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October 2009

OPERATIONAL PHASE

ENVIRONMENTAL MANAGEMENT PLAN

For

KINGSWOOD GOLF ESTATE, GEORGE

Compiled by:
HilLand Associates

Reference:
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Submitted to:
DEA&DP
George

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1 INTRODUCTION

HilLand Associates were appointed by Kingswood Golf Estate (PTY) Ltd, to update the Operational phase Environmental Management Plan (EMP) for the estate as required by condition 9 of the record of decision (ROD) EG 12/2/1-37-ERF 464 KINGSWOOD GOLF ESTATE (3292), issued by the Department of Environmental Affairs and Development Planning (DEA&DP). The aims of this EMP are to address all environmental issues applicable during the long term operation of the estate. This includes, but is not limited to:

- Long term alien vegetation management
- Building control for individual houses
- Open space management
- Water abstraction from the Rooi River
- Rehabilitation of the river system
- Long term environmental monitoring programs

According to condition 9 of the ROD, this EMP is submitted to DEA&DP as an update.

All property owners of the Kingswood Golf Estate as well as contractors working on the estate are bound by the EMP for the estate (in terms of both the construction and operational phases).

1.1 DESCRIPTION OF ESTATE

Kingswood Golf Estate is situated within the northern-western area of George. The surrounding land uses (those land uses abutting the site) consist of Heather Park and Rooiriveirrif residential areas, the Fancourt Links and the George golf courses, the Agricultural Research farm, agricultural lands and Municipal open space (wetlands).

The estate is owned by the Kingswood Golf Estate (PTY) Ltd, and the individual land owners of single title and group housing properties. It consists of a total of 730 privately-owned residential units, made up of a combination of single residential units and group housing clusters. The units are spread over the entire property, interspersed with the 18 hole golf course and driving range as well as open space (Conservation) areas. The golf course will be complimented by a club house (still to be built) and a hotel with golf lodges and a retirement village (approval process underway). Irrigation makes use of borehole and captured storm water runoff stored in the various dams on the estate.

The Rooi River flows east/west within the southern part of the property. All alien plants and trees have been eradicated from the system during the construction phase of the development. Ongoing alien clearing is part of the operational phase of the development and will be required for as long as the seed store is in the soil. It is the intention to recreate as natural a riparian system as possible, as a natural feature that compliments the housing and golf course

estate. This rehabilitation commenced during the construction phase with the bulk of the rehabilitation to continue into the operational life of the estate. This entails alien vegetation removal and control, erosion damage repair and wetland rehabilitation.

1.2 DEFINITIONS OF TERMS USED

Various non-layman terms are used to describe activities in this report. Definitions for the more important terms are provided below, along with their abbreviations.

Department of Environmental Affairs and Development Planning (DEA&DP)
Delegated authority in terms of NEMA, ensuring compliance with the ROD.

Environmental Control Officer (ECO)
A duly appointed environmental practitioner who will monitor compliance with the EMP, ROD and rezoning conditions and who reports to the ELC.

Environmental Impact Assessment (EIA)
The study done prior to approval of the development in order to determine the impacts that the development as well as possible alternatives may have on the environment of the site.

Environmental Impact Report (EIR)
A report arising from the EIA, it shows and discusses the results obtained during the EIA and is the basis on which the ROD is issued.

Environmental Liaison Committee (ELC)
A committee appointed in terms of the ROD, who meet on a bi-annual basis for the life of the project to ensure continual compliance with the ROD, EMP and other documents pertaining to the management of the Estate.

Environmental Management Plan (EMP)
A plan (designed by the EAP and approved by the DEA&DP) that provides rules, regulations, recommendations and guidelines on how to manage all management activities on the Estate in such a way that they can be considered environmentally friendly (*e.g.* a minimal environmental impact).

Estate management
Those persons/departments responsible for the overall management of Kingswood Golf Estate.

Home Owners Association (HOA)
An association formed by the residents of Kingswood Golf Estate along with Estate management. It is responsible for ensuring residents comply with the EMP, ECO instructions, residential rules and regulations, as well as handling residential complaints and requests. The HOA acts as a liaison between the residents and Estate management. The HOA is bound by the conditions of the ROD and EMP's.

Kingswood Architectural Committee (KARC)

A committee comprising of persons from the estate management, design centre and landscaping responsible for overseeing all building activities conducted on Kingswood Golf Estate.

Record of Decision (ROD)

The formal record of the Environmental Authorisation provided by DEA&DP to the developer, in order to undertake the various listed activities.

1.3 USING THIS DOCUMENT

All residents/landowners, Estate management, permanent or part-time employees including contractors and others staying, working or visiting Kingswood Golf Estate MUST ADHERE to the OEMP. All should be provided with a copy of this report. If it is not possible to supply them with a copy, they must be informed of the contents and given access to the report.

The OEMP must be taken into consideration for all activities on the Estate. The report has been divided into various sections, each dealing with a different "main" management activity (*i.e.* management of developed areas, management of open areas and monitoring). However, as the environment is a complex system, and what happens in one area effects another (*e.g.* run off from the golf course may increase nutrient levels in the river course) it is recommended that person understands the full scope of the OEMP prior to carrying out an activity.

Within the document are rules and regulations that MUST be adhered to, as well as recommendations and guidelines that should be adhered to. In the case of recommendations and guidelines, these must be followed unless more environmentally friendly approaches are identified and used. The Estate Management in consultation with the ECO and ELC are responsible for approving the method prior to it being implemented. It is suggested that the KARC, ECO, ELC and other appropriate persons remain in touch with up-to-date methods of environmentally friendly practices as to implement these in combination with what has been discussed in this report.

2 THE ENVIRONMENTAL CONTROL OFFICER

As per condition 7 of the ROD a suitably qualified Environmental Control Officer (ECO) was appointed throughout the construction phase of the development. It also requested that the ECO should then play a further role throughout the life of the project, as to ensure that the estate is continually managed on an environmentally friendly basis.

A remuneration schedule should be discussed through the Home Owners Association (HOA). The ECO is to be represented on the HOA trustee committee and will hold a veto right in relation to environmental issues.

The ECO's terms of reference are as follows:

- To ensure compliance with the OEMP, ROD and rezoning conditions, and any other conditions which may be imposed from time to time
- To assist homeowners regarding environmental concerns relating to construction of residences and associated structures.
- To report to the ELC on a bi-annual basis for the lifespan of the project.
- To call emergency meetings of the ELC as and when the need arises.

3 ENVIRONMENTAL LIAISON COMMITTEE

ELC terms of reference:

- Committee comprising of the ECO, developers representative (replaced by a HOA rep after the development period), Local authority representative, DEA&DP representative, CapeNature representative, Environmental NGO representatives (WESSA and Botsoc)
- To make decisions relating to minor amendments and modifications to the development as a result of operations (not where such changes would result in the definition of an "upgrade" coming into effect - which would require an authorisation in terms of the NEMA, as amended 2008).
- Ensure compliance with any relevant legislation.

4 MANAGEMENT OF DEVELOPED AREAS

Developed areas include:

- Residential units, made up of a combination of approximately single residential stands and group housing clusters and a small commercial component.
- Retirement village and golf hotel and lodges as proposed in the ROD amendment application and EIA process currently underway.
- Infrastructure associated with the development, including internal roads, pump stations and underground sewerage pipelines (to be maintained by the municipality), as well as underground electricity cables.
- An 18-hole golf course plus a practice hole, complimented by a clubhouse, driving range, putting green and tennis courts.
- 11 off-channel dams for golf course irrigation, with the golf course's drainage system being directed towards the various dams for water recycling.

Refer to Appendix 1 for map showing the layout of Kingswood Golf Estate.

4.1 CONSTRUCTION ACTIVITIES

The 18-hole golf course, 11 off-channel dams along with most of the associated infrastructure have already been developed according to the guidelines set out in the Construction phase EMP. However, residential houses and associated structures are to be developed during the operational life of the estate and are therefore discussed in the OEMP.

The Retirement Village and Hotel and Golf Loges, together with their infrastructure, will be built in terms of the updated CEMP and will fall under the OEMP after their construction is complete.

Any development (which has been approved and recorded in the ROD or any amendments thereof) that is to take place during the operational life of the estate is to follow the guidelines discussed below.

These specific guidelines have been set to ensure that environmental disturbance is limited both during civil and home construction. The aim of these guidelines is to ensure that construction does not destroy the very reason for originally purchasing a plot at Kingswood Golf Estate.

No construction may be allowed unless the following guidelines have been taken into consideration:

4.1.1 Persons responsible for overseeing construction

The management of construction activities during the operational phase will be the responsibility of the **Kingswood Estate Management**.

4.1.2 When would an Environmental Impact Report be required?

As an environmental impact assessment (EIA) has been done prior to the development, certain development of infrastructure (*i.e.* residential units) has therefore been approved in the ROD on the basis of the environmental impact report (EIR). There is no need for future EIRs to be done prior to construction of residences and other infrastructure not erected during the construction phase of the Kingswood Golf Estate. This is unless the proposed development or activity did not previously form part of the assessment and ROD. Any new listed activities in terms of NEMA will be subject to Environmental Authorisation.

Refer to Appendix 3 for building guidelines.

4.1.3 Submitting a "Proposal for development"

Landowners (those wishing to build) must compile and submit a **Proposal for development** to the KARC.

This proposal **must be approved** by the KARC prior to any construction (including extensions made on any existing infrastructure) can take place.

This proposal must include the following plans:

- **Building plan**

  The building plan must include a Layout Plan, Elevation Plan and Contour Plan.
  The Layout plan must include all driveways, decks, pools, water-features and any other surface infrastructure. Details should also include building materials to be used and the expected construction time frame.

- **Environmental plan**

  This plan should include demarcation of building envelope, plant rescue, and construction site plan indicating areas for stockpiling of topsoil, storage of materials, positions of silt fences and other erosion control mechanisms as well as a plant rescue programme. Refer to below regarding requirements for the environmental plan.

  The Building envelope is the area within which any physical disturbance must be contained. Physical disturbance includes the building of a house, pool and deck to name a few. The environmental plan must be approved by the ECO.

- Landscaping plan

This plan must among other things include the plant species to be planted after construction.

A detailed list of what is required to be covered in the proposal must be developed by the KARC. The list must be provided to landowners as to ensure that all applications for development of the plot are completed correctly. This list must be completed before any development approval is granted in order to avoid any allegations of discrimination or unfair practice in future.

Landscaping plans should also include a general layout plan to indicate siting of plants and features. The landscaping plans are to be signed off by the ECO or a designated appointee.

Please note that landscaping plans must be submitted one month prior to KARC's final certification.

4.1.4 Review of the "Proposal for development" by the KARC

The submitted proposal is to be reviewed by the KARC. This is to be done preferably at a monthly meeting depending on the urgency of the proposal. The landowner/applicant should then be notified within seven days of their decision.

If the application is **denied**, reasons for its denial must be given along with suggested means of rectifying the problem. It is then the applicant's responsibility to correct these problems and re-submit the proposal.

If the application is **approved**, it is suggested that the KARC provide the applicant with any recommendations and requirements that may reduce the environmental impact (where seen fit). The KARC must elect a member, or appoint a non-committee member that will be responsible for all liaison with the landowner. This will include assisting with any questions the landowner may have as well as ensuring the landowner complies with the OEMP, as well as recommendations or requirements the KARC may have given the landowner.

4.1.5 Prior to starting construction

No construction of residences may take place prior to approval by the KARC.

It is essential that plant rescue be done prior to any construction taking place. Plant rescue entails the physical transplanting of the indigenous material from the property to the site nursery or directly into the fynbos reserve or open space areas. Only once the ECO or a designated appointee has provided the landowner with a signed

certificate stating plant rescue has been carried out can construction go ahead (assuming all other requirements have been met).

The building area is to be physically screened off with a shade cloth fence at least 1.8m in height (as stipulated in Kingswood Golf Estate Building Regulations). Mulch bags or silt fences are to be placed along the base of this fence to trap any sediment, which may move following rain. These are to be kept clean during construction to prevent any movement of silt out of the demarcated zone.

The landowner must be given signed approval by the liaison member together with the ECO appointed by the KARC, to indicate that all mitigatory measures have been implemented satisfactorily, before continuing with construction.

4.1.6 During construction

The road verge area incorporates the area between the building envelope and the street. It may be used during construction for activities such as storage of building material and "non-hazardous" waste, and must be managed according to the specifications set out for the building envelope above during construction (*i.e.* plant rescue, topsoil rescue and screening requirements.

4.1.7 Post construction

This area is to be reinstated after completion of construction to natural vegetation from the attached lists. Landscaping of the sidewalks is permitted but only once a landscaping plan has been submitted and signed off by the ECO or a designated appointee.

Prior to occupation, it must be signed off by the ECO or the designated appointee, on behalf of the KARC. Any problems must be rectified by the landowner before occupation will be allowed.

4.1.8 Keeping record of decisions and progress regarding construction

A record of all decisions and progress regarding the construction must be kept on file. This is to make allowance for any problems in future, or to be used as a reference for similar developments.

NO work to commence on any building site prior to:

- The Building plans, environmental plans and landscaping plans are approved.
- Full demarcation of the property boundary / development area with a shade cloth boundary fence to prevent any access outside the property boundary and to contain the building activities to the site.
- A signed certificate of plant and topsoil rescue by the ECO

4.2 RESIDENTIAL AREAS

4.2.1 Residential rules and regulations

Homeowners are to ensure that they adhere to the following:

- Landscaping and integrating the natural vegetation with your home is a critical aspect of life at Kingswood. In view of this, landscaping guidelines have been established together with a plant list of the indigenous and exotic vegetation that is suitable for use on the estate.
- Follow the requirements as provided above when constructing on property.
- Waste management is to be done in accordance to Section 4.2.4 of the OEMP.
- Internal fencing in order to control domestic animals can be erected within the building envelope, according to the building guidelines. No fencing of the external erf boundaries is recommended. Residents who choose not to fence their properties will have the benefit of wild animals (*e.g.* Bushbuck and Grysbuck) moving through their gardens. Please be aware of this fact when landscaping.
- The architectural style of infrastructure is limited to the Cape Colonial Style to maintain the aesthetic qualities of the estate.
- Buildings must be maintained in good order to preserve the aesthetic qualities as well as maintaining safe structural standards.

4.2.2 Maintenance of residential properties

Landowners are responsible for ensuring the maintenance of infrastructure on their properties. This entails looking after the gardens and buildings. Broken sewerage pipelines, or other damaged servitudes are to be reported immediately to the estate management. Estate management must then assure that the relevant authority/ maintenance team is notified of the problem and rectifies the problem as soon as possible (so to prevent any negative environmental impact it may have).

4.2.3 Planting and maintaining of gardens

Gardens on the estate include those on individual plots as well as on and around the golf course and associated structures (*e.g.* club house). The following recommendations apply in all instances:

- <u>Species to be planted</u>

The garden area must make use of at least 80% indigenous vegetation to the Southern Cape. Appendix 2 contains a list of indigenous and exotic species as guide line. 80%

implies both area taken up in the garden and number of species planted ie 80% of trees, 80% shrubs and 80% ground cover must be indigenous. The general theme of landscaping is to be indigenous, but certain exotic elements would be acceptable within this theme (as long as they have been approved by the ECO or a designated appointee). Lawns may be made up of Kikuyu, however, indigenous grass species are encouraged as they are hardier and need significantly less water (eg Buffalo, Cape Fine). Exotic or Alien species that are regarded as inappropriate to an indigenous garden, or considered to be a threat to the surrounding natural vegetation will not be permitted on site. In this regards, the Conservation of Agricultural Resources Act (Act No 43 of 1983) as well as any other relevant legislation must be adhered to.

Formal landscaping should grade into the surrounding conservation area in a manner that results in a gentle blend. Fencing within the building envelope should be softened with the planting of indigenous vegetation.

- Use of fertilizers and compost heaps

  Compost heaps reduces the cost of expensive fertilizers. The estate promotes sustainability and environmentally friendly activities, as such composting is encourage but must adhere to the estate aesthetic guidelines. Use of the site on the estate must be done in agreement with Estate Management.

  It is recommended that homeowners consult the ECO with regards to the placement of a compost heap. Fertilizers must be applied and stored in a means as not to contaminate water streams.

- Conserving water in the garden

  The plant species indicated in Appendix 2 are mainly locally indigenous plants that are adapted to the local climate and should not require excessive watering in addition to the natural rainfall pattern. However, plant selection will not be enough to conserve water and homeowners should therefore adopt a water-wise-use ethic to assist in conserving water. It is suggested that all homes capture roof water for use in the gardens.

The following water-wise principles for private gardens are recommended:

- **Watering**

  The collection of roof water is encouraged for watering gardens. Such storage containers should preferably by located underground, or must comply with the aesthetic guidelines for the estate.

  Most people tend to over-water their gardens. Watering depends on soil type, irrigation equipment, the weather and the type of plant. To determine the soil type, simply squeeze some damp soil in your hand and roll it into a sausage.

Sandy soils will fall apart; loamy soil will hold together but crumble easily, and clay soil will mould into different shapes without breaking apart. With sandy soils, water drains quickly beyond the reach of the plant roots and these soil therefore require short, frequent watering. Clay soil has a high water-holding capacity, so it is best to give a deep watering, less often. It is suggested that watering once a week should be sufficient, except during exceptionally warm periods when evaporation is high.

Also remember the following:

- Never water while the wind is blowing and only water in the early mornings (before 11am) or late afternoons (after 4pm) as to reduce the loss of water due to evaporation which occurs at its maximum during midday.
- Group plants with similar requirements together and adjust watering according to their needs.
- Do not water automatically, first check whether the soil is dry.
- With trees and shrubs, rather water copiously less often so that the roots are encouraged to grow deeper.
- Use of mulch assists greatly in retaining soil moisture and reducing the need for irrigation. Grass clippings form a very effective mulch and reduce the amount of weed growth from bare ground.
- During periods of drought, it is suggested that minimal watering is done and water regulations, as set by the local authorities, are followed.

- Group plants with similar water requirements in the same beds

Many sought after plants many require regular watering, these should be grouped together in the most prominent part of the garden, where they are frequently seen and admired. Plants which may need watering only once a month should be considered for the rest of your garden. While most plants require regular watering after planting, once water wise plants are established, you can reduce watering dramatically.

Bedding plants and annuals require regular watering. Ask your nursery which of them are water wise, and enquire about mulching and water retention granules that reduce the need for water.

NOTE At least 80% of the plant species must be indigenous to the Southern Cape. Please view plant list in Appendix 2 as a guide.

- Reconsider your lawns

  Lawns guzzle water. Assess how much lawn you actually need for entertaining, children playing and pet exercising, and then consider reducing the area without reducing your enjoyment. If some areas of lawn are used as paths, maybe they would be better as mulched walkways.

  Do not cut your lawn too short during the growing season. Automatic sprinklers should irrigate lawns (and not the surrounding paths!) early morning in Summer and late afternoon in Winter. If it rains, override the system and remember too frequent watering results in shallow root growth and encourages fungal and other attacks on the grass.

  Consideration must be made to make use of water wise grass species for lawns. For example, Buffalo grass in place of water guzzling kikuyu. The lawn may take longer to establish, but it will be well worth it in the long run.

- Use of pesticides

  Strict control of pesticides is required to prevent the loss of indigenous species that perform vital ecological functions in gardens. Pesticides used should be highly species specific to the species the homeowner wishes to control. Organic pesticides are recommended, as not to allow poisons into the system.

- Garden refuse

  Garden refuse (including lawn trimmings) may not be disposed of in the open space areas, but must be taken to the duly allocated site, and preferably used to make compost.

4.2.4 Waste Management

The estate's refuse room must be maintained in an ordered fashion to promote recycling and prevent access to wildlife. This room should prevent any waste from being able to negatively affect the natural environment (*e.g.* leaching of nutrients or poisons into the ecosystem due to rain filtrating through the waste). All estate refuse must be divided by the individual homeowners or operators into the various recycling components as may be determined from time to time.

No waste may be disposed of in the open space areas, or anywhere else if not designated as a waste disposal area. All waste must be disposed of in appropriate municipal or other authorised dumping sites. Hazardous waste must be dealt with, with extreme caution and disposed at a dumping site created for hazardous wastes.

The National Environmental Management: Waste Act (59 of 2008) covers all aspects relating to waste management and must be adhered to at all times. Any other relevant legislation must also be adhered to.

4.2.5 Domestic Animals

The keeping of wild animals (e.g. monkeys, reptiles and birds) is not recommended on the estate.

NO ANIMAL that could threaten biodiversity of the estate, should it escape is recommended. Such species include certain alien fish species, bird species and reptile species. Homeowners wishing to keep alien or indigenous species must abide to the rules and regulations set of CapeNature as well as other regulations controlling the keeping of animals as pets. It is the responsibility of the homeowner to find out the details pertaining to pets they wish to keep. This can be either found out from the ECO or CapeNature.

Animals must be properly enclosed to prevent escape. Cats, which are more difficult than other animals to restrain, should be neutered/spayed to prevent breeding with feral cats and consequent increase in numbers within the natural environment.

Owners wishing to take their pets for walks (or any other reason) into the rest of the developed area or open space areas must do so only in areas where these pets are allowed. Within these areas the animal must be kept under control (e.g. birds and reptiles kept in a container, dogs and monkeys on a leash).

Wildlife on the Estate should remain with as little human interference as possible. Feeding of wild animals in close proximity to humans could result in habituation to humans. Bird feeders may be placed in trees or high enough above the ground so larger fowl (Geese, Guinea Fowl) cannot gain access to these feeders. The reason being that, these larger fowl and monkeys can become "problem animals" especially in times of drought. If these animals do become a problem the Estate would have to remove or have them destroyed which is not favourable.

The use of poisons of any nature on the estate for animal control is strictly prohibited unless undertaken by a professional service under specific control of the ECO and Estate Management.

4.2.6 Problem animal control

Various animals including snakes and bats may enter residential areas. The landowners may choose to remove such animals from their property. NO animal may be killed, and owners can be fined for killing an animal. The maintenance team of the

estate should be trained in the removal of problem animals, and should be responsible for the removal of such animals at the request of a homeowner.

In certain cases, such as with reptiles, these animals may not be removed from the property without the necessary trapping permits. The estate should either apply for such a permit from CapeNature, or find out from them who has the necessary authority and permits. Such a duly authorised person may then, at the homeowner's expense, be called to remove the problem animal.

In the event that a person is bitten by a snake or another potentially poisonous animal, the animal should be caught for positive identification. This would be necessary to ensure the person receives the correct treatment. If the animal cannot be caught it may be deemed necessary to kill.

PLEASE NOTE that most people are bitten when attempting to kill the animal or play with it. Also remember that one very often needs to get closer to an animal to kill it than to catch it. Catching animals is relatively simple. For example broom sticks can be used to gently persuade a snake into an empty container such as a bucket. A lid can then be placed in the bucket and the snake safely transported to where it can be released.

4.2.7 Fire protection

Within the open space areas, especially those areas dominated by fynbos, there is a high risk of fires, particularly during the dry summer months and periods of high wind velocities. No burning of waste on ANY PART of the Estate is permitted.

A fire place may be built within the building envelope. Braais are allowed only in this zone, including a weber braai or other form of portable braai. Coals (old or new) may not be disposed of in the surrounding natural area. The fire must be properly extinguished before being left unattended. Wood for the fire may not be collected from the open spaces of the estate.

4.3 GOLF COURSE AND ASSOCIATED STRUCTURES

There are various general rules and regulations pertaining to the use of and movement on and around the golf course. As these do not concern environmental management issues, they are not discussed in the OEMP. They do however need to be followed, and users of the golf course should be made aware of them. None of these rules or regulations may contravene the OEMP, and should assist the OEMP in reaching the objective of effective and efficient environmental management for the Estate.

4.3.1 Construction of infrastructure and modification of golf course

No modifications to the final golf course (after construction) can be effected without the consent of the ECO and ratification by the ELC. Also, out of play areas landscaping may not be modified without the consent of the ECO and ratification by the ELC. Major modifications may require approval by the DEA&DP.

4.3.2 Maintenance

It is vital for the golf course along with its associated infrastructure to be continuously maintained. This entails irrigation, trimming the greens and fairways as well as maintaining associated infrastructure, bunkers and irrigation dams. Associated infrastructure would include pump houses, roads as well as the club house. A maintenance program, capable of spanning the life of the estate, must be developed and implemented. It is the responsibility of the KARC to ensure that this program is implemented within the first year of the OEMP coming into effect. It is also their duty to ensure the program is continuously adapted (in an environmentally friendly manner) as new maintenance methods arise.

4.3.3 Golf course irrigation (water management)

While potable water is to be supplied by the local authority, irrigation water will come from the registered water rights of the property. The potential cumulative impact on the potable water resources of the area linked to the increased demand for Kingswood Golf Estate could potentially effect the overall water management planning for George. The Local Authority has however confirmed that the supply for the Estate has been calculated into their water management plan for future demand and supply.

Golf course irrigation control is to be based on watering only the areas where necessary. Greens and tees will require more regular irrigation, while the fairways must mostly rely on rainfall. Out-of-play areas are designed to utilize natural veld grasses and to reintroduce the fynbos elements, which will not be irrigated with the exception of during the growing period.

According to the EIR, 30 000m^3 water per month is required for irrigation of the golf course. Total irrigation must thus not exceed this amount. Consumption must therefore continually be monitored and records kept for audit purposes.

Surface and sub-surface cut off drains must be regularly checked and maintained in order to ensure that nutrient rich golf course irrigation water does not reach the natural open space areas.

4.3.4 Water abstraction

Prior to any abstraction from the river a permanent gauge marker plate must be installed in the source river upstream of the abstraction point to determine base flow. This along with the pump house was set up during the construction phase of the development. This marker requires annual review. This will allow for flow changes and flood damage.

4.3.4.1 When is abstraction allowed?

Under normal circumstances the run-off from site into the dams should be more than adequate for irrigation of the golf course. Abstraction of water from the Rooi River and unnamed tributary is therefore limited to exceptional circumstances only. These exceptional circumstances need to be substantiated by the KARC with the assistance of the ECO and recorded in this OEMP.

According to the ROD, abstraction will only be allowed if:

- Base flow of the source sites is equal to or higher than 12 litres per second (12l/s).
- Only a third (33%) of the volume exceeding the required base flow is abstracted. For example, for a measure flow of 24l/s, an abstraction of only 4l/s will be allowed.
- Total abstraction must not exceed 50 000m^3 per annum.

Permission must be obtained from the ELC to abstract water from the Rooi River and unnamed tributary of the Rooi River.

The ELC must ensure that run-off from the site is collected and used optimally and abstraction from the Rooi River and unnamed tributary is minimised. If optimal water collection is not taking place measures must be taken by the KARC to rectify the problem.

4.3.4.2 Monitoring abstraction of water

Abstraction of water must be monitored and measured with a water flow meter and an electricity meter on the pump. Data on the water flow at the gauge marker plate and pump rates must be kept. The base flow must be monitored and recorded daily during the period that water is abstracted from the Rooi River and unnamed tributaries.

For each day record:

- Base flow
- Amount abstracted
- Electricity meter

The ECO must ensure that there is compliance of this rule (e.g. accurate data being captured, base flow not below minimum).

4.3.5 Fertilizers

Fertilizers and herbicides are to be used in a manner that will have a minimal impact on the surrounding natural open areas. For example, losses into open areas due to runoff from irrigation must be prevented.

4.3.6 Alien plant control

All Herbicides must be used as per product label. The following regarding the use of herbicides must also be taken into consideration:

- Only registered herbicides for each specific species may be used.
- All herbicides used must be selective non-residual herbicides which have been tested to have no detrimental effect to the environment if utilised correctly. All herbicides that have being recommended are distributed by ECOGAURD and VOLCANO agroscience.
- All herbicide handlers should be properly trained by a recognised training centre. All herbicide handlers must use all required personal protective equipment (PPE), namely:

    - Rubber gloves (Water-proof extending to elbow)
    - Protective goggles
    - Single filter breathing masks
    - Overalls
    - Waterproof boots.

- The cleaning of herbicide storage containers and knapsack sprays must be done at the maintenance facility. Water used to clean storage containers and knapsack sprays must not be disposed of, but used to mix the next batch of herbicide.
- It must also be noted that Timbrel 3A should never be used as a foliar spray as it contains chemicals that can seriously affect the workers eyes (The risk of getting herbicide in your eyes increases when doing foliar application)
- Garlon 4 and Viroaxe should NOT be mixed with diesel (as per product label) but with water. A wetting agent such as Actipron should be used to substitute the function of the diesel.
- Herbicide should never be sprayed on rainy days or when the plant is still wet from previous rain or dew. If rain is forecast for the day, herbicide should not be sprayed (most herbicides require 5 rain free hours to be properly absorbed).
- The Herbicide product application labels must always be carefully read, as they contain invaluable information about the product and its use.

All fertilisers and herbicides must be properly stored in order to prevent accidental spillage. Refer to Table 1 for details pertaining to clearing methods and herbicides that can be used for various alien plants which may be encountered on the site.

Follow-up operations should be systematic. This entails developing an annual plan of operations for alien clearing, which can be divided into quarters (e.g. doing follow-up in a different section every three-month). It must be noted that follow-up alien clearing is of **utmost importance** and should it not be maintained, all money spent on initial clearing will have been totally wasted.

A dedicated team should be employed full time on the estate to ensure continuous follow up. This dedicated team could be members of the team responsible for the open space management.

A combination of methods should be used during the follow-up. The methods to be utilised for the main species occurring on the site are summarised in Table 1 below. However, these are not the only species occurring on site and all other species must be controlled appropriately.

Table 1. Recommended procedures for follow-up operations

SPECIES	TERRAIN	METHOD	HERBICIDE	FREQUENCY
Acacia mearnsii	Flat	Hand Pull	None	3 months
Acacia mearnsii	Moderately sloping	Hand Pull	None	3 months
Acacia mearnsii	Steep Slopes	Hand pull & Cut and stump treatment	Timbrel or equivalent	6 months
Acacia cyclops	Flat	Cut	None	6-8 months
Acacia cyclops	Moderately sloping	Cut	None	6-8 months
Acacia cyclops	Steep Slopes	Cut	None	6-8 months
Pinus spp	Flat	Hand Pull	None	4 months
Pinus spp	Moderately sloping	Hand Pull	None	4 months
Pinus spp	Steep Slopes	Cut	None	8 months

Eucalyptus spp	Flat	Cut and stump treatment	Timbrel	6-8 months
Eucalyptus spp	Moderately sloping	Cut and stump treatment	Timbrel	6-8 months
Eucalyptus spp	Steep Slopes	Cut and stump treatment	Timbrel	6-8 months
Hakea spp	Flat	Cut and stack	None	9 - 12 months
Hakea spp	Moderately sloping	Cut and stack	None	9 - 12 months
Hakea spp	Steep Slopes	Cut and stack	None	9 - 12 months
Rubus spp	Flat	Foliar spray	Garlon or Equivalent	6 months
Rubus spp	Moderately sloping	Foliar spray	Garlon or Equivalent	6 months
Rubus spp	Steep Slopes	Foliar spray	Garlon or Equivalent	6 months
Acacia melanoxylon	Flat	Cut and stack	Timbrel or Equivalent	6 - 8 months
Acacia melanoxylon	Moderately sloping	Cut and stack	Timbrel or Equivalent	6 - 8 months
Acacia melanoxylon	Gently Sloping	Cut and stack	Timbrel or Equivalent	6 - 8 months

4.3.7 Waste Management

All refuse must be disposed of only in the receptacles provided for such use and these must remain sealed in order to prevent access by wildlife, such as vervet monkeys, resulting in them becoming problem animals.

No waste may be disposed of in the open space areas, or anywhere else if not designated as a waste disposal area. All waste must be disposed of in appropriate

municipal or other authorised dumping sites. Hazardous waste must be dealt with, with extreme caution and disposed at a dumping site created for hazardous wastes.

The National Environmental Management: Waste Act (59 of 2008) consists of the regulations regarding waste management and must be complied with. Any other relevant legislation must also be adhered to.

5 MANAGEMENT OF OPEN SPACE AREAS

The open space areas of the estate are subject to an intensive conservation and rehabilitation programme. The main emphasis is on restoring the ecological integrity of the property for the benefit and enjoyment of all the residents and to the long term benefit of the natural biodiversity of the area. The following guidelines have been set up in order to achieve this.

PLEASE NOTE that **no formal landscaping** is permissible within the open space areas.

5.1 PROTECTION OF BUFFER AREA

Within the open space areas there is to be a buffer area subject to stricter conservation measures than in comparison to other open space areas. The buffer area incorporates the river courses and associated riparian vegetation. This is discussed in further detail under section 5.4.

In brief, a minimum setback line of 40m must be maintained along the Rooi River. With the exception of a minimum setback of 5m for the golf structures associated with holes 9, 10, 11 and 12, a minimum setback of 15m between the riverbed and golf course must be maintained along the unnamed tributary of Rooi River. No earthworks are allowed within the buffer area, and no permanent structures (other than a footpath), gardens or any part of the golf course is allowed within the 15m buffer area. Certain designated areas within the retirement village have a setback of 36m and NO gardens are permitted between the units along the river and the river.

It is not essential for the boundary of the buffer area to be demarcated as long as it can be correctly identified by using various landmarks. It is important for the boundary to be correctly identified to ensure compliance with the ROD, OEMP and various other documents pertaining to the management of the buffer area. If it is chosen to demarcate the boundary, it must be done in such away as to ensure **minimal visual impact**.

No burning is allowed within the buffer area. Material that may need to be burnt must be removed from the buffer area and burnt in a designated area on or off of the estate. The necessary burning permits must be arranged by the KARC. The site for the burn must be decided on by the KARC and approved by the ECO. If burning is to take place off of the estate, the KARC is responsible for obtaining the necessary permission. Burning should only be

done on days that are suitable for SAFE burning (e.g. possibilities of the fire becoming out of control are at a minimum). It is suggested that the KARC contact the Fire Control offices to enquire about the fire index rating for the day and to determine whether it is safe to burn. For large burns (that may raise concern from residents of the Estate and neighbours bordering the Estate) the local fire department should be notified of the Estate's plans to burn (in case anyone reports the fire), as well as the residents and neighbours. This must preferably be done at least a day before the burn. Residents and neighbours can be notified by means of pamphlets informing them of the Estate's intent.

5.2 MANAGEMENT OF FOOTPATHS AND OTHER TRAILS

According to condition 19 of the ROD public access must be retained along the Rooi River and the unnamed tributary of the Rooi River by means of public pathways or a hiking trail. These pathways/trails must be designed in such away that they prevent any degradation of the riparian and buffer zone along the river courses. Hiking trails on the site is covered by the CEMP.

5.2.1 User rules and regulations

All users of the trails system in Kingswood Golf Estate must be made aware of the following rules and regulations to be adhered to if using the trails system. This can be done by placing sign boards (designed to ensure maximum visibility of the sign board, while simultaneously having a minimal visual impact) at all the entry points to the trail.

- The general public must have free access to the pathways. This access must be provided at all three points along the security fence (from the Municipal trail system when established). A permit system should be implemented so that knowledge of who is using the trail is available.
- No motorised vehicles (e.g. motorcycles, four wheelers, scooters or golf carts) are permitted on the trail system or elsewhere in the open space areas unless as part of the maintenance requirements.
- Mountain bikes will be allowed only on designated paths.
- Pedestrians ALWAYS have right of way.
- There may be no deviation off of the path for any reason, unless the path is damaged or is unusable for any reason. In such circumstances deviation must be kept to a minimum.
- Any damage discovered on the trails should be reported to the estate management who is responsible for the immediate rectification.
- Damaged trails must be closed to ensure that no deviation from paths is necessary.
- The purpose of the trails is for the enjoyment of the natural surroundings (fauna and flora); these must therefore not be disturbed.
- Nothing may be removed from the open space trails. "Take only photos, Leave only footprints".

- As the fire danger is very high due to the type of vegetation that naturally occurs, no fires will be allowed.
- Smoking will only be allowed in designated areas. No cigarette butts may be dropped anywhere and must be extinguished prior to be disposed of.
- Domestic animals must be on a leash, and under control.
- No sleeping over or camping of any form is allowed within the trails system.
- No littering will be tolerated. All refuse must be disposed of only in the receptacles provided for such use and these must remain sealed in order to prevent access to such areas by the wildlife (e.g. ververt monkeys) resulting in them becoming problem animals.

Penalties for non-compliance

If possible, visitors not adhering to these regulations and rules may be penalized in the form of fines, or denial of future access depending on the severity of the offence. The KARC are required to weight the various offences and determine appropriate penalties. This must be recorded and used to fine offenders. Users should be made aware (on the signboard) that they might be penalized if caught breaking any of the above rules and regulations.

5.2.2 Trail maintenance

- A maintenance program must be set up within the first three months after commencing this OEMP, to ensure the path remains in a usable condition and does not lose its appeal to walkers.
- Must be done manually as machines may damage riparian vegetation
- In the event that mechanical equipment is needed, only one path, that is stable may be used. However, the path has been designed to ensure mechanical equipment is not required.
- Water deflection bars must be monitored to prevent erosion.

5.3 GENERAL RULES FOR OPEN AREAS

5.3.1 Modifications to the open space areas

No modifications to the open space areas may be allowed without the consent of the ECO and ELC. This includes the rehabilitation plans, alien clearing plans, landscaping plans, trail layout or any other activities in the open space.

5.3.2 Waste management

No dumping of garden or general refuse is allowed within the open areas. Users of the trail system must either take their refuse with them or dispose of it in the receptacles provided for such use.

5.3.3 Hunting and fishing

No hunting is allowed. The Open space areas must be regularly monitored for poaching; any snares found must be removed. There are currently no suitable angling fish species.

5.3.4 Domestic animals

No domestic animals are permitted into the open space areas unless on a leash. It is the owners responsibility to ensure that domestic pets do not enter into these nature areas on their own accord. Should any problem animals be found the estate management will be required to remove such animals from the estate. Owners will be penalized in the form of a fine, with repeat offenders being fined higher amounts and/or being denied the opportunity to keep pets on the Estate in future.

5.3.5 Motorised vehicles

No vehicles are allowed within the open space areas unless with proper authorization. Vehicles must remain on designated routes.

5.3.6 Fires and wood collection

No fires may be made within the open areas unless by order of the KARC, for reasons of controlling vegetation (*e.g.* fire is an essential element of the fynbos vegetation). In such an event the fire must be controlled and limited to a designated area (to be decided on by the KARC, with the approval of the ECO).

The KARC are responsible for organising the necessary burning permits.

If burning is to take place on the estate, the KARC is responsible for obtaining the necessary permission. Burning should only be done on days that are suitable for SAFE burning (*e.g.* possibilities of the fire becoming out of control are at a minimum). It is suggested that the KARC contact the Fire Control offices to enquire about the fire index rating for the day and to determine whether it is safe to burn. For large burns (that may arise concern from residents of the Estate and neighbours bordering the Estate) the local fire department should be notified of the Estate's plans to burn (in case anyone reports the fire), as well as the residents and neighbours. This must preferably be done a day before the burn. Residents and neighbours can be notified by distributing pamphlets informing them of the Estate's intent.

As the bulk of wood suitable for sale as braai wood was removed during the construction phase, the remainder of the wood from subsequent follow-ups or dying / dead trees must be left on site. No wood may be removed from the open areas.

5.4 RIVER COURSES & RIPARIAN VEGETATION

5.4.1 Management of indigenous fauna and flora

Prior to the start of the development the area consisted of a high density alien vegetation with little indigenous flora. This alien vegetation was removed during the construction phase and rehabilitation process started. This process is discussed later in section 5.5. As part of this rehabilitation process many indigenous plants were replanted (some of which originate from the plant rescue done in the area during the construction phase). No animals have been re-introduced and are expected to gradually move back into the area on their own accord.

The riparian vegetation and river course is to be left to recover naturally. In other words, once all plants have been planted the vegetation is to not be "gardened" in any way. Intervention may only take place if rehabilitation appears to have failed. This must be done in consultation with the ECO and ELC first.

5.4.2 Alien plant and animal control

Initial alien clearing took place during the construction phase of the Estate. However, continuous follow up will be required throughout the operational life of the Estate to prevent re-infestation. As this is a management activity that will be required both within the developed and open areas of the Estate, it is discussed in more detail under section 4.3.6 In short it involves:

- Follow up must be done manually.
- It is recommended that it be done when greater than one metre high (a size at which no wood would be suitable for removal).
- Foliar spray may be done but strict herbicide policies will be needed. Care must be taken that surrounding indigenous vegetation will not be negatively impacted.
- NO WASHING of equipment in the river.
- Care must be taken not to damage indigenous vegetation. Contractors must therefore know what to clear and what to preserve.

Regarding animal species. No alien fish were found to be in the river system. These should not be introduced as they may feed on the indigenous species. Should alien fish be found to be present at some later stage (either due to not being identified during the initial system or being introduced from further upstream) these should be removed. An appropriate removal method, which is not harmful to the indigenous fish, will have to be decided on and implemented by the KARC. Sterile Grass Carp have been introduced to the irrigation dam to assist in controlling plant growth. It is essential that only permitted sterile species are used under the guidance of CapeNature.

Unlike plants, alien mammal and bird species as well as other vertebrates are not seen as a major problem. Control is thus not deemed essential. The KARC should remain aware of future changes in alien animals and their control; this should then be added to this OEMP.

5.4.3 Modification of stream and river bed

No further modification to the river outside the river rehabilitation plan will be allowed without being approved by DEA&DP. This would entail submitting an EIR after having conducted an EIA. Estate management would be required to follow the procedures required by the DEA&DP.

In terms of NEMA, various listed activities trigger the need for Environmental Authorisation. These being:

Activity 1m) *"the construction of any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including -*

(i) canals;
(ii) channels;
(iii) bridges;
(iv) dams; and
(v) weirs;

Activity 4. "*The dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 cubic metres from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland*."

These activities trigger GN 386 and require a Basic Assessment process and Environmental Authorisation prior to the activity taking place. Those modifications made during the construction phase (to repair the erosion and establish the wetlands) have already gone through the EIA process and were accepted.

5.4.4 River maintenance

The most fundamental principle that has to apply to any river maintenance work is that everything should be done in a conservative and environmentally friendly way. Because all rivers differ in terms of their ecological importance or conservation status, the precautionary principle should guide all maintenance work due to the fact that, in most cases we do not have enough information available when we need to make the decisions.

The following are the suggested precautionary principles:

- Protection of riverbanks and riverbed

  Whenever possible, maintenance activities should be planned to avoid unnecessary disturbance to the banks and/or bed of the river. Alterations to the riverbed and riverbanks destroy crucial habitats for aquatic organisms.

- Manual labour

  Manual labour should always be considered first for river maintenance activities. Mechanical methods should be a last resort, to ensure that damage is minimised.

- Modifying only one bank

  Whenever possible only one riverbank should be disturbed during maintenance activities. The most valuable areas (biophysical or aesthetic) should be maintained. Unmodified areas act as a reserve from which plants and animals re-colonise disturbed areas. Hydraulic considerations should determine the side to be modified (*e.g.* it may be desirable to modify the inside of a bend and preserve the vegetation on the outside for bank stability).

- Time to undertake activity

  Maintenance activities in rivers could lead to significant damage if interrupted by high flows or floods, rather undertake activities during the dry summer season. The ECO should be consulted with regard to the most appropriate times for disturbance to riparian vegetation and aquatic organisms.

- Erosion/Sediment control

  All reasonable measures should be undertaken to ensure that erosion does not occur as a result of the river maintenance activities. Sedimentation can be minimised by more sensitive maintenance techniques such as: temporary silt traps, limiting disruption to the river bed and banks, reducing the excavation and the length of work, timing outside of the rainy season and leaving vegetated sections in tact.

- Access

  Whenever possible existing access routes to the river should be used, otherwise only one route should be used per site. The following guidelines are provided:

  - use the most degraded areas for access routes

- keep erosion potential and aesthetics in mind
- limit disturbance to the riverbank and riverbed as far as possible
- access routes must be rehabilitated
- Pollution prevention
  All potential pollutants should be kept away from rivers. Machinery should be checked for oil and fuel leaks, or possible soil and water contamination both prior to and during river maintenance activities.
- Spoil material
  No spoil material should be placed on the river banks, dumped on riparian or bank habitats, spread around trees, used to fill hollows and other irregularities in the floodplain, or be used for erosion control, but must be removed to approved dumping sites.
- Channelization or canalisation
  Channelization should never be seen as an option for solving any river maintenance problems, because the problems created by channelization are in all cases worse than those which one originally anticipated.
- Taking short cuts or straightening rivers
  Rivers never follow the shortest route and riverbeds are never smooth. The straightening of rivers channels and smoothing of riverbeds are not natural and must be avoided at all times. In both cases the potential to cause more harm exists. Meanders in rivers reduce the flow speed of the water and spread it over a wider area in the floodplain, thereby reducing flood risk and damage. The construction phase has removed unnatural obstructions in the river causing erosion.
- Eradication of alien vegetation
  Alien clearing has taken place during the construction phase, however follow-up will be required. No large sized plant material, generated as a result of follow-up should be left in the riverbed or riverbank. This is because material could clog-up bridges and may cause major damage to properties and the aquatic environment downstream of the activity. This material should be moved to above the 1-50 year flood line.

5.4.5 Water abstraction

According to the ROD, water abstraction from the Rooi River and unnamed tributary is allowed in exceptional cases. This is discussed in section 4.3.4.

5.5 REHABILITATION OF THE OPEN AREAS

According the ROD the upper valley and riparian zone must be correctly rehabilitated to allow these zones to form an effective buffer between the golf course, residential area and river itself. This buffer would help remove nutrients and wastes arising from the golf course before they enter the river.

Without rehabilitation, the invaded river will remain an eyesore to those who are able to appreciate nature and healthy rivers. The river will also be unable to contribute valuable services to the proposed development (*e.g.* river trails, bird watching at river hides, water purification). It is likely that without mitigation, and due to the close proximity of the river to George, the condition of rivers would be a continual embarrassment to the owners and residents of the proposed estate.

However, the river represents an excellent opportunity for the developers and residents of the golfing estate to correct the mistakes and carelessness of the past and return the river to an acceptable standard of ecological health.

It is the responsibility of the KARC to ensure rehabilitation of the open areas takes place. Rehabilitation started with the removal of alien trees during the construction phase, but must be continued until the area is successfully rehabilitated (*e.g.* climax vegetation is dominant, with stable ecological cycles and processes). However, once rehabilitation has been deemed successful, the area must still be maintained, conserved and monitored. Seasonal SASS monitoring is used as is water quality monitoring, in order to track the life of the river while it is being rehabilitated.

The rehabilitation of the riparian zone requires careful attention. The following is recommended to assist in making the rehabilitation process a successful one:

- Work on the riparian zone should proceed from the uppermost boundary where the river enters the property in a downstream direction.

- The river valley should be permanently cleared of all invasive alien trees. The initial clearing has taken place during the construction phase, a follow-up program is required for the operational life of the Estate.

- The river bed should not be mechanically interfered with (*e.g.* bull-dozing) as this section of the river should be allowed to recover naturally once all invasive alien trees along the river have been removed.

- It is preferable that indigenous grasses and shrubs should be used for rehabilitation as they do not require watering once established. They also attract birds and other indigenous fauna to the site, which through seed in their droppings, assist in

introducing other plants back into the system. Only locally indigenous species may be used for this purpose.

- Pockets of indigenous tree saplings (species typical to riparian zones in the George coastal plain) should be planted to assist in the recovery of this area. Saplings should be planted outside the flood zone of the river.

- The rehabilitated area must not be "gardened". It should be left to recover naturally. If recovery does not occur, alternate plans must be made. This may entail the use of an outside consultant to assist in determining the problem and finding a suitable solution.

- Any infestation from upstream should be taken up with the authorities in terms of existing legislation.

- Monitoring of the recovery of the river is essential otherwise it is impossible to quantify progress.

  The River Health Programme should be adopted as the means to do this. Due to its presence in the river, the Cape *Galaxias* would be perhaps the most appropriate natural indicator of the ecological state of the river. The Department of Water and Environmental Affairs in association with the provincial nature conservation department is instrumental in promoting and managing South Africa's River Health Programme. This programme uses four indices to monitor the ecological health of our rivers, namely SASS (a macro-invertebrate index), FAII (a fish index), RVI (riparian vegetation index) and an index of habitat quality and quantity.

6 MONITORING PROGRAMS

The main objective of the OEMP is to ensure that the activities carried out on the Estate have a minimal NEGATIVE effect on the natural environment. It is therefore important to ensure that this document is reaching that objective. This can be done through various monitoring programs designed for such a purpose.

6.1 LONG-TERM ALIEN PLANT MONITORING

The initial clearing has been completed during the construction phase of the development, with follow-up having started and to continue THROUGHOUT the operational life of the estate. Monitoring re-growth of alien plants is an essential element of follow-up operations.

A quarterly assessment of the extent as well as the areas of alien plant re-growth must be undertaken. The results of this assessment should be used in modification of the alien clearing plan in order to prioritise areas for the next quarter.

All records of assessments and areas cleared should be maintained in a database in order to measure the success of the rehabilitation. A quantifiable figure (Cost/Area) should also be recorded.

Refer to section 4.3.6 for further information regarding alien clearing on the Estate.

6.2. MONITORING OF WATER QUALITY AND QUANTITY

Continued water monitoring at the existing water monitoring sites (view Appendix 4 for the SASS sample sites) as per the EIR should take place. Section 5.5 refers to adopting the River Health Programme as a means of monitoring water quality. This programme is overseen by the Department of Water and Environmental Affairs in association with CapeNature. It uses four indices to monitor the ecological health of our rivers, namely SASS (a macro-invertebrate index), FAII (a fish index), RVI (riparian vegetation index) and an index of habitat quality and quantity.

It is therefore essential that these four indices be incorporated into the monitoring programme of the Estate. All water monitoring activities should be carried out on the same day. This will allow for accurate comparison of results for each index. Monitoring should be carried out at least once a year, but preferably once every season.

Monitoring of the water quality and quantity includes, but is not limited to:

6.2.1 Nutrient level monitoring

Should take place on an annual (every 3 months) basis, and would include:

- Potasium (K mg/l)
- Sodium (Na mg/l)
- Calcium (Ca mg/l)
- Magnesium (Mg mg/l)
- Ammonia (N mg/l)
- Sulphate (SO4 mg/l)
- Chloride (Cl mg/l)
- Alkalinity (CaCO3 mg/l)
- Nitrate + Nitrite (N mg/l)
- Ortho Phosphate (P mg/l)

- Fluoride (F mg/l)
- Conductivity (mS/N @25°C)
- pH (@25°C)
- Saturation pH (pHs @ 20°C)
- Total Dissolved Solids (mg/l)
- Hardness (CaCO3 mg/l)
- Aluminium (Al mg/l)
- Cobalt (Co mg/l)
- Copper (Cu mg/l)
- Iron (Fe mg/l)
- Lead (Pb mg/l)
- Manganese (Mn mg/l)
- Nickel (Ni mg/l)
- Zinc (Zn mg/l)
- Total Oxygen Demand (mg/l)

View Appendix 5 for the Nutrient Level Monitoring Sites

The results of all readings should be made available to all relevant authorities (i.e. DEA&DP, Department of Health) as well as to the ELC.

Should any imbalances or readings not be within the norm, the following steps should take place to rectify the problem:

- A professional consultant should be appointed to assess the situation.
- The origin of the problem must be determined
- The relevant Authorities should be informed of all problems even when not originating on the estate.
- If the problem originates on the estate, the cause must be determined.
- The cause of the problem (not only the result) must then be rectified at its origin in consultation with the professional consultant, ECO, ELC and the relevant authorities.
- A monthly monitoring schedule must then be adopted until the results have normalised.

6.2.2 Irrigation water monitoring

The total irrigation water used should be recorded by means installing a meter at the main irrigation pumps. This can then be compared to the amount of water returned to the cycle through the seepage pumps. Calculations can then be made to calculate nett loss of water as well as the effectiveness of the recycling system with the goal of the nett loss of water to a minimum.

These results should be made available to the ELC, ECO and authorities.

6.2.3 Water abstraction monitoring

Abstraction of water from the Rooi River and unnamed tributary must be monitored and measured with a water flow meter and an electricity meter on the pump. Data on the water flow at the gauge marker plate and pump rates must be kept. The base flow must be monitored and recorded daily during the period that water is abstracted.

It is suggested that for each day base flow, amount abstracted and the reading on the electricity meter be abstracted. These results should be made available to the ELC, ECO and authorities.

6.2.4 Fish monitoring

It is suggested that monitoring of fish focuses on the presence of the indigenous *Galaxias zebratus*. This is included in the seasonal SASS monitoring. This can then be compared with future surveys to determine whether numbers are increasing or decreasing.

It is suggested that the guidelines suggested by the River Health Programme be used for such monitoring. It may also be required that a professional consultant be used for this purpose, or assistance be obtained from CapeNature.

Should it be found that alien fish enter the system or indigenous fish start dwindling in numbers, an outside consultant should be employed to determine the cause of the problem and assist in rectifying it.

6.3 MONITORING OF KIKUYU INVASION

As the fairways of the golf course are kikuyu, and the entire farm was kikuyu, the potential for the kikuyu to invade the open space and out of play areas exists. The verges of the fairways and any other areas where kikuyu is present need to be regularly monitored to ensure that it is kept confined.

Where kikuyu invasion occurs in non grassy fynbos and thicket, it can be treated with a foliar spray of a grass selective herbicide such as verdict. If the kikuyu invades fynbos areas containing natural grasses, an alternative method of control will have to be sought.

Individual home owners should be encouraged to seek alternative species for lawns, for example Buffalo Grass.

6.4 MONITORING THE OEMP

The OEMP must be continually monitored to determine its effectiveness and efficiency.

6.4.1 Monitoring of activities dealt with in the OEMP

Section 6.1 to 6.3 pertains to monitoring programmes aimed at monitoring certain activities on the Estate. These are however not all that needs to be monitored. Records of all activities discussed in the OEMP should be kept. These records should include any exceptions that may have been made (under permission of the ECO, KARC and appropriate authorities), problems that were experienced, methods used to rectify problems as well as the final outcome. This information can then be used to determine flaws in the OEMP. These flaws would be guidelines or recommendations that are ineffective and inefficient. They would then need to be removed or changed/adapted until they are effective and efficient.

6.4.2 Monitoring compliance with the OEMP

The same records used for monitoring the activities in 6.4.1 can be used to monitor compliance with the OEMP. Records of non-compliance must be kept. These records must include details of the offence, offender and penalty.

All aspects of the OEMP need to be monitored / audited to ensure compliance and in order to remedy any problems with either the implementation or interpretation of the OEMP. These audits will assist in streamlining methods to avoid future conflict situations.

7 PENALTIES FOR NON-COMPLIANCE

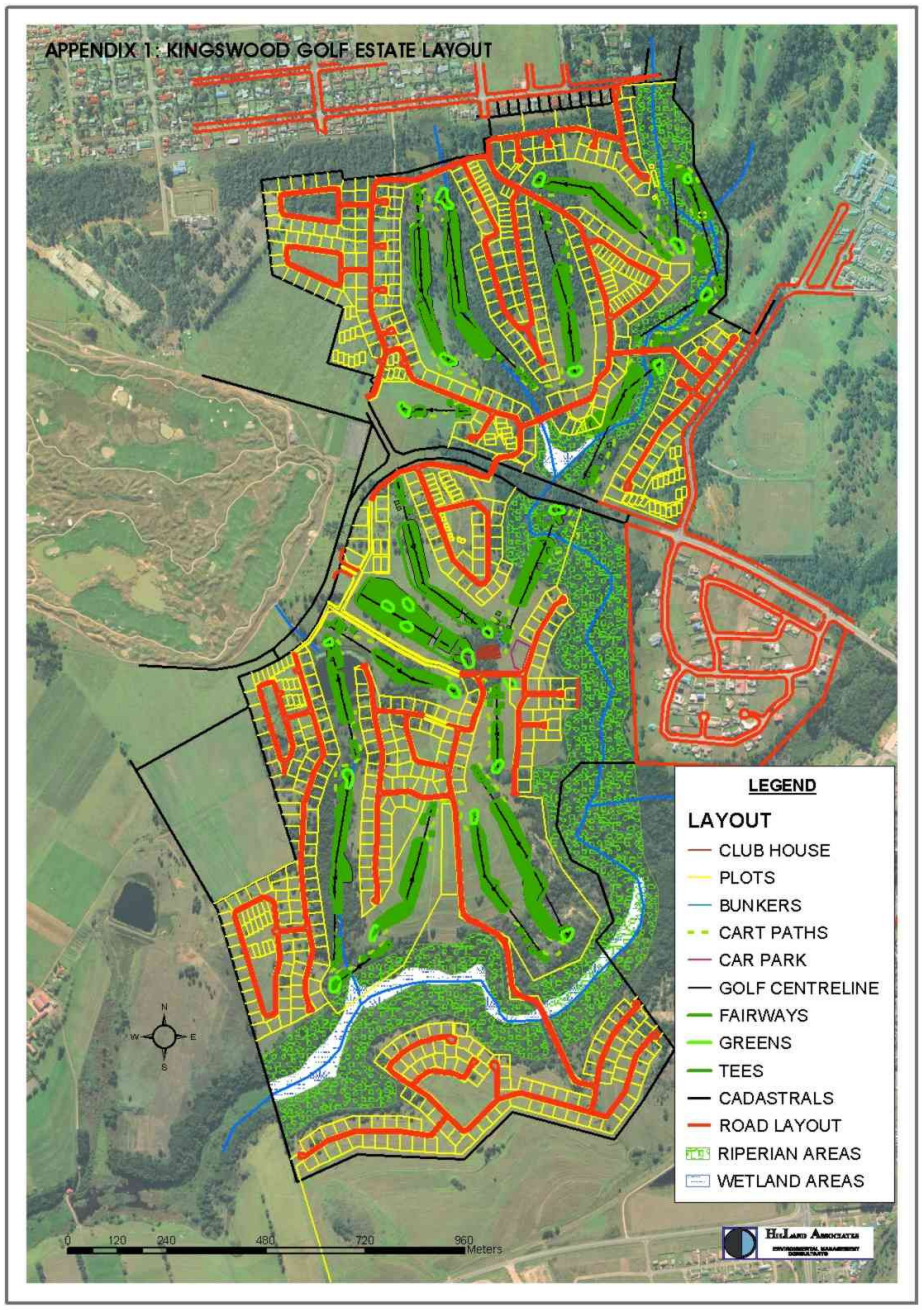
Those found not adhering to the OEMP are liable for penalties. Penalties are to be determined according to the weight of the offence. It is the responsibility of the KARC to determine what penalty suits what offence in consultation with the ECO. This should be recorded to be used for future offences, thus ensuring that the same offence receives the same penalties in the future. Repeat offenders are to be penalized more strictly than first time offenders. Ignorance is not an excuse for non-compliance.

8 EVALUATING AND REVISING THE OEMP

It is important to monitor the implementation of this document to determine whether or not the principles and guidelines set out in the OEMP are realistic, effective and efficient. The various monitoring programs discussed in section 6 should serve as effective means of evaluation.

The OEMP should be revised every five years to accommodate for an ever changing environment. It is the responsibility of the KARC to ensure that the OEMP is revised. It is recommended that the ECO be the person to revise the OEMP.

APPENDIX 1
KINGSWOOD LAYOUT


APPENDIX 1: KINGSWOOD GOLF ESTATE LAYOUT
LEGEND
LAYOUT
CLUB HOUSE
PLOTS
BUNKERS
CART PATHS
CAR PARK
GOLF CENTRELINE
FAIRWAYS
GREENS
TEES
CADASTRALS
ROAD LAYOUT
RIPERIAN AREAS
WETLAND AREAS
0 120 240 480 720 960
Meters
N
W
E
S

APPENDIX 2
LANDSCAPING SPECIES LIST

APPENDIX 3
BUILDING GUIDELINES

APPENDIX 4
SASS SAMPLE SITES

KINGSWOOD GOLF ESTATE
SASS 2009

0 125 250 500 750 1,000 Meters

HILLAND ASSOCIATES
ENVIRONMENTAL MANAGEMENT CONSULTANTS

APPENDIX 5
NUTRIENT LEVEL MONITORING SITES

KINGSWOOD GOLF ESTATE
WATER MONITORING SAMPLE POINTS
2009