



ENVIRONMENTAL MAINTENANCE MANAGEMENT PROGRAMME

Routine Maintenance of the Waterways on the Plettenberg Bay Country Club Golf Course, Plettenberg Bay, Western Cape.



PREPARED FOR:
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ENVIRONMENTAL MANAGEMENT PROGRAMME REQUIREMENTS:

Appendix 4 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Management Programme (EMP). The table below serves as a summary of how these requirements were incorporated into this EMPR:

(1) An EMPR must comply with section 24N of the Act and include:-

<p>(a) Details of –</p> <p>(i) The EAP who prepared the EMPR; and</p> <p>(ii) The expertise of the EAP to prepare an EMPR, including a curriculum Vitae;</p>	<p>This MMP was prepared by Joclyn Marshall of Eco Route Environmental Consultancy. Joclyn has a MSc in Environmental Science and has 12 years' experience in the environmental field. Candidate SACNASP Registration number 100121/11. Please see attached CV of the EAP (Appendix 1).</p>
<p>(b) A detailed description of the aspects of the activity that are covered by the EMPR as identified by the project description;</p>	<p>Section 2</p>
<p>(c) a map at an appropriate scale which superimposes the proposed activity, it associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;</p>	<p>Section 4</p>
<p>(d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –</p> <p>(i) planning and design;</p> <p>(ii) pre-construction activities;</p> <p>(iii) construction activities;</p> <p>(iv) rehabilitation of the environment after construction and where applicable post closure; and</p> <p>(v) where relevant, operation activities;</p>	<p>Sections 3, 4 and 10.</p>
<p>(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to –</p> <p>(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</p> <p>(ii) comply with any prescribed environmental management standards or practises;</p>	<p>Sections 3, 4 and 10.</p>



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(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 10.
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 7.1 and 10.
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 5 and 10.
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Sections 10.
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 10.
(l) a program for reporting on compliance, taking into account the requirements as prescribed by Regulations;	Section 7.
(m) an environmental awareness plan describing the manner in which – (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 7 and 10.
(n) any specific information that may be required by the competent authority.	Sections 10 and 14.



Glossary of Terms

BAR	Basic Assessment Report – A tool used by the EAP to submit to the competent authority if listed activities is triggered in Regulations GNR 327 and GNR 324 as per NEMA to make a decision regarding a proposed development.
DFFE	Department Forestry Fisheries and Environment – the national authority for sustainable environmental management and integrated development planning.
DFFE&DP	Department of Environmental Affairs and Development Planning – the provincial authority for sustainable environmental management and integrated development planning.
CBA	CBA Critical Biodiversity Area – Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.
EAP	<p>Environmental Assessment Practitioner – An EAP and a specialist, appointed in terms of regulation 12(1) or 12(2) must –</p> <ul style="list-style-type: none"> (a) be independent. (b) Have expertise in conducting environmental impact assessments or undertaking specialist work as required, including knowledge of the Act, these regulations and any guidelines that have relevance to the proposed activity. (c) Ensure compliance with these Regulations (d) Perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application. (e) Take into account, to the extent possible, the matters referred to in regulation 18 when preparing the application and any report, plan or document relating to the application; and (f) Disclose to the proponent or applicant, registered and affected parties and the competent authority all material information in the possession of the EAP and, where applicable, the specialist, that reasonably has or may have the potential of influencing – <ul style="list-style-type: none"> i. Any decision to be taken with respect to the application by the competent authority in terms of these regulations; or ii. The objectivity of any report, plan or document to be prepared by the EAP or specialist, in terms of these Regulations for submission to the competent authority; unless access to that information is protected by law, in which case it must be indicated that such protected information exists and is only provided to the competent authority. <p>(2) In the event where the EAP or specialist does not comply with sub regulation (1)(a), the proponent or applicant must, prior to conducting public participation as contemplated in chapter 5 of these regulations, appoint another EAP or specialist to externally review all work undertaken by the EAP or specialist, at the applicants cost.</p> <p>(3) An EAP or specialist appointed to externally review the work of an EAP or specialist as contemplated in sub regulation (2), must comply with sub regulation (1).</p>



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ECO/ESO	Environmental Control Officer – A site agent who needs to ensure that all environmental authorisation and conditions are adhered to during the construction phase of the project
EMPr	Environmental Management Programme – can be defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced”.
ESA	Ecological Support Area – Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of Pas or CBAs, and are often vital for delivering ecosystem services.
MMP	Maintenance Management Plan – means a maintenance management plan for maintenance purposes defined and adopted by the competent authority
NEMA	National Environmental Management Act (Act 107 of 1998) as amended 2017 – national environmental legislation that provides principles for decision-making on matters that affect the environment.
PA	Protected Area - A protected area is an area of land or sea that is formally protected by law and managed mainly for biodiversity conservation. Protected areas recognised in the National Environmental Management: Protected Areas Act (Act 57 of 2003) (hereafter referred to as the Protected Areas Act) are considered formal protected areas in the NPAES. This is a narrower definition of protected areas than the International Union for Conservation of Nature (IUCN) definition. ¹ The NPAES distinguishes between land-based protected areas, which may protect both terrestrial and freshwater biodiversity features, and marine protected areas.

DRAFT



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1. INTRODUCTION

This Maintenance Management Plan has been developed for request for adopting a Maintenance Management Plan (MMP) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), Environmental Impact Assessment (EIA) Regulations, 2014 (as amended). The MMP must be undertaken to the sufficient standard and requirements as defined by the competent authority, the Department of Environmental Affairs and Development Planning of the Western Cape Government (DEA&DP).

The purpose of the MMP is to maintain both man-made and ecological infrastructure in a manner that either improves the current state of, and/or reduces the negative impacts on a watercourse to ensure that ecosystems services are preserved/improved and to prevent further deterioration of the watercourse.

Notwithstanding the MMP possibly being defined or adopted by the Competent Authority, any other applicable statutory requirement must still be complied with (e.g. any obligations under the National Water Act, 1998 (Act 36 of 1998) or the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)).

The proponent must note that a MMP for a watercourse **must** be undertaken through consultation with the Department of Water and Sanitation and/or the relevant Catchment Management Agency (responsible water authority). This is to ensure compliance in terms of a Permissible Water Use as set out in the National Water Act, 1998 (Act No. 36 of 1998). It is recommended that this process for authorisation in terms of the National Water Act be clarified prior to the drafting and submission of the MMP.

Section 28 of NEMA (National Environmental Management Act, Act 107 of 1998) states that:

Duty of care and remediation of environmental damage - "(1) Every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot be reasonably avoided or stopped, to minimise and rectify such pollution or degradation of the environment"

This MMP must form an integral part of the contract documents, as it outlines the methodology & duties required so that the project objectives can be achieved in an environmentally sustainable manner; with particular reference to the prevention and mitigation of environmental impacts caused by maintenance activities associated with this project.

This MMP is a dynamic document that may need to evolve during its implementation period so that it recognises any new issues that may arise; or changes in the parameters of identified issues and can address these issues with the required/amended mitigation.

This MMP must be read in conjunction with the Freshwater Assessment for the Maintenance Management Plan compiled by Dr. J.M. Dabrowski of Confluent Environmental, dated March 2023 and the Alien Invasive Species Control Plan.



1.1. Purpose of the MMP

The purpose of this MMP is to ensure that the negative environmental impacts of the proposed activities are managed, mitigated, and kept to a minimum during the maintenance of the golf course. The MMP focuses on avoiding damage or loss on ecosystems and the services they provide, and to enhance positive environmental impacts where possible.

The MMP is a living document that is flexible and responsive to new and changing circumstances, however, should a change be made within the MMP permission from DEA&DP must first be obtained. Once the MMP is approved by DEA&DP it is seen as a legal binding document on the following affected parties:

- 1 Project Proponent.
- 2 All contractors.
- 3 Sub-contractors and staff.
- 4 The appointed ECO monitoring the works.

Copies of this MMP must be kept on site and all senior personnel are expected to familiarise themselves with the content of this MMP.

The MMP is valid for **5 years** after which it must be reviewed by relevant authorities. It is assumed that maintenance activities will be an ongoing requirement for the operational phase of the golf course. Should any amendments need to be made during operational phase, written authorisation should be obtained from DEA&DP.

1.2. The Polluter-Pays Principle

This principle provides for "the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment." The Polluter Pays Principle will be rigorously applied throughout the maintenance of the golf course.



2. PROJECT DETAILS

Eco Route Environmental Consultancy has been appointed by the Proponent **Plettenberg Bay Country Club** to prepare a Maintenance Management Programme (MMP) in compliance with the conditions set by Department of Environmental Affairs and Development Planning (DEA&DP) Western Cape Provincial Government, for Adoption of a Maintenance Management Programme.

The Plettenberg Bay Country Club (PBCC) is a golf course located along the banks of the Piesang River in Plettenberg Bay on Portion 1 of Farm 456 Grootfontein (Lat: -34.066096, Lon: 23.349361), and is 66ha in extent. The golf course is an important feature for local sport and tourism and the local economy and attracts a significant number of European visitors each summer (during the European winter). The course is located below the 1:50 year flood line and frequently experiences flooding following heavy rainfall events in the catchment area which affects the playability of the course and therefore impacts on revenues that the course can earn. Routine maintenance of the course and its artificial and natural watercourses is therefore required in order to ensure adequate drainage, while ensuring watercourses are adequately protected. Planned maintenance activities will take place in the Piesangs River as well as artificial water features and drainage channels associated with the former extent of a relatively large wetland seep system.



Figure 1: Location of the Plettenberg Bay Country Club in Plettenberg Bay.



Figure 2: Photographs of the Piesangs River downstream of the Roodefontein Dam, showing a dense riparian canopy and a mixed boulder and cobble river substrate.

Maintenance activities are likely to occur annually and are primarily aimed at improving drainage through the golf course by maintaining infrastructure (culverts) and clearing natural and artificial watercourses of sediment and nuisance aquatic plants (including encroaching *T. capensis* and the alien invasive *S. molesta*). Other terrestrial invasive alien plants, including Blackwood (*Acacia melanoxylon*), Black Wattle (*Acacia mearnsii*), and Brazilian Pepper Tree (*Schinus terebinthifolia*) require control and management.

2.2. Environmental Considerations

2.2.1. National Freshwater Ecosystem Priority Atlas (NFEPA)

The PBCC is located within sub-quaternary catchment (SQC) 9200 (Figure 3), which, according to the National Freshwater Ecosystem Priority Atlas (NFEPA, Nel et al., 2011), has been classified as a Freshwater Ecosystem Priority Area (FEPA). River FEPAs achieve biodiversity targets for river ecosystems and threatened/near-threatened fish species and were identified in rivers that are currently in a good condition (A or B ecological category). Their FEPA status indicated that they should remain in a good condition in order to contribute to national biodiversity goals and support sustainable use of water resources (Nel et al., 2011). For river FEPAs, the whole SQC is identified as a FEPA, although the FEPA status applies to the actual river reach within such a sub-quaternary catchment. The shading of the whole sub-quaternary catchment indicates that the surrounding land and catchment area needs to be managed in a way that maintains the good ecological condition of the river reach, which in this case, is the Piesang River, which flows through the golf course. It is therefore important that any maintenance activities that occur on the golf course do not result in any deterioration of the river or its catchment area. Maintenance activities must ultimately aim to maintain or improve the ecological condition of the Piesangs River.

2.2.2. Western Cape Biodiversity Spatial Plan

According to the Bitou WCBSPP the entire golf course falls within a protected area known as the Plettenberg Bay Country Club Private Nature Reserve (Figure 4).



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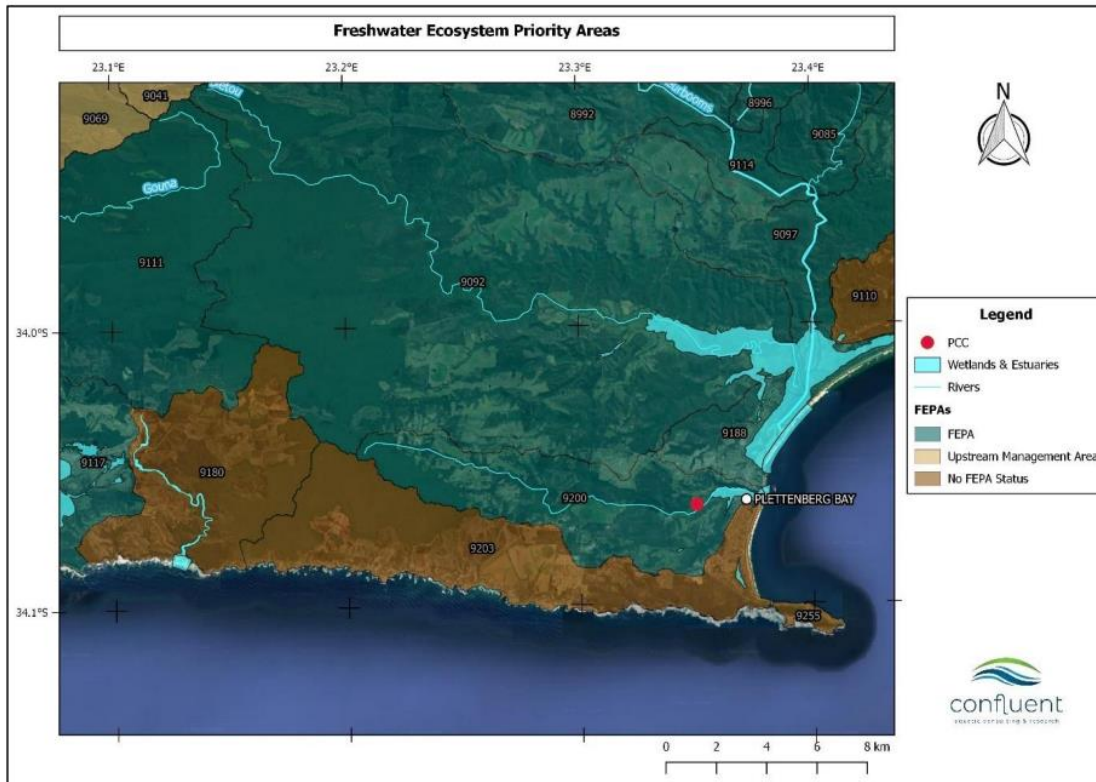


Figure 3: Map indicating the location the Plettenberg Bay Country Club in relation to FEPAs.



Figure 4: Map of the golf course in relation to the Western Cape Biodiversity Spatial Plan (WCBSP).



2.2.3. Watercourse Classification

According to the report by Freshwater Specialists, the entire reach of the Piesang River below the Roodefontein Dam that flows through the golf course can be classified as a perennial river. At a landscape level, the river flows through a relatively broad valley and the river is characterised by an active channel, with clearly discernible bed and banks. The geomorphological zonation is Upper Foothill, and is characterised by a moderately steep, cobble-bed or mixed bedrock-cobble bed channel, with plane bed, pool-riffle or pool-rapid reach types (Figure 2). The more undisturbed sections of the river (immediately below the Roodefontein dam) are well shaded by a dense riparian zone comprising of tall indigenous trees. As the river flows through the golf course, the riparian zone becomes far more diminished and is also absent along some stretches.

In addition to the river, there are remnant seep wetlands that formerly formed part of a much larger wetland seep system that stretched across the current golf course (Figure 5). Establishment of the course has converted much of this former wetland system into a series of artificial water features (i.e. small dams/water holes) that are interconnected by a system of shallow, grassed drainage canals (Figure 6). Water is not actively pumped into any of these dams, and their permanent inundation indicates that they have been excavated into a very shallow water table, which is consistent with conditions that would have caused the formation of a large seep wetland. This is further corroborated by the fact that boreholes located on the golf course actively decant to the surface without being actively pumped. The groundwater appears to be very rich in iron and there are widespread examples of a rusty coloured precipitate in many of the water features, which is caused by the oxidation of anaerobic soluble ferrous iron (Fe^{2+} - derived from groundwater) to insoluble ferric (Fe^{3+}) iron-hydroxide.

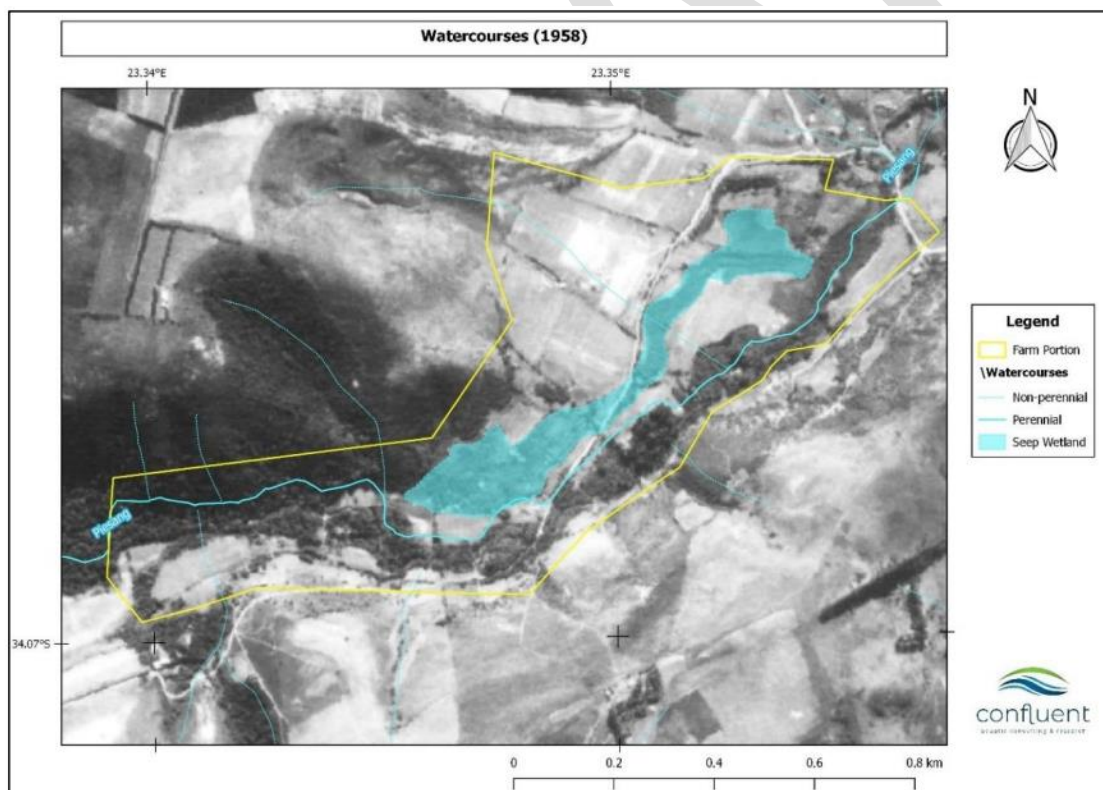


Figure 5: Historical ortho-photo from 1958 showing the likely former extent of the wetland seep system. Note also the dense riparian zone along most of the length of the Piesang River.

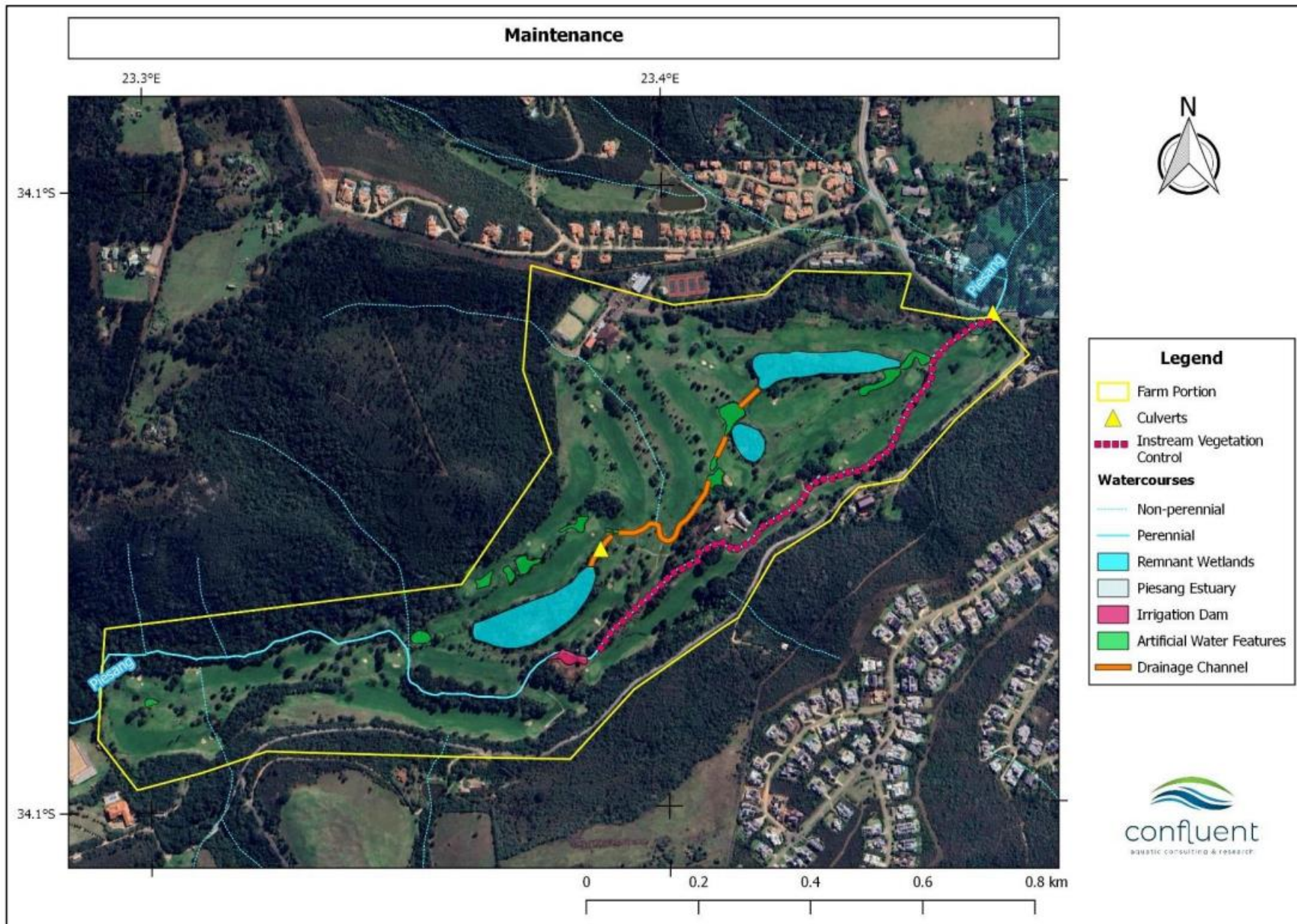


Figure 6: Map showing current day natural and artificial watercourses located throughout the golf course.

Only two remnant patches of what could be considered as natural wetland habitat remain (Figure 6). These are characterised by a dense and diverse coverage of wetland plants including species such as *Phragmites australis*, *Cliffortia odorata*, *Carpha glomerata* and a variety sedges and rushes (Figure 7).



Figure 7: Photographs illustrating the dense wetland vegetation in the eastern-most remnant of the wetland seep.

2.2.4. Piesangs River

The most serious impacts on the Piesang River are related to the regulation of flow caused by the Roodefontein Dam and the historical establishment of the golf course itself (See Freshwater Assessment, Table 1). Below the dam, the river initially runs through a section of indigenous vegetation and shows geomorphological characteristics typical of an Upper Foothills system, comprising of a relatively steep system with a cobble and boulder substrate. The river is shaded by a dense riparian canopy and instream emergent or aquatic vegetation is negligible. Once the river enters the golf course it becomes distinctly narrower, with steeper, higher banks, mostly grassed with kikuyu. The dense riparian canopy has been mostly removed along most of the length of the river through the golf course. Increased sunlight, together with modifications to the river substrate (which is more dominated by sediment as opposed to cobbles and boulders) and flow regime (i.e. reduced frequency and magnitude of flood events) has led to establishment of abundant instream vegetation (e.g. most notably *Typha capensis* as well as other sedges and grasses) which chokes long lengths of the river. The invasive water fern, *Salvinia molesta* was abundant throughout the river reach. A small instream dam is also located in the river which is used to abstract water for irrigation of the golf course. Remaining stretches of riparian vegetation are comprised of a mixture indigenous and alien vegetation (including Blackwood – *Acacia melanoxylon*, Black Wattle – *Acacia mearnsii*, Brazilian Pepper Tree - *Schinus terebinthifolia*). In summary a large loss of natural habitat, biota and basic ecosystem functions has occurred in the lower reaches of the Piesangs River, and the Present Ecological State (PES) is therefore D, Largely Modified.

The lower reach of the Piesang River is a perennial system and therefore sensitive to changes in flow and water quality. It forms an important link between the Estuarine Functional Zone and the larger Piesang River catchment area. The Ecological Importance and Sensitivity (EIS) of the watercourse is therefore considered to be High (See Freshwater Assessment, Table 3).

2.2.5. Wetland Seep

The hydrology has been fundamentally altered through the creation of artificial water features which concentrates water at these points as opposed to allowing it to seep over a larger area. In terms of geomorphology and vegetation, the majority of the former extent of the wetland seep has been filled in and transformed into golf course (i.e. fairways, artificial water features etc.) and only a few remnant patches of

natural wetland habitat remain. These remaining patches do however host a relatively high diversity of wetland plants and provide good habitat and refuge for a range of terrestrial and aquatic biota. The main impact on these remnant areas is invasion by alien tree species, including Blackwood - *Acacia melanoxylon*, Black Wattle – *Acacia mearnsii*, Brazilian Pepper Tree - *Schinus terebinthifolia*. The western seep had a high abundance of yellow-wood saplings around the periphery and removal of alien invasives would allow these indigenous trees to re-establish. Overall, the Present Ecological State (PES) for the wetland seep system is E: Seriously Modified.

The remnant wetland seep system is rated as moderate in terms of its Ecological Importance and Sensitivity (EIS), owing to its relatively large size and potential to host red data species. Given its position within the landscape (outside of the main channel of the Piesangs River), its hydro-geomorphological characteristics (i.e. a seep wetland) and the highly modified nature of the remnant wetland system, it offers little with respect to important hydro-functional attributes (e.g. attenuating floods and improving water quality). The wetland system offers no direct human benefits. The EIS is therefore considered to be Moderate.



Figure 8: Photographs illustrating impacts on the lower reaches of the Piesangs River, including removal of the riparian zone, dense growth of instream aquatic vegetation (A and B), a small instream dam used for irrigation of the golf course (C) and the exotic *Hibiscus diversifolius* which was relatively abundant along the banks (D).

2.2.6. Vegetation Type

The property is mapped as Garden Route Shale Fynbos (FFh 9), according to the South African National Biodiversity Institute (2006-2018) Vegetation Map (Figure 9). This vegetation type is considered to be Endangered. A small section of the property is South Outeniqua Sandstone Fynbos (Vulnerable). Most of the property is with an Endangered Ecosystem Threat Status, with a small section within a Vulnerable Ecosystem Threat Status as shown in figure 10, below. This is linked to the conservation status of the vegetation types.

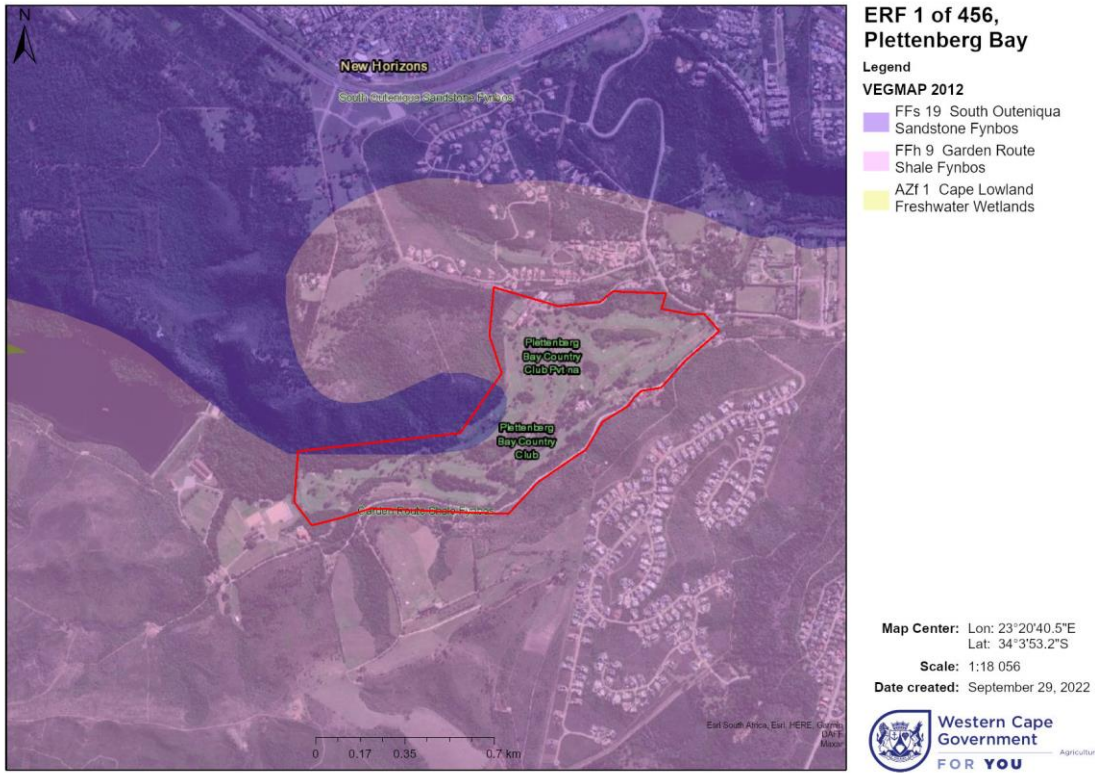


Figure 9: Vegetation Types.

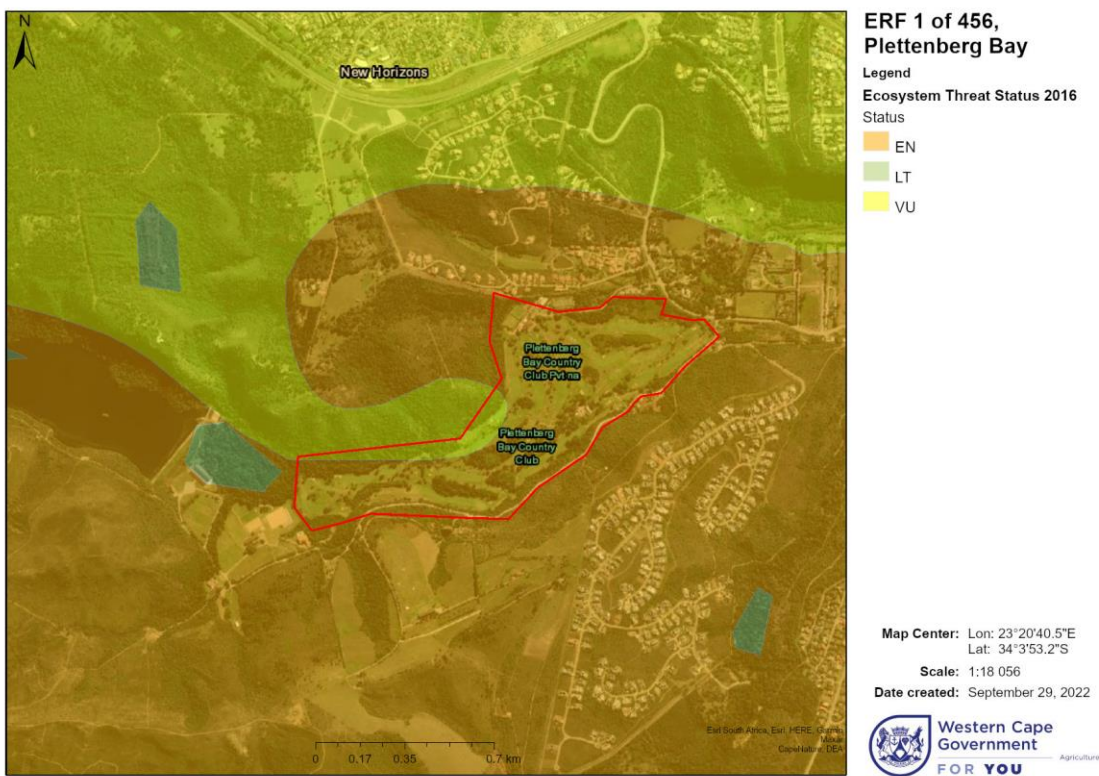


Figure 10: Ecosystem Threat Status.

2.2.7. Critical Biodiversity Areas

The PBCC falls outside of a Critical Biodiversity area or Ecological Support Area (Figure 9).

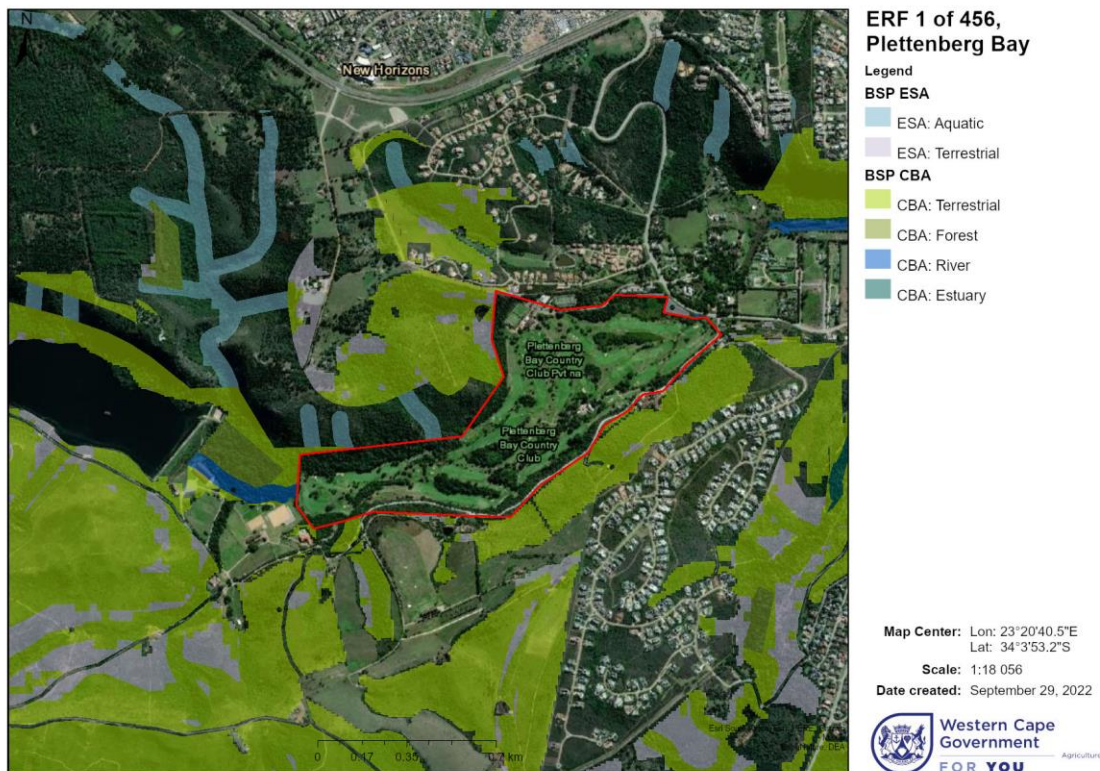


Figure 11: Critical Biodiversity Areas.

3. PROPOSED MAINTENANCE ACTIVITIES

3.1. De-silting of Artificial and Natural Watercourses

Water features and artificial channels lines connecting these features have become silted up and heavily vegetated over time, which affects the drainage of water through the course during heavy rainfall events, causing localised flooding and inundation of sections of the course. Desilting of artificial watercourses (water features and drainage channels) is required to improve drainage throughout the course. Similarly, the culvert beneath Piesang Valley Road has become heavily vegetated and silted up and will require clearing to improve drainage through the culvert.

3.1.1. Extent and Timing of Activity

- This activity is restricted to artificial water features and drainage channels on the golf course and to the culvert passing under the Piesang River Valley Road (see Figure 9).
- For the culvert under the Piesangs River Valley Road removal of silt upstream and downstream of the culvert must ensure free flow of water through the culvert but may not extend more than 20 m upstream or downstream of the culvert.
- Removal of silt in the Piesang River must be done using silt screens and/or geotextile to prevent silt from moving downstream.
- Remnant wetland habitats as delineated in Figure 6 are excluded from this activity.

- Removal of sediment from the drainage channel may not extend more than 20 m upstream of the western most culvert indicated in Figure 6.
- Clearing should be conducted at the end of summer during a relatively dry period (i.e. May to July) and should be conducted only once a year or following an extreme event that results in blockage of infrastructure.

3.1.2. Method Statement

- Sediment and silt will be removed by hand or using an excavator;
- Access points to be identified and planned to minimise disturbance to watercourses;
- Remove sediment from the location of infrastructure to reinstate the intended function of the infrastructure;
- Sediment must be removed to a suitable stockpile location outside of aquatic habitats;
- Any riparian areas disturbed by the activities must be revegetated; and
- Excavated sediment can be used for landscaping of the golf course.

3.2. Controlling Instream Vegetation in Water Features and the Piesang River

Water features and lower sections of the Piesang River have become heavily encroached with instream aquatic vegetation, most notably *Typha capensis* (Cape Bulrush). Nuisance growth of indigenous aquatic vegetation (such as bulrush) and other aquatic vegetation often needs to be managed in rivers where hydrological flows have been regulated by dams and high abstraction rates, which have the effect of reducing the magnitude and frequency of natural control measures such as floods. Removal of riparian zone results in higher light exposure of the channel which further stimulates growth of instream vegetation. Lack of grazing by large mammals and elevated supply of nutrients caused by use of fertilisers further leads to the encroachment of vegetation in watercourses. This vegetation needs to be routinely cut back and/or removed in order to facilitate improved drainage through the golf course and the river. In addition, vegetation in the eastern most remnant wetland area is encroaching onto the fairway of the 4th hole and needs to be controlled.



Figure 12: Photographs showing dense beds of *T. capensis* choking the Piesang River (A); dense reed beds in an artificial water feature on the golf course (B); and dense vegetation in the culvert below the Piesang River Valley Road obscuring the view of the channel (C and D).

3.2.1 Extent and Timing of Activity

- This activity is limited to artificial water features and drainage channels, the Piesang River downstream of the instream irrigation dam (including the culvert that passes beneath the Piesangs River Valley Road (Figure 6) and the outer edge of vegetation in the eastern most remnant wetland.
- Clearing of the drainage channel may not extend more than 20 m upstream of the western most culvert indicated in Figure 6.
- Clearing should be conducted at the end of summer (May to July) and should not be conducted more than once a year.

3.2.2 Method Statement

Artificial Water Features, Drainage Channels and the Piesang River:

- Brush-cutting:
 - The reeds should be cut below the lowest leaf and the remaining stump should not be longer than 15cm. If a brush cutter is used, mowing should be no lower than 12cm from the ground to minimise impacts to small animals and indigenous plants;
 - Remove all cut reeds (especially seed heads) and cleared alien vegetation from the watercourse/wetland area.
- Chemical Control:
 - Any chemical contrail should preferably be done according to a cut stem treatment.
 - Use herbicide approved for use in aquatic habitats (e.g. glyphosate and imazypyr).
 - Apply a few drops of the pesticide formulation to the freshly cut stems using a syringe or squirt bottle.

Eastern Remnant Wetland Area:

- Brush-cutting:
 - Brush cutting of wetland vegetation is limited to a distance of 1 m measured from the edge of the fairway into the wetland.
 - Apply the same methods as described in Section above for Artificial Water Features, Drainage Channels and the Piesang River.
 - Wetland vegetation may only be cut and the root systems of plants must not be removed.
- Chemical Control:
 - Chemical control may not be used on natural vegetation occurring in the remnant wetland areas.

3.3. Clearing Flood Debris from the Piesangs River

Flood debris, particularly wood debris can block channels and culverts and cause localised flooding and associated scouring and erosion of the bed and banks. This debris needs to be removed periodically to ensure efficient drainage of the channel.

3.3.1 Extent and Timing of Activity

- The activity is applicable to all artificial water features and channels, all culverts and the Piesangs River.
- The activity is an ongoing maintenance activity and is not restricted to any specific time of the year.

3.3.2 Method Statement

- Debris to be removed by hand as and when required.
- Artificial debris, such as cement blocks, must also be removed where they no longer serve a purpose.
- Debris must not be stockpiled along the river banks and must be disposed of outside of the watercourse.

3.4. Replacing Culverts and Overflow Pipes

Some culverts and overflow pipes (that discharge water from the artificial water features) along the artificial drainage channel system are undersized and blocked, leading to localised flooding during heavy rainfall events (Figure 13). These culverts need to be enlarged to facilitate improved drainage through the channel (Figure 13). Main risks associated with replacing culverts are sedimentation of downstream habitats and disturbance to the bed and banks which could lead to erosion.



Figure 13: Photograph of the western-most culvert blocked by vegetation and sediment.

3.4.1 Extent and Timing of Activity

- The activity is applicable to all culverts associated with artificial water features and drainage channels on the golf course.
- No culverts will be replaced within the Piesangs River.
- Replacement of culverts must take place during the drier season (May to July).

3.4.2 Method Statement

- Existing culverts to be removed by hand or excavator.
- Installation of new culvert, aligned with orientation of channel (less than 30 % deviation from the channel alignment);
- Fill associated with the culvert installation and approach material must be structurally stable;
- Fill associated with the culvert installation and approach material must be protected from erosion;
- All disturbed areas must be re-graded and stabilized by seeding or re-vegetating the riparian area upon completion. This helps to prevent surface erosion and/or sedimentation of the watercourse.

3.5. Controlling Alien Invasive Riparian Species

Alien invasive tree species are common along the length of the Piesangs River and throughout the remnant patches of remaining wetland habitat, and include (but are not limited to) the following species:

- Prickly hibiscus (*Hibiscus diversifolius*) – common along the banks of the Piesang River
- Brazilian pepper tree (*Schinus terebinthifolia*) – common within remnant wetland areas
- Blackwood (*Acacia melanoxylon*) – common along the Piesangs River and within remnant wetland areas
- Poplar (*Populus alba*) – common in the western most remnant wetland.

Growth of alien vegetation within and adjacent to river and wetlands, is usually at the expense of natural, indigenous aquatic vegetation which simply cannot compete. Negative impacts of alien vegetation include reduced water availability (due to increased rates of abstraction) and reduced habitat diversity and an associated reduction in biodiversity. The removal of invasive alien plants from the riparian zone and wetlands

is desirable not only from an aquatic ecological perspective but also due to the fact that they reduce the ability of the aquatic features to provide a number of valuable goods and services.

3.5.1 Extent and Timing of Activity

- Activity can be undertaken in and along all artificial and natural watercourses (including remnant wetland areas).
- Activity can be undertaken throughout the year.

3.5.2 Method Statement

- Correctly identify alien invasive species – consult independent experts if necessary;
- Young plants and saplings can be pulled by hand or using an appropriate tool (e.g. Tree Popper). Care must be taken to replace and compact disturbed soil after removal (i.e. stamped down by foot);
- Trees or shrubs that are too large to be pulled must be felled using a saw or chainsaw. The freshly cut stump must be immediately painted with a herbicide that is registered for control of the alien tree species. Important species and registered herbicides include, inter alia:
 - *Hibiscus diversifolius*: Glyphosate (Roundup)
 - *Schinus terebinthifolia*: Triclopyr (Garlon)
 - *Acacia melanoxylon*: Triclopyr (Garlon)
 - *Populus alba*: Imazapyr (Chopper or Hatchet)
- Herbicide must be mixed with a dye to identify stumps that have already been treated and prevent overuse/over application of the herbicide;
- All cut/felled plant material must be removed from the watercourse and/or riparian zone.
- Follow-up control must be conducted annually to prevent regrowth and the production of seed still remaining in soil.
- Revegetate areas with indigenous vegetation where necessary.

3.6. Controlling *Salvinia molesta*

Salvinia molesta (Kariba Weed) is an aquatic, mat-forming, free-floating fern with horizontal stems up to 25cm long is abundant throughout all watercourses (including dams and the Piesang River). It can form dense mats up to 50 cm thick which can completely cover the water surface. The mats clog watercourses and irrigation equipment and reduce waterflow. The mats also reduce light penetration, reduce oxygen levels and result in poor water quality and threaten indigenous aquatic plant and animal life. It is classified as a Category 1 NEMBA Category 1b weed and the PBCC is therefore obligated to attempt to control the weed as far as possible. The release of the salvinia weevil (*Cyrtobagous salviniae*) has brought this weed under full biological control throughout most of South Africa. However, the weed continues to persist in cooler temperate coastal zones along the Southern and Western Cape due to the agent's sensitivity to cooler temperatures.



Figure 14: Photographs illustrating dense mats of *S. molesta* in the Piesangs River.

3.6.1 Extent and Timing of Activity

- Activity can be undertaken in all natural and artificial watercourses throughout the property.
- Activity can be undertaken throughout the year.

3.6.2 Method Statement

- The weed can be removed by any means (hand or excavator) from artificial water courses and by hand from the Piesangs River.
- Biocontrol using the *C. salviniae* biocontrol agent is recommended. Once an assessment of the estimated biomass of the weed has been undertaken, the Department of Forestry Fisheries and Environment (DFFE) must be contacted to arrange release of the biocontrol agent (contact Debbie Muir: dsharp@dffe.gov.za).
- Following the release of the biocontrol, routine monitoring must be undertaken to estimate the presence and absence, and numbers of the biocontrol agents to determine whether any supplemental release is required.
- Once the biocontrol agents have been released, chemical control of the weed should not be undertaken. NO chemical control should be used without guidance from DFFE.

3.7. General Maintenance Practices

In general, maintenance activities must implement the following mitigation measures:

- Repairs and maintenance should be undertaken within the dry season, except for emergency maintenance works.
- Where at all possible, existing access routes should be used. In cases where none exist, a route should be created through the most degraded area avoiding sensitive/indigenous vegetation areas.
- Responsible management of pollutants through ensuring handling and storage of any pollutants is away from the watercourse. When machinery is involved, ensure effective operation with no leaking parts and refuel outside of the riparian area, at a safe distance from the watercourse to manage any accidental spillages and pose no threat of pollution.
- At no time should the flow of the watercourse be blocked (temporary diversions may be allowed) nor should the movement of aquatic and riparian biota (noting breeding periods) be prevented during maintenance actions.
- In circumstances which require the removal of any topsoil, this must be sufficiently restored through sustainable measures and practices.
- Concerted effort must be made to actively rehabilitate repaired or reshaped banks with indigenous local vegetation.
- No deepening of the watercourse beyond the original, pre-damage determined thalweg, unless such deepening is directly related to the natural improved functioning and condition of such a watercourse.
- Where at all possible, limit the disturbance to the zone of the thalweg. This is due to the ecological importance of the low flow channel and respective habitat being allowed to re-establish improving the ecological condition.
- The build-up of debris/sediment removed from a maintenance site may:
 - be utilised for the purpose of in-filling or other related maintenance actions related to managing erosion, which form part of an adopted MMP.
 - not be deposited anywhere within the watercourse or anywhere along the banks of a river where such action is not part of the proposed maintenance activity (ies).
 - Material that cannot be used for maintenance purposes must be removed out of the riparian area to a suitable stockpile location or disposal site.
- The use of foreign material, such as concrete, rubble, woody debris and/or dry land based soil, is strictly prohibited from being used in maintenance actions, unless for the specific purpose of repairs to existing infrastructure, coupled with appropriate mitigation measures.

- On completion of the maintenance action, the condition of the site in terms of relative topography should be similar to the pre-damaged state (i.e. the shape of the river bank should be similar or in a state which is improved to manage future damage). This ultimately dictates that the channel, banks and bed cannot be made narrower, higher or deepened respectively. Exceptions are considered for systems involved with the management of stormwater and improvements for water quality within the urban context.

4. KEY ISSUES

These are issues of importance and should be addressed during maintenance as well as the future management of the property. Maintenance activities typically impact on the following important drivers of natural and artificial watercourses:

- **Hydrology:** Impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes and base flows and modifications to general flow characteristics, including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g. seasonal to temporary or permanent; impact of over-abstraction or instream or off-stream impoundment of a wetland or river etc.);
- **Geomorphology:** This refers to the alteration of hydrological and geomorphological processes and drivers, and associated impacts to aquatic habitat and ecosystem goods and services primarily driven by changes to the sediment regime of the aquatic ecosystem and its broader catchment;
- **Modification of water quality:** This refers to the alteration or deterioration in the physical, chemical and biological characteristics of water within streams, rivers and wetlands, and associated impacts to aquatic habitat and ecosystem goods and services (e.g. due to increased sediment load, contamination by chemical and/or organic effluent, and/or eutrophication etc.);
- **Fragmentation:** Loss of lateral and/or longitudinal ecological connectivity due to structures crossing or bordering watercourses (e.g. road or pipeline crossing a wetland);
- **Modification of aquatic habitat:** This refers to the physical disturbance of in-stream and riparian aquatic habitat and associated ecosystem goods and services including the loss or degradation of all or part of any unique or important features associated with or within the aquatic ecosystem (e.g. waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils, etc.); and \
- **Aquatic biodiversity:** Impacts on community composition (numbers and density of species) and integrity (condition, viability, predator prey ratios, dispersal rates, etc.) of the faunal and vegetation communities inhabiting the site.
- **Alien plant infestation:** Impacts on biodiversity and ecological processes. This will be systematically removed and controlled throughout the operational phase of the golf course.

5. IMPACTS ASSOCIATED WITH THE MAINTENANCE ACTIVITIES

5.1. Assessment Criteria

The criteria are based on the EIA Regulations, published by the Department of Forestry, Fisheries and the Environment (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989. These criteria include:

Nature of the impact

This is an estimation of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.

Extent of the impact

Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region or will have an impact on a national scale or across international borders.

Duration of the impact

The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long term (16-30 years) or permanent.

Intensity

The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.

Probability of occurrence

The specialist should describe the probability of the impact actually occurring and should be described as improbable/unlikely (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

Reversibility

- Completely reversible – the impact can be reversed with the implementation of minor mitigation measures.
- Partly reversible – the impact is reversible but more intense mitigation measures are required
- Barely reversible – the impact is unlikely to be reversed even with intense mitigation measures
- Irreversible – the impact is irreversible, and no mitigation measures exist

Irreplaceable loss of resources

Describes the degree to which resources will be irreplaceably lost due to the proposed activity. It can be no loss of resources, marginal loss, significant loss or complete loss of resources.

Cumulative effect

An effect which in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development. The cumulative effect can be:

- Negligible – the impact would result in negligible to no cumulative effect
- Low – the impact would result in insignificant cumulative effects
- Medium – the impact would result in minor cumulative effects
- High – the impact would result in significant cumulative effects

Significance

Significance of impacts are determined through a synthesis of the assessment criteria and is described as –

- Low negative – where it would have negligible effects and would require little or no mitigation
- Low positive – the impact will have minor positive effects
- Medium negative – the impact will have moderate negative effects and will require moderate mitigation
- Medium positive – the impact will have moderate positive effects
- High negative – the impact will have significant effects and will require significant mitigation measures to achieve an accepted level of impact
- High positive – the impact will have significant positive effects
- Very high negative – the impact will have highly significant effects and are unlikely to be able to be mitigated adequately
- High positive – the impact will have highly significant positive effects.

5.2. Impacts foreseen during Maintenance

Project Phase	Maintenance			
Impact	Impact of excavation of sediment (for routine desilting and replacement of culverts) on water quality and aquatic biota.			
Description of impact	<p>The clearing of sediment can result in a localized disturbance within the associated aquatic habitats. This disturbance can result in increased turbidity as a result of suspension of silt into the water column if the work is undertaken in inundated areas. Invasion by alien plants also tends to occur at the disturbed area.</p> <p>Desilting will be limited to highly transformed aquatic habitats (i.e. water features and channels associated with the former extent of the wetland seep area) and the culvert that passes under the Piesang River Valley Road. Remnant wetland areas as indicated in Figure 6 are excluded from this activity.</p>			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Mitigation Measures	<ul style="list-style-type: none"> Material may only be removed from aquatic habitats after summer and during the dry season (i.e. May to July) except for when emergency maintenance works need to be undertaken; The disturbed area around infrastructure (e.g. culverts that need to be cleared) should be kept to a minimum. Where possible existing access points to the site should be used and any indigenous vegetation that is established adjacent to the works should preferably remain intact; If required, temporary sediment trapping should be put in place to filter water draining the area that will most likely contain high sediment loads; Manual labour should be used where possible within the aquatic habitats. Where the use of mechanical removal is unavoidable, the extent of operation of the machinery within aquatic habitats must be minimized; Desilting, must, where applicable coincide with the programme for clearing instream vegetation so as to minimise the frequency of disturbance in watercourses; Responsible management of pollutants must be practiced by ensuring that they are handled and stored at safe distance away from the watercourse. When machinery is involved, ensure effective operation with no leaking parts and refuel outside of the riparian area, at a safe distance from the watercourse to manage any accidental spillages; Excavated material that cannot be used for maintenance purposes or landscaping must be removed out of the riparian area to a suitable stockpile location or disposal site; and Disturbed areas should be kept clear of alien vegetation and must be actively reshaped and rehabilitated with indigenous, local vegetation. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Low Negative	
Duration	Short Term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Moderate	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Probable	Has occurred here or elsewhere and could therefore occur	Unlikely	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment

Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	Marginal loss - the resource is not damaged irreparably or is not scarce	Low	Marginal loss - the resource is not damaged irreparably or is not scarce
Significance	-36: Minor		-18: Negligible	
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	Maintenance			
Impact	Impact of clearing of vegetation on instream habitat and biota			
Description of impact	Bulrush (<i>Typha capensis</i>) and common reeds (<i>Phragmites australis</i>) are indigenous plants that can encroach into and dominate wetland and river habitat. The primary impact of clearing of reeds and bulrushes is the disturbance of riparian and aquatic habitat. Secondary impacts include exposure of soil and erosion and invasion of disturbed areas by alien plant species. Furthermore, the reduction in surface roughness caused by removal of vegetation allows results in higher flow velocities which could lead to erosion of the bed and banks of the river.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Removal of instream indigenous vegetation should be limited to nuisance growth of reeds and bulrushes that impede flow through channels and drains (as indicated in the Figure 9) and should not extend to vegetation along the banks (which must be retained to limit soil erosion); Clearing should be conducted at the end of summer during the dry season (May to July) to minimise sedimentation and should not be conducted more than once a year; Brush-cutting must avoid damage to the banks or other indigenous vegetation such as sedges and rushes; For brush cutting, the reeds should be cut below the lowest leaf and the remaining stump should not be longer than 15cm. If a brush cutter is used, mowing should be no lower than 12cm from the ground to minimise impacts to small animals and indigenous plants; Remaining indigenous vegetation should not be cleared. The disturbance of the watercourses and wetland areas when undertaking clearing activities should also be limited as far as possible, using existing access points; If surrounding plants and soil are disturbed by the clearing of vegetation, follow-up revegetation should be undertaken, using indigenous species; and In artificial water features, 10 to 20 % of vegetation must be retained to provide habitat and refuge for aquatic biota. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short Term	Impact will last between 1 and 5 years	Brief	Impact will not last longer than 1 year
Extent	Limited	Limited to the site and its immediate surroundings	Very limited	Limited to the site and its immediate surroundings
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	Low	Natural and/or social functions and/or processes are somewhat altered
Probability	Probable	Has occurred here or elsewhere and could therefore occur	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge

Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	-36: Minor		-18: Negligible	
Cumulative impacts	The impact would result in insignificant cumulative effects			

Project Phase	Maintenance			
Impact	Impact of alien invasive plant control on riparian and instream habitat			
Description of impact	Clearance of alien invasive vegetation can result in negative impacts to soil and remaining indigenous vegetation. If undertaken correctly however, clearing of AIPs will have a positive effect on the ecological condition of watercourses.			
Mitigable	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Identify alien plants to be removed. If unsure, contact the Department of Agriculture or Cape Nature for assistance. Clear alien vegetation according to the described alien vegetation removal methods for each invasive species as provided in the detailed method statements or with the methods and herbicides/biological control recommended on the Working for Water website: http://www.dwaf.gov.za/wfw/. Avoid trampling or clearing indigenous vegetation by using established paths where possible; Clear felled alien vegetation from the watercourse and riparian zone. Larger tree stumps can be left to minimise erosion of the cleared area; Where necessary revegetate cleared areas with suitable indigenous vegetation. Planted areas will require irrigation and care for a period of 1-2 years following planting. Planting of the new vegetation at the start of the wet season can assist ensuring that the new vegetation is kept wet however one would need to then avoid planting new vegetation within the areas that will be inundated in winter or subjected to flood flows; and Ongoing monitoring and clearing of regrowth of alien plants must be undertaken on an annual basis. Regular monitoring and control of alien vegetation should be undertaken to ensure that the plants are removed while still young saplings that can more easily be removed (usually pulling of seedlings by hand is possible when the soil is wet). This also prevents the spread of the alien plants once seeds have been produced; 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Low negative	
Duration	Short term	Impact will last between 1 and 5 years	Long Term	Impact will last between 16 and 30 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Medium	Natural and/or social functions and/or processes are notably altered	High	Natural and/ or social functions and/ or processes are significantly altered
Probability	Probable	Has occurred here or elsewhere and could therefore occur	Highly Probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact

Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	-36: Minor		+60: Minor	
Cumulative impacts	The impact would result in insignificant cumulative effects			

6. SPECIALIST RECOMMENDATIONS/MANAGEMENT ACTIONS

6.1. Freshwater Assessment

The historic establishment of the PBCC together with regulation of streamflows caused by the Roodefontein Dam have resulted in a significant modification of the lower reaches of the Piesangs River and former wetland areas. The PES of the Piesangs River is D and the wetland is E (Largely and Seriously modified, respectively).

Planned maintenance activities will take place in the Piesangs River as well as in artificial water features (small ponds and dams) and drainage channels associated with the former extent of the wetland seep system. The activities are likely to occur annually and are primarily aimed at improving drainage through the golf course by maintaining infrastructure (culverts) and clearing natural and artificial watercourses of sediment and nuisance aquatic plants (including encroaching *T. capensis* and the alien invasive *S. molesta*). Assuming implementation of mitigation measures, impacts to the watercourses are considered as negligible. In addition, the DWS Risk Assessment matrix determined that the risk of maintenance activities to the watercourses is Low, and therefore qualifies for a General Authorisation.

Based on this assessment it is recommended that the MMP for the PBCC be approved.

7. LEGISLATIVE REQUIREMENTS

7.1. National Environmental Management Act (NEMA, 1998)

A Management and Maintenance Plan (MMP) is a document that describes maintenance activities that need to take place within a watercourse. The MMP specifically relates to Activities 19 and 27, as listed in the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA) Environmental Impact Assessment (EIA) Regulations Listing Notice 1 of 2014 (GN R. 327), as amended. In line with the MMP, infilling or removal of more than 10 m³ material within a watercourse, and/or the clearance of 1 ha or more of indigenous vegetation, are allowed only if the works are undertaken for maintenance purposes AND form part of the EMMP when approved by the Department of Environmental Affairs and Development Planning (DEA&DP).

EIA Regulations Listing Notice 1 of 2014 (as amended)

- **Activity 19, Listing Notice 1:** The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving-
 - (a) will occur behind a development setback;
 - (b) is for maintenance purposes undertaken in accordance with a maintenance management plan;

(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (N.B. Points (d) and (e) does not apply as these activities fall within the coastal zone)

- **Activity 27, Listing Notice 1:** The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-
 - i. The undertaking of a linear activity; or
 - ii. Maintenance purposes undertaken in accordance with an MMP.

EIA Regulations Listing Notice 3 of 2014 (as amended)

- **Activity 12, Listing Notice 3:** The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with an MMP.

i. Western Cape

- i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;
- ii. Within critical biodiversity areas identified in bioregional plans;
- iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or
- v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.

7.2. National Water Act (NWA, 1998)

The Department of Water & Sanitation (DWS) is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (NWA) (Act No. 36 of 1998) aims to protect water resources, through:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way;
- The prevention of the degradation of the water resource; and
- The rehabilitation of the water resource.

A watercourse means:

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

No activity may take place within a watercourse unless it is authorised by the Department of Water and Sanitation (DWS). According to Section 21 (c) and (i) of the National Water Act, a Water Use License (WUL) is required for any activities that impede or divert the flow of water in a watercourse or alter the bed, banks, course or characteristics of a watercourse. The regulated area of a watercourse for section 21(c) or (i) of the Act water uses means:

- a. The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- b. In the absence of a determined 1 in 100-year flood line or riparian area the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); or
- c. A 500 m radius from the delineated boundary (extent) of any wetland or pan.

Maintenance and management activities on the golf course will require work to be undertaken within rivers and wetlands and therefore fall within the regulated area of a watercourse. Any water use activities that do occur within the regulated area of a watercourse must therefore be assessed using the DWS Risk Assessment Matrix (GN 509) to determine whether activities may be generally authorised (Low Risk according to the Risk Assessment Matrix) or require a WUL (Medium or High Risk according to the Risk Assessment Matrix).

7.3. National Environmental Management: Biodiversity Act no. 10 of 2004 (NEMBA)

NEMBA states that the biodiversity of South Africa must be managed, conserved, and sustained. Chapter 5 of the Act refers to "Species and organisms posing potential threats to biodiversity".

The purpose of Chapter 5 is to:

- a. to prevent the unauthorized introduction and spread of alien species and invasive species to ecosystems and habitats where they do not naturally occur.
- b. to manage and control alien species and invasive species to prevent or minimize harm to the environment and to biodiversity in particular.
- c. to eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats.

Section 75 refers to the control and eradication of listed invasive species:

- a) Control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs.
- b) Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.
- c) The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material, and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating, or re-establishing itself in any manner.

7.4. Conservation of Agricultural Resources Act 43 of 1983 (CARA)

CARA legalizes landowners to be responsible for the control of IAPs that occur on their property. It was promulgated before the NEMBA Acts, but should be used in conjunction with those Acts, especially on agricultural lands (as it was first intended to be used in the agricultural setting). Categories under CARA include:

Category 1: Declared weeds

These plants are prohibited and must be controlled.

Category 2: Declared invader plants with commercial value

These plants are allowed in demarcated areas, with a permit, and with plans in place to keep them within the demarcated area.

Category 3: Ornamental plants

Existing plants may be retained but may not be planted further and trade thereof is prohibited. Those occurring in watercourses must be removed.

7.5. Signing of the MMP

The acknowledgement form at the back of the approved MMP is to be signed by the holder of the Environmental Authorisation (the Proponent), the Site Manager and the ECO; acknowledging that all parties are familiar with the requirements of the MMP. All employees, especially the machine and equipment operators, are to be made aware of the conditions as contained in the MMP as well as the contractual conditions relating to the environment as contained in the contract document.

7.6. Project Responsibilities

Responsibility for the implementation of the MMP lies with the Proponent who must retain the services of a suitably experienced Environmental Control Officer (ECO) who will monitor the construction processes and activities periodically.

The project proponent will be responsible for the following:

- Adhering to the approved MMP.
- Ensure that all employed Contractors and Engineers are aware of and understand the conditions of the MMP.
- Has the right to remove any person or appointed contractors or personnel from site if the contravene with the MMP.
- Ensure that all contracts with contractors/engineers include the authorised MMP.
- Appoint an Environmental Control Officer.
- The project proponent (holder of the Environmental Authorisation of the MMP) must notify the competent authority of the commencement of maintenance management activities 14 days prior to such commencement taking place.

The ECO's responsibilities must include, *inter alia*:

- Secure the protection and rehabilitation of the environment.
- Guide, advise and consult the relevant authority on environmental issues during construction.
- Guide, advise and consult any sub-contractors, suppliers etc. who will be involved in this project.
- Revise the MMP as required and inform the relevant parties of the changes.
- Ensure that the MMP has been accepted and understood as a contractually binding document on all parties involved with this project.
- Ensure staff operating equipment are adequately trained, certified and sensitised to any potential hazards associated with their tasks.
- Educate staff as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources, ensure that they (the staff) have received the necessary safety training, and are aware of the importance of a "clean-site policy".
- The management guidelines contained in this document must form part of the contractual agreements between the Proponent, Site Manager and the ECO.

The Engineers and Contractors are responsible for the construction of the residential estate. The responsibilities indicated here are also relevant to Sub-Contractors. The responsibilities of the Engineers and Contractors include but are not limited to the following:

- Adhere with the conditions and recommendations of the MMP or any other legally binding documentation.
- Prevent actions that may cause harm to the environment.
- Be responsible for any remedial activities in response to an environmental incident within their scope of influence.
- Ensure compliance of all site personnel and / or visitors to the MMP and any other authorisations.

8. REPORTING PROCEDURES

8.1. Documentation

The following documentation must be kept on site in order to record compliance with the MMP:

An Environmental File which includes:

- Copy of the MMP;
- Copy of the Approval;
- Copy of all other licences/permits;
- Environmental Method Statements;
- Non-conformance Reports;
- Environmental register, which shall include:
 - Communications Register – including records of complaints, minutes and attendance registers of all environmental meetings;
 - Monitoring Results – including environmental monitoring reports, register of audits, non-conformance reports; and
 - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record.
- Waste Documentation such as, but not necessarily limited to: Waste Manifest Documents;
- Material Safety Data Sheets (MSDSs) for any hazardous substances; and
- Written Corrective Action Instructions.

8.2. Environmental Register

The Proponent will put in place an Environmental Register and will ensure that the following information is recorded for all complaints / incidents:

- Nature of complaint / incident.
- Causes of complaint / incident.
- Party/parties responsible for causing complaint / incident.
- Immediate actions undertaken to stop / reduce / contain the causes of the complaint / incident.
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint / incident.
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions.
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented.

- Copies of all correspondence received regarding complaints/incidents.

8.3. Non-Conformance Report

A Non-Conformance Report (NCR) will be issued to the Proponent as a final step towards rectifying a failure in complying with a requirement of the MMP. This will be issued by the ECO to the Proponent in writing. Preceding the issuing of a NCR, the Proponent must be given an opportunity to rectify the issue.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR. The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects;
- Nature of the risk;
- Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and should take the hierarchy of controls into account;
- Agreed timeframe by which the actions documented in the NCR must be carried out; and
- ECO should verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and Proponent should sign the Close-Out portion of the Non-Conformance Form and file it with the contract documentation.

8.4. Emergency Response

The Proponents environmental emergency procedures must ensure appropriate responses to unexpected / accidental actions / incidents that could cause environmental impacts.

The Environmental Emergency Response Plan is separate to the Health and Safety Plan as it is aimed at responding specifically to environmental incidents and must ensure and include the following:

- Employees shall be adequately trained in terms of incidents and emergency situations;
- Details of the organisation (i.e. manpower) and responsibilities, accountability and liability of personnel;
- A list of key personnel and contact numbers;
- Details of emergency services (e.g. the fire department / on-site fire detail, spill clean-up services) shall be listed;
- Internal and external communication plans, including prescribed reporting procedures;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures to be implemented; and
- Information on any hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

9. COMPLIANCE WITH THE MMP

9.1 Monitoring and Compliance

The monitoring and compliance of the development should take place as follows:

- An Environmental Control Officer (ECO) must be appointed to undertake auditing of maintenance activities.
- The ECO has the authority to instruct the Proponent to cease a particular operation causing or liable to cause significant environmental damage, and issue fines or penalties for non-compliance of the Maintenance Management Programme/ MMP.
- An ECO must audit the site and compile an audit report on a monthly basis during maintenance activities. This is particularly important for maintenance activities in the waterways and riparian areas. The Proponent must inform the ECO of when maintenance activities will be undertaken prior to commencement thereof.
- The holder of the environmental authorisation (the Proponent) is responsible to ensure that an environmental audit report is submitted to the Department of Environmental Affairs and Development Planning (DEA&DP) as per the timeframes stipulated in the Environmental Authorisation (EA).

9.2 Auditing Process

The terms of reference for the audits must comprise the following:

- Develop a checklist against which the criteria can be referenced during the audit.
- During the audit process, key individuals involved with the management of the project are to be given the opportunity to comment on issues being audited and will be invited to accompany the auditor during the site inspection.
- Compile an audit report on the implementation of the MMP and compliance to the Environmental Authorisation and submit this report to the competent authority (DEA&DP).

Compliance ratings against which the listed criteria are assessed are as follows:

Symbol	Rating	Interpretation
Y	Yes	Evidence of compliance
P	Partial	Evidence of partial compliance
N	No	Evidence of non-compliance
NR	Not Relevant	The condition or commitment is not relevant at this stage of the development or it is inappropriate
NA	Not Audited	Not audited

9.3 Non-Compliance

Definition

The non-compliance is defined as, and will be issued for:

- Any deviation by the Proponent from the environmental conditions and requirements as set out in MMP, or;
- Any contravention by the Proponent of environmental legislation, or;

- Any unforeseen environmental impact resulting from direct or indirect actions or activities on site that would be considered as a significant impact. Significance will be determined by the Environmental Control Officer (ECO) but will be informed by geographic extent, duration, lasting effects of the impact and extent of remediation to the impact.

Types of non-compliances issued

Two types of non-compliances may be issued:

A. Stop Works Non-Compliance

Stop Works Non-Compliance will require that all works as described in the non-compliance will stop immediately and may only continue on a formal written permission from the ECO.

Stop Works Non-Compliance will be issued under the following conditions:

- Total disregard by the Proponent to the environmental conditions and requirements listed in the MMP;
- An activity that if left unattended will escalate the degree, severity or extent of the environmental impact.

B. General Non-Compliance

A general non-compliance will allow work and activity by the receiving party to continue while the corrective action takes place.

9.4 Issuing a Non-Compliance

Non-compliance may be issued to:

- The Proponent
- Any representative of the Proponent

9.5 Process of Issuing Non-Compliance

The appointed Environmental Control Officer (ECO) may issue a formal non-compliance to the Proponent. A copy of the non-compliance issued will be placed in the MMP file. The Proponent will be responsible for returning a formally signed off corrective action (as per template) to the ECO to be placed in the MMP file. The ECO will be required to sign-off on the corrective action, indicating that it has been completed within the timeframes and to the satisfaction of the ECO.

9.6 Failure to complete corrective actions

In the event that the Proponent fails or refuses to complete the corrective action, either at all or within the allocated timeframe, the ECO shall,

- Inform DEA&DP in writing that a condition of approval for the project is not being met.

The DEA&DP office is responsible for resolving the impasse with the Proponent.

The Proponent is deemed not to have complied with the MMP if:

- Within the boundaries of the site and site extensions there is evidence of contravention of clauses;
- Environmental damage occurs due to negligence; inappropriate actions taken by the Proponent or any of his staff.

On receiving a notice of non-compliance the Proponent is required to swiftly address the issue/s taking all corrective actions required to rectify the situation. Penalties will be applied for non-compliant situations. Penalties/fines are advocated to ensure corrective measures are successfully undertaken and the necessary standard of rehabilitation is achieved.

The penalty associated with a chemical spill is not a set amount but will depend on the nature and extent of the spill; the cost of any soil and /or groundwater monitoring and any soil and /or groundwater remediation required by authorities will be to the Proponent's account.

The imposition of such a penalties / fines shall not preclude the relevant competent authority from applying an additional penalty in accordance with statutory powers.

Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression as deemed fit.

9.7 Unlawful Activity/ies

NEMA and its Regulations entitle environmental authorities to administer a fine not exceeding R 5 million or 10 years imprisonment and/or a fine and imprisonment for a person guilty of an unlawful activity. The Act makes allowance for the rectification of unlawful activity and may charge up to R1 million administration fees over and above the remediation costs.

NEMA makes provision for damages to be awarded by the courts where loss or damage has occurred as a result of a contravention of other environmental statutes. Importantly, NEMA provides for the liability of conviction of employees, managers, agents and directors for any offences resulting from the failure to take all the reasonable steps that were necessary under the circumstances to prevent the commission of an offence.

10. AMENDMENTS TO THE MMP

This MMP outlines the environmental practices and mitigation measures to be adhered to during the construction, operational phases, and rehabilitation in order to curtail and/or minimise potential negative impacts and promote sound environmental practises.

Any major issues not covered in the MMP as submitted, will be addressed as an addendum to this MMP, and submitted for approval. The MMP is a living document and is subject to change from time to time in consultation with the DEA&DP. Any amendments to the MMP will require approval from the DEA&DP.

11. ENFORCING THE MMP

The holder of the Environmental Authorisation (EA) has a responsibility to ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes casual labour, etc.). The MMP shall be part of the terms of reference for all stakeholders.

All senior and supervisory staff members shall familiarise themselves with the full contents of the MMP. They shall know and understand the specifications of the MMP and shall be able to assist other staff members in matters relating to the MMP.

TABLE OF RESPONSIBLE PARTIES BELOW:

Responsibility	Name of Responsible Party
Proponent	Plettenberg Bay Country Club
Environmental Control Officer/ ECO	(To be appointed)
Site Manager	(To be appointed)

12. ENVIRONMENTAL MANAGEMENT PROGRAMME

12.1 PRE-MAINTENANCE PHASE

Activity	Management / Mitigation	Responsibility	Frequency / Timing
Authorisations, Licences and Permits	Environmental Authorisations		
	All necessary authorisations, permits and licences must be obtained by the Proponent prior to commencement. This includes permits for the removal of protected plants, if required.	Proponent	Once-off
Appointment of Environmental Control Officer	Appointment of Environmental Control Officer		
	An Independent ECO must be appointed at the Proponent's cost to monitor the implementation of the MMP.	Proponent & ECO	Once-off
	Fourteen (14) days written notice must be given to the Department that the activity will commence. The notice must include a date on which it is anticipated that the activity will commence.		
	The nomination of the ECO must be given to DEA&DP, in writing fourteen (14) days prior to construction commencement. The notification must include contact details for the ECO and details pertaining to the ECO's relevant experience.		
Should the ECO for the development change at any time, this must be communicated, in writing, to DEA&DP, within fourteen (14) days of appointing the new ECO. The notification must include contact details for the ECO, details pertaining to the ECO's relevant experience and reasons for the change in ECO.	As required		
Preparation of Method Statements	Method Statements		
	Method Statements must be submitted by the Proponent/ Contractor to the ECO and must be adhered to by the Proponent/ Contractor. These relate to excavation methodologies, water and stormwater management, solid waste management requirements, the storage of hazardous materials (if applicable), and standard emergency procedures.	Proponent/ Contractor	Prior to commencement of construction and during construction (if necessary)
	The ECO will monitor the implementation of the statements.	ECO	On-going
Education of Site Staff on General and Environmental Conduct	Environmental Awareness and Training		
	Maintenance staff must be adequately educated by the ECO as to the provisions included in the MMP, and in terms of general environmentally-friendly practice.	ECO	Once-off and as required

Activity	Management / Mitigation	Responsibility	Frequency / Timing
<p>A general regard for the social and ecological wellbeing of the site and adjacent areas is expected of the site staff.</p>	<p>The ECO must ensure that all staff, and if applicable, Contractors / Sub-contractors / Suppliers / Service Providers are trained on the environmental, occupational safety and/or legal responsibilities expected from them.</p> <p>The training must take into account language and literacy requirements as well as measures to determine the effectiveness of the training. Proof of training must be attached to the ECO's audit reports.</p>		
	<p>Consideration of the implications of the MMP must form part of the formal site induction for all contractors, sub-contractors and casual labourers, preferably in their native language.</p> <p>The induction training will, as a minimum, include the following:</p> <ul style="list-style-type: none"> ➤ The importance of conformance with all environmental policies; ➤ The environmental impacts, actual or potential, of their work activities; ➤ The environmental benefits of improved personal performance; ➤ Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Consultant's environmental management systems, including emergency preparedness and response requirements; and ➤ The mitigation measures required to be implemented when carrying out their work activities. 		
	<p>All contractors, sub-contractors and casual labourers must acknowledge their understanding of the MMP and environmental responsibilities by signing an induction attendance record.</p>		
	<p>Staff, operating equipment, shall be adequately trained and sensitised to any potential hazards associated with their tasks.</p>	Proponent	During staff induction, followed by on-going monitoring
	<p>Translators are to be used where necessary during staff training.</p>	ECO	
	<p>The ECO must be on hand to explain more difficult / technical issues and to answer questions which may be raised.</p>	ECO	
	<p>Staff must be made aware that they are not to make excessive noise e.g. shouting, hooting.</p>	ECO & Proponent	
	<p>All employees must undergo the necessary safety training and wear the necessary protective clothing at all times.</p>		
<p>No alcohol / drugs to be present on site; no vehicles or machinery are to be operated whilst under the influence of alcohol or drugs.</p>			

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	<p>No firearms allowed on site or in vehicles transporting staff to / from the site (unless used by security personnel).</p> <p>No unsocial behaviour will be permitted.</p> <p>Bringing pets onto site is forbidden.</p> <p>Staff must make use of facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility is strictly forbidden).</p> <p>No fires to be permitted on site.</p> <p>Trespassing on private / commercial properties adjoining the site is forbidden.</p> <p>No worker may be forced to do work that is potentially dangerous or for what he / she is not so trained</p> <p>The staff conduct rules are described in a separate table of rules in the MMP. This is aimed at providing staff with the basic information regarding worker conduct on site.</p>		
Social Impacts	Communication Between Site Manager, Site Staff and I&APs		
	Should the staff be approached by members of the public or other stakeholders, they must assist them in locating the Site Manager, or provide a number on which they may contact the Proponent/ Site Manager.	Site Manager	On-going
	The conduct of the staff when dealing with the public or stakeholders shall be in a manner that is polite and courteous at all times.		
	Drivers of heavy-duty vehicles must exercise care when travelling to and from the site – and adhere to all legally enforceable requirements.		

12.2. MAINTENANCE PHASE

Activity	Management / Mitigation	Responsibility	Frequency / Timing
Excavation of sediment	Routine desilting and replacement of culverts	Site Manager / Contractor	May to July
	Material may only be removed from aquatic habitats after summer and during the dry season (i.e. May to July) except for when emergency maintenance works need to be undertaken.		
	The disturbed area around infrastructure (e.g. culverts that need to be cleared) should be kept to a minimum. Where possible existing access points to the site should be used and any indigenous vegetation that is established adjacent to the works should preferably remain intact.		
	If required, temporary sediment trapping should be put in place to filter water draining the area that will most likely contain high sediment loads.		
	Manual labour should be used where possible within the aquatic habitats. Where the use of mechanical removal is unavoidable, the extent of operation of the machinery within aquatic habitats must be minimized.		
	Desilting, must, where applicable coincide with the programme for clearing instream vegetation so as to minimise the frequency of disturbance in watercourses.		
	Responsible management of pollutants must be practiced by ensuring that they are handled and stored at safe distance away from the watercourse. When machinery is involved, ensure effective operation with no leaking parts and refuel outside of the riparian area, at a safe distance from the watercourse to manage any accidental spillages.		
	Excavated material that cannot be used for maintenance purposes or landscaping must be removed out of the riparian area to a suitable stockpile location or disposal site.		
	Disturbed areas should be kept clear of alien vegetation and must be actively reshaped and rehabilitated with indigenous, local vegetation.		
Remnant wetland areas are strictly excluded and must be regarded as "no-go" areas.			
Clearing of Vegetation	Encroachment of Indigenous Plants - Bulrush (<i>Typha capensis</i>) and common reeds (<i>Phragmites australis</i>)	Site Manager / Contractor	Yearly (May to July)
	Removal of instream indigenous vegetation should be limited to nuisance growth of reeds and bulrushes that impede flow through channels and drains (as indicated in the Figure 6) and should not extend to vegetation along the banks (which must be retained to limit soil erosion).		

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	<p>Clearing should be conducted at the end of summer during the dry season (May to July) to minimise sedimentation and should not be conducted more than once a year.</p> <p>Brush-cutting must avoid damage to the banks or other indigenous vegetation such as sedges and rushes.</p> <p>For brush cutting, the reeds should be cut below the lowest leaf and the remaining stump should not be longer than 15cm. If a brush cutter is used, mowing should be no lower than 12cm from the ground to minimise impacts to small animals and indigenous plants.</p> <p>Remaining indigenous vegetation should not be cleared. The disturbance of the watercourses and wetland areas when undertaking clearing activities should also be limited as far as possible, using existing access points.</p> <p>If surrounding plants and soil are disturbed by the clearing of vegetation, follow-up revegetation should be undertaken, using indigenous species.</p> <p>In artificial water features, 10 to 20 % of vegetation must be retained to provide habitat and refuge for aquatic biota</p>		
Alien Invasive Plants	<p>Alien plant eradication in riparian and instream habitat</p> <p>To be undertaken in accordance with the approved Alien Invasive Species Monitoring, Control and Eradication Plan.</p> <p>All invasive alien plants should be completely cleared from the property, and where a tree or bush cover is desired, replaced with suitable indigenous species.</p> <p>Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.</p> <p>The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.</p> <p>Identify alien plants to be removed. If unsure, contact the Department of Agriculture or Cape Nature for assistance.</p> <p>Clear alien vegetation according to the described alien vegetation removal methods for each invasive species as provided in the detailed method statements or with the methods and herbicides/biological control recommended on the Working for Water website: http://www.dwaf.gov.za/wfw/.</p>	Site Manager	Immediate and On-going

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	Avoid trampling or clearing indigenous vegetation by using established paths where possible.		
	Clear felled alien vegetation from the watercourse and riparian zone. Larger tree stumps can be left to minimise erosion of the cleared area.		
	Where necessary revegetate cleared areas with suitable indigenous vegetation. Planted areas will require irrigation and care for a period of 1-2 years following planting. Planting of the new vegetation at the start of the wet season can assist ensuring that the new vegetation is kept wet however one would need to then avoid planting new vegetation within the areas that will be inundated in winter or subjected to flood flows.		
	Ongoing monitoring and clearing of regrowth of alien plants must be undertaken on an annual basis. Regular monitoring and control of alien vegetation should be undertaken to ensure that the plants are removed while still young saplings that can more easily be removed (usually pulling of seedlings by hand is possible when the soil is wet). This also prevents the spread of the alien plants once seeds have been produced.		
Conservation of the Natural Environment	Erosion and Stormwater Control		
	Soil disturbance during the removal of alien invasive plants must be minimised as much as possible.	Site Manager	On-going
	Erosion prevention and control measures must be implemented. This may be by the use of mulch bags or silt fences.		
	Provision shall be made for storm water management measures that will ensure effective run-off control and prevent erosion at run-off points.		
	Continuous monitoring for evidence of erosion must be undertaken around the site.		
	Storm water control must be undertaken to prevent soil loss and erosion impacts from the site.		Immediately
	Fauna and Flora		
	Areas which are identified by the Environmental Control Officer (ECO) as being ecologically sensitive on or adjacent to the site are to be suitably demarcated to prevent damage by maintenance practices. These areas are to be recognised as “no-go” areas. In particular the remnant wetland areas must be regarded as “no-go” areas.	ECO & Site Manager	Immediately
No natural vegetation may be cleared without prior permission from the ECO and if applicable from any relevant authority.			
Disturbance to birds, animals and reptiles and their habitats must be minimized wherever possible.			

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	Alien invasive plant species must be continuously removed around the site according to the Alien Invasive Plant Control Plan.	Site Manager	On-going
Waste Management	On-Site Waste Management		
	The excavation and use of rubbish pits is forbidden.	Site Manager	On-going
	Burning of waste is forbidden. <i>A possible exception to this may be that the alien invasive vegetation which is removed from the site should be burned to prevent the spread of the plants. The transportation of Alien Invasive Plants is strictly forbidden in terms of the Conservation of Agricultural Resources Act (CARA), especially if in seed; unless stored in a completely sealed container.</i>		
Littering on the site is forbidden and the site shall be cleared of litter on a regular basis.			
Handling of Hazardous Materials (if necessary)	Hazardous Materials		
	Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes.	Site Manager	On-going
	All empty contaminated containers must be stored within a hazardous bunded area until collection by a reputable hazardous waste collection company. Waybills must be presented to the ECO for review and filing purposes.		
No vehicles transporting hazardous materials to the site may be washed on or near site. They must return to the supplier of such material to be cleaned out.			
Cultural Environment	Archaeology and Artefacts		
	No structures older than sixty years or parts thereof are allowed to be demolished altered or extended without a permit from Heritage Western Cape. If any archaeological sites/materials are exposed, mitigation regarding the finds must be conducted with the Heritage Western Cape regarding the destiny of the material. Examples of heritage resources are as follow: <ul style="list-style-type: none"> • Human remains • Coins/Gold/Silver • Fossils • Fossils shell middens/ marine shell heaps • Pottery/ceramics 	Site Manager	Immediate and On-going

Activity	Management / Mitigation	Responsibility	Frequency / Timing
	<p>If Heritage Western Cape agrees to the removal of the material, an archaeologist must apply for a permit to scientifically excavate/collect the material.</p> <p>All costs must be financed by the Proponent. This may include: All monitoring and mitigation expenses regarding the excavations/collecting of material, travel, accommodation and subsistence, analysis of the material, radiocarbon date(s) of the site(s) and a one-off curation/storage fee payable to the Western Cape Repository for Archaeological material.</p>		
Safety and Security	Safety and Security On-Site		
	Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents.	Site Manager	On-going
	No unauthorised person may be permitted to enter the site without prior permission of the site manager.		
	Fire Management		
	Firefighting equipment should be present on site at all times as per Occupational Health and Safety Act.	Site Manager	On-going
	All project staff must be trained in fire hazard control and firefighting techniques and know the proper procedure in case of a fire occurring on site.		
All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances.			
No open fires will be allowed on site.			
Smoking must not be permitted in areas considered to be a fire hazard.			

14. STAFF CONDUCT CONTROL AND INFORMATION SHEET

ALL STAFF MUST OBEY THE FOLLOWING RULES:	
1	DO NOT tamper with or destroy nesting sites, lairs or any other form of animal shelter.
2	DO NOT feed the native animals.
3	DO NOT leave the project site untidy and strewn with rubbish that will attract pests.
4	DO NOT bring any pets onto the project site.
5	DO NOT trespass onto private properties not linked to the project.
6	DO NOT carry a weapon onto the project site or in the vehicles transporting workers to and from the site.
7	DO NOT set fires.
8	DO NOT cause any unnecessary disturbing noise at the project site or at any designated worker collection/drop off points.
9	DO NOT drive a vehicle under the influence of alcohol.
10	DO NOT exceed the national speed limits on public roads or exceed the recommended speed limits in this management plan (where applicable)
11	DO NOT drive a vehicle that is generating excessive noise (noisy vehicles must be reported and repaired as soon as possible).
12	DO NOT litter along the roadsides, including both public and private roads.
13	DO NOT remove or destroy vegetation around the site without the prior consent of the site manager and Environmental Control Officer.
14	DO NOT tamper with, destroy or remove vegetation from any areas that have been fenced off or marked.
15	DO NOT pollute watercourses, whether flowing or not.
16	DO NOT drive through watercourses.
17	DO NOT operate critical items of mechanical equipment without having been trained and certified.
18	ALL employees must undergo the necessary safety training and wear the necessary protective clothing at all times.
19	NO unsocial behaviour will be permitted e.g., excessive shouting, hooting etc.
20	NO ad-hoc activities are to be undertaken e.g. fires for cooking, the use of surrounding bush as a toilet facility is strictly forbidden
21	NO trespassing on private / commercial properties adjoining the site is forbidden.
22	NO worker may be forced to do work that is potentially dangerous or for what he / she is not trained to do.

15. RESPONSIBILITIES

The “Responsibility” column is merely a guide and does not relieve the Proponent of his responsibilities in terms of overall compliance with the MMP.

FUNCTION	RESPONSIBILITY
Proponent	<ul style="list-style-type: none"> The Proponent is ultimately responsible for the ensuring compliance with all the requirements associated with the construction, operation, rehabilitation and decommissioning phases of the project.
Site Manager	<ul style="list-style-type: none"> The Site Manager is responsible to ensure that all necessary communication and submission of required documentation concerning this project is submitted to the relevant authorities. The site manager is required to adhere to the MMP and is responsible to ensure that all staff appointed also adhere the MMP. Ensures that all staff are made aware of the need to conduct activities in an environmentally responsible manner. (Site Manager) On instruction by the ECO, ensures that storm/surface water controls are established. Ensures prompt remediation of any sewage spills. Stockpiles are protected from aeolian effects, stormwater effects, or being driven over by workers. Ensures that a “clean-site” policy is applicable at all times. Ensures that all complaints by residents are dealt with promptly. Is responsible for any contravention/s by staff or any non-compliance with the MMP.
Environmental Control Officer (ECO)	<ul style="list-style-type: none"> The ECO is to have access to the site at all times, for the purpose of inspections to ensure that the environmental conditions of the MMP as well as the conditions stipulated to in the Approval are being implemented and adhered to. The ECO must report on the environmental aspects of the project to the responsible person/authority at agreed intervals. The need for any deviations or variations in the environmental conditions must be reported to the DEA&DP for approval prior to these being undertaken. The ECO must be fully cognisant with the contents of the MMP and any other applicable legislation
Competent Authority	<ul style="list-style-type: none"> The Compliance Officer appointed by the Competent Authority is responsible for the ensuring that the Proponent, Site Manager and ECO are compliant with the provisions of the MMP.

ACKNOWLEDGEMENT FORM

Record of signatures providing acknowledgment of being aware of and committed to complying with the contents of this Environmental Management Programme (MMP), which relates to the environmental mitigation measures for the project outlined below, and the environmental conditions contained in all other contract documents.

PROJECT NAME:

Maintenance Management Plan for the Routine Maintenance of the Waterways on the Plettenberg Bay Country Club Golf Course, Plettenberg Bay, Western Cape.

DEA&DP REF:

PROPONENT:

Signed: Date:

SITE MANAGER:

Signed: Date:

ENVIRONMENTAL CONTROL OFFICER

Signed: Date: