



Zimbali Country Club Golf Course Management Plan

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Version: FINAL



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i. Document Control

Author: Brendan Smith	Position: ZEMA Environmental Manager	Signature: 
Reviewed: Johan Bodenstein James Herbert	Position: ZEMA Environmental Consultant ZCC Green Keeper	Signature:  
Adopted by: Environmental Management Committee Zimbali Country Club	Position: EMC Chairman: Sarika Sewpersad ZCC Board of Governors: Shashi Marajh	Signature:  

EXECUTIVE SUMMARY

ZCC and their appointed contractor are responsible for the management of the Zimbali Golf Course. Whilst the in-play areas are intensively managed, the out of bounds and buffer areas (greenbelts) between the Golf Course and private residential properties require a management plan to ensure sustainable and proactive management of the habitats within this area. The purpose of this report is to therefore formalise the management actions for the ZCC Golf Course. This report will provide a template for the management of the natural vegetation within the golf course and adjacent property to ensure sustainable management and improved biological diversity and functioning.

The golf course and associated buffer areas incorporates a large area of the estate, encompassing a large percentage of the 'green open space' remaining on the estate. It is therefore critical that these habitats are appropriately managed. The management of the course is an ongoing process of ecological restoration and management.

This management plan describes the key environmental principles that will be applied to the golf course. There is a particular focus on reclaiming the threatened grassland habitats on the west estate. These areas which were historically Coastal Grassland are being lost due to afforestation and bush encroachment. The reclamation of these areas will improve the biodiversity and ecological functioning of the estate.

The reduction of 'maintained' areas and increased areas of indigenous grassveld will achieve both a reduction in maintenance costs and an increase in biodiversity. Whilst a significant volume of pruning has been proposed in the short term, this has been carefully assessed by specialists. The removal of plant species will be carefully done and offset by the immediate planting of replacement species. This is to avoid any potential loss of food supply to any wildlife species. Any trees that can be transplanted or rescued, will be taken to the ZEMA nursery and replanted once it has recovered. Fauna sweeps will be undertaken prior to any significant pruning, to ensure that any sensitive wildlife species are rescued and relocated. Removals will be immediately offset by replanting. 'Relocations' will be prioritised over 'removals'. Any trees that can be transplanted or rescued, will be taken to the ZEMA nursery and replanted once it has recovered. Fauna sweeps will be undertaken prior to any significant pruning, to ensure that any sensitive wildlife species are rescued and relocated.

Timeframes and responsibilities have been proposed, and rough cost estimates provided. These specifics will most likely fluctuate and evolve over time. This Management Plan will need to be updated accordingly. It is strongly recommended that the out of play areas (natural greenbelt areas) of the golf course are managed by the ZEMA Environmental Department, as this department has the necessary expertise for the management of this habitat. This will allow Golf Data to focus on their primary objective, maintaining the in-play areas of the course. However, it is critical that all parties continue to work closely together in the future.

1. INTRODUCTION

Zimbali Country Club (ZCC) and their appointed contractor, Golf Data, are responsible for the management of the Zimbali Golf Course. Whilst the in-play areas are intensively managed, the out of bounds and buffer areas (greenbelts) between the Golf Course and private residential properties require a management plan to ensure sustainable and proactive management of the habitats within this area. Pruning of trees and vegetation on the course is also an ongoing practice, as pruning is often required to maintain access, ensure safety, improve aesthetics, and ensure playability or line of sight. This has been undertaken on an ad-hoc, reactive basis. It was agreed that a vision for each hole of the course should be created jointly by ZCC and the ZEMA Environmental Department, to formalise a 'template' to which each hole and its adjoining greenbelt is *proactively* managed.

The purpose of this report is to therefore formalise the management actions for the ZCC Golf Course, with specific reference to the following key principles:

- Golf course playability and design.
- Aesthetics.
- Reducing carbon footprint, water usage and environmental impact.
- Minimising maintenance costs and labour manhours.
- Improving ecological functioning and management of habitats (such as grasslands, wetlands, and coastal forests).
- Increasing biodiversity and removing invasive alien plants (IAPs).
- Restoring 'holes' in the environment that have been created through the removal of IAPs.

The document covers all aspects of the golf course which includes 40 hectares (ha) of playing area and 25.74 ha of buffer area or surrounding green open space (refer to Figure 1 overleaf). The golf course and associated buffer areas incorporates a large area of the estate, encompassing a large percentage of the 'green open space' remaining on the estate. It is therefore critical that these habitats are appropriately managed. This document has been compiled following a detailed course tour between ZEMA, ZCC and Golf Data to establish common ground and each party's needs and desires.

Whilst there are many items that can be undertaken and achieved in the short term, the plan presented in this report will be a long-term project that can be undertaken over five to ten years. However, it must be noted that the management of the course is an ongoing process of ecological restoration and management. Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecosystems are dynamic communities of plants, animals, and microorganisms interacting with their physical environment as a functional unit. Restoration practitioners do not carry out the actual work of ecosystem recovery. Rather, they create the conditions needed for recovery so the plants, animals, and microorganisms can carry out the work of recovery themselves. Assisting recovery can be as simple as removing an invasive species or reintroducing a lost species or a lost function (like fire); or as complex as altering landforms, planting vegetation, changing the hydrology, and reintroducing wildlife. Zimbali and its golf course is an example of the latter. The goal of ecological restoration is to return a degraded ecosystem to its historic trajectory, not its historic condition. This is because full recovery of the ecosystem can take years, decades, or even hundreds of years. For example, while we can initiate a forest restoration process by planting trees, for full recovery to be achieved, the site should be a fully functioning forest with mature trees in the age-classes representative of a mature native forest. If there were 500-year-old trees in the forest that was destroyed, then the restoration should logically take hundreds of years to achieve full recovery.



Figure 1 ZCC Golf Course and Associated 'Buffer Areas'

1.1 Key Concepts and Definitions

Importance of Grasslands -The grasslands biome is the second largest biome in South Africa, covering 29% of South Africa. It is one of the most threatened biomes in South Africa, with 30% of the biome transformed beyond repair and only 2% formally conserved. Grasslands provide a diverse habitat for a wide range of endemic and endangered birds, butterflies, and reptiles. Of the 195 reptile species endemic to South Africa, 22% are found in the biome. One third of the 107 threatened South African butterfly species occur in the grasslands. Grasslands around the world are threatened by the purposeful planting of forest where none was before – a process called “afforestation.” This differs from “reforestation,” in which trees are planted in a previously deforested area.

Bush Encroachment - Occurs in grassland where woody plants such as shrubs and trees begin to grow in a grassland area, transforming the micro-climate to the detriment of the grassland integrity. This alters the structure and functioning of ecosystems, with these changes becoming increasingly irreversible as the fundamental nature of the ecosystems change. Such changes not only alter landscapes and their biodiversity, but also the nature and value of ecosystem services delivered from them.

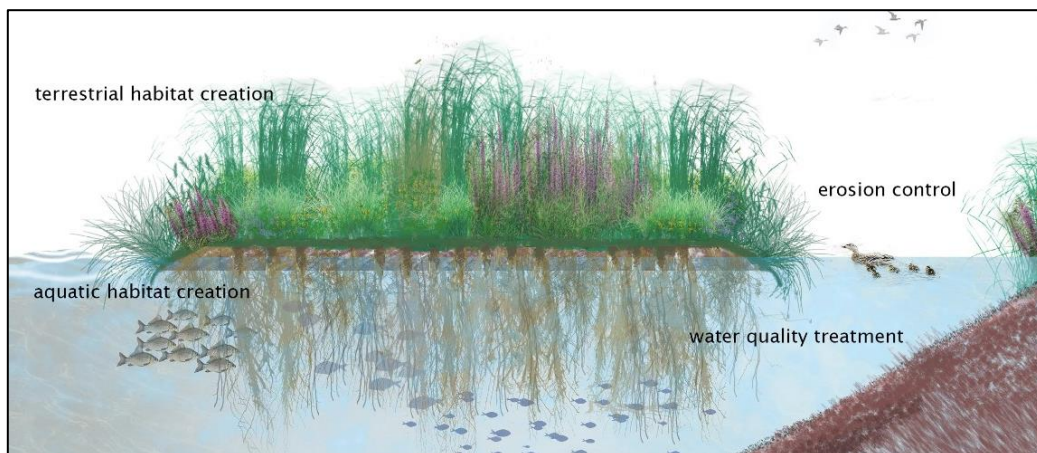
Invasive Alien Plants (IAPs) – Plants that are not natural to a specific habitat, often from another country, that out competes the local plants for water, space and resources such as nutrients, and becomes the dominant vegetative plant type in that habitat, are deemed to be invasive alien plants.

Zimbali Ethos and the Importance of diversity – Zimbali Coastal Resort ethos is to protect the existing natural habitat and to facilitate the expansion of the natural habitat through the land and natural resource management, as part of the process to provide world class resort accommodation and resort amenities.

Invasive Plants – invasive plants, in the context of this report, refers to fast-growing, indigenous pioneer plant species. Examples of these plant species include *Strelitzia nicolai* (referred to hereafter as *Strelitzia*), *Brachylaena discolor* (referred to hereafter as *Silverleaf*) and *Osteospermum moniliferum* (Tickberry).

Pruning and Removals - There are significant removals of plant species planned, however there is a large amount of planting that is also proposed. The planting will provide more diverse fodder for all wildlife on the estate throughout the year. The removal and planting will be undertaken strategically in a phased manner, to ensure minimal disturbance to the habitat and food requirements of the wildlife on the estate. Removals will be immediately offset by replanting. 'Relocations' will be prioritised over 'removals'. Any trees that can be transplanted or rescued, will be taken to the ZEMA nursery and replanted once it has recovered. Fauna sweeps will be undertaken prior to any significant pruning, to ensure that any sensitive wildlife species are rescued and relocated.

Floating Wetland - Globally, wetlands are the most biodiverse habitats but also the most at risk. Floating wetlands systems are anchored in dams to provide additional habitat for terrestrial (e.g. birds) and aquatic species (e.g. nursery grounds for fish). Whilst providing functional habitat, they also improve aesthetics.



2. GOLF COURSE HABITATS

The golf course encompasses a large portion of the estate and the habitats found within the golf course are elaborated on in the sections that follow.

2.1 Coastal Grassland

According to the South African National Biodiversity Institute (SANBI), a large portion (majority of the west estate) of Zimbali Coastal Resort (hereafter referred to as Zimbali or the Estate) was historically coastal grassland. The South African grasslands are a very old, complex, and slowly evolved system with indigenous species diversity second only to the well-known fynbos biome. The grasslands also play a vital role in water production. The term 'grasslands' creates the impression that the biome consists only of grass species. In fact, only one in six plant species in the biome is a grass. The remainder includes bulbous plants such as arum lilies, orchids, red-hot pokers, aloes, watsonias, gladioli, ground orchids and underground trees. Through a process of natural plant succession, these critically endangered grassland habitats have been lost to afforestation, bush encroachment, and urban sprawl. Coastal Grassland is overall the most threatened of all the grassland ecosystem groups. Extensive habitat loss has been caused by various forms of cultivation (principally sugarcane) and sprawling urban settlement.

2.2 Coastal Forest

Coastal forest is a habitat form found along the East Coast of South Africa where trees form a contiguous canopy with subcanopy trees, shrubs and an herbaceous plant layer as sub-ordinate plant layers. Coastal forest has declined in its land covering due to deforestation to make way for agriculture, afforestation with commercial timber and urban sprawl and is a vulnerable habitat type.

2.3 Wetlands and Waterways

Wetlands are areas where the soil is temporarily, seasonally, or permanently inundated, the soils are gleyed or mottled and plants able to grow in wet soils become established. It includes the transition between the water body and the dry land.

3. MANAGEMENT PLAN

This management plan will detail the specific management actions to be undertaken areas of each hole on the course. The environment is dynamic and therefore a one-size-fits-all approach cannot be adopted throughout the course. A tailored solution for each specific situation and location is therefore required. Each hole of the course will be presented in an aerial photograph, and each key feature will be numbered in this figure. The management actions for each of these enumerated areas will be described in the subsequent table. The numbers in the figure will correlate with the numbers in the table. The directional orientation (e.g. 'right-hand side', 'to the left of' etc.) will be described from the perspective of a teeing-off golfer, looking straight down the hole from the Tee box. The responsible person for each management action will be stated. A timeline for implementation will be stated for each action, this will include:

- Short term: within 1 year from date of adoption of this report.
- Medium term: 1-5 years.
- Long term: 5 years or longer.

Some items require ongoing management, this will be stated as such. It has been proposed by Golf Data that significant 'unused' areas of the course are converted to an indigenous grassveld habitat through the spreading of an indigenous grass seed mix. This will simultaneously reduce maintenance

costs (by reducing the area that is maintained, mowing time, petrol etc.) and increase the biodiversity of the course. All proposed grassveld areas are indicated in the Figures by yellow shading.

3.1 First Hole

The first hole includes the entrance area immediately following the crossing on Palm Avenue. This area comprises of a grassy hill that slopes up towards the main Tee Box and an open area adjacent to this, often used to park emergency vehicles during events. The main Tee Box has a Starter Hut and landscaped garden, with forest habitat to the right and left of the main Tee. A strip of coastal forest runs along the left-hand side of the hole, with a grassland mosaic on the upper right-hand slopes. The grassland is probably the best example of Indian Ocean Belt North Coast Grassland habitat on the estate, although sections of this habitat are being lost to bush encroachment. The vision of the hole is to accentuate the feature trees on the left-hand side by removing invasive woody vegetation *Brachylaena discolor* (Silverleaf) and *Strelitzia nicolai* (Wild Banana), whilst maintaining the right hand side as grassland with several feature trees (such as *Acacia nilotica*).

Please refer to Figure 2 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 1 provides a description of the proposed management actions.



Figure 2 First Hole

ZCC Golf Course Management Plan

Table 1 First Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Ambulance Parking Area	Minimise area that is currently maintained. Extend the current line of 'unmaintained area' (i.e. natural grass) by 2m into this area. Maintain emergency assembly point. Plant up area where grass is dead with indigenous plant species such as Grasses: <i>Melinis repens</i> , <i>Chloris gayana</i> , <i>Chenchrus ciliaris</i> , <i>Digitaria eriantha</i> , <i>Themeda triandra</i> , forbs and bulbs: <i>Aristea woodii</i> , <i>Hypoxis hemerocallidea</i> , <i>Kniphofia linearis</i> , <i>Albuca nelsonii</i> , <i>Freezia laxa</i> , <i>Nemesia denticulata</i> , <i>Whalenbergia krebsii</i> , <i>Gladiolus dalenii</i> , Taller forbs at the rear: <i>Justicia betonica</i> , <i>Hypoestes aristata</i> , <i>Casrissa macrocarpa</i> 'Green carpet', <i>Asparagus virgate</i> , <i>Polygala virgata</i> , Shrubs at the rear: <i>Tecoma capensis</i> , <i>Plumbago auriculata</i> , <i>Bauhinia tomentosa</i> , <i>Freylinia tropica</i> , <i>Carissa macrocarpa</i> , <i>Coddia rudis</i> , <i>Catunaregum spinosum</i> , <i>Dombeya bourgesiae</i>	ZCC with assistance from ZEMA in terms of plant palette and positioning.	Short Term
2. Entrance Hill	Remove small Silverleaf at the top of the hill. Leave large silverleaf tree but remove the large branch that is leaning over, and crown lift this tree for aesthetics. The thicket at the top of the hill is untidy, this can be removed in the foreground but maintained in the background. Supplement the current indigenous grass mix with more veld mix seeding. Supplementary planting of small shrubs amongst the grassland, e.g. <i>Barleria elegans</i> , <i>Barleria prionites</i> , <i>Helichrysum kraussii</i> , <i>Hypoestes aristata</i> , <i>Justicia betornica</i> , <i>Strelitzia regina</i> . Selectively shape the <i>Canthium inerme</i> for aesthetic purposes. Remove dead invasive alien plants (IAPs). Plant low groundcover plants with raised flower heads to provide colour above veld grass layer e.g. <i>Albuca nelsonii</i> , <i>Aloe cooperi</i> , <i>Aloe maculate</i> , <i>Bulbine natalenis</i> , <i>Berkheya speciosa</i> , <i>Eulofia speciosa</i> , <i>Gladiolus dalenii</i> , <i>Gladiolus ecklonii</i> , <i>Kniphofia linearifolia</i> , <i>Leonotis leunuris</i> and <i>Ornithogolum tenuifolium</i> .	ZEMA in consultation with ZCC.	Short Term
3. Forest on the right-hand side of Main Tee Box	Maintain as forest. Supplementary planting required to improve biodiversity. Minimise rows of <i>Dietes grandiflora</i> by interplanting different species such as <i>Barleria elegans</i> , <i>B. obtusa</i> , <i>Clivia miniate</i> , <i>Crinum macowanii</i> , <i>Justicia betonica</i> , <i>J. capensis</i> , these can be recycled from the garden next to the starter hut. Plant <i>Acalypha glabrata</i> , <i>Carissa bispinosa</i> , <i>Coddia rudis</i> , <i>Isoglossa woodii</i> and <i>Mackaya bella</i> , in the back of the forest area.	ZEMA in consultation with ZCC.	Short Term
4. Starter Hut/Parking Area	Remove garden and extend veld grass mix from entrance hill (2). Extend this up to the starters hut. Distribute plants removed from the garden into the forest (3) and on other sections of the course. Garden to the right of the starter hut to be removed and replaced with cynodon grass to improve access to the tee box. Grass species removed from this garden can be split and planted in the grassland areas of this hole. Maintain some plant species around the fountain to assist with screening/softening of the structure.	ZCC	Short Term

ZCC Golf Course Management Plan

5. Left Hand Side of Main Tee Box	Maintain as is, remove small trees that are popping up near the in-play border. Maintain sea view pocket by removing <i>Strelitzia nicolai</i> . Plant small screening species such as <i>Acacia nilotica</i> , <i>Acalypha glabrata</i> , <i>Calpurnea aurea</i> , <i>Dichrostachys cinerea</i> , <i>Dombeya bourgessiae</i> , <i>Grewia occidentalis</i> , <i>Maerua rosmarinoides</i> and <i>Ochna serrulata</i> to screen off the nursery area. remove strelitzia clumps that will affect line of sight. At the White tee box, remove the silverleaf to achieve a sea view. Crown lift feature trees for aesthetics.	ZCC	Short Term
6. Main Tee Box	Crown lift feature trees in view of the tee box as a general principle to maintain aesthetics. Remove acacia that is growing in the wrong place and will affect line of sight going forward. maintain small acacia's that are growing on right hand side of main tee box – shape to ensure aesthetics.	ZCC	Short Term
7. Right Hand Side of Hole	Remove strelitzia clumps from corner and amongst the Acacia trees to accentuate feature trees. Selectively remove encroaching silverleaf and Strelitzia's. Seed with indigenous veld mix. Extend the line of unmaintained grass by 4m on the hill leading to the access road which exits to Yellowwood Drive. Seed with indigenous veld mix. Remove the two random clumps of strelitzias near the cart path.	ZCC	Short Term
8. Left Hand Side of Hole	Remove small clump of Strelitzia's where suitable screening exists between course and private properties. Crown lift feature trees. Plant creeping dune fern on steep bare slopes near drain. Screen drain by planting a creeper (<i>Combretum bracteosum</i> , <i>Grewia lasiocarpa</i> , <i>Mamordica spherical</i> or <i>Mondia whitei</i>) with supporting wire mesh on the structure. Indigenous seed mix through grass area. Plant shrub plant species such as <i>Cavacoa aurea</i> , <i>Dombeya bourgessiae</i> , <i>Hippobromus pauciflorus</i> or <i>Tetradenia riparia</i> , for screening between course and houses, where IAPs were removed and gaps created.	ZCC	Short Term
9. Acacia Thicket	Selectively thin out this thicket (remove small Acacia's) to minimise bush encroachment, whilst still maintaining habitat for bushbuck and other antelope. Extend natural area with indigenous veld mix.	ZCC in consultation with ZEMA.	Short Term
10. Green	Indigenous seed mix to extend natural area on the southern side of the green, extend out of bounds area. Remove small Ficus that is in an unsuitable position before it becomes too big. Remove small Strelitzias but maintain the large Strelitzia clump, close the base of this clump by planting smaller shrub species such as <i>Acokanthera oppositifolia</i> , <i>Barleria albo-stellata</i> , <i>Diospyros lycioides</i> , <i>Eugenia capensis</i> , <i>Euryops pecitnatus</i> , <i>Hoslundia oppositifolia</i> , <i>Lippia javanica</i> , <i>Orthosiphon labiatus</i> , <i>Psoralea pinnata</i> , <i>Pycnostachys reticulata</i> , <i>Rothea myrocoides</i> , <i>Searsia dentata</i> or <i>Turraea obtusifolia</i> . The parking area at the green should be improved aesthetically, the 'shop window' area should be planted up with <i>Orthosiphon labiatus</i> , small <i>Strelitzia's</i> removed.	ZCC with assistance from ZEMA in terms of plant palette and positioning. ZEMA to plant Isoglossa.	Short Term
11. Pathway to second hole	Remove clump of Strelitzia's on first corner before descending the hill. Remove Strelitzia's in close on the edge of cart path and plant more suitable species such as <i>Grewia caffra</i> , <i>Grewia</i>		

ZCC Golf Course Management Plan

	<p><i>occidentalis</i>, <i>Polygala myrtifolia</i> and <i>Tetradenia riparia</i>. Relocate smaller Strelitzias further back into the forest area. Leave Strelitzia's that are located further than 4m from edge of cart path. Spread indigenous grassveld mix in areas where IAPs were removed. Brush-cut <i>Peristrophe</i> to knee height to allow it to sprout. Expand creeping dune fern by splitting and planting where IAPs were removed. This is a neat plant that can be planted up to the cart path border. Remove woody and messy vegetation from the side of the cart path. Allow deeper areas to transition into forest.</p>		
General	<p>Remove Invasive Alien Plants.</p> <p>Minimise bush encroachment in grassland areas by selectively removing woody vegetation.</p> <p>Crown lift feature trees.</p> <p>Proactively maintain 'shop windows' and viewsheds to ensure drastic pruning or maintenance is never required.</p>	ZCC	Ongoing

3.2 Second Hole

The second hole incorporates a large dam and associated wetland habitat, with a large sloping grass bank on the right-hand side of the hole. The Coastal Grassland habitat is slowly being lost due to bush encroachment from invasive plant species such as *Brachylaena discolor* (Coastal Silverleaf) and *Strelitzia nicolai* (Wild Banana). The vision for the hole is to maintain a grassland habitat on the right-hand side by selectively removing woody and invasive vegetation, with select feature trees being accentuated in the grassland. The screening of the cart path has been proposed through the planting of several trees including:

- *Acacia nilotica*
- *Berchemia zeyhei*
- *Buddleja saligna*
- *Croton gratissimus*
- *Cryptocarya latifolia*
- *Euclea crispa*
- *Garcinia gerrardii*
- *Gardenia thunbergii*
- *Heteropyxis natalensis*
- *Nuxia floribunda*
- *Ochna arborea*
- *Olea woodiana*
- *Rothamannia globosa*
- *Spirostachys africana*
- *Warburgia salutaris*.

Please refer to Figure 3 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 2 provides a description of the proposed management actions.



Figure 3 Second Hole

ZCC Golf Course Management Plan

Table 2 Second Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Entrance to hole	Remove Strelitzia clump and replace with species such as <i>Polygala myrtifolia</i> to improve aesthetics. Interplant where IAPs were removed and gaps created. Clean up the Cat's Whiskers tree (<i>Clerodendrum glabrum</i>) next to the entrance pathway by removing the leaning branch.	ZCC	Short term
2. Main tee box	Maintain line of sight so that the dam/water is displayed in the bottom left corner of the viewshed. This will require the ongoing pruning of the two <i>Rauvolfia caffra</i> trees that are starting to impact on this view. The current height of the crowns of these trees need to be reduced by 2m and maintained at that height. This must be achieved in a phased approach over several months.	ZCC in consultation with ZEMA	Short term
	Maintain Strelitzia clump and dead tree as a feature on the right-hand side of the tee box, plant up this area with low growing plants such as <i>Baleria obtusa</i> , <i>Digitaria eriantha</i> , <i>Eugenia capensis</i> , <i>Hypoestes aristata</i> , <i>Justicia betonica</i> , and <i>Pavetta lanceolata</i> .	ZCC	Short term
3. Right hand side of tee box	Remove strelitzia's that are growing onto and smothering the Acacia trees.	ZCC	Short term
	Remove and minimise bush encroachment. Screening species planting behind the bin to screen off house.		
	Clean up creepers adjacent the white tee box. Keep silverleaf but maintain current height.		
4. Cart Path	It has been proposed that several trees are to be planted on the left-hand side of the cart path, to screen the path and improve aesthetics. These plant species must be carefully chosen (a list has been provided by the ZEMA Environmental Department) to ensure that the visual screen does not become too tall to cast afternoon shadow on the grass and have problematic roots to interfere with infrastructure.	ZCC	Medium term
5. Grassland Bank	Remove invasive and woody vegetation to promote grassland habitat. Seed and interplant to improve biodiversity.	ZEMA in consultation with ZCC	Medium term
6. Dam	Maintain grassy edge to dam to deter Egyptian Geese. Install floating wetlands to improve aesthetics and provide habitat. The proposed location of these floating wetlands is indicated by the number 6 in Figure 3.	ZCC in consultation with ZEMA	Short term Ongoing
7. Green	Crown lift and neaten up the <i>Cordia caffra</i> . Prune the Swamp Fig off the green and maintain it accordingly. Please note that this is a protected tree species, and the pruning of it requires permit authorisation from the Department of Forestry.	ZCC in consultation with ZEMA	Short term Ongoing

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General	Actively manage and maintain the grassland habitat by removing invasive and woody vegetation.	ZCC	Ongoing
	Prevent bush encroachment. Small trees and shrubs need to be controlled.		
	Grass must be mowed to simulate grazing, in the absence of fire management.		
	Remove Invasive Alien Plants		
	Ensure invasive plant species are kept away from immediate in play areas.		

3.3 Third Hole

The third hole is relatively large, with a significant buffer area on the right-hand side. This was previously grassland, however due to lack of management it has almost completely been lost to bush encroachment. A small dam and wetland system exist on this hole, a very important habitat that must be correctly managed. Another wetland system exists on the left of the hole, between this hole and the 7th hole. The management of this wetland system between these two holes will be included in the third hole's management plan. A patch of coastal forest exists on the left of the tee box, separating the 3rd and 8th hole tee boxes. It is envisioned that this coastal forest patch will be maintained as such, whilst the bank on the right-hand side will be reclaimed into grassland. The wetland habitats will be very carefully managed with minimal disturbance. The dam is subject to an Integrated Water Use License Application with the Department of Water and Sanitation, the outcome of this application will determine the management actions here.

Please refer to Figure 4 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 3 provides a description of the proposed management actions.



Figure 4 Third Hole

ZCC Golf Course Management Plan

Table 3 Third Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Screen between 2 nd green and 3 rd tee box	Start interplanting screening species such as <i>Acokanthera oppositifolia</i> , <i>Barleria albo-stellata</i> , <i>Cyperus textillis</i> , <i>Cyperus prolifer</i> , and <i>Euryops pectinatus</i> , once established, remove silverleaf in a phased manner. Take Strelitzia clumps out immediately. Create a pocket through the silverleaf to achieve view of the dam on the 2 nd .	ZCC in consultation with ZEMA	Short to medium term
2. Main tee box	Remove silverleaf and Strelitzia from next to the yellow tee. Crown lift the Acacia and seed with indigenous veld mix. The Acacia on the cart path corner of the blue tee box (right hand side) should be removed, so should the silverleaf behind it. Improve aesthetics on the right-hand side of the white tee box ('shop window') with the use of the following species <i>Aristea woodii</i> , <i>Crinum macowanii</i> , <i>Crocasmia aurea</i> , <i>Gladiolus dalenii</i> , <i>Helichrysum cymosum</i> , and <i>Vigna vexilata</i> Remove small Waterberry's and Forest Fever Berry, as both trees are unsuitably located.	ZCC in consultation with ZEMA	Short term
3. Forest Patch	Remove silverleaf from the fringe to the left of the main tee box. Maintain this forest edge by removing large trees approximately 5m in from the current edge of the course. Plant up or seed areas that have been left devoid due to IAP removal.	ZCC	Short term
4. Right hand side Bank	Remove IAPs (large gum trees) and invasive vegetation. Maintain a select amount of feature trees, otherwise manage bush encroachment, and reclaim back to grassland habitat. Seed and interplant.	ZEMA in consultation with ZCC	Medium to long term
5. Dam and Wetland	Long term management objectives to be determined based on the outcomes of the IWULA application. Removal of IAPs and woody vegetation.	ZEMA in consultation with ZCC	Ongoing
6. Wetland	Remove woody vegetation such as silverleaf, <i>Carissa macrocarpa</i> , IAPs and Strelitzia's. Maintain habitat of bull rushes, ferns, and grasses with one or two feature trees.	ZEMA in consultation with ZCC	Ongoing
7. Green	Improve aesthetics of 'shop window'. Clean up vines and shrubs that are suffocating the Red Milkwood. Accentuate this tree as a feature tree. Plant up next to the cart path going up the hill to the parking area with the following species: <i>Cadaba natalensis</i> , <i>Hoslundia oppositifolia</i> ,	ZCC in consultation with ZEMA	Short term Ongoing
General	Actively manage and maintain the grassland habitat by removing invasive and woody vegetation.	ZCC in consultation with ZEMA	Ongoing
	Prevent bush encroachment. Small trees and shrubs need to be controlled.		

ZCC Golf Course Management Plan

	Grass must be mowed to simulate grazing, in the absence of fire management.		
	Remove Invasive Alien Plants		
	Ensure invasive plant species are kept away from immediate in play areas.		
	Minimise disturbance to sensitive wetland areas		

3.4 Fourth Hole

The 4th hole is flanked by an extensive wetland system on the right-hand side, and a smaller fragment of a wetland on the left-hand side between the 4th and 6th holes. These wetlands are critical habitats for the endangered Pickersgill Reed Frog (*Hyperolius pickersgillii*), amongst others. It is therefore critical that these habitats are managed correctly. It is also critical to erect information boards educating the golfers of this fact. A small watercourse intersects the course, below the tee boxes. This natural drainage line can be better defined with the select installation of suitable wetland plant species. Alternatively, rocks can be installed to assist with stormwater flow, whilst improving aesthetics.



Please refer to Figure 5 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 4 provides a description of the proposed management actions.



Figure 5 Fourth Hole

ZCC Golf Course Management Plan

Table 4 Fourth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Area between main tee box and Maple Close	Confirmation obtained from ZCC that this area will never be used for a tee box, ZEMA will plant up the area with suitable species such as <i>Agapanthus praecox</i> , <i>Aloe maculata</i> , <i>Aristida junciformis</i> , <i>Aristea woodii</i> , <i>Becium obovatum</i> , <i>Berkheya speciosa</i> , <i>Chenchrus ciliaris</i> , <i>Chloris gayana</i> , <i>Cymbopogon excavates</i> , <i>Digitaria eriantha</i> , <i>Eragrostis curvula</i> , <i>Helichrysum kraussii</i> , <i>Hyparrhenia hirta</i> (at the back), <i>Justicia flava</i> and <i>Scabiosa columnbaria</i> .	ZEMA	Medium term
2. Main tee box	Branch at entrance to 4 th hole (after road crossing) is too close to the path and can be removed. Remove <i>Strelitzia</i> 's close to the tee box, the larger ones behind this clump can be left. The line of sight issues from the <i>Ficus</i> next to the blue tee box can be easily solved with targeted pruning of the bottom left branches. A tree (<i>Halleria lucida</i>) can be planted between this <i>Ficus</i> and the <i>Erythrina</i> tree (where the bull rushes currently are) to assist with protection to the nearby home. Remove <i>Strelitzia</i> 's that are encroaching this <i>Erythrina</i> .	ZCC	Short term
3. Uluwatu Buffer Area	Remove Silverleaf and maintain as grassland area. Minimise bush encroachment, interplant with grassland species. (See 1 above)	ZCC	Ongoing
4. Bank above the stream	Extend unmaintained area by approximately 6m (towards the stream).	ZEMA in consultation with ZCC	Short term
5. Stream	Line the water course with Maccaferri MacMat® R – Polymer and place rocks in the gully to shape the drain as per the picture samples provided above. Accentuate key areas with plantings of <i>Cyperus prolifer</i> , <i>Kniphofia linearis</i> , <i>Paspalum urvillii</i> , <i>Zantedeschia aethiopica</i> . Scarify and plant wetland plant species.	ZCC in consultation with ZEMA	Ongoing
6. Wetland on right hand side	Remove IAPs, invasive and woody vegetation.	ZEMA in consultation with ZCC	Ongoing
7. Wetland between 4 th and 6 th	Remove IAPs, invasive and woody vegetation. Erect signage regarding the importance of this wetland habitat for the critically endangered Pickersgill Reed Frog (<i>Hyperolius pickersgillii</i>).	ZCC in consultation with ZEMA	Ongoing
8. Bank above cart path	Seed with indigenous grassland veld mix. Storm water control issues to be addressed in conjunction with ZEMA Building Control Department.	ZEMA in consultation with ZCC	Short term
General	Prevent bush encroachment within the wetland and grassland habitats. Trees need to be controlled.	ZCC in consultation with ZEMA	Ongoing
	Remove Invasive Alien Plants.		

ZCC Golf Course Management Plan

	Ensure invasive plant species are kept away from immediate in play areas.		
	Minimise disturbance to sensitive wetland areas.		

3.5 Fifth Hole

The 5th hole tee box is located on the top of the hill, with the green located at the bottom of the valley, adjacent to a dam. The hole is picturesque, providing sweeping sea views. The 5th hole provides various habitats, as it is a mixture of grassland, thicket, and wetland systems. The grassland in between the tee boxes, which makes its way down the hill, is in relatively good condition with good species diversity and structure. The sides of the hole are flanked by thicket, which should be maintained to provide habitat. Towards the bottom of the valley, a large sweeping grass bank is found on the left-hand side. This grassland habitat is in good ecological condition, with some evidence of bush encroachment starting. The U-shaped dam provides a buffer between the hole and the natural corridor of vegetation between Zimbali Drive and the green. This dam and the riparian vegetation provide habitat for aquatic and terrestrial species which requires careful management and maintenance action to minimise disturbance, whilst maintaining aesthetics.

Please refer to Figure 6 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 5 provides a description of the proposed management actions.



Figure 6 Fifth Hole

ZCC Golf Course Management Plan

Table 5 Fifth Hole Management Actions

Location	Management Actions	Responsible Person	Timeline
1. Gardens at entrance to hole	Strip garden and reuse plants elsewhere on the course. Replace landscaped area with indigenous veld grass mix, and other grassland plants such as <i>Agapanthus praecox</i> , <i>Aloe maculata</i> , <i>Aristida junciformis</i> , <i>Aristea woodii</i> , <i>Becium obovatum</i> , <i>Berkheya speciosa</i> , <i>Chenchrus ciliaris</i> , <i>Chloris gayana</i> , <i>Cymbopogon excavatus</i> , <i>Digitaria eriantha</i> , <i>Eragrostis curvula</i> , <i>Helichrysum kraussii</i> , <i>Hyparrhenia hirta</i> (at the back), <i>Justicia flava</i> and <i>Scabiosa columnbaria</i> .to create a natural look.	ZCC	Short Term
2. Grassland between Tee Boxes	Brush cut grassland annually. Continually remove woody and invasive vegetation. Manually remove untidy Buffalo grass species and replace with indigenous grass plugs. Extend grasslands to cart path.	ZCC	Ongoing
3. Right hand side of Tee Boxes	Push back the Silverleaf, approximately 5m to create a grassland corridor and improve aesthetics, maintain this line as indicated in Figure 6. Plant thatching grass (<i>Andropogon eucomus</i> , <i>Cymbopogon excavatus</i> , <i>Diheteropogon amplectans</i> , <i>Hyparrhenia hirta</i>) in the background to provide fodder for Cane Rats that are currently problematic. Manually remove untidy Buffalo grass species and replace with indigenous grass plugs. Extend grasslands to cart path.	ZCC in consultation with ZEMA	Medium Term
4. Left hand side of Tee Boxes	Remove small Silverleaf adjacent to the red/blue tee box. Push back vegetation off the cart path and replace with neater shrubs such as <i>Plumbago auriculata</i> , <i>Tecoma capensis</i> and <i>Tetradenia riparia</i> to provide a transition from the verge to the forest. Split and plant the Creeping Dune Fern on the verge, extend all the way up to the top tee box. Keep Dune Myrtle Trees (<i>Eugenia capensis</i>), these are rare and do not grow much higher than their current height. Remove Silverleaf on last corner to provide view of the green, replace with grassland species.	ZCC in consultation with ZEMA	Medium Term
5. Left hand bank	Selectively remove Silverleaf to promote grassland, however small patches of thicket must be maintained to provide cover. Maintain grassland on an ongoing basis to prevent bush encroachment. Strip Buffalo grass from the parking area and replace with diverse indigenous grass species.	ZEMA in consultation with ZCC	Ongoing
6. Dam	The riparian (ferns and other plants on the water's edge) and aquatic (bull rushes, lilies) vegetation is well established and provide vital habitat. The area within the L Cove of the dam, indicated by the white circle in Figure 6 must be maintained clear of bull rushes to provide views of the water from the course. The bull rushes that are removed can be relocated elsewhere in the dam. A 2m buffer must be maintained around any bulrush that has a nest. Riparian and aquatic vegetation	ZCC in consultation with ZEMA	Ongoing

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	elsewhere on the dam can be maintained as is, to provide habitat. Maintain vegetation around the drainage point at the back of the dam.		
7. Cart path to 6 th	Crown lift Fever Trees. Remove young Silverleaf's and Strelitzia's. interplant the garden of <i>Dietes</i> with the following species <i>Aristea ecklonii</i> , <i>Aspilia natalensis</i> , <i>Asystasia gangetica</i> , <i>Bulbine abyssinica</i> , <i>Chlorophytum saundersiae</i> , <i>Gazania rigens</i> (green). Push back Silverleaf off the cart path, [particularly on the right-hand side. Remove <i>Strelitzia</i> from encroaching on the Red Beech tree. Selectively remove palms that are too close to the golf cart path. All removed plant species can be relocated to the natural corridor between the course and Zimbali Drive. Strip the Buffalo grass on the right-hand side of the path and seed with indigenous veld mix.	ZCC	Short Term
General	Prevent bush encroachment within the wetland and grassland habitats. Trees and invasive vegetation need to be controlled.	ZCC in consultation with ZEMA	Ongoing
	Remove Invasive Alien Plants.		
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		
	Minimise disturbance to sensitive wetland areas.		

3.6 Sixth Hole

The 6th hole is relatively elongated, with a large dam on the right-hand side, and a small but critically important wetland system on the left, between the 6th and the 4th hole. This wetland has been identified by experts as critical habitat for the endangered Pickersgill Reed Frog. A large natural forest corridor exists on the right-hand side, between the 6th and Zimbali Drive, managed by ZEMA. A small thicket exists between the tee boxes and Brittlewood Drive. Another small thicket and grassland exist between the green and Uluwatu PUD. The dam has an existing island which can be enhanced with supplementary planting. A floating wetland could also be installed.

Please refer to Figure 7 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 6 provides a description of the proposed management actions.



Figure 7 Sixth Hole

ZCC Golf Course Management Plan

Table 6 Sixth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Yellow Tee Box	The clump of wild dagga behind the tee box must be pruned back to knee height annually. Extend this wild dagga around the bank on the right-hand side. Remove Silverleaf behind the tee box. Crown lift feature trees (Pigeonwood, Umtoni) on the left-hand side (adjacent to parking area) and remove small silverleaf to accentuate these trees.	ZCC	Short Term
2. Right hand side of Tee Boxes	Plant feature trees and wait for them to establish, then remove Silverleaf up to the <i>Ficus</i> . Manually remove Buffalo grass from the edge of the course and replace with indigenous veld grass seed mix. Crown lift <i>Ficus</i> . Remove reeds from adjacent to the white/blue tee box.	ZCC	Medium to Long term
3. Left Hand Side of Blue Tee Box	Remove <i>Strelitzia</i> and Silverleaf from the grass bank and maintain as grassland. Maintain small passages and thickets of Silverleaf to maintain habitats. Remove small or thin clumps but maintain natural thickets. Push back Silverleaf by removing lower branches and remove Acacia on the edge of the cart path. Selectively remove <i>Strelitzia</i> 's that are located too close to the cart path but maintain thicket.	ZCC in consultation with ZEMA	Medium Term Ongoing
4. Corner of cart path	Maintain line of sight here to ensure visibility of the bunker from the tee box. Continually prune back vegetation.	ZCC	Ongoing
5. Between Tee Box and Dam	Maintain <i>Hibiscus</i> on an ongoing basis. Remove Silverleaf between the <i>Hibiscus</i> and <i>Ficus lutea</i> . Crown lift <i>Ficus lutea</i> . Remove bulrushes from southern edge of dam. Maintain "unmaintained" strip of vegetation on water's edge.	ZCC	Ongoing
6. Left hand side	Underplanting in thickets behind the <i>Ficus</i> and <i>Erythrina</i> required to regain forest understorey. <i>Isoglossa woodii</i> recommended. Remove Silverleaf from this corner, keep <i>Strelitzia</i> clump.	ZCC/ZEMA	Short to Medium Term
7. Wetland	Remove small <i>Strelitzia</i> but maintain bigger clump. Remove IAPs and Silverleaf. Clean up Turkey Berry.	ZCC	Short Term
8. Raphia Palms	The <i>Raphia</i> palm flowers once at an age of between 20 and 40 years, and then dies. It is noted that these palms will most likely die within the next 10 years. A replacement plan should be made by then (i.e. replace with more palms, or different tree species). More <i>Raphia</i> palms can be placed in the natural corridor between the dam and Zimbali Drive to encourage Palm Nut Vulture's. Replace dead trees between the <i>Raphia</i> Palms and the Acacia with <i>Searisa gueinzii</i> .	ZCC/ZEMA	Long Term
9. Uluwatu Grassland	Remove small Umtoni trees and maintain as a grassland, as per notes on Hole 4. Round off veld grass from the stream drain. Plant in red hot pokers. Maintain	ZCC	Ongoing

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	established thickets, expand the areas of Creeping Dune Ferns. Continually remove the IAP Sword Fern.		
10. Between Uluwatu and Green	Maintain this open area as is. Remove small Silverleaf and Umdoni trees that are popping up.	ZCC	Short Term
11. Green	Crown lift the large <i>Ficus trichopoda</i> to promote more light infiltration onto the green, and to improve aesthetics. The crown height can be reduced by 5m and maintained at that height going forward. Remove reeds from water's edge immediately adjacent the green.	ZCC	Ongoing
12. Pathway between 6 th and 7 th	Left hand side near the green, push back Silverleaf from edge of cart path. Plant up sandy area on the right-hand side. Plant shrubs on the left-hand side to screen off the Uluwatu house's deck. ZEMA to restore forest in the natural corridor between the course and Zimbali Dr, where IAP removal has opened holes. Clean up reeds close to the path on the left-hand side of the corner, keep reeds that are further back but maintain a 2m buffer from the path. This will open visibility and improve aesthetics. Remove the <i>Strelitzia</i> from encroaching on the <i>Erythrina</i> on the left-hand side by the entrance to the 7 th tee box. Clean up <i>Strelitzia</i> clump on the right-hand side. Once the Waterberry establishes, remove this clump of <i>Strelitzia</i> . Remove Silverleaf. Crown Lift Umdoni, push back Silverleaf.	ZCC	Medium Term
General	Prevent bush encroachment within the wetland and grassland habitats. Trees and invasive vegetation need to be controlled.	ZCC in consultation with ZEMA	Ongoing
	Remove Invasive Alien Plants.		
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		
	Minimise disturbance to sensitive wetland areas.		

3.7 Seventh Hole

The 7th hole is bordered by the natural Zimbali Drive corridor on the right, and the 3rd hole on the left. The tee boxes are separated from the fairway by a wetland emanating from the left-hand side of the hole, which the tee boxes and cart path intersect. The wetland on the left-hand side forms the border to the 3rd hole for approximately half of the hole, which then opens to expose several feature trees which then transition to a natural thicket towards the green. Numerous feature trees exist on the right-hand side of the fairway, bordered by the more natural Zimbali Drive corridor. There is a defined line of maintained and unmaintained areas on this side. The topography rises steeply behind the green, towards the 11th green and the golf cart pathway leading to the bridge over Zimbali Drive.

Please refer to Figure 8 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 7 provides a description of the proposed management actions.



Figure 8 Seventh Hole

ZCC Golf Course Management Plan

Table 7 Seventh Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Tee Box Wetland	Maintain height of reeds to ensure playability and line of sight. Remove invasive and woody vegetation.	ZCC	Ongoing
2. Left hand side Wetland	Remove <i>Ficus ingens</i> from the wetland – this is not an appropriate species. This can be transplanted into the natural corridor along Zimbali Drive. Remove woody vegetation on an ongoing basis.	ZCC	Short Term
3. Right Hand Side Wetland	Push back Silverleaf approximately 5m. remove low growing vegetation to accentuate feature trees.	ZCC in consultation with ZEMA	Short Term
4. Right Hand Side of Fairway	Reinstate forest fringe by planting appropriate species such as <i>Acalypha glabrata</i> , <i>Clerodendrum glabrum</i> , <i>Dombeya bourgessiae</i> , <i>Grewia occidentalis</i> , <i>Turraea floribunda</i> , <i>Turraea obtusifolia</i> , <i>Vangueria infausta</i> . Maintain thin strip of natural habitat between 7 th and Zimbali Drive – retain current maintenance line to ensure this natural corridor is maintained. Push back Hibiscus 2-3m and maintain that line going forward. Expand unmaintained area by approximately 2-3m between the two Wild Plum trees. Veld mix the bare slope before the green.	ZCC	Medium Term
5. Thicket between 7 th and 3 rd	Plant up areas where IAPs have been removed. Remove <i>Strelitzia</i> 's that are in proximity on the left-hand side of the cart path. Manually remove Buffalo grass and seed with indigenous grass mix.	ZCC	Ongoing
6. Left hand side of Cart Parking Area	Remove Silverleaf and plant up area to create a 'feature garden. The following species are recommended: Shrubs: <i>Mackaya bella</i> , <i>Mitriostigma axilare</i> , <i>Pavetta lanceolata</i> , <i>Plectranthus ecklonii</i> , <i>Plectranthus saccatus-saccatus</i> , <i>Plectranthus zuluensis</i> Ground-cover plants: <i>Chlorophytum saundersiae</i> , <i>Droguetia iners</i> , <i>Phaulopsis imbricata</i> , <i>Crinum moorei</i> , <i>Scadoxus multiflorus</i> , <i>Scadoxus puniceus</i> . Push back <i>Strelitzia</i> 's off the Ficus and plant up the area with more suitable shrubs. The following species are recommended: <i>Allophylus natalensis</i> , <i>Isoglossa woodii</i> , <i>Psychotria capensis</i> .	ZCC/ZEMA	Medium to Long Term
7. Thicket and slope between 7 th and 11 th Holes	Remove <i>Strelitzia</i> 's and crown lift Silverleaf. Seeding of indigenous veld grass mix.	ZCC	Short Term
8. Grass Bank below the cart path to bridge	Remove Silverleaf and other invasive plants. Maintain as grassland.	ZCC	Ongoing
9. Thicket Between Zimbali Dr and Course	Investigate the potential of opening small pockets between the course and Zimbali Drive, to provide views of the course to users of Zimbali Dr.	ZEMA in consultation with ZCC	Short Term
General	Prevent bush encroachment within the wetland and grassland habitats. Trees and invasive vegetation need to be controlled.	ZCC in consultation with ZEMA	Ongoing

ZCC Golf Course Management Plan

	Remove Invasive Alien Plants.		
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		
	Minimise disturbance to sensitive wetland areas.		

3.8 Eighth Hole

The 8th hole is located between the 2nd and 11th holes. It is bordered by a thicket on the slope to the left, which adjoins the dam on the 2nd on the adjacent slope. The slope on the left-hand side of the 8th is a perfect candidate for grassland restoration. The 8th hole lies slightly higher than the 11th fairway, located to the right of the 8th, several feature trees along the low point forms the border between these two holes. A natural thicket forms the boundary to the 10th and 11th holes.

Please refer to Figure 9 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 8 provides a description of the proposed management actions.



Figure 9 Eighth Hole

ZCC Golf Course Management Plan

Table 8 Eighth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Left Hand Side of Tee Box	Plant screening species such as <i>Allophylus dregeanus</i> , <i>Allophylus natalensis</i> , <i>Clerodendrum glabrum</i> , <i>Halleria lucida</i> , <i>Hippobromus pauciflorus</i> behind the Strelitzia's. Remove strelitzia once shrubs have established, to accentuate trees. Remove Strelitzia clump next to blue tee box. Remove Strelitzia clump from Paperbark Acacia. Relocate as many Strelitzia's as possible, and plant as screening to dump site.	ZCC in consultation with ZEMA	Long term
2. Left hand side of Fairway	Remove Strelitzia clumps and small Silverleaf, improve grassland area and maintain as grassland. Keep thickets towards the crest of the hill, maintain slopes as grassland. Crown lift feature trees (Acacia and Figs) to prevent excessive shading out and loss of grassland species.	ZCC in consultation with ZEMA	Ongoing
3. Right Hand Side of Fairway	Indigenous grass seed mix below feature trees located between the 8 th and 11th (extend in a thin strip from existing thicket down towards the last tree closest to the tee box). Remove Silverleaf from edge of fairway, clean up woody vegetation and open Acacia's. Maintain existing thicket as such to provide shelter for wildlife.	ZCC in consultation with ZEMA	Short Term
4. Left Hand Side of Green	Veld grass all the way to the edge of the dam. Remove IAPs, Silverleaf and Red Beech. Scarify the buffalo grass and seed with indigenous veld mix. Crown lift feature trees. Encourage growth and spread <i>Juncus</i> and <i>Schoenoplectus corymbosus</i> tufts to other areas on the water's edge. Place another dead tree on this side of the dam to provide more areas for birds to perch.	ZCC	Medium Term
5. Pathway to 9 th	Brush cut back the <i>Setaria</i> once a year. Hide the drain on the right-hand side of the path with clumpy grass species such as <i>Cymbopogon excavatus</i> and <i>Hyparrhenia hirta</i> . Strip buffalo grass and replace with indigenous veld mix. Remove Strelitzia's on the uphill and maintain grassland area.	ZCC	Ongoing
General	Prevent bush encroachment within the grassland habitats. Trees and invasive vegetation need to be controlled.	ZCC in consultation with ZEMA	Ongoing
	Remove Invasive Alien Plants.		
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		

3.9 Ninth Hole

The 9th hole is a relatively short hole, with a narrow strip of thicket on each side of the course. Umsinsi Villas border the left-hand side of the course. Property owners adjoining the course should be consulted and briefed with regards to planting palettes and the environmental vision for the course, to ensure their landscaping ties into that of the course's. The following species are recommended:

Grasses

Aristida junciformis
Chenchrus ciliaris
Chloris gayana
Digitaria eriantha
Eragrostis curvula
Melinis repens
Themeda triandra

Groundcovers

Abrus precatorius
Aloe cooperi
Aloe maculata
Aristea woodii
Asystasia gangetica
Becium obvatum
Carpobrotus dimidiata
Chaetacanthus setiger
Chlorophytum saundersiae
Gazania rigens (green and silver forms)
Helichrysum cymosum
Justicia capensis
Justicia flava
Scabiosa columbaria
Stachys aethiopica
Sutera floribunda
Vigna vexilata

Please refer to Figure 10 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 9 provides a description of the proposed management actions.



Figure 10 Ninth Hole

ZCC Golf Course Management Plan

Table 9 Ninth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Left Hand Side of Tee Box	Clean up <i>Strelitzia's</i> from <i>Acacia's</i> . Remove smaller <i>Strelitzia</i> clumps from this area but maintain the large clump of <i>Strelitzia's</i> adjacent the white tee box. Scarify and remove the Buffalo grass and reseed the area with an indigenous veld seed mix.	ZCC	Short Term
2. Right Hand Side of Tee Box	Remove woody vegetation and IAPs. Remove Silverleaf between white and blue tee boxes. Maintain as grassland.	ZCC	Short Term
3. Right Hand Side of Fairway	Remove small Silverleaf, crown lift feature trees. Remove dead and woody vegetation. Scarify and remove the Buffalo grass and reseed the area with an indigenous veld seed mix. Maintain as grassland.	ZCC	Ongoing
4. Left Hand Side of Fairway	Maintain as grassland. Discuss with neighbouring residents to ensure landscaping palettes tie into each other (i.e. replace <i>Carpobrotus</i> with grass species). Remove Silverleaf close to cart path.	ZCC	Ongoing
5. Left hand side of Green	Very shady underneath the Fig tree, which hampers grass growth. Unformal cart path shortcut exacerbating this issue. close off pathway and plant up area with the following species: <i>Asparagus plumosus</i> , <i>Asystasia gangetica</i> , <i>Chlorophytum butcherii</i> , <i>Chlorophytum comosum</i> , <i>Chlorophytum modestum</i> , <i>Chlorophytum saundersiae</i> , <i>Clivia miniata</i> , <i>Crinum macowanii</i> , <i>Crinum moorei</i> , <i>Phaulopsis imbricata</i> , <i>Setaria lindenbergiana</i>	ZCC/ZEMA	Short to Medium Term
6. Behind Green	Remove <i>Strelitzia</i> clumps and replace with feature trees such as <i>Clerodendrum glabrum</i> , <i>Euclea natalensis</i> , <i>Searsia gueinzii</i> , <i>Dombeya rotundifolia</i>	ZCC	Long Term
7. Garden Before Road Crossing	Remove groundcovers and <i>Kalanchoe</i> , replace with grassland species to tie in better with the Aloes such as <i>Aristea woodii</i> , <i>Aristida junciformis</i> , <i>Becium obovatum</i> , <i>Bulbine natalensis</i> , <i>Justicia flava</i> , <i>Polygala virgata</i> .	ZCC	Short Term
General	Prevent bush encroachment within the grassland habitats. Trees and invasive vegetation need to be controlled.	ZCC in consultation with ZEMA	Ongoing
	Remove Invasive Alien Plants.		
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		

3.10 Halfway House and Nursery

The halfway house is located between the 9th and 10th holes, off Palm avenue. It comprises of a cart parking lot, practice areas (chipping, driving, and putting), a restaurant and bathrooms. The nursery is located immediately north of the practice green, with a small band of natural vegetation dividing the two areas.

Please refer to Figure 12 overleaf for the layout of this hole and proposed management areas. Table 11 provides a description of the proposed management actions.



Figure 11 Halfway House and Nursery

ZCC Golf Course Management Plan

Table 10 Halfway House Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Area next to stairways	These areas are in shade and as a result the grass is not growing well. There are patches of sand. The shaded garden can be planted up with taller plants at the back including <i>Coddia rudis</i> , <i>Dietes grandiflora</i> , <i>Hypoestes aristata</i> , <i>Justicia betonica</i> , <i>Justicia capensis</i> , and <i>Mitriostigma axilare</i> . Ground cover plants are to include <i>Asparagus plumosus</i> , <i>Asystasia gangetica</i> , <i>Chlorophytum butcherii</i> , <i>Chlorophytum comosum</i> , <i>Chlorophytum modestum</i> , <i>Chlorophytum saundersiae</i> , <i>Clivia miniata</i> , <i>Crinum macowanii</i> , <i>Crinum moorei</i> , <i>Microsorium scolopendria</i> , <i>Phaulopsis imbricata</i> , and <i>Setaria lindenbergiana</i> .	ZCC	Medium Term
2. Halfway House	Continually maintain the Silverleaf and other trees surrounding this building. Vegetation should be maintained 1.5m from the structure.	ZCC	Ongoing
3. Thicket Between Halfway House and Nursery	The strip between the grass on the edge of the practice green and the Plumbago hedge can be planted up with suitable low growing, low maintenance plants to create a natural look and transition to the Plumbago thicket at the rear. Species such as <i>Barleria elegans</i> , <i>Barleria obtusa</i> , <i>Barleria prionitis</i> , <i>Hypoestes aristata</i> , <i>Perestrophe cernua</i> are recommended. Feature plants in the grassland can include <i>Crinum macowanii</i> , <i>Leonotis leunuris</i> , <i>Aloe chaboidii</i> , <i>Aloe cooperi</i> , <i>Aloe maculata</i> , <i>Kniphofia linearifolius</i> , and <i>Gladiolus dalenii</i> .	ZCC in consultation with ZEMA	Medium Term
General	Remove IAPs.	ZCC	Ongoing

3.11 Tenth Hole

The 10th hole is located between Palm Avenue and Zimbali Drive. There is a small pond next to the tee box which drains through an artificial stream that meanders through the hole. This canal drains into the dam located downhill from the 10th, on the 11th hole. There is a narrow strip of vegetation between the 10th and Zimbali Drive, where the opportunity for various viewpoints from Zimbali Drive exist.

Please refer to Figure 12 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 11 provides a description of the proposed management actions.



Figure 12 Tenth Hole

ZCC Golf Course Management Plan

Table 11 Tenth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Dam	Soften the concrete edge of this dam by installing planter boxes with clumps of the following wetland and aquatic species: <i>Cyperus prolifer</i> , <i>Juncus lomatoophylus</i> , <i>Kniphofia linearis</i> , Slopes surrounding the dam should be planted up with clumpy grass species such as <i>Aristida junciformis</i> , <i>Digitaria eriantha</i> , <i>Eragrostis curvula</i> , <i>Sporobolus fimbriatus</i> , to improve aesthetics. Veld mix should be applied to the grass area immediately between the dam and cart path entrance to the hole.	ZCC	Ongoing
2. Behind Starter House	Indigenous grassveld mix in area currently being maintained and mowed. Volume of <i>Dietes</i> can be reduced and clumps relocated further back into the bush. Replace the removed <i>Dietes</i> with <i>Asysasia gangetica</i> and <i>Phaulopsis imbricata</i> Remove Silverleaf and leaning branch of <i>Trichilia emetica</i> .	ZCC	Short Term
3. Left hand side of tee box	Push back Silverleaf that is encroaching onto the cart path. Push back <i>Dietes</i> from the edge of the cart path and relocate deeper into the greenbelt. Plant in shade species such as <i>Asysasia gangetica</i> , <i>Chlorophytum butcheriana</i> , <i>Chlorophytum comosum</i> , <i>Chlorophytum saundersiae</i> and <i>Phaulopsis imbricata</i> to create a feature garden.	ZCC in consultation with ZEMA	Short Term
4. Line of sight from tee box	Maintain the Ficus on the right-hand side of the tee box to ensure line of sight, regular pruning to the left-hand side of the tree is encouraged to maintain line of sight.	ZCC	Ongoing
5. Stream	Soften this water feature with edge planting of the following species <i>Barleria elegans</i> , <i>Barleria obtusa</i> , <i>Geranium flanaganii</i> , <i>Helichrysum cymosum</i> , <i>Hoslundia oppositifolia</i> . Create planting boxes periodically throughout stream and plant species such as <i>Cyperus dives</i> , <i>Cyperus prolifer</i> , <i>Gunnera perpense</i> , <i>Hygrophilla auriculata</i> , <i>Kniphofia laxiflora</i> , <i>Zantedeschia aethiopica</i> .	ZCC	Ongoing
6. Left hand side of Cart Path	Remove <i>Strelitzia's</i> near cart path.	ZCC/ZEMA	Medium to Long Term
7. Right hand side of Cart Path	Remove random clump of <i>Strelitzia's</i> and replace these with feature trees such as <i>Dombeya rotundifolia</i> .	ZCC	Short Term
8. Behind the green	Selectively remove some clumps of <i>Strelitzias</i> . Retain the main clump.	ZCC in consultation with ZEMA	Short Term
General	Ensure invasive plant species are kept away from immediate in play areas and cart paths.	ZCC	Ongoing
	Remove silt and IAPs from the waterways.		

3.12 Eleventh Hole

The 11th hole is the final hole on the western side of Zimbali Drive. The hole is relatively short and adjoins the 8th hole, located to the right. A thicket extends between the 10th, 11th, and 8th holes. The stream from the 10th continues to meander through this hole, culminating in a small dam opposite the 11th green. A natural thicket exists between the 11th and Zimbali drive, providing a natural buffer.

Please refer to Figure 13 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 12 provides a description of the proposed management actions.



Figure 13 Eleventh Hole

ZCC Golf Course Management Plan

Table 12 Eleventh Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Cart path between 10 th and 11 th	Create planter pockets in the stream and plant suitable wetland plants such as <i>Cyperus dives</i> , <i>Cyperus prolifer</i> , <i>Gunnera perpense</i> , <i>Hygrophilla auriculata</i> , <i>Kniphofia laxiflora</i> , <i>Zantedeschia aethiopica</i> . Seed the area between the canal and Zimbali Drive thicket with indigenous grassveld mix.	ZCC in consultation with ZEMA	Medium Term
2. Right hand side of tee boxes	Remove <i>Strelitzia's</i> from the edge of the thicket and maintain the grassland accordingly.	ZCC	Short Term
3. Left hand side of tee boxes	Plant up the area between the stream and Zimbali drive with suitable low growing, low maintenance plants to create a natural look and transition to the thickets. Species such as <i>Barleria elegans</i> , <i>Barleria obtusa</i> , <i>Barleria prionitis</i> , <i>Hypoestes aristata</i> , <i>Perestrophe cernua</i> are recommended.	ZCC in consultation with ZEMA	Medium Term
4. Between 11 th and 8 th	The row of trees emanating from the thicket should be extended across the entire boundary of the 11 th /8 th holes. It is envisaged that 6 trees will be required to fill the holes, the following are recommended <i>Acacia nilotica</i> , <i>Acacia robusta</i> , <i>Acacia sieberiana</i>	ZCC	Long Term
5. Dam Garden	Maintain as a feature garden. Supplementary planting and maintenance (i.e. composting) is required, the following species are recommended <i>Agapanthus praecox</i> , <i>Albuca nelsonii</i> , <i>Bulbine natalensis</i> , <i>Dimorphotheca fruticosa</i> , <i>Sutera floribunda</i> . Remove <i>Strelitzia</i> from this island garden and replace with a low growing, more aesthetically pleasing plant such as a clump of <i>Indigofera jucunda</i> . Shape <i>Acacia</i> . Remove <i>Euphorbia tirucalli</i> and exotic <i>Diets</i> . Cut back <i>Pelargonium</i> once a year.	ZCC	Ongoing
6. Cart Parking Area	Push back <i>Hibiscus</i> 2m on the left-hand side. Cut back the <i>Hibiscus</i> from the White Stinkwood to accentuate the tree. Plant up the area that the <i>Hibiscus</i> has been pushed back from with the following species <i>Dombeya bourgessiae</i> , <i>Grewia occidentalis</i> . The <i>Hibiscus</i> is a protected tree species and any maintenance requires a permit.	ZCC in consultation with ZEMA	Medium Term
7. Thicket behind green	Remove <i>Strelitzia's</i> , IAPs and Silverleaf from the edge of the thicket and plant up this thicket with the following sub canopy species <i>Acalypha glabrata</i> , <i>Canthium spinosum</i> , <i>Catunareum spinosum</i> , <i>Coddia rudis</i> , <i>Psychotria capensis</i> , <i>Searsia pentheri</i> .	ZCC	Medium Term

ZCC Golf Course Management Plan

8. Cart Path to 12 th	Reassess once large IAP infestation has been cleared. Remove grass from the verge and replace with groundcovers such as <i>Asystasia gangetica</i> , <i>Gazania rigens</i> , <i>Helichrysum cymosa</i> , <i>Phaulopsis imbricata</i> .	ZCC	Short Term
General	Prevent bush encroachment within the grassland habitats. Trees and invasive vegetation need to be controlled.	ZCC in consultation with ZEMA	Ongoing
	Remove Invasive Alien Plants.		
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		

3.13 Twelfth Hole

The 12th hole has a well large and well-established thicket on the left-hand side, which narrows as the hole progresses to the green. A small buffer thicket exists on the right-hand side between the hole and Forestwood Drive residences. There is a large volume of IAPs around the Tee Box, which will need to be restored through supplementary planting once they are removed.

Please refer to Figure 14 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 13 provides a description of the proposed management actions.



Figure 14 Twelfth Hole

ZCC Golf Course Management Plan

Table 13 Twelfth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Cart Path	Plant up forest understory with plants such as <i>Isoglossa woodii</i> . Maintain trees on immediate edge of cart path, but do not interfere with surrounding forest. Maintain tunnel effect. Remove Silverleaf off the big Flat Crown tree on the cart path.	ZCC	Ongoing
2. Left hand side of Fairway	Maintain as is and retain current maintenance line. Replace Buffalo grass with low groundcover plants such as <i>Barleria elegans</i> , <i>Barleria obtusa</i> , <i>Barleria prionitis</i> , <i>Justicia betonica</i> , <i>Perestrophe cernua</i> , <i>Grewia occidentalis</i> , <i>Searsia crenata</i> . Do not open area around the Yellowwood trees, as they are reliant on the Silverleaf and other forest species to provide shelter and protection. Removing this protection will result in damage to the tree. They are also a shade species, too much sun exposure will further damage them. They are slow growing and will take another 10-15 years to establish. They will naturally 'pop out' of the canopy once they mature. Plant up holes in the treeline with <i>Allophylus dregeana</i> , <i>Buddleja saligna</i> , <i>Clerodendrum glabrum</i> , <i>Dombeya bourgessiae</i> , <i>Dombeya cymosa</i> , <i>Dombeya rotundifolia</i> , <i>Grewia occidentalis</i> , <i>Halleria lucida</i> , <i>Searsia gueinzi</i> , <i>Searsia rehmanniana</i> .	ZCC	Long Term
3. Right Hand Side of Fairway	Maintain Silverleaf, cut back top heavy Silverleaf at a 45° angle.	ZCC in consultation with ZEMA	Short Term
General	Remove Invasive Alien Plants.	ZCC in consultation with ZEMA	Ongoing
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		

3.14 Thirteenth Hole

The 13th hole is the ZCC's feature hole with picturesque view of Holy Hill and the VOP Dam. The tee box is elevated from the rest of the course, and the tee box locations cascade down this hill. Unfortunately, a large storm felled a total of 93 trees on the right-hand side of the fairway. This disturbance has resulted in a large volume of IAPs colonising this area. Significant replanting will have to be undertaken to restore this area.

Please refer to Figure 15 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 14 provides a description of the proposed management actions.



Figure 15 Thirteenth Hole

ZCC Golf Course Management Plan

Table 14 Thirteenth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Right Hand Side of Tee Boxes	Follow defined maintenance line, push back vegetation behind this line and maintain. Plant up with shrubs and suitable understory plants such as <i>Acalypha glabrata</i> , <i>Diospyros natalensis</i> , <i>Catunaregum spinosum</i> . Remove small <i>Strelitzia's</i> from the edge and transplant deeper into the forest.	ZCC	Ongoing
2. Between Tee Boxes	Maintain as grassland. Retain <i>Strelitzia reginae</i> as feature plants. Strip Buffalo grass and replace with indigenous veld grass mix.	ZCC	Short Term
3. Left Hand Side of Tee Boxes	Remove exotic palm tree. Maintain current crown height of trees in proximity of the cart path and tee boxes to allow for suitable light infiltration onto the tees. Remove parasitic growths from these trees. Keep <i>Strelitzia's</i> away from the edge of the cart path, maintain a neat edge. Supplementary planting of subcanopy plants such as <i>Acalypha glabrata</i> , <i>Diospyros natalensis</i> , <i>Catunaregum spinosum</i> , <i>Isoglossa woodii</i> . Remove tall <i>Strelitzia</i> by blue tee but keep smaller ones.	ZCC	Short Term
4. Line of Sight from Tee Boxes	Remove left hand trunk of the Croton on the right-hand side of viewshed. This tree is mature in height, but girth will expand over time. Shape Silverleaf on the left-hand side of the viewshed. The Red Beech at the bottom left-hand side needs to be shaped and pruned in a phased manner. Remove a few protruding branches from the Swamp Fig in the centre, maintain current height. Prune the height of the Flatcrown by approximately 0.5m. Shape and selectively remove protruding branches from the Thorny Elm. Maintain this on an ongoing basis to ensure line of sight.	ZCC in consultation with ZEMA	Ongoing
5. Right hand side of fairway	Due to the loss of 93 trees during the Easter 2019 storm, a large volume of IAPs have colonised this area. Significant IAP removal is required which will cause many gaps and holes will be created. These will have to be planted up with species such as <i>Acacia nilotica</i> , <i>Acalypha glabrata</i> , <i>Allophylus natalensis</i> , <i>Catunaregum spinosum</i> , <i>Clerodendrum glabrum</i> , <i>Hippobromus pauciflorus</i> and <i>Sclerocroton integerrimum</i> along the outer edge. Mid-slope the trees <i>Calpurnea aurea</i> , <i>Cola natalensis</i> , <i>Ochna serrulata</i> , <i>Rawsonia lucida</i> , <i>Strychnos madagascariensis</i> and <i>Zanthoxylum capense</i> can be planted. In the wet-soil area <i>Ficus sur</i> , <i>Ficus trichopoda</i> , <i>Kraussia floribunda</i> , <i>Rauvolfia caffra</i> , <i>Tabernaemontana ventricosa</i> , <i>Tarenna pavettoides</i> and <i>Voacanga thouarsii</i> can be planted. Cut back reeds that are encroaching onto the course.	ZEMA in consultation with ZCC	Long Term

ZCC Golf Course Management Plan

6. Left hand side of fairway	This maintained corner area is not utilised by golfers and should be returned to natural vegetation.	ZCC/ZEMA	Medium to Long Term
7. Green	The <i>Hibiscus</i> on the right-hand side can be pruned and the height can be maintained to ensure views of the VOP dam. Reed bed can be cut back by 2m from the edge of the course. The roots must be removed to prevent regrowth.	ZCC	Short Term
8. Cart Path to 14 th	Clean up right-hand side of path and remove dead branches. Remove <i>Strelitzia's</i> from edge of cart path. Remove Silverleaf on left-hand side of T-Junction. Clean up the Flatcrown tree by removing smothering vegetation. Push back Silverleaf 3m on right-hand side.	ZCC	Short Term
9. Right hand side of green	Push back reeds from the edge of the course.	ZCC	Short Term
General	Ensure that line of sight from the tee box is constantly maintained as per point 4, to prevent the need for drastic pruning to be undertaken.	ZCC in consultation with ZEMA	Ongoing
	Remove Invasive Alien Plants.		
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		

3.15 Fourteenth Hole

The 14th hole is relatively short with an elevated tee box, requiring golfers to clear a wetland between the tee and the green. This hole is located on the western fringe of Holy Hill and is flanked by the coastal forest on the right-hand side. The wetland in the middle of the hole drains into the VOP dam. Coastal forest and the dam are on the left-hand side of the hole.

Please refer to Figure 16 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 15 provides a description of the proposed management actions.



Figure 16 Fourteenth Hole

ZCC Golf Course Management Plan

Table 15 Fourteenth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Left Hand Side of Tee Box	<p>Push back Silverleaf off the Flat Crown tree next to cart parking area. Maintain Thorny Elm tree. Remove Silverleaf and <i>Strelitzia</i> from the immediate side of the cart path, near the turning circle.</p> <p>Screen off the toilet area with suitable plant species such as creepers into the trellis or plant 'curtain' using one or more of <i>Combretum bracteosum</i>, <i>Cyphostemma hypoleucum</i>, <i>Mondia whitei</i>, <i>Rhoicissus tometosa</i>, <i>Rhoicissus tridentata</i>.</p>	ZCC	<p>Ongoing</p> <p>Long Term</p>
2. Right Hand Side of Tee Box	Remove IAPs and restore disturbed pocket of vegetation with suitable coastal forest species such as <i>Maerua caffra</i> , <i>Maerua racemulosa</i> , <i>Maerua rosmarinoides</i> , <i>Tricalysia capensis</i> , and interplant these with <i>Isoglossa woodii</i> .	ZCC	Long Term
3. Line of Sight	Maintain current line of sight as is. Ensure Hibiscus on the right-hand side is maintained. Keep Flat Crown on left hand side from protruding into line of sight. Push back Silverleaf by 3m next to the Blue tee box.	ZCC	Ongoing
4. Old bunkers	Convert old bunkers into wetland or planted area with the following species: <i>Cyperus dives</i> , <i>Cyperus esculente</i> , <i>Cyperus prolifer</i> , <i>Kniphofia linearifolia</i> , <i>Dissotis canescens</i> , <i>Zantedeschia aethiopica</i>	ZCC in consultation with ZEMA	Medium Term
5. Between Cart Path and Green	Extend natural area and plant up with suitable, low maintenance groundcovers such as <i>Aneilema aequinociale</i> , <i>Asystasia gangetica</i> , <i>Chlorophytum saundersiae</i> , <i>Commelina erecta</i> , <i>Phaulopsis imbricata</i> .	ZCC in consultation with ZEMA	Medium Term
General	Remove Invasive Alien Plants.	ZCC in consultation with ZEMA	Medium Term
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		

3.16 Fifteenth Hole

The 15th hole is located at the toe of Holy Hill, with several wetlands draining across the hole. The Pinnacles PUD is located on the left-hand side, with a large swamp forest located further along the hole (adjacent to the fairway and green) between the 15th and 16th holes. A wetland exists between the green and the fairway, draining from The Pinnacles, across the 15th and into the Holy Hill wetland. The Holy Hill wetland exists on the immediate right-hand side of this hole at the toe of Holy Hill. This wetland drains into the main VOP dam. This wetland is critical for storm water management. Unfortunately, a large volume of IAPs are colonising this wetland area. poor storm water management measures are also leading to siltation and incising of this wetland.

Please refer to Figure 17 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 16 provides a description of the proposed management actions.



Figure 17 Fifteenth Hole

ZCC Golf Course Management Plan

Table 16 Fifteenth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Line of Sight	Maintain current line of sight. Cut back Wild Frangipani tree.	ZCC	Ongoing
2. Right Hand Side of Tee Box	Keep Hibiscus maintained and off the cart path.	ZCC	Ongoing
3. Right Hand Side of Red Tee Box	Remove <i>Bridelia micrantha</i> . Crown lift Umdoni.	ZCC	Short Term
4. Right Hand Side of Fairway	Transplant small <i>Barringtonia racemosa</i> and Wild Frangipani before they become problematic and whilst they are still small and can be transplanted.	ZCC in consultation with ZEMA	Short Term
5. Right Hand Side of Wetlands	Maintain current line of sight	ZCC	Ongoing
General	Remove Invasive Alien Plants.	ZCC in consultation with ZEMA	Ongoing
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		
	Minimise impacts in the sensitive wetland areas.		

3.17 Sixteenth Hole

The tee boxes of the 16th hole are elevated above a wetland system that flows across into the 15th. The Blue Tee Box is in the middle of the wetland. The hole is surrounded by Coastal Forest.

Please refer to Figure 18 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 17 provides a description of the proposed management actions.



Figure 18 Sixteenth Hole

ZCC Golf Course Management Plan

Table 17 Sixteenth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Top Tee Box	Remove <i>Strelitzia</i> and push back <i>Hibiscus</i> all the way around the edge of the tee box. Transplant the small <i>Ficus</i> growing on the right-hand side. The height of the canopy behind the tee box must be maintained to allow light infiltration.	ZCC	Ongoing
2. Line of Sight	Remove Quinine tree from behind the red tee box. Remove lower branch of the <i>Bridelia</i> in the wetland between the tee boxes. Flatcrown on left hand side – push back branches out of line of sight. Remove <i>Canthium inerme</i> and Umdoni branch that is obstructing line of sight from the red tee box.	ZCC	Short Term
3. Wetland	Remove woody and IAPs such as the Umdoni and Pigeonwood trees from the wetland. Transplant as many small trees as possible. Extend veld grass mix on the left-hand side between white tee box and greenbelt.	ZCC in consultation with ZEMA	Short Term
4. Cart Path	Maintain <i>Hibiscus</i> and ensure it is off the path. Remove small <i>Strelitzia</i> 's.	ZCC	Ongoing
5. Left hand side of Fairway	Crown lift trees. Brush cut grassland area and interplant with grass plugs to improve diversity.	ZCC	Ongoing Medium Term
6. Right hand side of Cart Parking Area	Remove and push back Silverleaf to accentuate Wild Plum tree.	ZCC	Ongoing
7. Behind Green	Plant up the area underneath the <i>Acacia</i> 's with a suitable shade plant species such as Creeping Dune Fern.	ZCC in consultation with ZEMA	Medium Term
General	Remove Invasive Alien Plants.	ZCC in consultation with ZEMA	Ongoing
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		

3.18 Seventeenth Hole

The 17th hole has a well-established thicket on the right-hand side, which is interrupted by the access road to the 16th hole and Sandwedge road. IAP removal has already been undertaken adjacent to this servitude road. The right-hand side of the tee box has a well-established grassland bank and is a good example of what we are trying to achieve in many areas of the course (refer to Figure 19). There are several houses located very close to the course on the left-hand side, the screening that is present is important for protection from golf balls. The cart path between the 17th and 18th holes goes through a coastal forest patch on both sides of the Pitching Wedge road crossing.

Please refer to Figure 20 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 18 provides a description of the proposed management actions.



Figure 19 Natural Grassland Bank



Figure 20 Seventeenth Hole

ZCC Golf Course Management Plan

Table 18 Seventeenth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Tee Box	Extend grassland down the slope in front of the white tee box and opposite the blue and red tee box	ZCC	Short Term
2. Left hand side Grassland	Maintain as grassland and remove IAP's. Remove small Silverleaf trees that are establishing and remove all Silverleaf trees from the cart path edge.	ZCC	Ongoing
3. Right Hand Side	This thicket is important habitat for fauna and must be maintained as is. The current maintenance line can be maintained. the 'border' of grassland that forms a grassland strip with the course along this side should be extended down to the Servitude road, as indicated in Figure 20. Maintain access road.	ZCC	Ongoing
4. Left Hand Side of Fairway	Maintain thicket that has formed here, as it is providing protection to these properties. The Silverleaf growing onto the cart path can be pushed back on an ongoing basis. Remove Silverleaf off of Milkwood to accentuate the tree.	ZCC	Ongoing
5. Wild Plum tree on the path	This tree is severely affected by PSHB and it is recommended that the severely infested branches are removed to prevent further spread.	ZCC	Short Term
6. Left hand side of Green	Brush cut Buffalo grass and spread indigenous veld grass seed mix. Transplant Coast Bone-Apple trees. Maintain as grassland.	ZCC	Short Term
7. Right Hand Side of Fairway	Provide screening plants in front of property, maintain rest of the area as grassland with some patches of thicket.	ZCC	Ongoing
8. Cart Path to 18 th	Push back <i>Hibiscus</i> from the pathway edge and underplant with suitable sub-canopy species such as <i>Acalypha glabrata</i> , <i>Coddia rudis</i> , <i>Diospyros lycioides</i> , <i>Maytenus procumbens</i> , <i>Rothmannia globosa</i> , <i>Scelrocroton integerrima</i> . Neaten up path edge by removing dead Silverleaf branches and cleaning up dead overhanging branches. Remove <i>Strelitzia</i> from the cart edge and push back the Silverleaf on the other side of the Pitching Wedge crossing.	ZCC	Ongoing
General	Prevent bush encroachment within the grassland habitats. Trees and invasive vegetation need to be controlled.	ZCC in consultation with ZEMA	Ongoing
	Remove Invasive Alien Plants.		
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		
	Crown lift feature trees		

3.19 Eighteenth Hole

The 18th hole is bordered by a narrow strip of vegetation down the right-hand side, which provides cover to houses located behind this small screen of natural thicket. The left-hand side has a larger, more established natural thicket.

Please refer to Figure 21 overleaf for the layout of this hole and proposed management areas, including areas that are proposed to be converted to indigenous grassland. Table 19 provides a description of the proposed management actions.



Figure 21 Eighteenth Hole

ZCC Golf Course Management Plan

Table 19 Eighteenth Hole Management Plan

Location	Management Actions	Responsible Person	Timeline
1. Tee Box Line of Sight	Large volume of IAPs to remove, this will open the area around the tee box significantly. Remove <i>Acacia</i> thicket on the left-hand corner and maintain this area as grassland.	ZCC	Ongoing
2. Left hand side grassland	Maintain a strip of indigenous grassland buffer between the thicket and the hole. This grassland belt may differ in width throughout the course but should be a minimum of 3m. Remove Duiker Berry and push back trees 3m from edge to maintain this grassland belt.	ZCC	Ongoing
3. Left Hand Side of Fairway	Push back and crown lift <i>Ficus</i> approximately 3m. Remove all random <i>Strelitzia</i> clumps from within the in-play area. Plant up thicket to the left of this with these (transplant) and other screening trees.	ZCC in consultation with ZEMA	Medium to Long Term
4. Right Hand Side of Fairway	Crown lift <i>Acacias</i> . Maintain encroachment of branches onto the course. Crown lift <i>Ficus</i>	ZCC	Ongoing
5. Right Hand Side Near Green	Push back Silverleaf and seed indigenous veld grass mix. Maintain 2m strip of grassland as a transition from the cart path to the thicket.	ZCC	Ongoing
6. Behind Green	Remove <i>Strelitzia</i> from the in-play area. Selective pruning to obtain a pocket sea view. Remove the large exotic Australian Silver Oak to help obtain sea view.	ZCC/ZEMA	Medium to Long Term
General	Prevent bush encroachment within the grassland habitats. Trees and invasive vegetation need to be controlled.	ZCC in consultation with ZEMA	Ongoing
	Remove Invasive Alien Plants.		
	Ensure invasive plant species are kept away from immediate in play areas and cart paths.		

4. COSTS

As each hole has been provided with a specific management plan, costs associated with each hole can vary significantly. For instance, the conversion of large areas of thicket into grassland on the 1st, 2nd, 3rd and 4th holes can be completed relatively quickly and cost effectively, as this primarily entails removing invasive species (such as Silverleaf), and seeding the bare areas with an indigenous grass seed mix.

Other areas such as the 13th, which requires mass planting to offset the impact of the April 2019 storm and IAP removals, will require substantially higher costs. The ZEMA Nursery can be utilised for the mass propagation of plants, both for 'feature garden' areas and forest replanting. This can substantially reduce associated costs but will take additional time for plants to propagate.

The conversion of large areas of the course into an indigenous grass veld mix will substantially reduce maintenance costs (petrol, vehicle wear and tear, man hours etc) associated with mowing and course maintenance (use of pesticides etc.), whilst simultaneously improving the ecological diversity and aesthetics of the course. Indigenous seed mix costs approximately R150 per kg. One kg of seed mix can cover an area of 50m². Approximately 2.84ha (28 456m²) of the course has been proposed to be converted to grassland, equalling an approximate cost of R85 200.00 (568 x 1kg bags).

Currently, ZCC is undertaking mass IAP removal on the course. Unfortunately, due to budgetary constraints, this is being undertaken by a small labour team. This increases the time required to remove the IAPs from each hole. Despite the constraints, progress has been good. The total monthly cost of this exercise currently is R19 910. The removal of IAPs have provided an indication of the poor ecological quality of the course and highlighted the need for restoration to be undertaken together with the IAP removal.

It is therefore proposed that the current IAP team is increased, and a restoration team is included as part of the contract. This restoration team will be responsible for undertaking the directives in this management plan. It is recommended that a 4-man team can be dedicated to these ZCC buffer/out of play areas, and the composition of the team can be adjusted as required. For instance, should additional labour be required for IAP removal for a particular hole, the team can be adjusted accordingly for a period. Should additional labour be required for a planting project or restoration activities, the IAP team can be reduced and reallocated to restoration temporarily. It is important to be dynamic and having one company responsible for all management aspects of the out of play areas will help to facilitate this. Golf Data will be able to focus their efforts and labour force on the maintenance of the course (in play areas).

The nursery can be utilised for plant propagation, but it is recommended that an annual budget of at least R15 000.00 is made available for the procurement of plant species. R15 000 will only make provision for 75 trees priced at R200 (20 litre bag size or 2m in height) or 200 trees at R75 (10 litre/1-1.5m) or 400 trees at R40 (5 litre/0.5m). Please refer to Table 20 overleaf for a summary of these costs.

ZCC Golf Course Management Plan

Table 20 Cost Estimations

Item	Description	Frequency	Cost	Quantity	Total
Seed Mix	Indigenous seed mix for converting maintained areas into a natural grassveld area	Once off cost	R150 per kg	568	R85 200.00
Plants	Annual budget for the procurement of plants that cannot be provided by the onsite ZEMA nursery.	Annual	R15 000	75 trees priced at R200 (20 litre bag size or 2m in height) or 200 trees at R75 (10 litre/1-1.5m) or 400 trees at R40 (5 litre/0.5m).	R15 000
IAP Removal & Restoration Team	Increasing the current IAP team to include the restoration component (excluding Chipper). Increasing the current monthly cost of R19 910 to R43 832.50	Monthly	R43 832.50 (an increase of R23 922.50 from current cost).	12 months	R525 990.00 (currently R238 920.00)
Sub Total (Once off Costs)					R85 200.00
Sub Total (Annual Costs)					R540 990.00
Total					R626 190.00

5. CONCLUSION

This detailed report has been compiled in consultation with ZCC, Golf Data, ZEMA and an independent horticultural specialist. The objective of this report is to provide a template for the management of the natural vegetation within the golf course and adjacent property to ensure sustainable management and improved biological diversity and functioning. The reduction of ‘maintained’ areas and increased areas of indigenous grassveld will achieve both a reduction in maintenance costs and an increase in biodiversity. Whilst a significant volume of pruning has been proposed in the short term, this has been carefully assessed by specialists. Large scale planting has also been proposed. The planting will provide more diverse fodder for all wildlife on the estate throughout the year. The removal and planting will be undertaken strategically in a phased manner, to ensure minimal disturbance to the habitat and food requirements of the wildlife on the estate. Removals will be immediately offset by replanting. ‘Relocations’ will be prioritised over ‘removals’. Any trees that can be transplanted or rescued, will be taken to the ZEMA nursery and replanted once it has recovered. Fauna sweeps will be undertaken prior to any significant pruning, to ensure that any sensitive wildlife species are rescued and relocated. At all times, pruning will be undertaken with a precautionary approach, always under pruning as opposed to over pruning. Fauna sweeps will be undertaken prior to any significant pruning, to ensure that any sensitive wildlife species are rescued and relocated.

The grasslands biome is the second largest biome in South Africa. It is also one of the most threatened biomes in South Africa. Bush encroachment occurs in grassland where woody plants such as shrubs and trees begin to grow in a grassland area, transforming the micro-climate to the detriment of the grassland integrity. This alters the structure and functioning of ecosystems, with these changes becoming increasingly irreversible as the fundamental nature of the ecosystems change. Such changes not only alter landscapes and their biodiversity, but also the nature and value of ecosystem services delivered from them. Grasslands require ongoing management and removal of woody species (shrubs and trees) to maintain the integrity of this habitat. Significant pruning will be required to regain the grassland habitats that have been lost to both bush encroachment and afforestation.

The removal of trees from within wetland systems is in line with good ecological practice, as any trees growing in wetland systems contribute to drying them out – which impacts negatively on the system. The removal of the trees also helps enhance the wetlands as habitats for our endangered Pickersgill

Reed Frog and is a direct management recommendation from Dr Jeanne Tarrant and Dr Adrian Alexander – the foremost experts in this field.

Timeframes and responsibilities have been proposed, and rough cost estimates provided. These specifics will most likely fluctuate and evolve over time and is also dependent on the future happenings of ZCC, particularly considering the proposed amalgamation with ZEMA, finalisation of the lease and other contractual agreements. It is strongly recommended that the out of play areas (natural/greenbelt areas) of the golf course are managed by the ZEMA Environmental Department, as this department has the necessary expertise for the management of these habitats. This will allow Golf Data to focus on their primary objective, maintaining the in-play areas of the course. However, it is critical that all parties continue to work closely together in the future. The financial implications of this proposal can be tabled at the various relevant forums and committees for discussion and conclusion.