetting agent such as Actipron at 50 ml per 10 litres of water should be

	important.	simultaneously used. As an alternative Garlon4 @ 5% mixture with water or Roundup at 10% mixture with water
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**ANNEXURE F – Recommended indigenous plants for gardens and horticulture**

**F.1 – Indigenous shrubs, trees and groundcovers particularly recommended for coastal littoral (near beach) garden planting**

<b>Name</b>	<b>Common Name</b>	<b>Description</b>
<i>Acokanthera oblongifolia</i>	Dune Poison-bush	Shrub / small tree
<i>Aloe thraskii</i>	Dune Aloe	Form plant
<i>Allophyllus natalensis</i>	Dune False Currant	Tree
<i>Apodytes dimidiata</i>	White Pear	Tree
<i>Aptenia cordifolia</i>	Aptenia	Groundcover
<i>Asparagus densiflorus</i>	Emerald Fern	Groundcover
<i>Asystasia gangetica</i>	Asystasia	Groundcover
<i>Barleria obtusa</i>	Bush Violet	Groundcover
<i>Brachylaena discolor</i>	Coastal Silver Oak	Tree
<i>Bridelia micrantha</i>	Coastal Goldenleaf / Mitzeerie	Large Tree
<i>Bulbine asphodeloides</i>	Spreading Bulbine	Groundcover / bedding plant
<i>Carissa macrocarpa</i>	Large Num-num	Bushy shrub / small tree
<i>Carissa macrocarpa</i> (variety "Green Carpet")	Spreading Num-num	A smaller, low-growing variety
<i>Carpobrotus dimidiata</i>	Natal Dune Vygie	Groundcover
<i>Chrysanthemoides monilifera</i>	Bush Tick-berry	Shrub
<i>Deinbollia oblongifolia</i>	Dune Soap-berry	Shrub / small tree
<i>Dietes grandiflora</i>	Large Wild Iris	Bedding plant
<i>Dimorphotheca fruticosa</i> (formerly <i>Osteospermum fruticosum</i> )	White Dune Daisy	Groundcover
<i>Dodonea angustifolia</i>	Sand Olive	Small, bushy tree
<i>Dracaena alectriformis</i>	Large-leaved Dragon Tree	Form plant, in a more protected, shady situation
<i>Grewia occidentalis</i>	Cross-berry	Shrub / small tree
<i>Erythrina caffra</i>	Coast Coral Tree	Large tree, but site well back from salt-spray / wind zone
<i>Euclea natalensis</i>	Natal Guarri	Small to medium-sized tree
<i>Ficus burkei</i> (formerly incorrectly called <i>F. thoningii</i> )	Common Wild Fig	Large tree
<i>Ficus burtt-davyi</i>	Veld Fig	Shrub / small tree
<i>Ficus lutea</i>	Giant-leaved Fig	Large tree
<i>Gazania rigens</i>	Trailing Gazania	Groundcover

<i>Grewia occidentalis</i>	Cross-berry	Shrub / small tree
<i>Haemanthus albiflos</i>	White Paint Brush	Lily
<i>Hibiscus tiliaceus</i>	Lagoon Hibiscus	Tree
<i>Maytenus procumbens</i>	Dune Koko Tree	Small tree
<i>Mimusops caffra</i>	Coastal Red Milkwood	Tree
<i>Pavetta revoluta</i>	Dune Bride's Bush	Shrub / small tree
<i>Pelargonium capitatum</i>	Rose-scented Pelargonium	Shrub
<i>Phoenix reclinata</i>	Wild Date Palm	Tree
<i>Polygala myrtifolia</i>	September Bush	Shrub / small tree
<i>Psychotria capensis</i>	Black Bird-berry	Shrub, small tree, in a more protected, shady situation
<i>Psydrax obovata</i>	Quar	Tree
<i>Rhus natalensis</i>	Natal Karree	Small tree
<i>Rhus nebulosa</i>	Sand Taaibos	Trailing shrub
<i>Scadoxus puniceus</i>	Snake Lily	Lily
<i>Sideroxylon inerme</i>	White Milkwood	Tree
<i>Strelitzia nicolai</i>	Natal Wild Banana	Tree
<i>Syzygium cordatum</i>	Umdoni	Tree
<i>Tricalysia lanceolata</i>	Jackal-coffee	Shrub / small tree
<i>Tricalysia sonderiana</i>	Coast Coffee	Shrub / small tree
<i>Trichilia dregeana</i>	Forest Mahogany	Large tree

## ANNEXURE F.2

### Other trees occurring on the KZN North Coast

Name	Common name	Comment
<i>Acacia natalitia</i>	-	Fast-growing, bushy tree with yellow flowers
<i>Acridocarpus natalitius</i>	Moth-fruit	Climber with attractive yellow flowers
<i>Albizia adianthifolia</i>	Flatcrown	Fast-growing, large, shade tree
<i>Allophylus africanus</i>	False Currant	Medium-sized tree, attracts insects
<i>Allophylus dregeanus</i>	Forest False Currant	Small tree
<i>Anastrabe integerrima</i>	Pambati Tree	Medium-sized tree
<i>Antidesma venosum</i>	Tassel Berry	Fast growing, medium-sized tree, bird magnet
<i>Apodytes abbotii</i>	-	Shrub or small tree
<i>Apodytes dimidiata</i>	White Pear	Neat, medium-sized tree
<i>Baphia racemosa</i>	Natal Camwood	Slow-growing, medium-sized tree with attractive white flowers

<i>Barringtonia racemosa</i>	Powder-puff Tree	Medium-sized tree, requires moist conditions
<i>Bauhinia natalensis</i>	Natal Bauhinia	Shrub or small tree with attractive white flowers
<i>Bersama lucens</i>	Glossy White Ash	Neat, small or medium-sized tree
<i>Burchellia bubalina</i>	Wild Pomegranate	Small tree with attractive orange flowers
<i>Buxus macowanii</i>	Cape Box	Neat small tree
<i>Buxus natalensis</i>	Natal Box	Neat shrub or small tree
<i>Calodendrum capense</i>	Cape Ash	Large tree with spectacular pink flowers
<i>Calpurnea aurea</i>	Natal Laburnum	Fast growing, small tree with prolific yellow flowers that attract insects
<i>Canthium inerme</i>	Turkey-berry	Spiny, medium to large tree
<i>Cassipourea gummiflua</i>	Large-leaved Onionwood	Small tree
<i>Cassipourea malosana</i> (sometimes incorrectly called <i>C. gerrardii</i> )	Common Onionwood	Medium-sized to large tree
<i>Celtis africana</i>	White Stinkwood	Large tree, attracts birds
<i>Chaetacme aristata</i>	Thorny Elm	Large, handsome tree, slow-growing
<i>Chionanthus peglerae</i>	Giant Pock Ironwood	Medium to large tree
<i>Chrysophyllum viridiflorum</i>	Fluted Milkwood	Large, slow-growing tree
<i>Clerodendrum glabrum</i>	White Cat's Whiskers	Fast-growing, medium-sized tree
<i>Coddia rudis</i>	Small Bone-apple	Shrub with small, neat leaves
<i>Cola natalensis</i>	Coshwood	Small to medium-sized tree
<i>Combretum kraussii</i>	Forest Bushwillow	Fast-growing, medium-sized tree
<i>Commiphora harveyii</i>	Red-stemmed Corkwood	Striking form tree
<i>Commiphora woodii</i>	Forest Corkwood	Medium-sized tree with fruit that attracts hornbills
<i>Cordia caffra</i>	Septee Tree	Small to medium-sized deciduous tree
<i>Croton sylvaticus</i>	Forest Fever-berry	Large, relatively quick-growing tree
<i>Cryptocarya woodii</i>	Cape Quince	Small, neat tree
<i>Cryptocarya wyliei</i>	Red Quince	Shrub or small tree
<i>Cussonia nicholsonii</i>	South Coast Cabbage Tree	Small form tree
<i>Cussonia sphaerocephala</i>	Forest Cabbage Tree	Large, fast-growing form tree
<i>Cussonia spicata</i>	Common Cabbage Tree	Medium-sized tree

<i>Dalbergia multijuga</i>	Hairy Flat-bean	Climbing shrub with neat leaves
<i>Diospyros natalensis</i>	Acorn Diospyros	Small to medium-sized tree, with small, neat leaves
<i>Dombeya tiliacea</i>	Forest Wild Pear	Smaller tree, with a mass of white flowers in autumn
<i>Dovyalis longispina</i>	Natal Apricot	Spiny small tree with bird-attracting fruit
<i>Drypetes arguta</i>	Water Ironwood	Smaller tree
<i>Drypetes gerrardii</i>	Forest Ironwood	Large tree
<i>Duvernoia adhatodoides</i>	Pistol Bush	Large shrub or small tree
<i>Ekebergia capensis</i>	Cape Ash	Medium-sized tree
<i>Elaeodendron croceum</i> (also called <i>Cassine papillosa</i> )	Common Saffron	Smaller tree
<i>Englerophytum natalense</i>	Natal Milkplum	Slow-growing, small or medium-sized tree
<i>Erythroxylum emarginatum</i>	Common Coca Tree	Shrub or small tree
<i>Erythroxylum pictum</i>	Forest Coca Tree	Smaller tree
<i>Erythrina caffra</i>	Coast Coral Tree	Medium to large tree with striking red flowers in winter
<i>Erythrina humeana</i>	Dwarf Coral Tree	Shrub with striking red flowers in summer
<i>Erythrina lysistemon</i>	Common Coral Tree	Small to medium tree with striking flowers in winter
<i>Eugenia capensis</i>	Dune Myrtle	Shrub or small tree
<i>Eugenia natalitia</i>	Common Myrtle	Shrub or small tree
<i>Euphorbia tirucalli</i>	Rubber Euphorbia	Succulent tree
<i>Ficus natalensis</i>	Natal Fig	Large tree, bird magnet
<i>Ficus polita</i>	Wild Rubber Fig	Large tree, bird magnet
<i>Ficus sur</i>	Broom Cluster Fig	Larger tree, bird magnet
<i>Gardenia thunbergia</i>	White Gardenia	Small tree
<i>Grewia lasiocarpa</i>	Forest Raisin	Shrub or small tree with pink flowers
<i>Halleria lucida</i>	Notsung / Tree Fuschia	Smaller tree with a mass of red flowers that attract sunbirds
<i>Harpephyllum caffrum</i>	Wild Plum	Large, very fast-growing tree, with fruits that are very attractive to birds
<i>Heteropyxis natalensis</i>	Lavender Tree	Attractive, smaller tree with lavender-scented leaves

<i>Hippobromus pauciflorus</i>	False Horsewood	Small Tree
<i>Indigofera jucunda</i>	Showy Indigo	Small tree with many pinkish-white flowers
<i>Indigofera natalensis</i>	Forest Indigo	Shrub with white flowers
<i>Keetia gueinzii</i>	Climbing Turkey-berry	Woody climber
<i>Loxostylis alata</i>	Tarwood	Smaller tree, spectacular in flower and fruit
<i>Macaranga capensis</i>	Wild Poplar	Larger tree
<i>Mackaya bella</i>	Forest Bells	Shrub or small tree, with mauve flowers
<i>Mimusops obovata</i>	Red Milkwood	Slow-growing, medium-sized tree
<i>Mystroxyton aethiopica</i>	Kooboo Berry	Smaller tree
<i>Ochna arborea</i>	Cape Plane	Slow-growing, smaller tree, with striking yellow flowers
<i>Ochna natalensis</i>	Natal Plane / Mickey Mouse Bush	Slow-growing, smaller tree, with striking yellow flowers
<i>Ochna serrulata</i>	Small-leaved Plane	Shrub with striking yellow flowers
<i>Olea woodiana</i>	Forest Olive	Medium-sized tree
<i>Pavetta inandensis</i>	Forest Bride's Bush	Smaller tree
<i>Pavetta lanceolata</i>	Weeping Bride's Bush	Shrub or small tree
<i>Peddia africana</i>	Poison Olive	Shrub or small tree
<i>Pittosporum viridiflorum</i>	Cheesewood	Medium-sized tree, fruit attracts birds
<i>Podocarpus latifolius</i>	Real Yellowwood	Large tree
<i>Portulacaria afra</i>	Spekboom	Succulent small tree
<i>Protorhus longifolia</i>	Red Beech	Large tree
<i>Rapanea melanophloeos</i>	Cape Beech	Smaller tree
<i>Rauvolfia caffra</i>	Quinine Tree	Large, semi-deciduous tree, fruit attracts birds
<i>Rawsonia lucida</i>	Forest Peach	Small tree
<i>Rhoicissus digitata</i>	Baboon Grape	Woody climber
<i>Rhoicissus rhomboidea</i>	Glossy Forest Grape	Woody Climber

<i>Rhoicissus tomentosa</i>	Common Forest Grape	Woody Climber
<i>Rhoicissus tridentata</i>	Bushman's Grape	Woody Climber
<i>Rhus chirindensis</i>	Red Currant	Larger tree
<i>Rhus dentata</i>	Nana-berry	Shrub or small tree
<i>Rhus lucida</i>	Glossy Currant	Bushy shrub
<i>Rhus pentheri</i>	Common Crow-berry	Shrub or small tree
<i>Rhus rehmanniana</i>	Blunt-leaved Currant	Smaller tree
<i>Rinorea angustifolia</i>	White Violet-bush	Shrub or small tree
<i>Rothea myricoides</i> (formerly called <i>Clerodendrum myricoides</i> )	Blue-flowered Tinderwood	Shrub or small tree
<i>Rothmannia capensis</i>	Cape Gardenia	Medium-sized tree with very attractive white flowers
<i>Rothmannia globosa</i>	September Bells	Medium-sized tree with very attractive white flowers in spring
<i>Sapium ellipticum</i> (now called <i>Shirakiopsis</i> <i>ellipticum</i> )	Jumping-seed Tree	Smaller tree
<i>Sapium integerrimum</i> (now called <i>Sclerocroton</i> <i>integerrimum</i> )	Duiker-berry	Medium to large tree, fruit attracts birds
<i>Scolopia zeyheri</i>	Thorn Pear	Spiny, medium-sized tree
<i>Strophanthus speciosus</i>	Common Poison Rope	Woody climber with striking yellowish-red flowers
<i>Syzygium cordatum</i>	Umdoni / Water-berry	Handsome medium to large tree with fruit that attracts birds
<i>Tarchonanthus littoralis</i> (formerly included in <i>T.</i> <i>camphoratus</i> )	Small to medium-sized tree	Grows well in close to beach areas
<i>Tarenna pavettoides</i>	False Bride's Bush	Small or medium-sized tree, good for damp areas
<i>Trema orientalis</i>	Pigeonwood	Medium-sized tree, fast growing pioneer
<i>Tricalysia capensis</i>	Cape Coffee	Shrub or small tree, with sweetly scented white flowers
<i>Trichocladus crinitus</i>	Black Hazel	Shrub or small tree, decorative shade plant

<i>Trichocladus ellipticus</i>	White Hazel	Shrub or small tree, attractive shade plant
<i>Trichocladus grandiflorus</i>	Green Hazel	Small to medium-sized tree, rather slow-growing but striking in white flower
<i>Monanthes affra</i>	Dwaba Berry	Woody climber
<i>Turraea floribunda</i>	Wild Honeysuckle Tree	Small to medium-sized tree with sweetly scented flowers
<i>Turraea obtusifolia</i>	Small Honeysuckle Tree	Shrub or small tree, very striking when in a mass of white flowers
<i>Uvaria affra</i>	Small Cluster-pear	Woody climber
<i>Vepris lanceolata</i>	White Ironwood	Small to larger tree, attracts butterflies
<i>Xylothea kraussiana</i>	African Dog-rose	Shrub to smaller tree, with striking flowers that look like 'fried eggs'
<i>Xymalos monospora</i>	Lemonwood	Medium-sized tree

### F.3 – Other smaller plants (shrubs, herbs, groundcovers and creepers)

Note that because many nurseries only stock a limited range, greater latitude is given in this list. Therefore, while almost all species do occur on the KZN South Coast, though not necessarily on the littoral, a few other indigenous garden staples are included (the latter indicated in with an asterisk \*).

Name	Common name	Description
<i>Agapanthus</i> (all species)	Agapanthus	Bedding plant
<i>Albuca fastigiata</i>	Large Spreading White Albuca	Rockery plant
<i>Aloe chabaudii</i> *	Chabaud's Aloe	Aloe, can be massed in beds
<i>Aloe cooperi</i>	Cooper's Aloe	Aloe, likes damp areas
<i>Aloe maculata</i>	Common Soap Aloe	Aloe up to 1 m, can be massed in beds
<i>Asparagus falcatus</i>	Large Forest Asparagus	Bushy climber
<i>Aspilia natalensis</i>	Wild Creeping Sunflower	Herb for damp areas
<i>Bulbine abyssinica</i>	Bushy Bulbine	Succulent, groundcover
<i>Bulbine frutescens</i> *	-	Succulent, groundcover
<i>Bulbine natalensis</i>	Broad-leaved Bulbine	Succulent, rockery or pot plant
<i>Bulbine</i> sp. nov. (Pondoland)	-	Succulent, rockery or pot plant, hardier plant that does better in sun than <i>B. natalensis</i>
<i>Canavalia rosea</i>	Beach-bean Canavalia	Climber with pink flowers
<i>Chlorophytum comosum</i>	Green Hen and Chickens	Groundcover, bedding plant
<i>Chlorophytum krookianum</i>	Giant Chlorophytum	Feature plant up to 2 m, likes damp places
<i>Chlorophytum</i> (formerly <i>Anthericum saundersiae</i> )	Weeping Anthericum	Can be used in mass in beds
<i>Clematis brachiata</i>	Traveller's Joy	Climber with attractive white flowers
<i>Cotyledon orbiculata</i>	Pig's Ears	Succulent, rockery plant
<i>Clivia miniata</i>	Clivia	Can be used in mass in beds
<i>Clivia robusta</i>	Clivia	Can be used in mass in beds

<i>Crassula multicava</i> subsp. <i>multicava</i>	Fairy Crassula	Succulent, can be used as a groundcover
<i>Crassula pellucida</i>	-	Succulent, can be used as a ground cover
<i>Crassula sarmentosa</i>	-	Trailing succulent, suitable for rockeries
<i>Crinum macowanii</i>	River Lily	-
<i>Crinum moorei</i>	Moore's Lily	Shady places only
<i>Crocasmia aurea</i>	Falling Stars	Irid with striking orange flowers, suitable for sun and shade
<i>Cyperus prolifer</i>	Dwarf Papyrus	Form plant, does best in damp or well watered places
<i>Cyperus textilis</i>	Tall star sedge	Form plant up to 1 m, best for damp places
<i>Cyphostemma flaviflorum</i>	-	Succulent climber
<i>Cyphostemma hypoleucum</i>	Double-barrel Vine	Succulent climber
<i>Cyrtanthus brachycyphus</i>	Orange Ifafa Lily	Bright orange flowers, does best in a pot
<i>Cyrtanthus mackenii</i>	Ifafa Lily	White to peach-coloured flowers, does best in a pot
<i>Delosperma species</i>	Delospermas	Succulent groundcover
<i>Desmodium repandum</i>	Orange Desmodium	Small shrub with orange flowers for shady areas
<i>Dicliptera clinopodia</i>	-	Straggling, rather untidy shrubs with a mass of pink flowers in autumn which attract butterflies
<i>Dietes bicolor</i>	Peacock Flower	Irid with yellow flowers, can be used in mass in beds
<i>Dietes butcheriana</i>	Forest Iris	Irid with white flowers, in shady places
<i>Dietes iridioides</i>	-	Irid with white flowers
<i>Distephanus</i> (formerly <i>Vernonia angulifolius</i> )	Trailing Vernonia	Climbing shrub with pink flowers in winter
<i>Gazania krebsiana</i>	Common Gazania	Daisy-like yellow flowers
<i>Gerbera ambigua</i>	Pink and White Gerbera	Daisy-like, usually white flowers
<i>Gladiolus dalenii</i>	African Gladiolus	Irid with orange flowers

<i>Gloriosa superba</i>	Flame Lily	Deciduous, weak-stemmed climber with striking orange flowers
<i>Gomphocarpus physocarpus</i>	Milkweed	Slender herb to 2 m, attracts butterflies
<i>Helichrysum cymosum</i>	-	Bushy groundcover
<i>Helichrysum panduratum</i>	-	Bushy groundcover
<i>Hibiscus calyphyllus</i>	Large Yellow Wild Hibiscus	Large shrub with large yellow flowers
<i>Hibiscus pedunculatus</i>	Forest Pink Hibiscus	Slender shrub with pink flowers, does best in light shade
<i>Hypoestes aristata</i>	Ribbon Bush	Shrub with masses of pink flowers in the winter
<i>Isoglossa woodii</i>	-	Shrub up to 2 m, for 'wild' parts of a garden
<i>Justicia betonica</i>	Paper Plume	Herb, suitable for massed plantings, flowers white to pale pink
<i>Justicia petiolaris</i>	Blue Justicia	Herb to 1 m, flowers blue to mauve, in light shade
<i>Justicia protracta</i>	Veld Justicia	Herb to 0.5 m, in sunny places
<i>Kalanchoe thyrsiflora</i>	White Lady	Succulent, good for rockeries
<i>Lagenaria sphaerica</i>	Wild Melon	Climber with large white flowers
<i>Lampranthus stipulaceus</i>	-	Succulent groundcover, also useful in rockeries
<i>Leonotis leonorus</i>	Leonotis / Wild Dagga	Shrub to 2,5 m, produces a mass of orange flowers in winter that attract sunbirds
<i>Mitriostima axillare</i>	Small False Loquat	Woody shrub
<i>Orthosiphon labiatus</i> *	Shell Bush	Hardy shrub to 1.8 m, producing many pink flowers
<i>Pavonia columella</i>	Pink Pavonia	Shrub up to 2 m with pink flowers, likes damp places
<i>Plectranthus ambiguus</i>	Large-flowered Plectranthus	Herb up to 1 m, suitable for shady,

		well watered areas, purple flowers
<i>Plectranthus ecklonii</i>	Large Spur-flower Bush	Shrub up to 2 m, purple flowers
<i>Plectranthus fruticosus</i>	Forest Spur-flower	Shrub up to 2 m, purple flowers
<i>Plectranthus madagascariensis</i>	Madagascar Spur- flower	Groundcover, suitable for sunny areas, white flowers
<i>Plectranthus petiolaris</i>	-	Herb to 1 m, purple flowers
<i>Plectranthus saccatus</i>	Stoep Jacaranda	Trailing herb for shady places, purple flowers
<i>Plectranthus zuluensis</i>	Zulu Spur-flower	Soft shrub to 2 m for shady places, purple or white flowers
<i>Plumbago auriculata</i>	Plumbago	Scrambling sgrub to 2 m, with powder-blue flowers
<i>Podalyria velutina</i>	Hairy Podalyria	Shrub to 2.5 m
<i>Polygala virgata</i>	Purple Broom	Slender shrub to 2 m, purple flowers attract many insects
<i>Sansevieria hyacinthoides</i>	Mother-in-Law's Tongue	Succulent plant, suitable for hot, dry areas
<i>Scadoxus multiflorus</i> subsp. <i>katherinae</i>	Katharine Wheel	Deciduous plant for damp, shady areas, with orange flowers
<i>Scadoxus puniceus</i>	Blood Lily	Deciduous plant with striking orange flowers
<i>Senecio barbetonicus</i>	Succulent Bush Senecio	Succulent shrub up to 2 m, does well in hot, dry places
<i>Senecio macroglossus</i>	Flowering Ivy	Succulent climber with pale yellow flowers
<i>Senecio tamoides</i>	Canary Creeper	Succulent climber with yellow flowers
<i>Strelitzia reginae</i>	Crane Flower / Bird-of -paradise flower	Feature plant, to 1.5 m
<i>Tecomaria capensis</i>	Cape Honeysuckle	Shrub or small tree to 2-4 m, striking orange flowers
<i>Tephrosia grandiflora</i>	Large Pink Tephrosia	Annual or biennial shrub to 1.5 m with pink flowers

<i>Tephrosia shilwanensis</i>	-	Shrub, 1-2 m with pink flowers
<i>Tetradenia riparia</i>	Iboza / Misty Plume Bush	Succulent shrub to 2 m, flowers white to purple
<i>Thunbergia alata</i>	Black-eyed Susan	Creepers with yellow to orange flowers
<i>Thunbergia natalensis</i>	Dwarf Thunbergia / Natal Blue Bell	Shrublet to about 1 m, flower blue-mauve
<i>Tinnea galpinii</i>	Black Lip-flower	Shrub up to 0.6 m
<i>Zantedeschia aethiopica</i>	White Arum Lily	Does best in damp or well-watered places
<i>Zantedeschia albomaculata</i>	Arrow-leaved Arum / Spotted-leaved Arum	Does best in damp or well-watered places

\* Note that *Kniphofia* (Red-hot Poker) species hybridize with wild species very easily, and many plants in horticulture sold under species names are in fact hybrids.

Given the possible presence of pokers in wetland areas, no pokers may be utilized in garden or landscaped areas, or brought into the Zululami Development at all.

#### **Wetland gardening**

Homeowners intending on constructing ponds or water features should contact the ECO for a list of suitable plants, available as a hard copy only.