

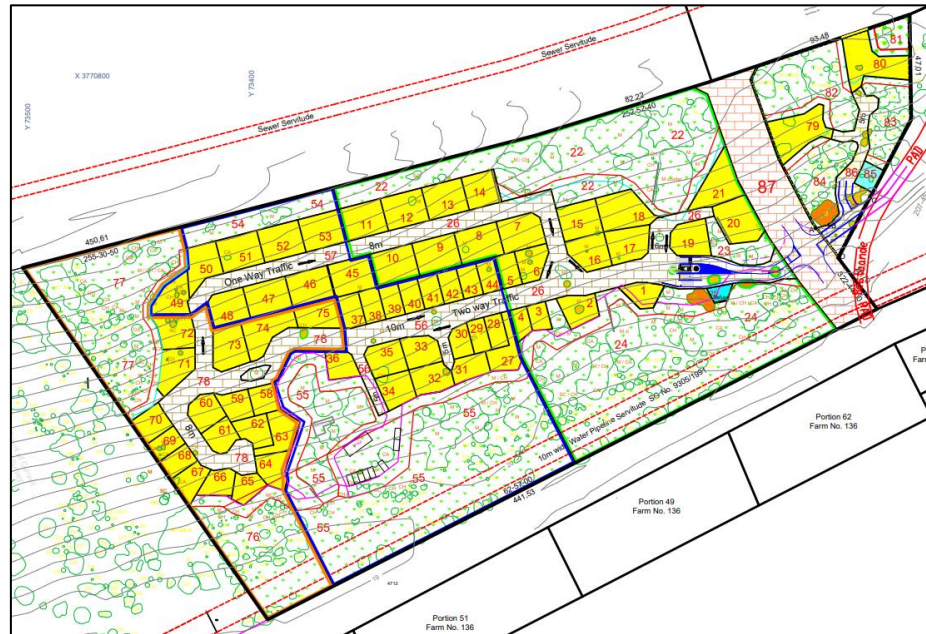


DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

for
RESIDENTIAL DEVELOPMENT

on
Remainder of Erf 2841 and Erf 5574, Tergniet, Mossel Bay Municipality

In terms of the
National Environmental Management Act (Act No. 107 of 1998, as amended) & 2014 Environmental Impact Regulations (as amended)



Prepared for Applicant: Seebou Wonings (Pty) Ltd

Date: 6 September 2024

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Assisting Candidate EAP: Mr **Francois Byleveld** (MSc Geology [University of the Free State]) (Candidate EAPASA Registration Number: **2023/6770**) in assistance to the appointed EAP.

PURPOSE OF THIS REPORT:**Draft Environmental Management Programme****APPLICANT:****Seebou Wonings (Pty) Ltd****CAPE EAPRAC REFERENCE NO:****MOS766/07****SUBMISSION DATE****06 September 2024**

DRAFT ENVIRONMENTAL MANAGEMENT & MAINTENANCE PROGRAMME

for

RESIDENTIAL DEVELOPMENT

on

Remainder of Erf 2841, Tergniet, Mossel Bay Municipality

In terms of the

National Environmental Management Act (Act No. 107 of 1998, as amended) & 2014
Environmental Impact Regulations (as amended)

Submitted for:

Stakeholder Review & Comment

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ORDER OF REPORT

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ENVIRONMENTAL MANAGEMENT & MAINTENANCE PROGRAMME REQUIREMENTS

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

Table 1: Checklist in terms of Appendix 4 of Regulation 982 of 2014 EIA Regulations

Requirement	Description
Details and expertise of the EAP who prepared the EMPr; including curriculum vitae.	Appointed EAP: Ms Louise-Mari van Zyl (Primary EAP 2019/1444) Assisting Candidate EAP: Mr Francois Byleveld (Candidate EAP 2023/6770) See Appendix 10.
A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	<u>Section 1</u>
A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that must be avoided, including buffers	Appendix 2
A description of the impact management objectives, including Management Outcomes, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all the phases of the development including – (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities.	<u>Section 4</u> – Environmental Impacts & Mitigations <u>Section 5</u> - Responsibilities <u>Section 6</u> – Pre-Construction Design <u>Section 7</u> – Construction Phase <u>Section 8</u> – Operation Phase
A description and identification of impact management outcomes required for the aspects contemplated above.	<u>Section 4</u>
A description of the proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated above will be achieved and must, where applicable include actions to – (i) Avoid, modify, remedy control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practises; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; and	<u>Section 4</u> <u>Section 6</u> <u>Section 7</u> <u>Section 8</u>

Requirement	Description
(iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	
The method of monitoring the implementation of the impact management actions contemplated above.	<u>Section 9</u> <u>Section 11</u>
The frequency of monitoring the implementation of the impact management actions contemplated above.	<u>Section 9</u>
An indication of the persons who will be responsible for the implementation of the impact management actions.	<u>Section 5</u>
The time periods within which the impact management actions must be implemented.	Not Applicable
The mechanism for monitoring compliance with the impact management actions.	<u>Section 9</u>
A program for reporting on compliance, taking into account the requirements as prescribed in the Regulations.	<u>Section 9</u>
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.	<u>Section 5</u> <u>Section 6</u> <u>Section 7</u> <u>Section 8</u> <u>Section 9</u>
Any specific information that may be required by the competent authority.	Not Applicable.

ABBREVIATIONS AND ACRONYMS

BSP	Biodiversity Sector Plan - to inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on biodiversity.
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983) - provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.
CBA	Critical Biodiversity Area - areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan.
DFFE	National Department of Forestry, Fisheries & the Environment – the national authority responsible for the sustainable environmental management and integrated planning.
DEA&DP	Department of Environmental Affairs and Development Planning – the provincial authority for sustainable environmental management and integrated development planning. The competent authority is this case.
DWS	Department of Water & Sanitation Affairs – National authority mandated to enforce the National Water Act (NWA).
EA	Environmental Authorisation – Authorisation obtained on completion of an Environmental Impact Assessment in terms of the National Environmental Management Act (NEMA).
ECA	Environment Conservation Act, 1989 - To provide for the effective protection and controlled utilization of the environment and for matters incidental thereto.
ECO	Ecological Control Officer – independent site agent appointed to observe and enforce the implementation of environmental policies and principles on a development site.
EIA	Environmental Impact Assessment - a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.
EMMPr	Environmental Management & Maintenance Programme – 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 positive benefits of the projects are enhanced.
GIS	Geographic Information System - system designed to capture, store, manipulate, analyse, manage, and present all types of geographical data.
GPS	Global Positioning System - a radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world.

NEMA	National Environmental Management Act (Act 107 of 1998, as amended) – national legislation that provides principles for decision-making on matters that affect the environment.
NEM:BA	National Environmental Management: Biodiversity Act (Act No.10 of 2004) – provides for the management and conservation of South African biodiversity within the framework of NEMA.
NFA	National Forestry Act (Act No.84 of 1998) - provides for the protection of forests, as well as specific tree species within South Africa.
NSBA	National Spatial Biodiversity Assessment – aims to assess the state of South Africa’s biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors.
NWA	National Water Act (Act No.36 of 1998) - ensures that South Africa's water resources are protected, used and managed.

1. INTRODUCTION

Cape Environmental Assessment Practitioners (Cape EAPrac) was appointed by the Applicant, **Seebou Wonings (Pty) Ltd**, to develop an Environmental Management Programme (EMPr) which will be used to promote and ensure environmental monitoring and control during all relevant phases (pre-construction, construction, operational as well as maintenance) associated with the proposed activity.

The Applicant proposes to develop a residential development consisting of 68 erven (General Residential I), with an average size of approximately 220m² / erf, on Remainder of Erf 2841 (~5.25ha), Tergniet (Figure 1).



Figure 1: Locality map of Erf 2841, Tergniet (FormaPlan, 2024).

Erf 2841 is currently zoned Agriculture Zone I, and should Environmental Authorisation be obtained, it is proposed to subdivide and rezone the property to the following:

- 68 x General Residential Zone I (~1.4937ha).
- 2 x Utility Zone (~0.0167ha).
- 11 x Open Space Zone II (~2.8163ha).
- 5 x Transport Zone III (~0.6712ha).
- 1 x Transport Zone I (~0.2525ha).

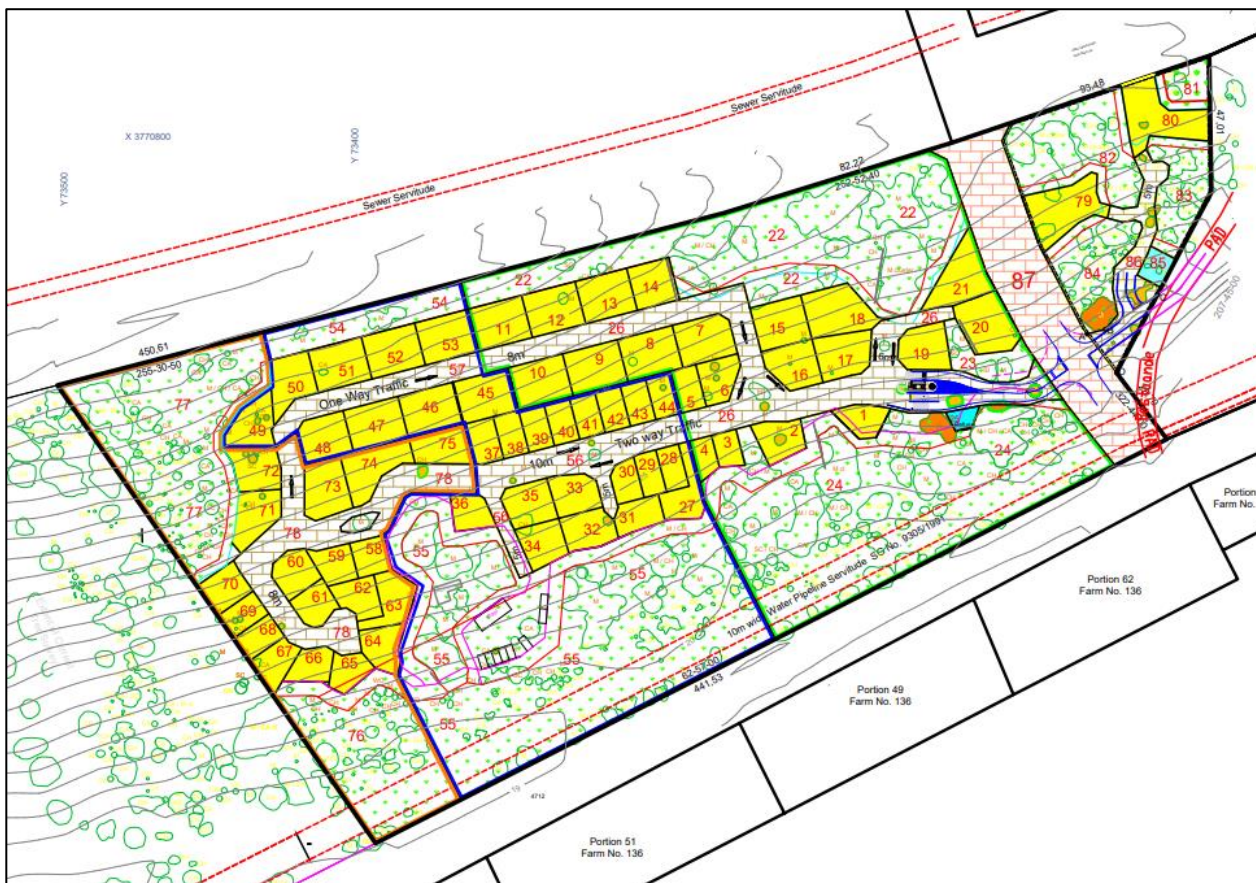


Figure 2: Site development plan of proposed development on Remainder of Erf 2841 (Formaplan, 2024).

Services:

Water: The proposed development is proposed to be supplied by the Mossel Bay Municipality water supply network (specifically the Great Brak River area). It is proposed to connect via a 160mm \varnothing water pipeline to the newly installed 200mm \varnothing water pipeline in the R102 road reserve. The internal water network will consist of 75mm – 110mm diameter uPVC pipelines with 25mm \varnothing metered erf connections.

Sewerage: Remainder of Erf 2841 does not contain any existing sewage infrastructure. The internal sewerage network will consist of 160mm \varnothing pipes with 110mm \varnothing diameter erf connections. The internal sewerage network will drain towards a new sewerage pump station (within an existing services servitude adjacent to the railway line) proposed on the southern boundary of Erf 5574 from which sewage will be pumped towards the regional pump station on Erf 2839 via a new gravity/pump line.

Access: Access to the proposed development will be directly off Souwesia Avenue. Souwesia Avenue connects to the R102 which is a Provincial Road linking Tergniet with Great Brak. Internal access roads will be 3 – 6.2m wide paved roads with edging on one side and a mountable curb on the other side. The proposed entrance gatehouse will allow for a 36m stacking distance from the position of the access boom to the Souwesia Avenue road reserve.

Stormwater: Remainder of Erf 2841 has a natural slope in a southern direction. Stormwater structures will be designed to act as energy dissipater and soak away systems simultaneously into the green belt area.

Solid Waste: All solid waste will be disposed at the local Municipal dump site. The removal of solid waste and management thereof will be done by Mossel Bay Municipality as per a Service Agreement between the Mossel Bay Municipality and the Developer.

Electricity: The Mossel Bay Municipality will provide a 400kVA mini substation to be funded by the

developer of RE/2841. The total estimated maximum demand for the entire development will amount to 216kVA (ADMD). The new mini substation will be placed within the proposed development and will be ring fed from an existing 4-way RMU located on the corner of R102 and Fynbos Avenue (Erf 2839).

This document provides part of a series of documents that is being circulated for public and stakeholder input as part of the Basic Assessment process, before being provided to the competent authority, the provincial Department of Environmental Affairs & Development Planning (DEA&DP) for decision making.

This EMPr contains **management requirements** and **recommendations** made by *Cape EAPrac*, the appointed specialist as well as in terms of the regulations contained in the **National Environmental Management Act** (NEMA, Act 107 of 1998) and environmental best practice principles.

This EMPr must be updated to include any conditions of the **Environmental Authorisation** (EA) as issued.

1.1 PURPOSE OF THE EMPR

The purpose of this EMPr is to ensure that the environmental impacts and management of the various phases, of the proposed activity, on the receiving environment are managed, mitigated and kept to a minimum (i.e., the **outcome** of implementing the EMPr). The EMPr must provide easily understood and clearly defined **actions** that must be implemented during each phase of the proposed activity. The EMPr is a dynamic document that is flexible and responsive to new and changing circumstances.

The document is binding on the Applicant (Seebou Wonings (Pty) Ltd), all contractors and sub-contractors to the site.

This EMPr must be included as part of any documents / agreements, as well as contractual documents between the Applicant and any contractors.

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

Any changes or deviations to this EMPr must be authorised by the competent authority in the event that any environmental outcomes are amended.

1.2 STATUS OF THE EMPR

It is of utmost importance that this EMPr be read in conjunction with any legally obtained authorisations such as an Environmental Authorisation (EA). This EMPr is viewed as a dynamic document that must be reviewed and updated on a continual basis.

The EMPr is valid for the duration of the project (both for construction as well as future maintenance) with each applicable phase corresponding to the identified requirements.

2 EMPR PHASING

2.1 PRE-CONSTRUCTION PHASE

The pre-construction phase refers to the design phase of the project. This will ensure that any requirements and best practise mechanisms are built into the planning / design phase to be developed in the construction and operational phase. In terms of this application, the pre-construction can be considered as the site selection and engineering designs and mitigations.

2.2 CONSTRUCTION PHASE

The construction phase refers to the actual construction of the development on the property and includes all earthworks and installation of bulk services (water, sewerage, roads, stormwater, electricity etc.). In terms of this application, this phase relates to the construction of the civil engineering services and infrastructure.

2.3 OPERATIONAL / MAINTENANCE PHASE

The Operation Phase of this project relates to the ongoing management and maintenance required to ensure sustainable development. In terms of this application, this refers to all activities that are undertaken once construction is completed and the site is handed over to the HOA of the residential development.

All future maintenance of the structure (i.e., after flooding, erosion etc) must be implemented in accordance with this EMPr (procedures for construction activities to be followed).

The Applicant must ensure that the Operational Phase maintains the underpinning principles 'Duty-of-Care-to-the-Environment' and ideals of sustainable development.

Maintenance of the structures, once installed, must be undertaken in accordance with this management & maintenance plan.

2.4 CLOSURE AND DECOMMISSIONING PHASE

Decommissioning refers to the process of removing the operating assets of any development after completion of the operating life cycle.

The decommissioning phase is not foreseen in the near future at the moment.

Should the need arise in future to remove the structure wholly, the Applicant must consult with the Competent Authority to ensure compliance with legislation applicable at the time.

3 LEGISLATIVE REQUIREMENTS

The project Applicant is required to comply with all necessary legislation and policies applicable to development and management of the development. These include but are not limited to:

3.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA, ACT 107 OF 1998)

The National Environmental Management Act (**NEMA**, Act 107 of 1998, as amended), makes provision for the identification and assessment of **activities** that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the provincial Department of Environmental Affairs & Development Planning (DEA&DP)) based on the findings of an Environmental Impact Assessment (EIA).

NEMA embraces the notion of sustainable development as contained in the Constitution of South Africa (Act 106 of 1996) in that everyone has the right:

- to an environment that is not harmful to their health or wellbeing; and
- to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.

NEMA aims to provide for cooperative environmental governance by establishing principles for decision-making on all matters relating to the environment and by means of Environmental

Implementation Plans (EIP) and Environmental Management Plans/Programmes (EMPr), of which this EMPr is one.

Principles contained in Section 2 of the NEMA, amongst other things, prescribe that environmental management must:

- In order of priority aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
- Avoid degradation of the environment and avoid jeopardising ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

It is incumbent upon the landowner, to ensure that the abovementioned principles, entrenched in this EMPr are upheld and complied with.

3.2 ENVIRONMENT CONSERVATION ACT, 1989 (ECA)

The EIA regulations contained in the Environmental Conservation Act (ECA) have been replaced by NEMA. However, property owners must comply with the draft regulations pertaining to noise as published in the province of Western Cape Provincial Extraordinary Gazette as provision made in section 25 of the ECA), as well as Section 24 of the ECA regarding waste management and Section 20 of the ECA dealing with waste management under Part IV, Control of Environmental Pollution.

3.3 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (NEM:BA) (ACT 10 OF 2004)

This Act controls the management and conservation of South African biodiversity within the framework of NEMA. Amongst others, it deals with the protection of species and ecosystems that warrant national protection, as well as the sustainable use of indigenous biological resources. Sections 52 & 53 of this Act specifically make provision for the protection of critically endangered, endangered, vulnerable and protected ecosystems that have undergone, or have a risk of undergoing, significant degradation of ecological structure, function or composition as a result of human intervention through threatening processes.

The National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No. 32689, 6 November 2009) was gazetted in 2014. The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the National Spatial Biodiversity Assessment (NSBA) 2004 & 2011.

In addition to the management of ecosystems, this Act makes provision for the management and control of alien invasive vegetation. This includes the listing of invasive species that are a threat to natural ecosystems. These species must be strictly controlled and / or eradicated. The property has been significantly transformed due to grazing practises but does not contain many alien vegetation species. Only indigenous vegetation should be permitted for landscaping by the proposed HOA and future landowners.

3.4 NATIONAL WASTE MANAGEMENT STRATEGY

The National Waste Management Strategy presents the South African government's strategy for integrated waste management for South Africa.

It deals among others with: Integrated Waste Management Planning, Waste Information Systems, Waste Minimisation, Recycling, Waste Collection and Transportation, Waste Treatment, Waste Disposal and Implementing Instruments.

It is advisable that an integrated waste management system be adopted, which includes waste minimisation, waste recycling and the proper storage and disposal of waste, which does not impact of the health of the environment and human health.

All waste must be collected and disposed of at a waste facility. No waste material may be left on site once construction/maintenance is completed.

3.5 NATIONAL WATER ACT (NWA, ACT 36 OF 1998)

The National Water Act (NWA) gives effect to the constitutional right of access to water. The Act's overall purpose is to ensure that South Africa's water resources are protected, used and managed in ways which take into account a number of factors, including inter-generational equity, equitable access, redressing the results of past racial and gender discrimination, promoting sustainable and beneficial use, facilitating social and economic development, and providing for water quality and environmental protection.

The NWA makes persons who own, control, occupy or use land responsible for taking measures to prevent pollution of water resources, and empowers Government authorities to take measures to enforce this obligation.

3.6 NATIONAL FOREST ACT (ACT 84 OF 1998)

The NFA provides for the **protection of forests**, as well as **specific tree species**, quoting directly from the Act: "no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated". The Department of Agriculture, Forestry & Fisheries (DAFF) is responsible for the implementation and enforcement of the NFA, which includes **prohibition of damage to indigenous trees in any natural forest without a licence** (Section 7 of the NFA), as well as the prohibition of the cutting, disturbing, damaging destroying or removing **protected trees** without a licence (Section 15 of the NFA).

The purpose of the National Veld and Forest Fire Act is to **prevent and combat veld, forest and mountain fires** throughout the RSA and to provide institutions, methods and practices for achieving this purpose. Institutions include the formations of such bodies as **Fire Protection Associations** (FPA's) and **Working on Fire**. The Act provides the guidelines and constitution for the implementation of these institutions as well as their functions and requirements.

3.7 NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The purpose of the National Heritage Resources Act is to:

- Introduce an integrated and interactive system for the management of the national heritage resources;
- Promote good government at all levels,
- Empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations;
- To lay down general principles for governing heritage resources management throughout South Africa;

- To introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa;
- To establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources at national level;
- To set norms and maintain essential national standards for the management of heritage resources in South Africa and to protect heritage resources of national significance;
- To control the export of nationally significant heritage objects and the import into South Africa of cultural property illegally exported from foreign countries;
- To enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources;
- To provide for the protection and management of conservation-worthy places and areas by local authorities; and
- To provide for matters connected therewith.

3.8 OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993)

The Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work.

In terms of this Act, a Health and Safety Officer and Protocol must be implemented on any sites. The appointment of a Health and Safety Officer is the responsibility of the proponent and contractor and is included in this report to ensure due diligence on construction sites. It is the responsibility of the appointed HSO to conduct any required audits and as such only the appointment of an HSO will be auditable in terms of this document.

4 ENVIRONMENTAL IMPACTS & MITIGATIONS

The following specialist impact assessments / studies were undertaken for the proposal:

- Aquatic Biodiversity Compliance Statement (Confluent Environmental)
- Terrestrial Biodiversity & Botanical Impact Assessment (Confluent Environmental)
- Terrestrial Animal Species Compliance Statement (Confluent Environmental)
- Visual Impact Assessment (VRM Africa)

The following environmental impacts of the proposed activity were identified and considered during the environmental process, based on which the associated mitigation measures were recommended for implementation (to reduce negative impacts & enhance positive ones):

Specialist Assessments/Compliance Statement

Potential Impacts

- Loss of Hartenbos Dune Thicket (Endangered) habitat due to earthworks and other construction related activities for the Remainder of Erf 2841.
- A loss of protected tree species (*Sidoxylon inerme inerme* & *Pittosporum viridiflorum*), and potential SCC due to earthworks and other construction related activities for the Remainder of Erf 2841.
- Remaining thicket habitat, protected trees, and plant biodiversity are negatively affected by the management of the construction site (i.e., staff, stockpiles, and equipment).

- A slow loss of thicket habitat, protected tree species, and plant species biodiversity due to maintenance activities required to maintain the RE/2841 (e.g., vegetation trimming, path and road maintenance, ongoing management of invasive plants, etc.).
- Protected trees on the site negatively affected by inappropriate landscaping resulting in genetic pollution, and potential long-term biodiversity loss from the cultivation of species that are not indigenous to the vegetation type and surrounding landscape.
- Loss of landscape character from construction and development.
- Loss of landscape character from operation of the development.

4.1 **MITIGATIONS**

Table 2: List of Mitigation Measures & Associated Management Requirements

Mitigation	Condition of Approval	Included in EMP	Construction Phase	Operational /Maintenance Phase
Mitigations / Recommendations				
The disturbance footprint of proposed developments should be clearly defined and demarcated to prevent unnecessary damage to the surrounding environment.		✓	✓	
Protected trees, and other large trees on the site that could still be protected must be marked on the site. The marked trees are to be left undisturbed during construction, and this could be made easier by using wooden boxes around the trees.		✓	✓	
Construction netting and fencing must be used to clearly indicate construction areas. Shade cloth used as fencing should be hammered into the ground using wooden pegs.		✓	✓	
Clear signs for “no-go” areas for vehicles and personnel should be placed strategically on the site. No-go areas are anywhere outside of the direct area of influence of the construction phase.		✓	✓	
A turning circle and parking area for construction and delivery vehicles may only take place in areas that are already cleared, i.e., not between the railway and development area where some thicket vegetation remains outside of the PAOI.		✓	✓	
No delivery vehicles are allowed in fynbos and thicket vegetation.		✓	✓	
For once off deliveries, clear indications on the nearby roads should be put up to guide truck drivers to the construction site, thus avoiding divers getting lost and causing unnecessary disturbance.		✓	✓	
Weather reports must be checked daily to avoid heavy machinery and activities on the site during rainy weather. Following a rainfall event (excluding short periods of gentle, light rain), all construction on the site must cease temporarily.		✓	✓	
Where vegetation will be cleared to make way for construction, filled sandbags must be used to reduce the intensity of water runoff and flow over the site.		✓	✓	

Mitigation	Condition of Approval	Included in EMP	Construction Phase	Operational /Maintenance Phase
Topsoil on the site (excluding topsoil under dense stands of invasive plants in the previously cleared area) in new excavation areas must be stripped to a depth of ca. 30cm and kept in designated piles. Topsoil piles must be suitably covered with a geotextile to prevent any additional invasive species seeds from falling in and establishing in the soil.		✓	✓	
If the SDP of a proposed development does not have enough space for the storage and protection of topsoil within the disturbance envelope, then the Contractor must identify an alternative temporary stockpile area that is already transformed and where it can easily be retrieved for post-construction rehabilitation.		✓	✓	
The topsoil piles must be clearly labelled so that it does not mix with subsoils excavated or any other construction material for the site.		✓	✓	
Dust suppression mechanisms e.g., materials and regular site maintenance (e.g., cleaning surfaces and “rounding off” a workday) is essential to reduce dust, and general pollution.		✓	✓	
The proposed development can have up to a maximum disturbance envelope of 2m around the proposed development.		✓	✓	
Prior to the commencement of construction and earth movement on the site, a plant search and rescue must be conducted by a suitably qualified horticultural specialist. The rescued plants must be kept in a nursery that should preferably be set up on the construction site on Erf RE/2841. Alternatively, arrangements with a suitable nursery should be made to keep and care for removed plants during the construction phase of the project. The rescued plants must be planted back with the aid of botanists and / or horticultural specialists within the 2m disturbance footprint around the permanent disturbance footprints. This will promote the regeneration of natural fynbos around the developments and reduce the possibility of negative edge effects on the site. Any additional plants that are observed during construction within a development footprint must be rescued and added to the rescued plants in the indigenous nursery.		✓	✓	
Alien clearing must be undertaken during the construction phase to prevent invasive plants from becoming large stands during this time. Ongoing monitoring and clearing of invasive plants on the site should occur.		✓	✓	
No kikuyu grass is allowed anywhere on the site.		✓	✓	
Materials used during construction must be sourced and transported responsibly to minimise the risk of further introductions of new invasive plants and contamination of the site, and especially the fynbos vegetation.		✓	✓	
All new staff must be briefed about the layout of the construction site and must be made aware of the no-go areas and fact that the surrounding environment is sensitive and must not be disturbed.		✓	✓	

Mitigation	Condition of Approval	Included in EMP	Construction Phase	Operational /Maintenance Phase
Construction vehicles should be checked on a daily basis at the start of the day for leaks and other faults.		✓	✓	
Sandbags or sawdust should be available on the site to ensure that any accidental oil or toxic material spills can be contained and stopped quickly.		✓	✓	
Any contaminated soil on the site must be removed by a registered hazardous waste service provider (Spill Tech, Interwaste, EnviroServ etc.).		✓	✓	
Vehicles with leaks and other problems must not be allowed to operate on the site until they have been repaired.		✓	✓	
Materials used during construction must be sourced responsibly to minimise the risk of further introductions of new invasive plants.		✓	✓	
No waste dumping or burning is to be allowed on the site or in the surrounding environment. All material waste is to be collected in designated bins and must be transported to a registered waste disposal facility.		✓	✓	
Adequate ablution facilities must be provided for every construction project. Ablution facilities must be regularly maintained and cleaned. At least one toilet per ten to fifteen construction staff should be available.		✓	✓	
Should portable toilets be used, these must be placed on a level platform before construction starts and they must be placed away from any potential fynbos habitat on the site.		✓	✓	
Concrete, cement, plastering, and painting: Mixing areas be properly defined on the site and must be bunded or surrounded by an impermeable material to prevent any runoff into the surrounding environment. The designated mixing areas should be limited to areas that will become future hard surfaces on the site, or that are already transformed and likely to remain transformed.		✓	✓	
No concrete and cement mixing is allowed in areas outside of the PAOI. The 2m disturbance envelope should preferably also be avoided for this activity on the site.		✓	✓	
Cleaning of cement, plastering & paint equipment must be done into a designated, bunded & lined slurry sump or container to avoid contaminating the environment.		✓	✓	
Stockpiles and soil must all be covered by a geotextile or plastic covering, which must also be bunded (e.g., sandbags) when the piles are not in use on the site. This will prevent the material from washing away and contaminating the substrate of the site which likely still contains useful seeds and soil organisms.		✓	✓	

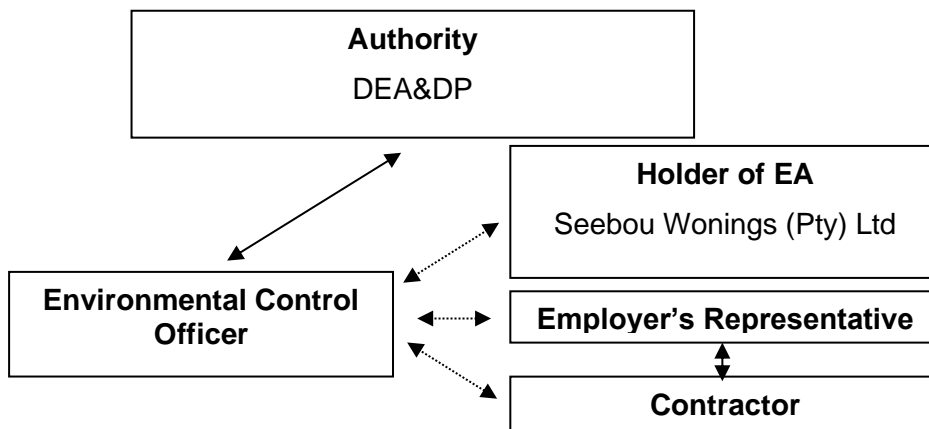
Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational /Maintenance Phase
Should any Agulhas Long-billed Lark nests be found or suspected to occur on site, construction should be paused until such time that their presence can be confirmed by a faunal specialist.		✓	✓	
Alien clearing and monitoring according to an alien eradication plan be followed.		✓	✓	✓
Emergency & cleaning supplies for incidents of waste spillage, or accidental fires should be kept nearby (e.g., keep lime, spades, first aid etc. handy). Fire extinguishers etc. must be kept on the camp as per fire safety regulations.		✓	✓	✓
Staff on the site must be properly trained and guests must be well aware of activities that are not allowed on the site.		✓	✓	✓
No staff member is allowed to dispose of grey water in the environment.		✓	✓	✓
No member of staff or guest are allowed to walk where a path is not clearly labelled or outside of roads and boardwalks.		✓	✓	✓
Instructions for the proper use of chemical toilets must be provided and must be clearly visible in all restrooms.		✓	✓	✓
Plants naturally found in Hartenbos Dune Thicket may be used in gardening / reestablishing natural thicket vegetation following alien clearing efforts.		✓	✓	✓
Rehabilitation of thicket should be prioritised above gardening. Lawns must be limited.		✓	✓	✓
Landowners are responsible to maintain their gardens, so that plants do not overgrow. No garden waste may be dumped in any remaining natural area and must be disposed of in a responsible manner.		✓	✓	✓
Fertilisers and pesticides must be avoided, and when used it must be done with caution and may not become routine practice.		✓	✓	✓
Set the laydown back from the roads so that they are not a dominating visual feature on areas that will be developed. Screen with green shade cloth (2m high).		✓	✓	
No overnight accommodation for workers.		✓	✓	
Fencing should be black Thru-View without electrical security on top and maximum height of 2m.		✓	✓	
Establishment of low hedges from indigenous shrubs such as <i>Carissa bispinosa</i> (pruned 1m height) to reduce visual intrusion of the security fencing, and along the Fynbos road areas.		✓	✓	✓
Lights at night mitigation to ensure that light spillage does not take place (Refer to Annexure C of the Visual Impact Assessment for generic lighting mitigation). No overhead lighting. Downward or inward facing		✓	✓	✓

Mitigation	Condition of Approval	Included in EMP	Construction Phase	Operational /Maintenance Phase
light such that direct lighting is not visible to the casual observer without compromising security.				
Advertising should be constrained and not be visually dominating. Make use of muted / natural colours with a mid grey hue. The base of the banner should not be elevated more than 1m off the ground and not be larger than 1m high x 2m wide.		✓	✓	✓
The colours and textures used in the development should be chosen such as to reduce visual contrast. The walls should be natural colour with a mid-grey hue, and the roofs preferably slate grey/ or similar. White colour on the walls should not be used.		✓	✓	✓
Best Practise				
Construction work must be limited to Mondays-Fridays (07:00-18:00) and Saturdays (08:00-13:00)		✓	✓	
Construction work may not take place on Sundays.		✓	✓	
Protected tree permits must be obtained prior to any removal/trimming of protected trees/clumps.		✓	✓	
Vegetation clearing must be done in phases to avoid large pieces of land being exposed to the wind (which could result in unnecessary dust pollution).		✓	✓	
Make use of wetting agents should dust be a problem.		✓	✓	
Rehabilitation of work areas to take place as soon as possible to minimise dust pollution.		✓	✓	
The site must be monitored during major earthworks by an archaeologist appointed by the developer.		✓	✓	
An ECO must be appointed to oversee construction and must keep record of any complaints regarding noise/dust pollution.		✓	✓	
Construction material must be stored on-site and construction vehicles must not obstruct traffic flows.		✓	✓	
Clear the proposed development site of all NEMBA listed invasive alien vegetation species prior to any site clearing/development to ensure that indigenous vegetation can recover and rehabilitate more easily.		✓	✓	
Only indigenous vegetation permitted in the place of the loss of remainder on-site natural vegetation/habitat.		✓	✓	
Employees must be prohibited from making open fires during construction phase.		✓	✓	
Should any heritage resources, including evidence of graves and human burials, archaeological material and palaeontological material be discovered during the execution of the activities above, all works must		✓	✓	

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational /Maintenance Phase
be stopped immediately, and Heritage Western Cape must be notified without delay.				
Contractors should provide at least one (1) toilet for every ten (10) people present on the development site.		✓	✓	
Employees must be prohibited from collecting plants.		✓	✓	✓

5 RESPONSIBILITIES

This section deals with the responsibilities of various parties during the Construction Phase of any development (see chart below).



5.1 HOLDER OF THE EA

The holder of the EA / property owner is the overseeing entity responsible for ensuring that all activities undertaken on the property comply with the Environmental Authorisation (EA) and associated Environmental Management Programme (EMPr) (as well as any other approval / licence / permit).

The responsibilities of the holder of the EA / property owner include, but are not limited to the following:

- Ensure that **all tender documentation** include reference to, and the need for compliance with, the EA and EMPr as well as any other legally binding documentation, which include and are not limited to Approval/s.
- Be conversant with, and ensure that all Contractors, Sub-contractors, Engineers (and future senior site managers / personnel) are made aware of, and understand the conditions and recommendations, contained in the abovementioned documentation;
- Ensure that all Contractors, Sub-contractors and Engineers (during construction activities) are made aware of their 'Duty of Care to the Environment' and that any damage or degradation of the natural environment within the bounds of the property will not be tolerated and must be dealt with / remedied at the cost of the perpetrator;
- Take remedial and/or disciplinary action in circumstances where persons are found to be in contravention of the abovementioned legally binding documentation.

5.2 ENGINEERS AND CONTRACTORS

The Engineers and Contractors are often the parties responsible for physically carrying out the activities for which majority of the recommendations in this EMPr are intended. Service providers and Contractors include: services, building contractors, 'handy-men' and engineers overseeing the installation and maintenance of services etc. The responsibilities indicated here are also relevant to Sub-Contractors.

Contractors are responsible to ensure that all sub-contractors are compliant with the EA, the EMPr, and any relevant licence, permit or any legally binding documentation relevant to their operations.

It is recommended that contractors and sub-contractors use colour codes for easy identification by the Environmental Control Officer (i.e., colour coded hard hats or vests).

The responsibilities of these parties include but are not limited to the following:

- Be conversant and compliant with the EA, the EMPr, and any relevant License, Permit or any legally binding documentation relevant to their operations;
- Have a responsibility to adhering to any conditions and recommendations laid out in above mentioned 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;
- Liaise with the holder of the EA/WULA in complying with the EMPr, and in the event that any industry regulated standards are in contradiction with the EMPr or any other authorisations.
- Review and amend to any construction activities to align with the EMPr and Best Practice Principles;
- Ensure compliance of all site personnel and/or visitors to the EMPr and any other authorisations.

5.3 ECOLOGICAL CONTROL OFFICER (ECO)

It is recommended that a suitably qualified Environmental Control Officer (ECO) be appointed to oversee all activities for the duration of the construction phase (i.e. construction activities, rehabilitation) as well as any maintenance work that must be undertaken that will involve earthworks or machine works. The ECO must have at least 3 years' experience and proven competency as an ECO.

The responsibilities of the ECO include but are not limited to the following:

- Provide environmental induction training to Contractors on site prior to construction activities commencing.
- Provide maintenance, update and review of the EMPr if necessary.
- Liaison between the Project Holder of the EA, Contractors, Authorities and other lead stakeholders on all environmental concerns, including the implementation of the EMPr.
- Compilation of Environmental Control Reports (ECR) to ensure compliance with the EA, EMPr and duty of care requirements, where necessary.
- Compilation of the Environmental Audit Report or Environmental Completion Statement, after completion of construction (or as otherwise defined in the Environmental Authorisation), where necessary.
- Ensuring/guiding and monitoring compliance with the EA and EMPr and any legally binding documentation.
- Facilitating consultation with relevant environmental authorities (e.g. DEA&DP, DFFE, CapeNature or Municipality).

- Facilitating the application for any required amendment of the EA/EMPr.
- Provide guidance and interpretation of the EA and EMPr where necessary.
- Issuing site instructions to the contractor for corrective actions required.
- The ECO is required to conduct regular site visits for the duration of the construction period, in order to ensure the Contractor receives the necessary induction and that all procedures are in place. Additional site visits may be undertaken in the event of any unforeseen environmental accidents.
- The duration and frequency of these visits may be increased or decreased at the discretion of the ECO.
- Attendance of site meetings if required.
- Maintain a record of environmental incidents (e.g. spills, impacts, legal transgressions etc.) as well as corrective and preventative measures taken. This information must also be included in the ECR.
- Maintain a public complaints register in which all complaints and action taken must be recorded. This information must also be included in the ECR.

5.4 ECO SITE VISIT FREQUENCY

The following site frequency for ECO site visits has been determined:

- Bi-weekly during all construction activities.
- Maintenance activities must be monitored on an ad hoc basis depending on the type of maintenance.

Ad hoc site visits may be undertaken in the event of any incidents or specific requests from the project holder of the EA or project team.

5.5 ENVIRONMENTAL INDUCTION & TRAINING

The holder of the EA in consultation with the Contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EA and EMPr. The presentation shall be conducted, as far as is possible, in the employees' language of choice. The Contractor must provide a translator from their staff for the purpose of translating, if this is deemed necessary.

As a minimum, training must include:

- Explanation of the importance of complying with the EA and EMPr and the employees accountability.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this EMPr and its specification ("no-go" areas, etc.).
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.

Where staff turnover is high and with additional appointment of sub-contractors, it may be necessary to undertake additional induction training sessions. The Contractor must keep records of all environmental training sessions, including names, dates and the information presented.

6 PRE-CONSTRUCTION DESIGN CONSIDERATIONS

It is recommended that sustainable design considerations are implemented during the planning phase to ensure that the impacts associated with the development are avoided, minimised or managed before construction commences.

6.1 <u>STORMWATER MANAGEMENT PREPARATION</u>					
Management Outcome			Impacts & Risks Avoided		
To prepare the site to minimise the negative impacts of stormwater.			Damage to the environment caused by stormwater runoff.		
Management Actions					
a. Final design of the stormwater system must take place prior to construction to ensure timeous implementation.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Site Plans	Once off	Architect / Engineer	Prior to construction	Audit	Once off
6.2 <u>DEMARCATIION OF WORK AND NO-GO AREAS</u>					
Management Outcome			Impacts & Risks Avoided		
To clearly define the work area and avoid impacting on non-work areas.			Negative construction impacts on natural and rehabilitated areas.		
Management Actions					
a. Clearly identify and demarcate the development area, area of works and spoiling areas prior to the commencement of any activities on site.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Once off	Developer / contractor	Pre implementation	Audit	Once off

b. Fuel and chemicals may only be stored in a designated work area.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Once off	Developer / contractor	Pre implementation	Audit	Once off
c. Provide on-site sanitation and rest areas for personnel.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Once off	Developer / contractor	Pre implementation	Audit	Once off
6.3 WATER RESOURCE PROTECTION					
Management Outcome			Impacts & Risks Avoided		
To minimise the use of scarce water resources by improving consumption methods.			Unsustainable or wasteful use of water for construction and operation purposes.		
Management Actions					
a. Rainwater harvesting must be incorporated into the designs. All rainwater tanks must be shown on building plans.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Site Plans	Once off	Architect / Engineer	Prior to construction	Audit	Once off
b. Water efficiency must be incorporated into the design of the units.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance

Site Plans	Once off	Architect	Prior to construction	Audit	Once off
<p>Dual Flush Toilets</p> <p>Conservative estimates have shown that a saving of more than 22 000 liters per household can be achieved annually with the installation of dual flush toilets (Aquanotion, 2008). All households and ablution facilities should be fitted with dual flush systems.</p> <p>Low flow shower heads</p> <p>The installation of low flow shower heads can not only reduce water consumption by up to 50%, but also the energy required for water heating by up to 50% (Eartheasy, 2008).</p> <p>It has been estimated that a saving of up to 57 000 liters of water per annum per household can be achieved through the installation of low flow shower heads. Low flow shower heads make use of either aerators or pulse systems to reduce the flow without compromising the quality of the shower. The choice of shower head is up to the individual owner but must have a flow of less than seven liters per minute.</p> <p>Low flow Taps</p> <p>Low flow tap use aerators to reduce the flow of the water. These are either built into the faucet or added as an aftermarket product. The faucets in bathrooms should have a peak flow of less than 10 liters per minute.</p> <p>It is not necessary to install aerators in kitchen sinks as they are seldom run without a plug. All bathroom basins must be fitted with low flow faucets.</p> <p>Washing machines</p> <p>It is recommended that all washing machines that are to be installed in shared facilities should be front loading washing machines as opposed to top loading washing machines. Apart from much lower energy and water requirements, front loader washing machines have a number of advantages that make them a better environmental choice:</p> <ul style="list-style-type: none"> - Less wear and tear on washed materials – Washed materials therefore last longer and result in a net resource saving; - Faster drying times - Because of the horizontal axis and faster spin speeds, more water is removed, and the materials dry faster which results in energy saving if a clothes dryer is used.; - Quieter operation – Therefore less noise pollution; and - Less detergent - Far less is required compared to top loaders. Fewer chemicals therefore reach treatment plants and ultimately waterways. <p>Geyser and pipe insulation</p> <p>Apart from the savings in terms of energy as detailed below, insulating geysers and pipes save water, as shorter periods of running the tap to get hot water are required.</p> <p>All structures should have insulation on geysers and all hot water pipes.</p> <p>Waterwise Landscaping</p> <p>Waterwise landscaping principles must be incorporated into the detailed landscaping plans. The following principles apply to waterwise gardening:</p> <ul style="list-style-type: none"> - Grow water-wise plants – generally the best suited plants are those indigenous to the area, as they seldom need additional watering; - Group plants according to their water needs – this avoids wasting water on plants that don't need it; - Consider the quality and type of the lawn. Lawns use unacceptable amounts of water, so consider reducing lawn areas to a minimum. Use tougher, low-water lawn types such as Buffalo (coastal areas) or Kweek (inland) rather than Kikuyu. - Maintain the garden – remove unwanted plants, plant more perennials than summer annuals, as they have deeper root systems and so need less watering. - Improve the soil and mulch. Soil water-holding capacity is improved by higher organic matter content. Mulching (covering the soil with a thick layer of bark, compost, straw etc.) keeps the soil much more moist. 					

- Plant in the right season – For winter rainfall areas this is in autumn and early winter, so the plants have a chance to develop their root systems before the dry season. In summer rainfall areas it is spring and early summer for the same reason.
- Water correctly – avoid watering during the heat of the day or in windy conditions.
- The best irrigation system is drip irrigation – it uses 25% of water used by normal irrigation systems with the same effect and can even be placed under lawns.

Grey Water

Grey water is the water that comes from the bath, shower, basins, laundry and the kitchen sink. It is not to be confused with Black water, which is sewage that comes from the toilet. Black water is toxic and requires very specific methods of treatment in order to be safe for re-use. Grey water, however, can easily be recycled and re-used for a variety of uses. These include:

- Irrigation of gardens;
- Water for flushing toilets;
- Any outdoor use;
- Dampening dusty areas or roads.

Grey water systems require precise methods to clean the water. There are various companies and organizations that can assist with implementing a grey water system.

6.4 ENERGY RESOURCE PROTECTION

Management Outcome		Impacts & Risks Avoided			
To minimise the use of energy resources by improving consumption methods.		Excessive and unnecessary energy consumption.			
Management Actions					
a. Incorporate energy efficiency into the design of the facility.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Energy saving checklist	Once off	Owner	Ad hoc	Audit	Once off

Solar heating water systems

Solar heated water systems are an innovative way of producing hot water without putting additional pressure on gas or municipal power supply. There are many different types available on the market, and homeowners should consider all their requirements (number of people using facility, location of house, angles of roof) before making a choice.

Energy Efficient Lighting

In terms of Best Practice, it is required that energy saving lighting fixtures be used throughout the entire development. It is therefore specified that Light Emitting Diode (LED) or Compact Fluorescent (CF) lighting be used as opposed to incandescent lighting. This is required for all internal and external lighting, including street lighting. Proximity switches should be used in areas where lighting for pedestrians is required.

NO external High Pressure Sodium (HPS) or Metal Halide (MH) spot or floodlights should be installed.

CF lighting uses quantities of mercury in the bulbs and tubes which pose serious environmental hazards. The mercury from one CF bulb can pollute many thousand litres of water if not treated correctly (Eden District Municipality, 2011). CF lighting (energy saving bulbs and tubes) must be correctly disposed of at registered Hazardous waste sites. Companies like Pick n Pay and Woolworths offer facilities to collect CF bulbs for recycling and disposal. The following should be considered when handling CF bulbs (eHow Home, 2011):

Energy Efficient Appliances

Energy efficient appliances are becoming widely available. Follow the Energy Guide labels on appliances to help selection of correct models. Any appliance that has to heat up water or air will use more energy, as will an appliance that boasts additional extras such as ice making, dispensing and auto defrosting on fridges or heat drying on dishwashers.

Solar Cooling Systems

Where required by homeowners, the homeowner should consider the use of solar cooling systems such as absorption or adsorption chillers as opposed to conventional air conditioning units.

Evaporative Cooling Systems

Consideration should be given to evaporative cooling systems as these cut down considerably on energy usage for appliances such as air conditioners. Furthermore, the system ensures that fresh air circulates within housing units, which improves on environmental health risks.

Fresh air is drawn from outside the house (the hotter the better) and passes through moistened pads which cools it down and filters it before flowing through outlets in the house.

There are certain parameters required for evaporative cooling systems, which should be thoroughly investigated prior to installation.

Geyser and pipe insulation

Apart from the savings in terms of energy as detailed below, insulating geysers and pipes save water, as shorter periods of running the tap to get hot water are required.

All structures should have insulation on geysers and all hot water pipes.

7 CONSTRUCTION CONSIDERATIONS

These Construction Phase requirements are aimed at using Best Practise Principles and/or specialist recommendations to manage the impacts on the environment during the construction of the development.

Table 3: Site Clearance Methodology.

No	Action	Scheduling
1	Survey approved layout on site.	Prior to construction
2	Establish site camp and material stockpile sites (incl. waste disposal area, portable toilets etc. The construction camp and necessary ablution facilities meant for construction workers must not be in any of the delineated no-go / sensitive areas.	Prior to construction.
3	Demarcate work areas using correct demarcation methods. (Protected tree species must have a 2m high screen outside the drip line of the trees/vegetation – ECO to advise).	Prior to construction.
4	Demarcate sensitive areas as no-go areas in consultation with the ECO. Demarcation must be up prior to any site clearing/construction works commencing and must remain in place (and well maintained) for the duration of the construction phase.	Prior to construction.

5	Erosion control measures must be put in place prior to any construction activities that would result in soil being exposed.	Prior to construction.
6	Weather forecasts from the South African Weather Bureau of up to three days in advance must be monitored on a daily basis to avoid exposing soil, works or materials during a storm event. This must be considered in conjunction with tide tables for beach construction work.	Construction
7	Commence with mechanical vegetation clearing within the demarcated work areas only.	Construction
8	Vegetation clearing should occur in parallel with the construction progress to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.	Construction
9	Any biomass from the clearing activities must be stockpiled within the development footprint at an area / areas approved by the ECO. It is recommended that the biomass must be chipped in situ and stockpiled within designated areas within the footprint. Alternatively, it must be removed and taken to an approved disposal site for biomass. NO DUMPING IS ALLOWED.	Construction
10	Any cleared areas that will not be immediately constructed or planted, must be covered with the wood chips or other mulch to prevent wind erosion.	Construction

7.1 STORMWATER MANAGEMENT

Management Outcome		Impacts & Risks Avoided			
To minimise the generation of contaminated stormwater.		Minimise sedimentation, erosion and/or undercutting.			
Management Actions					
a. Develop level spreaders along the fence line to prevent the high-velocity of stormwater runoff.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Once off	Developer / contractor	Pre implementation	Audit	Once off

Any areas that are identified by the ECO as being prone to erosion must be suitably protected. During construction, the contractor shall protect all areas susceptible to erosion by installing temporary works (e.g., sandbags, haybales, silt fences) and by taking any other measures necessary to prevent stormwater from concentrating in streams and scouring slopes, banks, etc.

In areas where construction activities have been completed and where no further disturbance would take place, rehabilitation and re-vegetation should commence as soon as possible. A suitable rehabilitation method statement must be submitted to the ECO for approval.

7.2 DUST CONTROL

Management Outcome	Impacts & Risks Avoided
To ensure there is no health risk or loss of amenity due to emission of dust to the environment.	Ensure land coverage with biomass chips / vegetation / damping to minimise dust.

Management Actions

a. Implement a dust prevention strategy, developed at the project planning stage

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Once off	Developer / contractor	Pre implementation	Audit	Once off

The strategy should include the following amongst others:

- Speed control to minimise dust on site.
- Exposed stockpile materials must be adequately **protected** against wind (covered) and should be sited taking into consideration the prevailing wind conditions.
- Trucks bringing in materials must be covered to prevent dust and small particles escaping and potentially causing damage to people and property.

7.3 NOISE AND VIBRATION

Management Outcome	Impacts & Risks Avoided
To ensure nuisance from noise and vibration does not occur.	Nuisance impacts to neighbours and visitors.

Management Actions

a. Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site.

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing	Time period	Mechanism for monitoring Compliance	Programme for reporting
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		management action			on Compliance
As required	Initially when vehicle or machinery is introduced to the site and thereafter monthly. As required if complaints registered.	Contractor	During construction and operation	Audit	As required
b. Enclose noisy equipment such as generators and pumps.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	Initially when vehicle or machinery is introduced to the site and thereafter monthly. As required if complaints registered.	Contractor	During construction	Audit	As required
c. Provide noise attenuation screens, where appropriate.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	Initially when vehicle or machinery is introduced to the site and thereafter monthly. As required if complaints registered.	Contractor	During construction	Audit	As required

d. Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm weekdays and 8 am to 1 pm Saturday, except where, for practical reasons, the activity is unavoidable. No work to take place on Sundays.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	As required if complaints registered.	Contractor	During construction	Audit	As required
7.4 <u>TRAFFIC CONTROL</u>					
Management Outcome			Impacts & Risks Avoided		
To manage and minimise the nuisance effect created by construction traffic.			The development entrance access will be via Souwesia Avenue. Increase in traffic during construction phase along the access routes on the R102 and Souwesia Avenue		
Management Actions					
a. Implement a traffic management strategy during construction.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Daily	Contractor	During construction	Audit	As required
<ul style="list-style-type: none"> • Construction related activities should be timed where possible to avoid peak periods. • No construction workers, apart from security personnel, should be allowed to stay on site overnight. • Contractors appointed by the developer must ensure that workers are transported to and from the site daily. • Construction related activities should comply with all relevant building regulations. In this regard activities on site should be restricted to between 07:00 and 18:00 during weekdays and 08:00 and 13:00 on Saturdays. No work should be permitted on Sundays and public holidays. 					
7.5 <u>WASTE MANAGEMENT</u>					
Management Outcome			Impacts & Risks Avoided		
To minimise the waste load discharged to the environment.			Improve waste disposal methods during construction. Reduce waste volumes to landfill sites.		

Management Actions					
a. Reduce wastes by selecting, in order of preference, avoidance, reduction, reuse and recycling.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Record of volumes of material removed	As required	Contractor	As required	Audit	Records
b. Maintain a high quality of housekeeping and ensure that materials are not left where they can be washed or blown away to become litter.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Photographic	Weekly	Contractor	As required	Audit	Records
c. Provide bins for construction workers and staff at locations where they consume food.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Photographic	Weekly	Contractor	As required	Audit	Records
d. Conduct ongoing awareness with staff of the need to avoid littering.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Induction	Once off	Contractor	As required	Audit	Attendance register
7.6 <u>STOCKPILE MANAGEMENT</u>					
Management Outcome			Impacts & Risks Avoided		
To manage soil stockpiles so that dust and sediment in run-off are minimised.			Pollution due to dust and sediment runoff.		

Management Actions					
a. Minimise the number of stockpiles, and the area and the time stockpiles are exposed.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Photographic	As required	Contractor	As required	Audit	Records
b. Keep topsoil and underburden stockpiles separate.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	Daily when stripping topsoil	Contractor	Continuously during construction	Audit	Records
c. Ensure that stockpiles and batters are designed with slopes no greater than 2:1 (horizontal/vertical).					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly
d. Stabilise stockpiles and batters that will remain bare for more than 28 days by covering with mulch or anchored fabrics or seeding with sterile grass.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly

e. Establish sediment controls around unstabilised stockpiles and batters.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly
f. Suppress dust on stockpiles and batters, as circumstances demand.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly
7.7 <u>STORING FUELS & CHEMICALS</u>					
Management Outcome			Impacts & Risks Avoided		
To ensure that fuel and chemical storage is safe, and that any materials that escape do not cause environmental damage.			Avoid hydrocarbon pollution to soil and watercourses/coastal environments.		
Management Actions					
a. Minimise fuels and chemicals stored onsite.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records

b. Install bunds and take other precautions to reduce the risk of spills.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
c. Implement a contingency plan to handle spills, so that environmental damage is avoided.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
7.8 <u>MINIMISING EROSION</u>					
Management Outcome			Impacts & Risks Avoided		
To minimise the quantity of soil lost during construction due to land-clearing.			Avoid siltation by installing silt traps.		
Management Actions					
a. Schedule measures to avoid and reduce erosion by phasing the work program to minimise land disturbance in the planning and design stage.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records

b. Keep the areas of land cleared to a minimum, and the period areas remain cleared to a minimum.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
c. Base control measures to manage erosion on the vulnerability of cleared land to soil loss, paying particular attention to protecting slopes.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
d. Mulch, roughen and seed cleared slopes and stockpiles where no works are planned for more than 28 days, with sterile grasses.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
e. Keep vehicles to well-defined haul roads (From Souwesia Avenue).					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Site plan	As required	Contractor	As required	Audit	Final site plan

f. Rehabilitate cleared areas promptly.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor	Continuously during construction	Audit	Final Rehabilitation statement
7.9 REHABILITATION & BOTANICAL MANAGEMENT					
Management Outcome			Impacts & Risks Avoided		
To ensure that degradation to existing botanical components are minimised and that any rehabilitation is undertaken with conservation orientated approach.			To minimise the disturbance to existing flora. To minimise the introduction and/or spread of weed species.		
Management Actions					
a. Demarcate sensitive areas to avoid damage during construction.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor / George Municipality	Continuously	Audit	Visual / photographic
b. Rehabilitation and landscaping may only make use of indigenous vegetation.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor / George Municipality	Continuously	Audit	Visual / photographic
All necessary permits must be obtained prior to the commencement of any construction activities for protected species.					

7.10 FAUNA MANAGEMENT					
Management Outcome			Impacts & Risks Avoided		
To ensure that impacts to native faunal species is minimised and/or avoided.			To minimise the impact to fauna.		
Management Actions					
a. Prevent unnecessary mortalities of indigenous fauna.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Ad hoc	As required	Contractor	Continuously	Audit	Visual / photographic
7.11 SOCIAL REQUIREMENTS					
Management Outcome			Impacts & Risks Avoided		
To ensure equitable, fair and safe social interaction on construction sites.			Loss of employment opportunities to the region.		
Management Actions					
a. It is strongly recommended that the Contractor make use of local labour as far as possible for the construction phase of the project.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Employment records	Ad hoc	Contractor	Ad hoc	Audit	Once off
b. Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the Developer and the Contractor.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance

Site records	Ad hoc	Contractor	Ad hoc	Audit	Once off
<p>Targets</p> <ul style="list-style-type: none"> - The contractor should endeavour to source local suppliers. - The contractor must ensure that suitable procurement policies are in place that supports local economic growth. - Locally manufactured products must be used as far as possible. <p>Site Security</p> <p>Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the developer and the contractor.</p> <p>Considering this, contractors need to be proactive in order to curtail theft and crime on and resulting from the construction site. It is recommended that the contractor develop a jobsite security plan prior to commencement of construction. This jobsite security plan should take into account protection of the construction site from both internal and external crime elements as well as the protection of surrounding communities from internal crime elements. All incidents of theft or other crime should be reported to the South African Police Service, no matter how seemingly insignificant.</p>					
<p>7.12 <u>METHOD STATEMENTS</u></p>					
Management Outcome			Impacts & Risks Avoided		
To ensure efficient communication mechanisms in the implementation of environmental performance requirements.			Prevention of potential impacts are avoided during construction by means of correct communication.		
Management Actions					
a. Method statements are written submissions by the Contractor to the ECO in response to the requirements of this EMP or to a request by the ECO. The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	Ad hoc	Contractor	As required	Audit	Once off
<p>Based on the specifications in this EMP, the following method statements are required as a minimum (more method statements may be requested as required at any time under the direction of the ECO):</p> <ul style="list-style-type: none"> • Demarcation of “No-Go” areas. • Site clearing. • Alien vegetation management. • Plant rescue (protected species; permit required). • Hazardous substances and their storage. • Materials requirements and sourcing. 					

- Solid waste control system.
- Fire control and emergency procedures.
- Stormwater management.
- Erosion control.
- Traffic control.
- Noise control.

7.13 CEMENT BATCHING

Management Outcome		Impacts & Risks Avoided			
Cement powder has a high alkaline pH that may contaminate and adversely affect both soil pH and water pH negatively. A rapid change in pH can have consequences on the functioning of soil and water organisms as well as on the botanical component.		Minimises negative impacts to vegetation and soils on areas that will not be hard surfaced.			
Management Actions					
b. All concrete batching must take place on an area that is to be hard surfaced as part of the development.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
c. Concrete mixing areas must have bund walls or a settling pond in order to prevent cement run off. Once the settling ponds dry out, the concrete must be removed and dispatched to a suitable disposal site.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
d. When using Readymix concrete, care must be taken to prevent spills from the trucks while offloading. This form of batching is preferable for large constructions as no on site batching is required and there is a lesser likelihood of accidental spills and run off. Trucks may not be washed out on site.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing	Time period	Mechanism for monitoring Compliance	Programme for reporting

		management action			on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
7.14 HERITAGE REQUIREMENTS					
Management Outcome			Impacts & Risks Avoided		
To minimise the impacts of development, operation and maintenance of the Project on the heritage values in the Project area.			Ensure heritage impacts are minimised and impacts outside of the approved disturbance area are avoided.		
Management Actions					
a. No disturbance of heritage values outside of the approved disturbance area.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Site records	Ad hoc	Contractor	Ad hoc	Audit	Once off
<ul style="list-style-type: none"> The site must be monitored during major earthworks by an archaeologist appointed by the developer. Should any heritage remains of potential cultural value be exposed during excavations, these must be immediately reported to the ECO and the Provincial Heritage Resource Authority of the Western Cape, namely Heritage Western Cape in terms of the national Heritage Resources Act (Act No. 25 of 1999). Heritage remains uncovered or disturbed during earthworks may not be disturbed further until the necessary approval has been obtained from Heritage Western Cape. Should any archaeological remains including (but not limited to) fossil bones, fossil shells, coins, indigenous ceramics, colonial ceramics, marine shell heaps, stone artefacts, bone remains, rock art, rock engravings and any antiquity be discovered during construction, they must be immediately reported to the ECO and Heritage Western Cape and not disturbed further until the necessary approval has been obtained. Should any human remains be uncovered, they must immediately be reported to the ECO and the HWC archaeologist, who can be contacted on (021) 483 9685. Construction in the area must cease immediately and the site may not be disturbed further until the necessary approval has been obtained. 					

8 OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The Operational/Maintenance Phase of this EMPr refers to the day to day management activities that are required to ensure sustainability and the achievement of the principles and objectives of the development. The requirements are applicable to the proponent, all employees and all visitors to the property.

8.1 <u>ALIEN VEGETATION MANAGEMENT</u>					
Management Outcome			Impacts & Risks Avoided		
To ensure that indigenous vegetation is encouraged within urban areas.			Ongoing spread of alien invasive species. Ensure protected species are taken into consideration.		
Management Actions					
a. Staff must practice ongoing alien invasive management.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	Ongoing	George Municipality	As required	Audit	Audit
b. Retain and manage protected and indigenous vegetation.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	Ongoing	George Municipality	As required	Audit	Audit
Rehabilitate with appropriate indigenous vegetation to promote soft landscaping. Replace vegetation if it dies off with indigenous vegetation.					
8.2 <u>STORMWATER MANAGEMENT</u>					
Management Outcome			Impacts & Risks Avoided		

To ensure management of stormwater during operation phase			To prevent erosion due to stormwater impact		
Management Actions					
a. No stormwater runoff should be allowed to concentrate onto open spaces and downhill of the property.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Ensure soft landscaping	Ongoing	Developer / HOA	As required	Audit	Audit
<ul style="list-style-type: none"> Concentration of stormwater runoff will be minimised through the application of landscaping techniques, i.e., by creating grass lined swales, undulations and depressions. Ensure rainwater harvesting takes place. 					

9 CONSERVATION MANAGEMENT PLAN (OPEN SPACE MAINTENANCE AND MANAGEMENT)

The purpose of this Conservation Management Plan (CMP) component of the EMPr is to address and guide activities within this designated area to ensure that it is managed in an integrated manner, to promote biodiversity management objectives and a conservation use. This is to ensure a positive conservation outcome into the future during the operational phase of the estate.

This Conservation Management Plan (CMP) is applicable to all Open Space areas associated with the development.

The CMP is applicable to both Construction and Operation phases of the development. The action items associated with this EMPr are also applicable at all times. This CMP thus focusses specifically on biodiversity management.

9.1 DEMARCATION OF ERVEN & OPEN SPACE INTERFACE AREAS

- Prior to any site clearing/earthworks/vegetation removal, all erf boundaries bordering onto the No-Go open space areas, must be clearly demarcated to (A) define the open space area as excluded from private property boundaries, (B) to prevent any pet dogs from accessing the open space areas unaccompanied and (C) establish a visual barrier that can be monitored.
- Temporary demarcation during construction must be such that it is highly visible and must be marked clearly as NO-GO areas.
- Permanent fences around erven bordering onto the open space areas may NOT be fitted with pedestrian gates allowing uncontrolled access into the open space areas.
 - It is the Holder of the EA or HOA/Managing Agent's responsibility to monitor these 'contact/interface areas' with the No-Go conservation open space areas to ensure compliance.

- Owners/Tenants bordering onto the No-Go open space areas may NOT extend any formal landscaping (gardening), or structures (i.e. children's play areas) beyond their property boundaries into these open space areas.
 - It is the responsibility of the Holder/HoA/Managing Agent to conduct regular inspections along these interfaces / contact areas with the No-Go open space areas to ensure that no form of 'creeping' is permitted or entertained;
- Owners/Tenants, may NOT clear any vegetation beyond their property boundaries into the No-Go open space areas to utilise privately.
 - It is the responsibility of the Holder/HoA/Managing Agent to conduct regular inspections along these interfaces / contact areas with the No-Go open space areas to ensure that no form of 'creeping' is permitted or entertained;
- When erecting temporary or permanent boundary fences along the No-Go open space areas, workers must make every effort to work from the development footprint side so as to avoid/minimise any temporary disturbance on the open space areas.
- In all instances the ECO must specifically monitor and report on these interface areas with the No-Go open space areas during construction and operational phases to ensure no 'creeping' takes place over time. Any non-compliance must be reported to the Holder/HOA/Managing Agent immediately for them to issue instructions to remove/rehabilitate such affected areas without delay.

9.2 ACCESS TO OPEN SPACE AREAS

- During construction workers may NOT enter the demarcated open space areas unless it is the teams responsible for invasive alien vegetation clearing in the designated open space areas OR a team responsible for fire-fighting and then only allow existing footpaths/vehicular routes.
 - Method Statements must be submitted to the ECO for approval for any minimal trimming of vegetation that may hinder/prevent effective fire management/invasive alien vegetation clearing.
- Specific reference in the HOA Constitution, as well as via the provision of information pamphlets and sign boards/notices placed strategically along the open space areas of the property at all existing access points to the open space areas, prohibiting the following:
 - No pets permitted in the No-Go open space area unless they are on a leash under full control of the owner;
 - Picking of flowers/plant clippings/damage to vegetation/collecting fauna not permitted;
 - User must remain on existing footpaths only and no new footpaths /accesses may be created unless it is of a temporary nature for clearing of invasive alien vegetation/firefighting in the open spaces, in which case the temporary access must be blocked-off once the clearing/firefighting team has achieved its target and only with permission from the ECO in accordance with a Method Statement.

9.3 INVASIVE ALIEN VEGETATION MANAGEMENT

For on-site invasive alien vegetation management, the Holder must ensure continuous invasive alien clearing during construction and operation.

- The ECO must do a monthly visual inspection of phases not yet developed, as well as the remnant natural No-Go areas, to identify any listed invasive alien plant species that require removal;
- The ECO must provide an instruction to the Contractor on how such species must be removed / disposed off in accordance with Alien Clearing Guideline document attached as Appendix 6;

- The ECO must report on ongoing invasive alien vegetation removal in monthly Environmental Control Reports to the Competent Authority.

9.4 ESTATE LANDSCAPING & MANAGEMENT OF PRIVATE GARDENS

Within urban environments, one of the greatest impacts on adjoining/surrounding open space areas is the spread of exotic / alien invader vegetation indiscriminately planted in gardens and landscaping of recreational open space areas. Plants do not adhere to boundaries such as fences or cadastral units, and may be blown, carried (by fauna) or creep outside of designated areas (gardens) and establish themselves in natural areas. This results in the so called “garden escapees”, which can negatively affect the biodiversity and ecological functioning of natural areas. The most effective method of preventing this is simply to landscape with only locally occurring, indigenous plant species. The other benefits to using this approach is that local indigenous plants are adapted to local conditions and use less water and/or fertilisers i.e. require less maintenance.

The vegetation type mapped to occur in the area is Hartenbos Dune Thicket. However, aside from taking note of and/or identifying what plant species are currently growing naturally in the open space corridors, it is often difficult to determine what indigenous plant species are considered to be ‘local’ and are known to grow in Hartenbos Dune Thicket, and in the Southern Cape for that matter. It is not always an easy task to recreate or replant indigenous vegetation types in a garden setting.

The following points must be adhered to or implemented by residents and service providers (garden services) in this regard:

- No invasive alien plant species may be used for any gardening landscaping purposes. All listed alien plant species must be removed from the property and may not be reintroduced through rehabilitation or landscaping.
- Under no circumstances may garden waste / ornamental plant species material be disposed of in the open space areas / corridors;
 - It is the responsibility of the Holder/HOA/Managing Agent to monitor the interface erven, as well as any footpaths within the open space areas, to ensure that residents/tenants do not dispose of their garden waste into the adjacent open space areas;
 - The ECO must monitor the interface erven with the open space areas, as well as any footpaths within the open space areas;
- All garden waste material must be collected and disposed of at a suitably registered facility (unless re-used in the garden/landscaped areas of the Estate);
- The use of water-wise landscaping is recommended, not only in the interests of water conservation, but because excessive watering can create changes in the nutrient levels and hydrological capabilities of the soil.

9.5 WILDLIFE MANAGEMENT IN THE OPEN SPACE AREAS

Developments of any kind create several problems for the indigenous fauna of an area. This includes destruction and fragmentation of their habitat, destruction of corridors, introduction of problem animals, poaching, road mortality and disturbance of breeding sites to name a few. This section identifies various mechanisms that can be adopted by home owners to improve their interaction with the local wildlife (Harrison, 2008 and CapeNature).

Avoid Destruction of Natural Habitats and Populations

Habitat destruction is the prime driver in the decimation of populations.

- Restrict development and construction activities outside the No-Go open space areas and maintain groundcover until such time as it will be transformed;
- Clear each building site or development phase individually to allow animals/reptiles to relocate to undisturbed areas;
- Restrict the footprint of development to the smallest area possible;
- Preserve undeveloped portions of erven in their natural state (trimming of vegetation permitted to keep the site neat whilst vacant);
- Create laydowns in previously disturbed areas or within areas that are to be developed to avoid unwanted and costly rehabilitation post-construction;
- Clear the site in a logical sequence (towards natural areas in order to allow fauna to escape towards open space areas);
- Rehabilitate affected areas, where applicable;
- Manage functional areas appropriately i.e. recreational areas are not conservation areas;
- Compensate for loss of habitats through creating indigenous gardens;
- Facilitate search-and-rescue operations before and during site clearance;
- Leave undeveloped portions of erven unfenced to optimize animal movement over the longest possible period of time;
- Wherever possible, place pipelines and cables underground, and rehabilitate – all outside of the open space areas;

Road Mortality

Road deaths of animals as a direct result of human actions must be avoided by adhering to the following:

- Restrict speed on all internal roads;
- Use appropriate curb designs (recommend edge restraint and/or mountable instead of barrier curbs).

Light Pollution

The unnecessary introduction of lighting can change animal behaviour and must be avoided/minimized in proximity to the No-Go open space areas:

- Reduce exterior lighting and avoid constant lighting bordering onto these areas;
- Use only long-wavelength or low wattage lights for exterior lighting;
- Use directional fittings for exterior lights to reduce lighting on adjacent open space areas;
- Encourage the screening of interior lighting for all erven directly bordering the No-Go conservation open space areas.

Poaching of Local Wildlife

In light of the objectives of conservation and improving biodiversity in the open space areas poaching is strictly prohibited within the boundaries of the property. The following points should be considered to prevent poaching:

- Educate workers to avoid poaching;
- Patrol the area to ensure that no snares are set;
- Report incidents of snaring to the Holder/HOA/Managing Agent;
- Keep a record of incidents;
- In the event of any poachers detected a criminal case must be opened by the Estate against the person/persons responsible for poaching either animal/plant species from the Estate.

Problem-animal Scenarios

Problem animals are created as a direct result of human interference in their habitats. Baboons and monkeys are the most common of problem animals as they most easily adapt to using humans as a food source, and are able to access houses, vehicles and most other units with ease when not sufficiently secured.

In order to minimise the impact of problem animals on people and to protect the animals themselves, the following must be undertaken:

- Do not allow feeding of wild animals;
- Keep attractive resources out of reach, this includes planting of fruit trees too close to dwellings;
- Keep food out of reach of baboons and monkeys i.e. don't leave a picnic unattended;
- Exercise rigorous control of edible refuse;
- Do not leave dustbins outside in easy reach;
- Keep windows and doors securely closed when no at home;
- Avoid bird feeders as the seed / fruit put out for birds do attract other animals as well.
- Feral cats and dogs must be removed from the Estate. Contact the local Society for the Prevention of Cruelty to Animals (SPCA) for assistance in capturing and removing feral animals.

Domestic Animals

Domestic animals such as dogs, cats, monkeys and some birds can cause problems to the natural fauna if not kept adequately enclosed. This is in line with the municipal bylaws regarding domestic animals. The following measures must be implemented and communicated very clearly to all homeowners.

- No domesticated animal may roam outside of the owners property unsupervised;
- Animals roaming the nature areas unsupervised are liable to be removed from the site at the conservation authority's discretion;
- The municipal regulations regarding the number of animals that may be kept must be adhered to.
- No pets may access the open space area of land without being on a leash and under control of the owner/tenant at all times

The following requirements are applicable to the proponent, all employees and all visitors of the property (please also refer to **Error! Reference source not found.** below for ease of reference):

9.6 MONITORING

Monitoring is an important tool in determining the effectiveness of management actions by measuring changes in the environment. These could be in the form of fixed-point photography where an area is photographed on a regular/seasonal basis to ascertain changes, monitoring of a particular aspect such as landscape integrity parameters, recordings of animal movement from fixed point etc. The most important aspect of any monitoring programme is **consistency and continuity**. This will ensure a level of scientific accuracy to determine baselines/thresholds and measure changes/deviations.

Any required monitoring reports must be made available to the competent authority as required.

The type and frequency of monitoring must include:

- During construction photographs must be taken from pre-identified fixed points and a comprehensive record maintained by the ECO;
- Incident Reports;

- Site meeting minutes.

9.7 POST-CONSTRUCTION MAINTENANCE & VALIDITY OF EMPR

“Maintenance” means *actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint.*

A “Maintenance Management Plan” means a *management plan for maintenance purposes defined or adopted by the competent authority.*

The following is recommended:

- Conduct an as-built survey of the completed structure and HOA of the residential estate to keep this on record for future maintenance work.
- Any reports of damage to the structure to be followed-up by HOA of the residential estate.
- HOA of the residential estate to conduct visual inspection post heavy rains/flooding for any damage to the structure. Detect damages/abnormalities (bulging, broken components, corrosion of mesh baskets, vegetation growth or vandalism).
- DEA&DP to be notified, seven (7) days in advance, of any maintenance work.
- Appoint an ECO to monitor maintenance work.
- Holder of the EA must supply ECO with a Method Statement for maintenance work in order to determine inspection frequency.
- ECO completion report once maintenance is complete.
- Maintenance work to be undertaken in line with EMPr and as-built survey (engineer to confirm compliance with “as-built”).

9.8 MONITORING TIMEFRAMES SUMMARY

Table 4: Monitoring Timeframe Summary

MONITORING TIMEFRAMES		
Type	Frequency	Criteria
ECO visits	As per section 5.4	Site photographs/site diary
Record keeping	Bi-weekly	Site photographs, method statements, site meeting minutes (if applicable)
	3-month post construction	Completion Statement
Auditing	One year post construction	Compliance with the EA, EMPr, municipal permits.

9.9 ENVIRONMENTAL AUDITS

A final construction phase Completion Statement must be submitted within 3 months of completion of construction / site handover.

This Completion Statement must include the monitoring results as above, where applicable to construction.

An independent Environmental Audit must be undertaken one (1) year post construction.

9.10 AUDIT REPORTS FREQUENCIES AND FORMAT

The table below provides a summary of the timeframes for the various Audit Reports specified in the EA.

Table 5: Audit Reports Timeframe Summary

ENVIRONMENTAL AUDIT TIMEFRAMES		
Type	Frequency	Criteria
Construction Audit	One year post construction	Audit on operational aspects of the EA and EMPr
Future audits	Competent Authority to confirm	Compliance with the Environmental Regulations for Audits

In terms of the 2014 EIA Regulations, Audit Reports must be submitted to the registered Interested & Affected Parties within 7 days of submission to the competent authority.

In order to comply with the 2014 EIA Regulations, any audits must be undertaken using the following format:

Table 6: Environmental Audit Requirements

Appendix 7 of Regulation 326 of the 2014 EIA Regulations, as amended contains the required contents of an Environmental Audit Report. The checklist below serves as a summary of how these objectives & requirements were incorporated into this Audit Report.	
Objective	Description
The objective of the environmental audit report is to -	
(a) Report on – (i) the level of compliance with the conditions of the environmental authorisation and the EMPr, and where applicable, the closure plan; and (ii) the extent to which the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan achieve the objectives and outcomes of the EMPr, and closure plan.	
(b) Identify and assess any new impacts and risks as a result of undertaking the activity.	
(c) Evaluate the effectiveness of the EMPr, and where applicable, the closure plan.	
(d) Identify shortcomings in the EMPr, and where applicable, the closure plan.	
(e) Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan.	
Requirement	Description

Appendix 7 of Regulation 326 of the 2014 EIA Regulations, as amended contains the required contents of an Environmental Audit Report. The checklist below serves as a summary of how these objectives & requirements were incorporated into this Audit Report.

Objective	Description
(1) An Environmental audit report prepared in terms of these Regulations must contain -	
(a) Details of – (i) The independent person who prepared the environmental audit report; and (ii) The expertise of independent person that compiled the environmental audit report.	
(b) A declaration that the independent auditor is independent in a form as may be specified by the competent authority.	
(c) An indication of the scope of, and the purpose for which, the environmental audit report was prepared.	
(d) A description of the methodology adopted in preparing the environmental audit report.	
(e) An indication of the ability of the EMPr, and where applicable the closure plan to – (i) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis; (ii) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and (iii) Ensure compliance with the provisions of environmental authorisation, EMPr, and where applicable, the closure plan.	
(f) A description of any assumptions made, and any uncertainties or gaps in knowledge.	
(g) A description of an consultation process that was undertaken during the course of carrying out the environmental audit report.	
(h) A summary and copies of any comments that were received during any consultation process.	
(i) Any other information requested by the competent authority.	

Any other requirements of the EA or any other authorisations must be incorporated into an Audit where necessary.

10 DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

Not Applicable.

11 NON-COMPLIANCE

Any person is liable on conviction of an offence in terms of regulation 49(a) of the National Environmental Laws Second Amendment Act (Act 30 of 2013) to imprisonment for a period not exceeding ten (10) years or to a fine not exceeding R10 million or an amount prescribed in terms of the Adjustment of Fines Act, 1991 (Act No. 101 of 1991).

It is the responsibility of the ECO to report matters of non-compliance to the Employer's Representative or the Holder of the EA if no representative is in place. It is the responsibility of the Holder of the EA, and not the ECO, to report such matters of non-compliance to the competent Authority.

11.1 PROCEDURES

The Holder of the EA shall comply with the environmental specifications and requirements of this EMP, any Approval / License issued and Section 28 of NEMA, on an on-going basis and any failure on his part to do so will entitle the authorities to **impose a penalty**¹.

In the event of non-compliance, the following recommended process shall be followed:

- The competent authority shall issue a **Notice of Non-compliance** to the Holder of the EA, stating the nature and magnitude of the contravention.
- The Holder of the EA shall **act to correct the transgression** within the period specified in by the authority.
- The Holder of the EA shall provide the competent authority with a **written statement** describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions.
- In the case of the Holder of the EA failing to remedy the situation within the predetermined time frame, the competent authority may recommend halting the activity.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the competent authority shall be entitled to undertake or to cause to be undertaken such **remedial works** as may be required to make good such damage at the cost of the Project applicant.
- In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be referred to **specialists and / or the competent authority** for determination.
- The competent authority shall at all times have the right to **stop work** and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

¹ A penalty may not necessarily be a monetary fine but could also be a stoppage in work time, additional mechanisms to prevent pollution or degradation at the cost of the proponent or even a directive to cease activities from the competent authority.

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Appendix 1: Locality Maps

Locality Map



© OpenStreetMap (and) contributors, CC-BY-SA

Date created: 2024/05/08

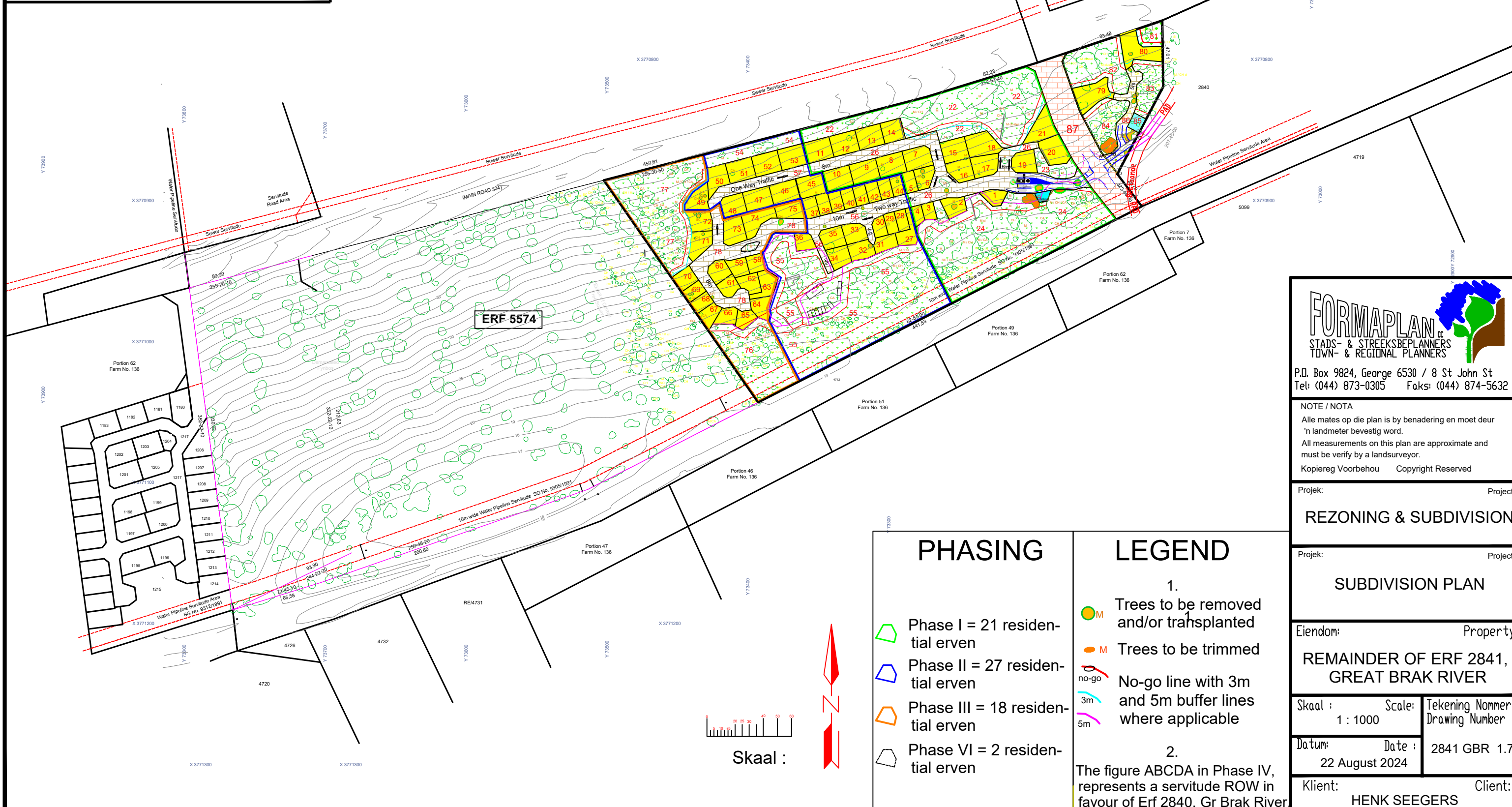


Appendix 2: Site Development Plan

LEGEND

- Application is made for rezoning of a portion of Erf 2841, Great Brak River from Agricultural Zone I to Subdivisional Area for a development consisting 68 Group Housing erven, private open spaces, private streets, utility erf and a public street.
- Application is made for subdivision of the Subdivisional Area as follows:
 - 68 Erven = Gen Res Zone I (ave size 220m²)
 - 2 Erven = Utility Zone
 - 11 Erven = Open Space Zone II
 - 5 Erven = Transport Zone III
 - 1 Erf = Transport Zone II

Portion Nos.	Zonings	Size (ha)	% of development	
1 - 21, 27 - 53, 58 - 75, 79 & 80	Gen Res Zone I	1,4937	28.45	
25, 85	Utility Zone	0.0167	0.32	
22 - 24, 54, 55, 76, 77, 81 - 84	Open Space Zone II	2.8163	53.64	
26, 56, 57, 78, 86	Transport Zone III	0.6712	12.78	
87	Transport Zone II	0.2525	4.81	
TOTAL		5.2504	100.00	



FORMAPLAN
STADS- & STREEKSBEPLANNERS
TOWN- & REGIONAL PLANNERS

P.O. Box 9824, George 6530 / 8 St John St
Tel: (044) 873-0305 Faks: (044) 874-5632

NOTE / NOTA
Alle mates op die plan is by benadering en moet deur 'n landmeter bevestig word.
All measurements on this plan are approximate and must be verify by a landsurveyor.
Kopiereg Voorbehou Copyright Reserved

Projek: **REZONING & SUBDIVISION**

Projek: **SUBDIVISION PLAN**

Eiendom: **REMAINDER OF ERF 2841, GREAT BRAK RIVER**

Skaal : 1 : 1000 Scale: 1 : 1000
Tekening Nummer: 2841 GBR 1.7
Drawing Number

Datum: 22 August 2024 Date: 22 August 2024
Klient: HENK SEEGER Client:

PHASING

- Phase I = 21 residential erven
- Phase II = 27 residential erven
- Phase III = 18 residential erven
- Phase VI = 2 residential erven

LEGEND

- Trees to be removed and/or transplanted
 - Trees to be trimmed
 - No-go line with 3m and 5m buffer lines where applicable
- The figure ABCDA in Phase IV, represents a servitude ROW in favour of Erf 2840, Gr Brak River



Skaal :



Appendix 3: Environmental Sensitivities Map

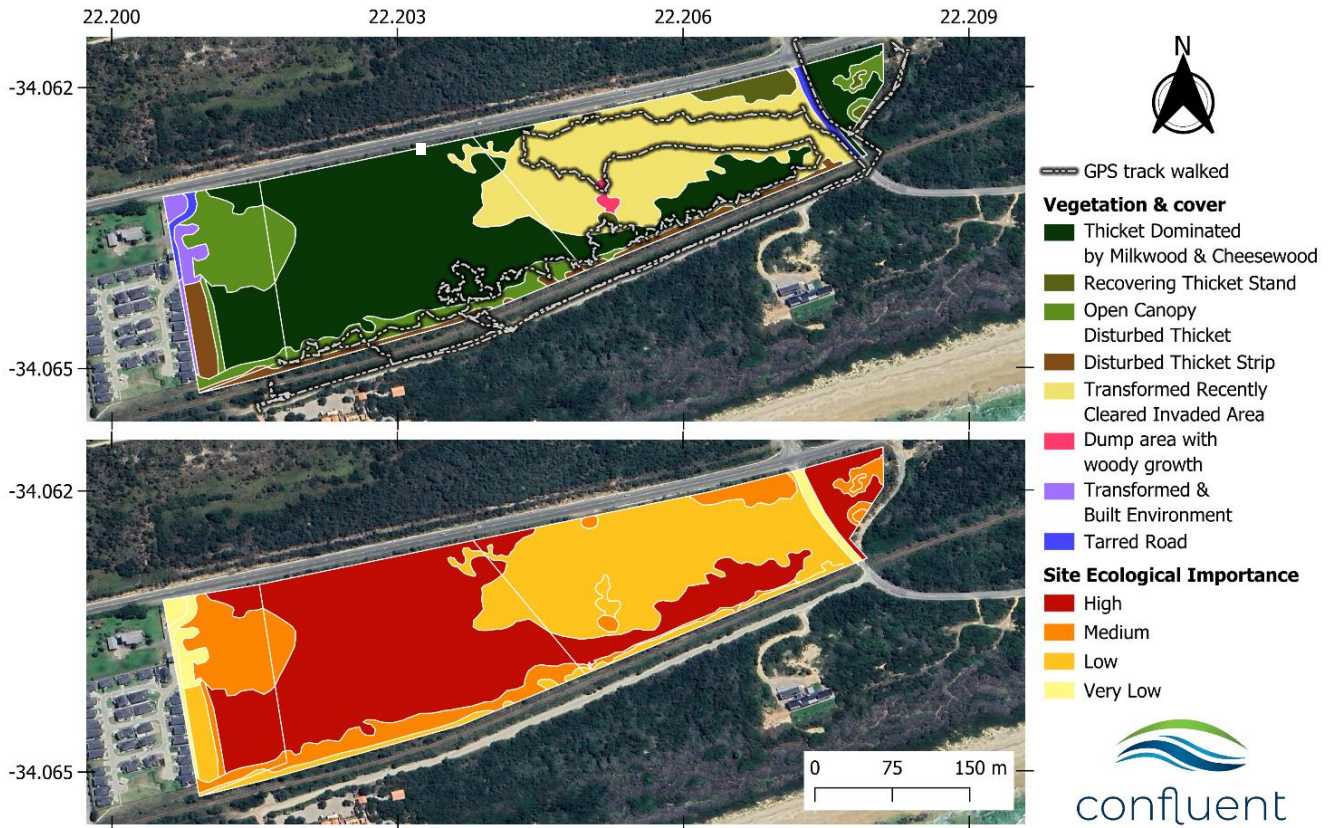


Figure 10: Maps indicating Top) the vegetation present on Erf RE/2841 as well as Erf 5572 & 5573 (for completeness) and Bottom) the corresponding site ecological Importance (SEI) categories that are applicable to the different areas.

Appendix 4: Environmental Guidelines For Construction

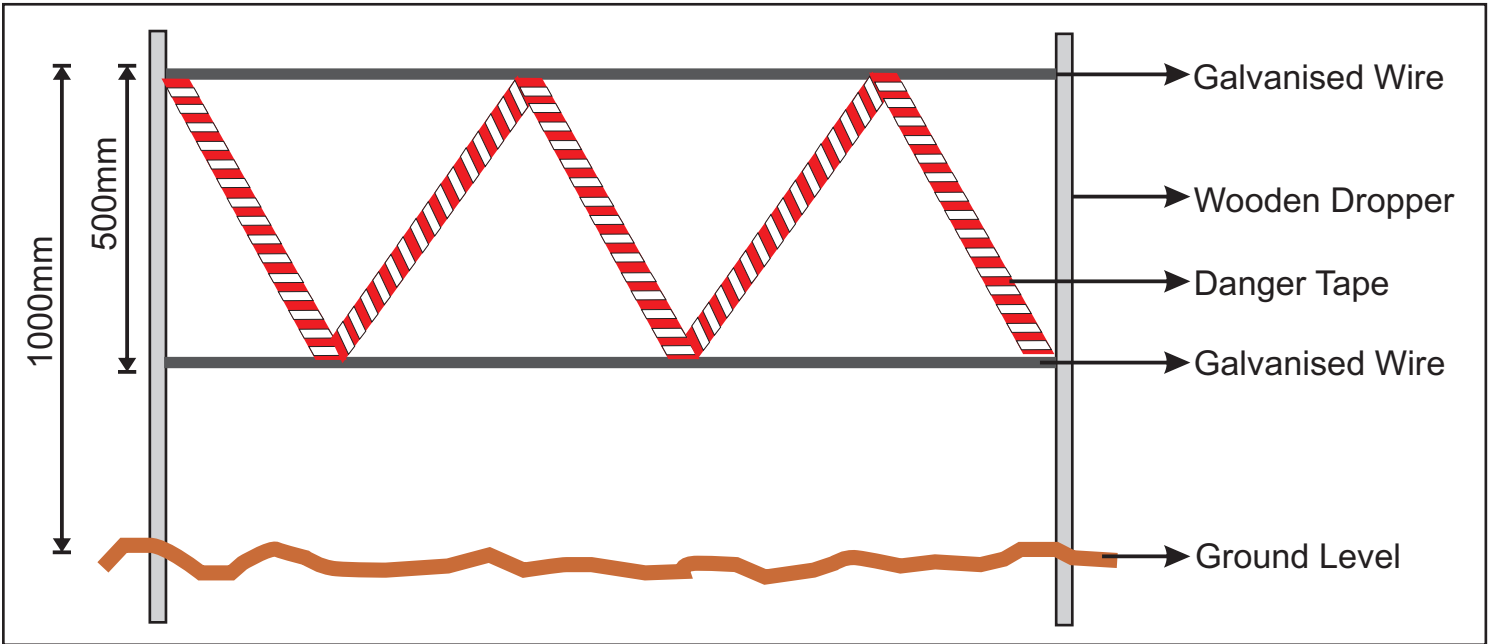


Plate A: Showing a cross section of a typical method of demarcation of no-go areas.

Where demarcation is required on a down slope, it can be more cost effective to include the required silt protection mechanisms on the same support structure as the demarcation. This is detailed in **Plate B** below and must be read in conjunction with the details on erosion control included in the previous diagram.

GENERAL CONSIDERATIONS FOR DEMARCATION OF NO GOAREAS

- The demarcation must include all areas that are going to be disturbed in the total construction (including all service lines)
- The no -go areas may not be accessed by any person (including lunch, tea breaks etc.). Without the explicit written permission from te ECO.
- Maximum fines will be issued for any non compliance with regards to the no go policy.

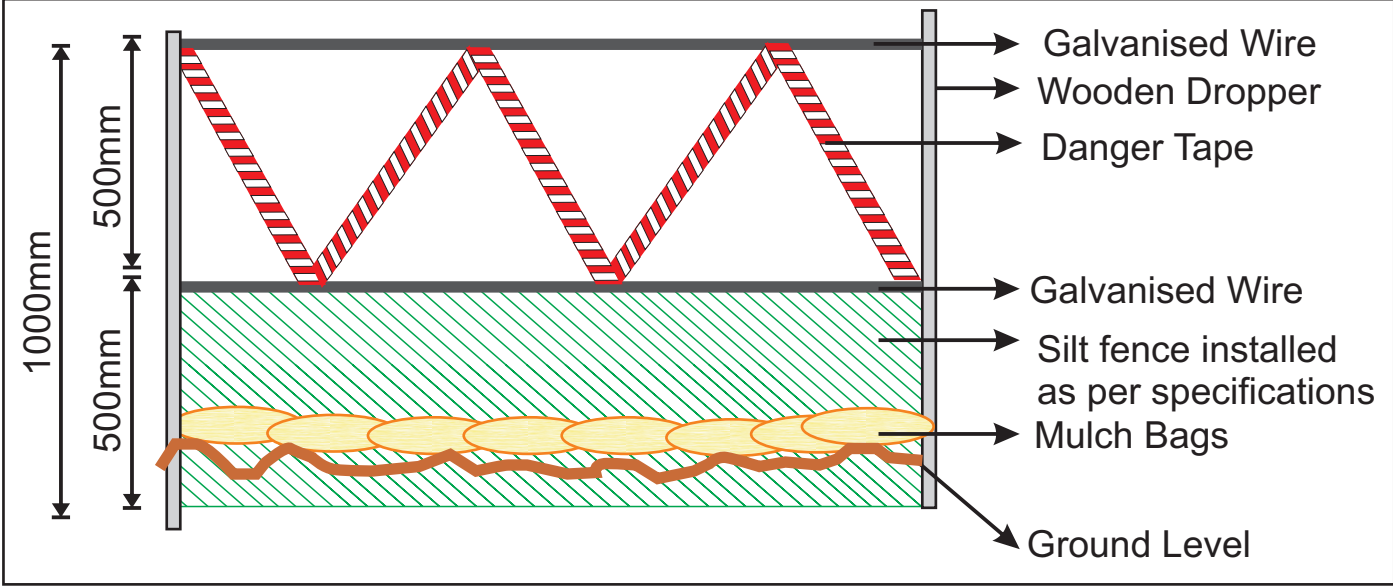
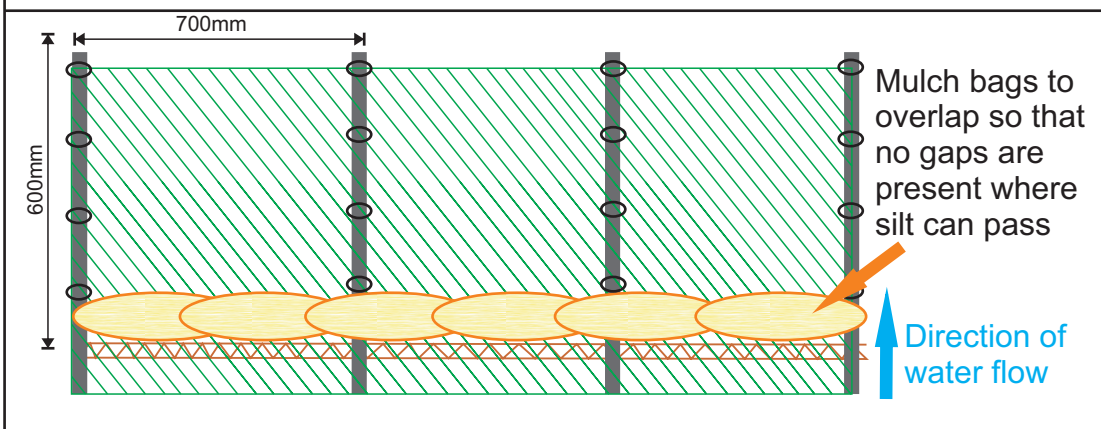


Figure 1: Demarcation of No - Go Areas During Construction



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Frontal View



The purpose of a silt fence is to create a temporary barrier to maintain sediment on a construction site in order to prevent soil erosion and pollution through sediment and nutrient loading. Silt fences are designed to detain sediment from the disturbed construction area and also prevent sheet erosion by decreasing the velocity of the run off.

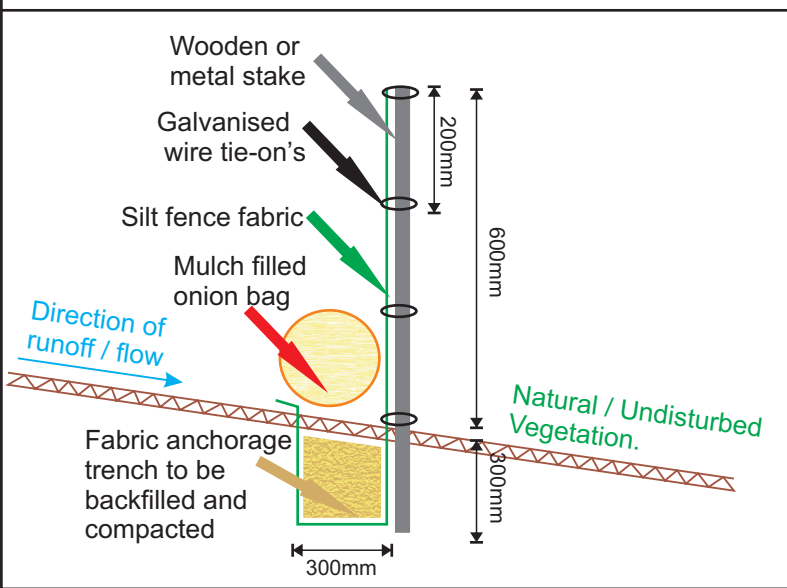
Technical Specifications

- Silt fence fabric to consist out of 50% shade cloth or a geotextile such as biddim (if biddim is used, it is not necessary to place mulch bags).
- Wooden droppers are suitable for the stakes. If the construction program takes place over an extended time frame it may be necessary to use treated droppers or metal stakes.
- The support stakes should not be placed further than 700mm apart on the down slope side of the fabric.
- The fabric should be secured to the stakes using galvanised wire ties not further than 200mm apart.
- The fabric anchorage trench should be at least 300mm deep.

Planning, Placing and Maintenance

- The silt fence is to be installed on all disturbed slopes where sheet erosion may take place.
- This type of silt fence is not suitable for areas where water is concentrated. i.e. gulleys and storm-water outlets.
- The silt fences should be along the contour lines
- The rows of silt fences should be bowed to prevent erosion and loss of silt on the ends of the fence line.
- Silt fences should be inspected weekly and before every forecast rainfall event. Any damage must be repaired immediately.
- Silt deposits should be cleared after each rainfall event. **CLEARED SILT MUST NOT BE PLACED DOWN SLOPE OF THE FENCE.**

Cross-section View



Top View

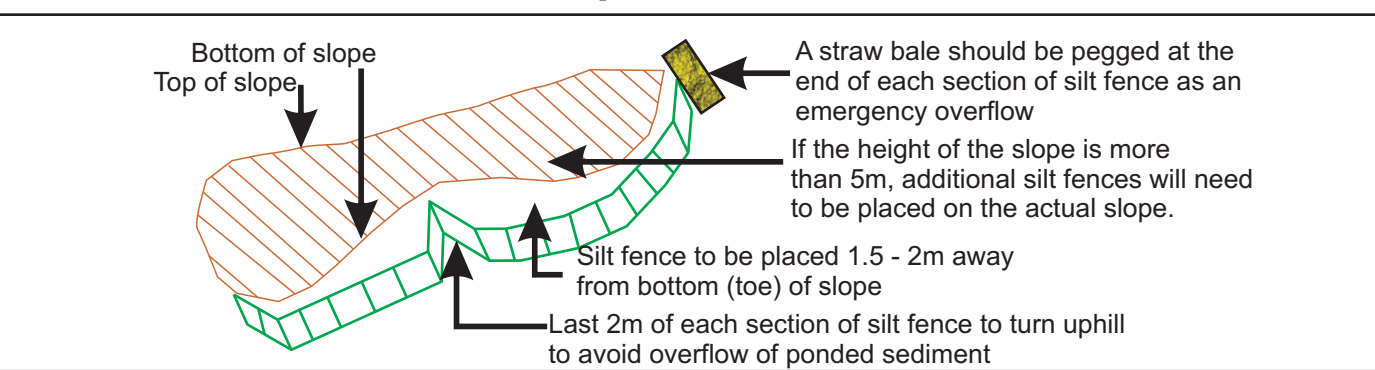
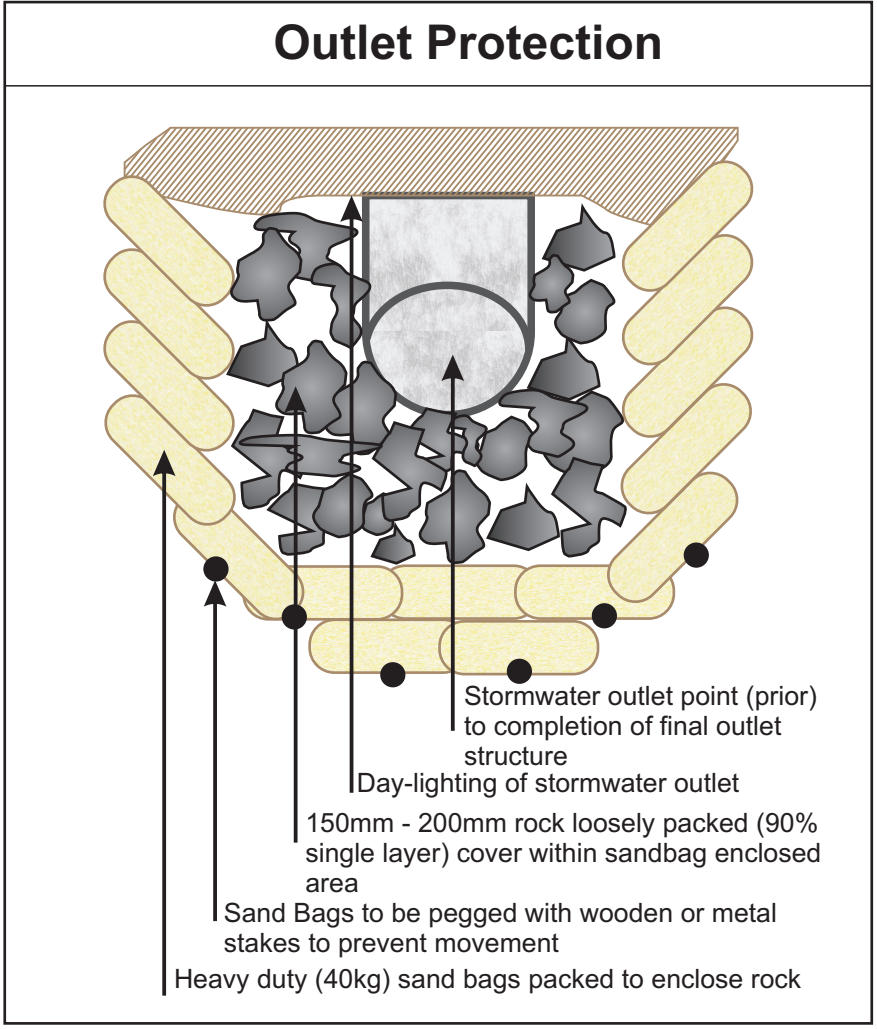
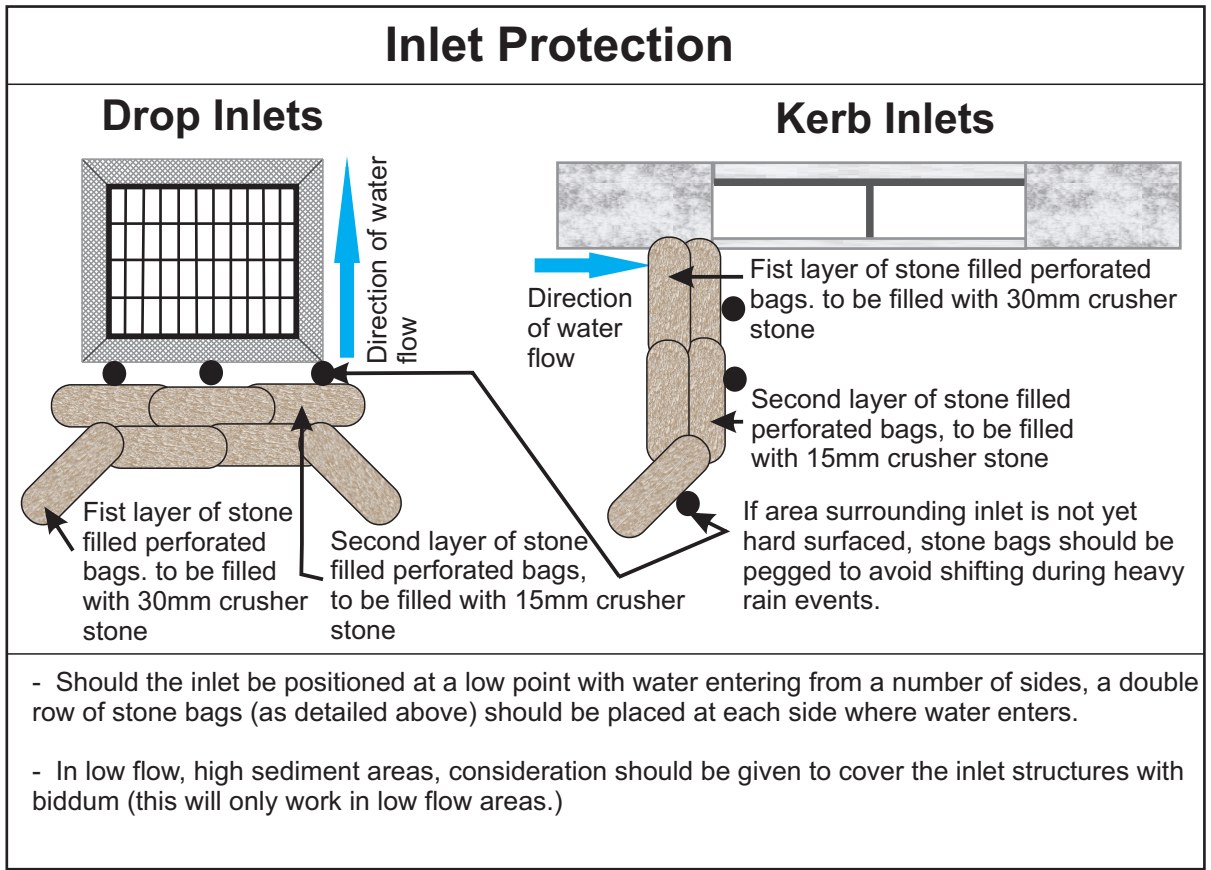


Figure 2: Specifications for Silt Fences





- The methodology referred to above is effective as a temporary measure to be used during construction and is in no way intended to replace the permanent measures that must be installed. These permanent measures must be constructed as per the engineers specifications.
- Stormwater systems should ideally be constructed during low rainfall periods in order to allow for permanent protection measures to be put in place before the rainy season.
- Consideration should be given to encase the outlet structure with a geo-fabric such as biddum. This should first be clarified with the site engineer to ensure compatibility with the stormwater system.

Figure 3: Specifications for Temporary Stormwater Management During Construction



Key Environmental Considerations for Haul Roads

The most important environmental factor to be considered regarding access and haul roads, is the location thereof. Haul roads should be designed to make use of future permanent internal roads and access points.

The haul roads should never be construction in areas that will not be permanently transformed with the development. Nor should they be constructed in any sensitive area.

Another safety and environmental hazard caused by haul road surface is dust problems. Roads should be designed with enough fines to act as binders for the larger particles. However, an excess of fines will result in these particles being released to the atmosphere when repeated stress is applied by the equipment tires. All haul roads that do not have a "sealed" surface, will create dust. The dust problem is mainly dealt with by application of water.

Minimisation of Dust on Haul Roads

- Every effort to minimize dust pollution on the site must be undertaken.
- Construction vehicles must adhere to speed limits and minimization of haul roads must be implemented. During dry, dusty periods haul roads should be kept dampened to prevent excess dust.
- No potable water may be used for damping haul roads.
- As an alternative, products such as road environment dust suppressants (Reds) would be recommended in order to minimize the use of water for controlling dust pollution. This is to be determined by the ECO during construction as required.

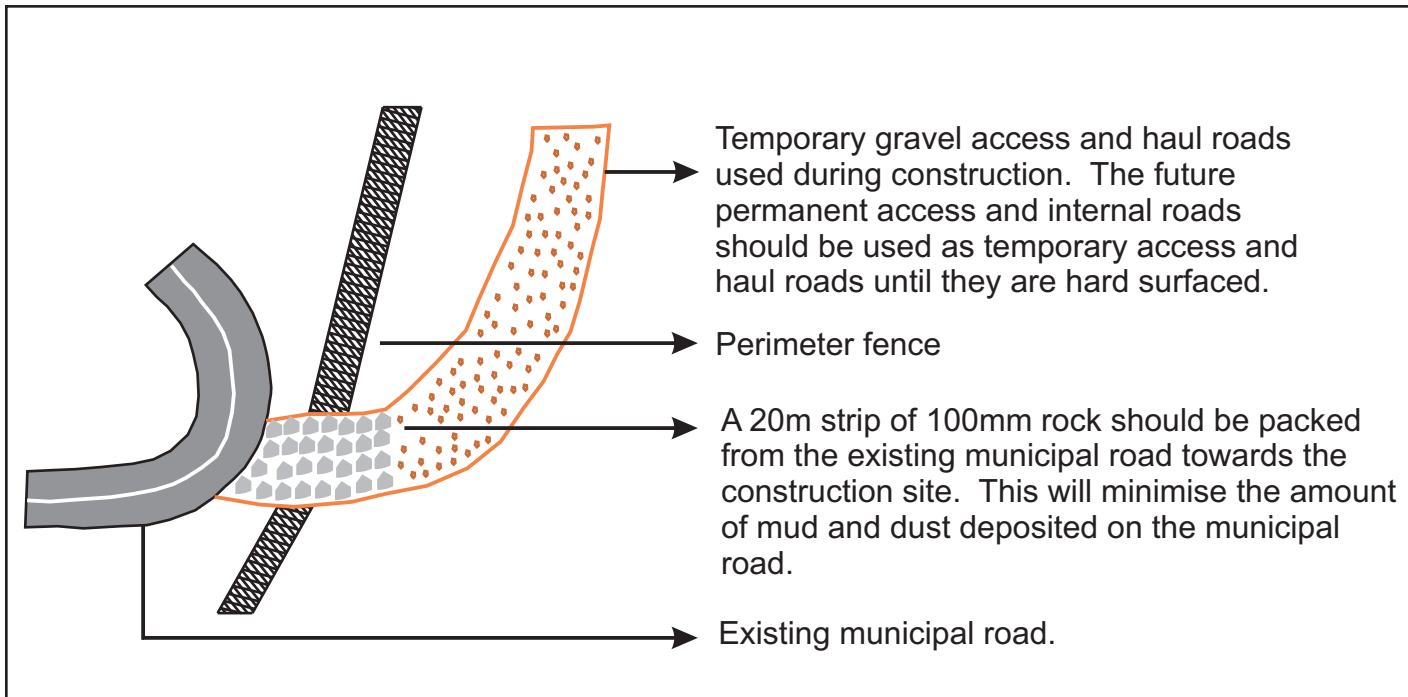


Figure 4: Management of Haul and Access Control During Construction



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Appendix 5: Snake Information Poster

COMMON SNAKES OF THE SOUTHERN CAPE

Garden Route & Klein Karoo



VERY DANGEROUS

Has caused human fatalities

DANGEROUS

Painful bite, but does not require antivenom

MILDLY VENOMOUS

Not thought to be harmful

HARMLESS

Not dangerous to humans



VERY DANGEROUS

Cape Cobra (*Naja nivea*)



VERY DANGEROUS

Cape Cobra - juvenile (*Naja nivea*)



VERY DANGEROUS

Cape Boomslang - male (*Dispholidus typus typus*)



VERY DANGEROUS

Cape Boomslang - female (*Dispholidus typus typus*)



VERY DANGEROUS

Puff Adder (*Bitis arietans arietans*)



DANGEROUS

Berg Adder (*Bitis atropos*)



VERY DANGEROUS

Rinkhals - banded phase (*Hemachatus haemachatus*)



DANGEROUS

Coral Shield Cobra (*Aspidelaps lubricus lubricus*) Photo David Maguire



MILDLY VENOMOUS

Karoo Sand Snake (*Psammophis notostictus*)



MILDLY VENOMOUS

Herald or Red-lipped Snake (*Crotaphopeltis hotamboeia*)



MILDLY VENOMOUS

Spotted Harlequin Snake (*Homoroselaps lacteus*)



DANGEROUS

Rhombic Night Adder (*Causus rhombeatus*)



CAN INFLICT A NASTY BITE

Mole Snake (*Pseudaspis cana*)



HARMLESS

Rhombic Egg-eater (*Dasypeltis scabra*)



HARMLESS

Western Natal Green Snake Photo Tyrone Ping (*Philothamnus natalensis occidentalis*)



HARMLESS

Olive Snake (*Lycodonomorphus inornatus*)



HARMLESS

Brown House Snake (*Boaedon capensis*)



HARMLESS

Common Brown Water Snake (*Lycodonomorphus rufulus*) Photo Tyrone Ping



HARMLESS

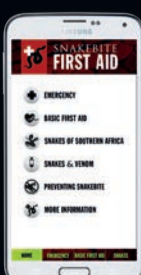
Delalande's Beaked Blind Snake (*Rhinotyphlops lalandei*)



HARMLESS

Common Slug-eater (*Duberria lutrix lutrix*) Photo Tyrone Ping

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JOHAN MARAIS is the author of various books on reptiles including the best-seller *A Complete Guide to Snakes of Southern Africa*. He is a popular public speaker and offers a variety of courses including **Snake Awareness**, **Scorpion Awareness** and **Venomous Snake Handling**. Johan is accredited by the International Society of Zoological Sciences (ISZS) and is a Field Guides Association of Southern Africa (FGASA) and Travel Doctor-approved service provider. His courses are also accredited by the Health Professions Council of South Africa (HPCSA).

Appendix 6: Best Practice Guidelines Alien Vegetation Management

Best Practice Guideline: alien vegetation management

Preamble

Invasive alien vegetation must be removed from environmentally sensitive areas with the least amount of damage to indigenous vegetation, to ensure compliance with the Conservation of Agricultural Resources Act (**CARA**) regulations.

Before any clearing of alien vegetation is initiated, it must be understood that when the programme starts, it must be implemented until completion. There is no value in *ad hoc* clearing, with no follow-up programme.

Management actions:

- Map the extent of invasion as well as density and height of alien species
- Determine costs and priorities and produce a plan of operations detailing Initial control (drastic reduction of the existing population), Follow-up control (control of seedlings and coppice re-growth) and Maintenance (on-going, low-level control) and include targets and timeframes.
- Prioritise the clearing of the most lightly infested areas first
- Prioritise the clearing of highly invasive species which may not have become well established to date
- Prioritise clearing before the burning of a block
- Prioritise clearing within the first season after a burn
- Prioritise follow up clearing
- To restore/rehabilitate areas cleared of alien vegetation
- Keep record of clearing operations and stands

Where should you start?

By removing invasive alien plants from your property, you will help reduce their spread. If your property is very large, and there are many invasive plants present, consider the following as high-priority areas, which should be controlled first:

- The area immediately around buildings, if there is a risk of fire.
- Low-density infestations, to curb the spread of invasive plants into surrounding areas.

- The tops of slopes, watercourses, and steep, long bare slopes, to inhibit the spread of seeds downhill or downstream, where they will infest new areas.
- Sites where initial control work has been completed and regrowth is present, to prevent densification and further infestation.
- Disturbed sites, to prevent new infestations from mass germination of alien seeds in the soil.

Seedlings should be controlled when shorter than 0,5 m to avoid costly control work at a later stage.

Control methods

The following section contains generic guidelines/principles for the removal of alien plants. Specific removal methods for each plant are provided further below.

Invasive alien plant control relies on four main methods - manual, mechanical, chemical and biological control. Long-term success of any programme is best achieved through a combination of these. This is called an integrated control approach.

When using herbicide

Read the labels for specific instructions.

Do

- spray when plants are actively growing,
- ensure that herbicide is mixed according to label application rates,
- ensure correct wearing of safety gear at all times,
- plan the application of herbicides before the operation commences,
- spray when the sun is shining,
- use a drip sheet and keep herbicide in a demarcated area in the veld out of direct sunlight,
- apply spray to the canopy and stems,
- include dye to assist in the identification of areas that have been cleared,
- include a wetting agent should be added to the herbicide mix to allow for better absorption.

Do not

- spray during strong wind, or where there is the slightest evidence of drift,
- spray when it is very hot,
- spray when plants are stressed or dormant,

- spray plants that are over 1m,
- apply herbicide in the rain or on wet, damp leaves,
- allow pregnant women to be directly involved in herbicide operations, or spray near children, animals or water bodies.

Storage

All storage facilities shall comply with the requirements of AVCASA.

Using labour intensive methods

- Always start at the highest point and work downwards i.e. downhill or downstream
- Start from the edge of the infestation and work towards the centre

❖ Hand pulling

- Hand pulling is most effective with small (30cm), immature or shallow rooted plants.
- Shake the excess sandy material from the plant, this makes the plant easier to stockpile and lighter to transport

❖ Chopping/ cutting/ slashing

- This method is most effective for plants in the immature stage, or for plants that have relatively woody stems/ trunks.
- This is an effective method for non-resprouters or in the case of resprouters (coppicing), if done in conjunction with chemical treatment of the cut stumps.
- **Note**
 - Cut/slash the stem of the plant as near as possible to ground level.
 - Paint resprouting plants (i.e. black wattle, lantana and port jackson) with an appropriate herbicide immediately after they have been cut.
 - Stockpile removed material into piles as prescribed.

❖ Basal bark

- Application of suitable herbicide in water can be carried out to the bottom 250mm of the stem. Applications should be by means of a low pressure, coarse droplet spray from a narrow angle solid cone nozzle or by using a paintbrush.
- **Note**
- If plant is multi stemmed, then each stem needs to be treated.

❖ Ring barking

- Remove the bark and cambium around the trunk of the tree in a continuous band around the tree at least 25cm wide, starting as low as possible.
- Where clean de-barking is not possible due to crevices in the stem or where roots are exposed, a combination of bark removal and basal stem treatments should be carried out.
- For aggressively coppicing species pull off the bark below the cut to ground level (bark stripping), to avoid the use of herbicide.
- **Note**
- This method is not used for stands but rather individual large trees

❖ Bark stripping

- All the bark shall be stripped from the trunk between the ground level and 1m above ground level.
- Application of suitable herbicide can also be used with this method.
- Applications should be by means of a low pressure, coarse droplet spray from a narrow angle solid cone nozzle or by using a paintbrush.

❖ Frilling

- Using an axe or bush knife, make a series of overlapping cuts around the trunk of the tree, through the bark into the softwood (approximately 500mm from ground level). The thickness of the blade should force the bark open slightly, ensuring access to the cambium layer.
- Ensure to affect the cuts around the entire stem.
- Apply the herbicide immediately to the cuts by spraying into the frill. The frill needs to be deep enough to retain the herbicide.

Using mechanical methods

❖ Felling

- De-branch cut trees and where possible remove all material.
- Where possible large trees are to be felled so that they fall uphill.
- Cut the plant down as low as possible to the ground.
- Apply herbicide immediately (no later than 30mins) to the cambium layer.
- Ensure all the cuts in the cambium layer are treated.

❖ **Bark stripping**

Where bark stripping is used, then all the bark shall be stripped from the trunk between the ground level and 1m above ground level.

- Application of suitable herbicide can also be used with this method.
- Applications should be by means of a low pressure, coarse droplet spray from a narrow angle solid cone nozzle or by using a paintbrush.

Using chemical control

- Chemical control of alien plants is not recommended in aquatic systems due to the risk of pollution, but may be used on the floodplain in conjunction with cutting or slashing of plants.
- Chemicals should only be applied by qualified personnel.
- Only herbicide registered for use on target species may be used.
- Follow the manufacturer's instructions carefully.
- Appropriate protective clothing must be worn.
- Only designated spray bottles to be used for applying chemicals.

❖ **Injection**

- Drill or punch downward slanting holes into the tree around the entire circumference of the stem.
- Inject the chemical directly into the plant.

❖ **Foliar spray**

- Use a solid cone nozzle that ensures an even coverage on all leaves and stems to the point of runoff.
- Do not spray just before rain (a rainfall-free period of 6 hours is recommended) or before dew falls.
- Avoid spraying in windy weather as the spray may come into contact with non target plants.
- Spraying dormant or drought stressed plants is not effective as they do not absorb enough of the herbicide.

❖ **Cut stump application**

- This is a highly effective and appropriate control method for larger woody vegetation that has already been cut off close to the ground.
- The appropriate herbicide should be applied to the stump using a paintbrush within 30 min of being cut.
- Stems should be cut as low as possible. Herbicides are applied in water as recommended for the herbicide.

Stacking

- Stacking the cut material in heaps, or in windrows along mountain contours to reduce erosion, facilitates easy access for follow up.
- It also assists in containing the resulting fuel load and therefore the risk of uncontrolled fire.
- Keep stacks well apart to prevent fires from crossing easily, not less than fire meters apart, this is naturally dependant on the size of the stack & the resulting fire intensity when they burn.
- Stockpile removed material into piles of 2m high, 3m wide windrows/stacks.
- Stack light branches separately from heavy timber (75mm and more). Preferably remove heavy branches to reduce long burning fuel loads that can result in soil damage from intensely hot fire.
- Do not make stacks under trees, power and telephone lines, within 30 meters of a fire belt or near watercourses, houses and other infrastructure.

Disposal of plant material

- Plant material should be used beneficially wherever possible, as opposed to disposing it at a landfill site where it takes up valuable airspace.
- Woody and dry material, provided no seeds are present, can be chipped and used as mulch or made available to the local community for firewood.
- Wet material and aquatic weeds should be combined with other organic matter and composted. Alternatively, it may be possible to use it for basket making, animal feed or other uses.
- Material which cannot be used beneficially must be disposed of at a registered and approved disposal site.
- When removing material, take care to remove all debris, including shoots and seeds.

Monitoring

- Follow-up inspections are required in order to establish whether follow-up operations are required.
- It is preferable to follow up on an area and remove all seedlings or treat resprouting plants, rather than treat a new area.

Conclusion

Any land management programme in South Africa will inevitably include an alien plant control program. Alien control programs are essential to protect valuable resources such as economically viable agricultural land, surface and ground water, biodiversity and the beautiful landscapes of our country. An alien control program however requires a high level of commitment, coordination between landowners and authorities, professional planning and implementation and a good dose of common sense. Competent land managers are essential for cost effective and professional implementation programmes. The guidelines provided are compiled from a wide source and will hopefully provide insight to land managers in order for financial and human resources to be effectively used in an integrated control programme.

SPECIES & CARA Category	CONTROL METHODS
<p><i>Salix babylonica</i> weeping willow CARA 2</p>	<p>Fell the trees and treat the cut stumps with a Triclon 2% solution or a mycoherbicide. Trees can be felled, then burnt, and seedlings sprayed with herbicide. Biological Control can be released on regrowth or seedlings.</p>
<p><i>Melia azedarach</i> Seringa CARA 3</p>	<p>Foliar Spray Confront 0.75% Solution. Cut Stump Confront 3% Solution. Frill Confront 3% Solution. Basal Stem Garlon 2% Solution. Cut Stump Access 2% Solution.</p>
<p><i>Solanum mauritianum</i> bug weed CARA 1</p>	<p>Hand pulling can be done. Mature plants can be sawed and herbicide applied to cut stump. Frilling is also another method that can be used with herbicide. Foliar spray can be done using: 12.5ml of Starone 200 (Fluroxypyr) mixed with 10l water. Spray onto plants up to 1m tall 0.5l/ha 50ml Mamba (Glyphosate) mixed with 10l water 2l/ha Touch Down (Glyphosate Trimesium) 2l/ha to be used on plants that are 500mm tall. 50ml Garlon 4/Viroaxe (Triclopyr Ester) mixed with 10l water 1,5l/ha Frill the trunk of large trees and use the following: 300ml Timbrel 3A (Triclopyr Amine Salt) mixed with 10l water 1,5l/ha 200ml Chopper (Imazapyr) mixed with 10l water 1l/ha After felling, a cut stump can be treated with: 300ml Timbrel 3A (Triclopyr Amine Salt) mixed with 10l water 2,25l/ha 200ml Chopper (Imazapyr) mixed with 10l water 1l/ha Disposal: Stack and burn. Chip cut material.</p>

SPECIES & CARA Category	CONTROL METHODS
<p><i>Opuntia ficus-indica</i> prickly pear CARA 1</p>	<p>Seedlings can be hoed, mature plants can be dug out.</p> <p>Chemical control applications: Inject into 4 – 12 pre-made holes per plant any of the following: MSMA II mixed with 1l water and injected at 2ml/dose. Mamba (Glyphosate) 1l mixed with 2l water and injected at 2ml/dose. Touchdown (Glyphosate) 330ml mixed with 10l water and injected at 2ml/dose.</p> <p>Biological Control is a very cost effective way of removing this species.</p> <p>Disposal: Leave standing until it rots away. It can be burnt in stacks after it has dried out.</p>
<p><i>Agave americana</i> agave Proposed Invader species</p>	<p>Seedlings can be hoed, or dug out if mature.</p> <p>For chemical control, inject 2ml of MSMA into the bowl of the plant - 2l per 1000 plants.</p> <p>Biological control is the most cost effective way of dealing with this species.</p> <p>Disposal: Leave standing until it rots away.</p>
<p><i>Pinus pinaster</i> Pine CARA 2</p>	<p>Can be pulled out by hand or hoed.</p> <p>Intermediate sized plants should be cut at ground level, with the root being left behind.</p> <p>Mature pine trees can be cut/sawed. Ring barking or filling can also be used.</p> <p>Disposal: Cut material can either be stockpiled for removal or used as erosion barriers. Smaller stemmed material can be stacked for burning or chipping. Seed bearing slash that has been chipped must be left to compost (or to allow seeds to germinate) before being used. Stockpiling should be avoided within a flood plain as this could pose a flood risk. It should always be known that stacked material poses a fire hazard and burns easily.</p>
<p><i>Pennisetum clandestinum</i> Kikuyu CARA 2</p>	<p>A herbicide with the active ingredient glyphosate should be used. Plants should be sprayed during their active growing season (summer or autumn dependant on rainfall region).</p> <p>The suitability of using herbicide near water should be considered i.e. some herbicides may pollute the downstream environment.</p> <p>Application of herbicides is more successful in conjunction with mechanical means.</p>

SPECIES & CARA Category	CONTROL METHODS
<p><i>Eucalyptus spp.</i> Blue gums CARA 1 & 2</p>	<p>Can be pulled out by hand or hoed. Intermediate sized plants should be cut at ground level, with the root treated with herbicides immediately. Mature <i>Eucalyptus</i> can be cut/sawed. Herbicides should be applied to the stump as soon as possible thereafter (within 30 mins).</p> <p>The suitability of using herbicide near water should be considered i.e. some herbicides may pollute the downstream environment. Seedlings can be sprayed using 200g/ha Brush Off (Mersulphfuron Methyl) plus 3l/ha Mamba (glyphosphate). Frill the trunk of mature plants, apply a mix of 1250ml Chopper (Imazapyr) & 10l of water at a rate of 6 l/ha. With a cut stump, apply a mix of 1250ml Chopper (Imazapyr) & 10l of water at a rate of 6 l/ha.</p> <p>If the species is known, check the rate on the label. For spot spraying coppice, apply 16l water, 16gms Brush off, 1% Mamba and 0,5% Actipron. Application of herbicides is more successful in conjunction with mechanical means.</p> <p>Disposal: Cut material can either be stockpiled for removal or used as erosion barriers. Smaller stemmed material can be stacked for burning or chipping. Seed bearing slash that has been chipped must be left to compost (or to allow seeds to germinate) before being used. Stockpiling should be avoided within a flood plain as this could pose a flood risk. It should always be known that stacked material poses a fire hazard and burns easily.</p>
<p><i>Poplar canescens</i> grey poplar CARA 2</p>	<p>Pull out and remove entire root system. Immature and mature plants can be sawed and the stump can be treated with herbicides. The suitability of using herbicide near water should be considered i.e. some herbicides may pollute the downstream environment. For seedlings/immature trees apply a foliar spray of 150ml of Garlon 4/ Viroaxe (Triclopyr Ester) can be mixed with 10l of water and applied at a rate of 2 l per hectare. For stumps that have been cut try 500 ml Chopper (Imazapyr) mixed with 10 l water and applied at a rate of 1.5 l per hectare (Do not apply in riparian zone where water can be contaminated!!!)</p> <p>Large/mature trees that have been cut can be treated with 500 ml Chopper (Imazapyr) mixed with 10 l water and applied at a rate of 1.5l/ha. Cut stumps or frilled trees can be treated with 300ml of Timbrel 3A (Triclopyr Amine salt) mixed in 10 l of water applied at a rate of 1.5 l per hectare. Ecoplugs can be used for trees that are within 10m of a river course.</p> <p>Application of herbicides is more successful in conjunction with mechanical means.</p> <p>Disposal: Cut material can either be stockpiled for removal or used as erosion barriers. Smaller stemmed material can be stacked for burning or chipping. Seed bearing slash that has been chipped must be left to compost (or to allow seeds to germinate) before being used. Stockpiling should be avoided within a flood plain as this could pose a flood risk. It should always be known that stacked material poses a fire hazard and burns easily.</p>

SPECIES & CARA Category	CONTROL METHODS
<p><i>Arundo donax</i> spanish reed CARA 1</p>	<p>Hand removal, removal of rhizomes is essential to avoid resprouting. Foliar Spray can be done using Mamba 10% solution.</p>
<p><i>Acacia cyclops</i> rooikrans CARA 2</p>	<p>Can be removed by hand. Large/mature trees should be removed by cutting the stem below ground level - follow up in the form of weeding of seedlings when they are 15-40 cm high. Disposal: Cut material can either be stockpiled for removal or used as erosion barriers. Smaller stemmed material can be stacked for burning or chipping. Seed bearing slash that has been chipped must be left to compost (or to allow seeds to germinate) before being used. Stockpiling should be avoided within a flood plain as this could pose a flood risk. It should always be known that stacked material poses a fire hazard and burns easily. Can be used for firewood, charcoal and as a building material.</p>
<p><i>Acacia longifolia</i> long-leafed wattle CARA 1</p>	<p>Seedlings/saplings can be pulled out by hand if in the seedling stage. With large/mature trees, the stem should be cut cleanly as near to the ground as possible, ensuring buds don't sprout. The suitability of the use of herbicide near water should be considered i.e. some herbicides may pollute the downstream environment. For seedlings, a foliar spray of 60ml of Garlon 4/ Viroaxe (Triclopyr Ester) can be mixed with 10l of water and applied at a rate of 2l/ha. Cut large/mature trees, the stump can be treated with 60ml of Garlon 4/Viroaxe (Triclopyr Ester) mixed with 10l of water and applied at a rate of 2 l/ha. After cutting the stump or felling tree, it can also be treated with 300ml of Timbrel 3A (Triclopyr Amine salt) mixed in 10 l water and applied at a rate of 1.5l/ha. Application of herbicides is more successful in conjunction with mechanical means. Biological control is available. Disposal: Cut material can either be stockpiled for removal or used as erosion barriers. Smaller stemmed material can be stacked for burning or chipping. Seed bearing slash that has been chipped must be left to compost (or to allow seeds to germinate) before being used. Stockpiling should be avoided within a flood plain as this could pose a flood risk. It should always be known that stacked material poses a fire hazard and burns easily. Can be used for firewood, charcoal and as a building material.</p>

SPECIES & CARA Category	CONTROL METHODS
<p><i>Acacia saligna</i> port Jackson CARA 2</p>	<p>Can be removed by hand. Large/mature trees should be removed by cutting the stem below ground level; thereafter the stumps should be treated to prevent the formation of shoots and left to dry. Follow up in the form of weeding of seedlings when they are 15-40 cm high is necessary. The suitability of the use of herbicide near water should be considered i.e. some herbicides may pollute the downstream environment. For seedlings a foliar spray of 2-4 l of Mamba (Glyphosate) can be applied as a spot spray (1.5%) at a rate of 2-4 l/ha. A foliar spray of 50ml of Garlon 4/ Viroaxe (Triclopyr Ester) can be mixed with 10l of water and applied at a rate of 1.5 l/ha.</p> <p>Note: Do not use Garlon 4 or Viroaxe if other pioneer grass seedlings are present. A foliar spray of Touchdown (Glyphosate Trimesium) can be applied at a rate of 2-4 l/ha.</p> <p>Immature plants should be treated with a foliar spray of 50ml of Garlon 4/Viroaxe (Triclopyr Ester) mixed with 10l of water and applied at a rate of 3 l/ha. Can be treated with Touchdown (Glyphosate) applied at a rate of 4l/ha. Cut stumps of large/mature trees can be treated with 300ml of Timbrel 3A (Triclopyr Amine salt) mixed in 10 l of water applied at a rate of 1.5 l/ha. A Garlon solution can also be applied to approximately 0.6m length of stump. Application of herbicides is more successful in conjunction with mechanical means.</p> <p>Biological control is available, once the fungus has become established in an area; it is preferable not to use any other control measures.</p> <p>Disposal: Cut material can either be stockpiled for removal or used as erosion barriers. Smaller stemmed material can be stacked for burning or chipping. Seed bearing slash that has been chipped must be left to compost (or to allow seeds to germinate) before being used. Stockpiling should be avoided within a flood plain as this could pose a flood risk. It should always be known that stacked material poses a fire hazard and burns easily. Can be used for firewood, charcoal and as a building material.</p>
<p><i>Acacia mearnsii</i> black wattle CARA 2</p>	<p>Seedlings/saplings can be pulled out by hand. Immature plants can be removed with hand tools. Intermediate sized plants should be cut at ground level, with the root being treated with herbicides. Mature plants can be cut/sawed. Herbicides should be applied to the stump as soon as possible thereafter (within 30 min).</p> <p>The suitability of the use of herbicide near water should be considered i.e. some herbicides may pollute the downstream environment. For seedlings a foliar spray of 150ml Mamba (Glyphosate) per 10l of water can be applied at a rate of 3 l/ha. A foliar spray of 25-75ml of Garlon 4/Viroaxe (Triclopyr Ester) can be mixed with 10l of water and applied at a rate of 0.5-1.5 l/ha.</p> <p>For young trees a foliar spray of 75ml of Garlon 4/Viroaxe (Triclopyr Ester) can be mixed with 10l of water and applied at a rate of 3 l/ha. Cut large/mature trees, the stump can be treated with 3 l of Timbrel 3A (Triclopyr Amine salt) mixed in 100 l of water applied at a rate of 1.5 l/ha. Application of herbicides is more successful in conjunction with mechanical means.</p> <p>Biological control is available, when cutting down the trees, the stump fungus should be applied to the cut stumps.</p>

SPECIES & CARA Category	CONTROL METHODS
<p><i>Acacia pycnantha</i> golden wattle CARA 1</p>	<p>Seedlings and immature plants can be removed by hand. The stems of large/mature trees should be cut below ground level; thereafter treated to prevent the formation of shoots and left to dry. Follow up in the form of weeding of seedlings when they are 15-40 cm high. The suitability of the use of herbicide near water should be considered i.e. some herbicides may pollute the downstream environment. For seedlings a foliar spray of 2-4 l of Mamba (Glyphosate) can be applied as a spot spray (1.5%) at a rate of 2-4 l/ha. A foliar spray of 50ml of Garlon 4/ Viroaxe (Triclopyr Ester) can be mixed with 10l of water and applied at a rate of 1.5 l/ha. Note: Do not use Garlon 4 or Viroaxe if other pioneer grass seedlings are present. A foliar spray of Touchdown (Glyphosate Trimesium) can be applied at a rate of 2-4 l/ha. Immature plants should be treated with a foliar spray of 50ml of Garlon 4/Viroaxe (Triclopyr Ester) mixed with 10l of water and applied at a rate of 3 l/ha. Can be treated with Touchdown (Glyphosate) applied at a rate of 4 l per ha. Cut stumps of large/mature trees can be treated with 300ml of Timbrel 3A (Triclopyr Amine salt) mixed in 10 l of water applied at a rate of 1.5 l/ha. A Garlon solution can also be applied to approximately 0.6m length of stump. Application of herbicides is more successful in conjunction with mechanical means. Disposal: Cut material can either be stockpiled for removal or used as erosion barriers. Smaller stemmed material can be stacked for burning or chipping. Seed bearing slash that has been chipped must be left to compost (or to allow seeds to germinate) before being used. Stockpiling should be avoided within a flood plain as this could pose a flood risk. It should always be known that stacked material poses a fire hazard and burns easily. Can be used for firewood, charcoal and as a building material.</p>

*Contact PPRU for information, advice and availability of bio-control agents, see contact details below.

HELPFUL CONTACT NUMBERS

Note: Although these telephone numbers are correct at the time of going to print, they may change from time to time.

Working on Fire

Tel: +27 (0) 21 799 8800

Fax: +27 (0) 21 797 8390

Web Site: www.workingonfire.org

Plant Protection Research Unit (PPRU)

Stellenbosch: Vredenburg Research Centre

Tel: +27 (0) 21 887-4690

Fax: +27 (0) 21 883-3285

Website: <http://www.arc.agric.za/>

Working for Water

Toll-free number 0800-005-376

Web site: <http://www.dwaf.gov.za/wfw/>

Department of Agriculture

Durbanville

Tel: +27 (0) 21 976 8136/1759

Fax: +27 (0) 21 976 1889

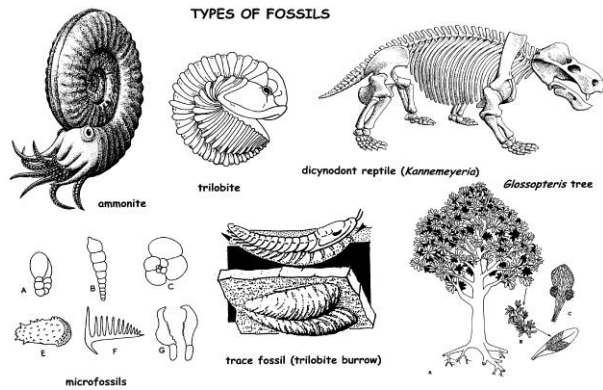


Appendix 7: Fossil Finds Poster

Palaeontology: what is a fossil?

Fossils are the traces of ancient life (animal, plant or microbial) preserved within rocks and come in two forms:

- Body fossils preserve parts, casts or impressions of the original tissues of an organism (e.g. bones, teeth, wood, pollen grains); and
- Trace fossils such as trackways and burrows record ancient animal behaviour.



How to report chance fossil finds: What should I do if I find a fossil during construction/mining?

If you think you have identified a fossil:

Immediately inform the ECO or Site Agent. He/she will then contact HWC and write a report and if necessary operations will stop in that specific area until the fossil is recovered

Heritage Western Cape
ceoheritage@westerncape.gov.za

021 483 5959

www.hwc.org.za

iLifa leMveli iNtshona Kholo
Erfenis Wes-Kaap
Heritage Western Cape

Types of palaeontological finding - What does a fossil look like?

Fossils vary in size, from fossilised tree trunks and dinosaur bones down to very small animals or plants. Finds can be **individual fossils** (one isolated wood log or bone) or **clusters and beds** (several bones, teeth, animal or plant remains, trace fossils in close proximity or bones resembling part of a skeleton). A bed of fossils is a layer with many fossil remains.

Below there is a list of few examples of fossils which may be identified during excavations in the Western Cape.


Image	Description	Image	Description
	Leaves		Snail shells and other shells
	Fossil wood		Bones of larger animals
	The remains of fish and marine life (e.g. teeth, scales, starfish)		Large burrows made by moles and other animals
	Stromatolites		Traces made by burrowing insects (ants, wasps, dung-beetles etc.).
	Animal footprints		

Images provided by Dr John Almond

Text by HWC's Archaeology, Palaeontology & Meteorites Committee June 2016



Appendix 8: Environmental Do's and Don'ts Poster

	ENVIRONMENTAL DO'S	ENVIRONMENTAL DON'TS
Work Site	 <p>Workers and equipment to stay within site boundaries</p>	 <p>Do not enter no go areas</p>
Materials & Equipment	 <p>Use drip trays Report spills</p>	 <p>Do not create dust Do not drive too fast</p>
	 <p>Store in camp at night Check for leaks Ensure loads don't spill</p>	 <p>Do not wash machinery or tools on site</p>
Waste Management	 <p>Use toilets provided</p>	 <p>Don't burn or bury waste No fires on site Report any other fires</p>
	 <p>Use bins provided for cigarette butts & waste</p>	 <p>Eat in designated area Don't eat at dam or river</p>
Natural Environment	 <p>Save water Use only drinking water provided</p>	 <p>Do not damage trees, flowers or rocks</p>
	 <p>Protect animals and archaeological remains</p>	 <p>Do not swim or wash in the dam or river</p>
Danger & Emergencies	 <p>Know emergency procedures & no's Report accidents</p>	 <p>No smoking near gas or diesel</p>
	 <p>Be careful when working with hazardous substances</p>	 <p>Fines will be issued for non-compliance with environmental specifications</p>

Appendix 9: Health and Safety

Health and Safety

The Contractor must ensure compliance with the Occupational Health and Safety (No. 85 of 1993). Of key importance is the following (Section 8 of the aforesaid act):

8. General duties of employers to their employees:

- Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.
- Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular-
 - the provision and maintenance of systems of work, plant and machinery that, as far as is reasonably practicable, are safe and without risks to health;
 - taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment;
 - making arrangements for ensuring, as far as is reasonably practicable, the safety and absence of risks to health in connection with the production, processing, use, handling, storage or transport of articles or substances;
 - establishing, as far as is reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures must be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures;
 - providing such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of his employees;
 - as far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken;
 - taking all necessary measures to ensure that requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used;
 - enforcing such measures as may be necessary in the interest of health and safety;
 - ensuring that work is performed and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and

- causing all employees to be informed regarding the scope of their authority as contemplated in section 37 (1) (b).

The Occupational Health and Safety Act aims to provide for the health and safety of persons at work and for the health and safety of persons in connection with the activities of persons at work and to establish an advisory council for occupational health and safety.

Health & Safety on site is the responsibility of the contractor and the proponent.

Although this is not the function of the ECO, it is a standard requirement for building construction and must be monitored and evaluated by a suitably qualified Health & Safety person. It will not form part of any environmental audit in the future.

Appendix 10: EAP Company Profile



Cape EAPrac Company Profile

Cape Environmental Assessment Practitioners (Pty) Ltd was established in March 2008 by Directors **Doug Jeffery** (EAPASA Reg. No 2019/1746) and **Louise-Mari van Zyl** (EAPASA Reg. No. 2019/1444). The full time professional team includes: **Dale Holder** - Senior Environmental Practitioner (EAPASA Reg.No 2019/301), **Siân Holder** (Practitioner/ECO/Environmental Education), **Mariska Byleveld** - Candidate Environmental Practitioner (EAPASA Reg. No 2023/6593), **Francois Byleveld** - Candidate Environmental Practitioner (EAPASA Reg.No 2023/6700), **Onke Nandipha** (EAPASA Reg.No 2023/6688) & **Charmaine Mudau** - Full Time On-Site ECOs and **Carin Naudé** - Business Administrator.

The firm implements legislation under the National Environmental Management Act (NEMA), National Environmental Management: Waste Act (NEM:WA) and the National Environmental Management: Air Quality Act (NEM:AQA).

Our main services include:

- Environmental Impact Assessments (EIA's & Basic Assessments)
- Environmental Management Policies & Plans (EMMP's)
- Environmental Control & Monitoring(ECO)
- Environmental Audits
- Environmental Education & Interpretation
- Environmental Constraints Analysis
- Public Participation & Stakeholder Engagement
- Outeniqua Sensitive Coastal Area Permits (OSCA)
- Forestry Applications (for removal/pruning of protected species)
- GIS & Mapping
- Retrospective Damage Assessment (Section 24G)
- Rehabilitation Plans
- Coastal Water Discharge Permits
- Air Quality Licence Applications (AEL's)
- Waste Management Licence Applications (Waste Licence)

PROJECT EXPERIENCE INCLUDES

Reverse Osmosis Desalination; Sensitive Environmental Management including National Parks/Conservation Areas & World Heritage Sites; Renewable Energy Projects (Solar & Wind); Waste Management License Applications for Waste Disposal Sites, Sewerage Plants & Abattoirs; Waste-to -Energy Projects including Biogas Facilities; Marine Aquaculture; Filling Stations; Air Emission Processes for Sawmills, Brick Works & Processing Plants; ECO responsibilities on Private & State Housing Developments, Provincial & Municipal Roads and Infrastructure, Private, Provincial & Municipal applications for development of infrastructure, housing & commercial components

LIST OF ONGOING **CAPE EAPRAC**
PROJECTS IS AVAILABLE
ON REQUEST.
PLEASE VISIT OUR
WEBSITE FOR MORE DETAILS

The Team

Doug Jeffery - Director

Doug Jeffery obtained a Bsc with majors in Botany and Zoology at the University of Cape Town (UCT) and went on to obtain his MSc in Botany also at UCT. He has worked extensively in the Western-, Southern- and Eastern Cape both as a professional Botanist and co-ordinating EIA processes for over 20 years. He is registered with the South African Council for Natural Scientific Professions since 1990. He is also registered with the Environmental Assessment Practitioners Association of South Africa.

email: doug@dougjeff.co.za



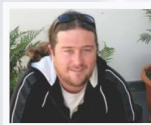
Dale Holder

Senior Environmental Practitioner

Dale graduated from the Technicon Pretoria in 1999 with a National Diploma in Nature Conservation. He worked as a Socio-Ecologist for SANParks and as Project Manager for the Department of Marine and Coastal Management. He started working as an environmental practitioner in 2002. His focus is currently on Renewable Energy Infrastructure Assessment, but is also involved with assessments in various other industries.

Registered as a Professional Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA). (Reg. No. 2019/301)

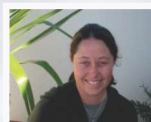
email: dale@cape-eaprac.co.za



Siân Holder - Consultant / ECO

Siân completed a National Diploma Nature Conservation (Pta Tech), B-tech Nature Con. (NMMU) and a Masters Degree in Environmental Education (Rhodes University). She joined our team in 2008. She worked as Environmental Assessment Practitioner for many years, but her current focus is on Environmental Control and Monitoring, Rehabilitation and Alien Invasive Management.

email: sian@cape-eaprac.co.za



Carin Naudé

Business Administrator

Carin obtained a BBA degree through UNISA. She gained extensive experience in business management and administration since 1988. She joined Cape EAPrac in June 2008 and is responsible for the day to day administrative functions of the business. Her acquired knowledge and leadership skills enables the rest of the team to function efficiently in their respective fields.

email: carin@cape-eaprac.co.za



Louise-Mari van Zyl

Director / Principal Environmental Practitioner

Louise-Mari van Zyl holds a Masters degree in Geography & Environmental Sciences from the University of Stellenbosch. She worked as an Environmental Assessment Practitioner (EAP) since 2002 on projects in the Eastern, Southern, Western & Northern Cape provinces. She is registered as an EAP with the Environmental Assessment Practitioners Association of South Africa.

email: louise@cape-eaprac.co.za



Mariska Byleveld

Candidate Environmental Practitioner

Mariska joined Cape EAPrac in April 2022. She completed her BSc in Geology in 2016, BSc Honours in 2017 and holds a MSc in Geology from the University of the Free State (2020). She worked as a Geologist for two years before joining our team. She is registered as a Candidate Environmental Practitioner.

email: mariska@cape-eaprac.co.za

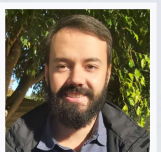


Francois Byleveld

Candidate Environmental Practitioner

Francois graduated from the University of the Free State in 2020 with a MSc in Geology. After working in the petroleum industry, he joined our team in May 2023 to train as an Environmental Assessment Practitioner. He is registered as a Candidate EAP.

email: francois@cape-eaprac.co.za



On-Site ECOs



We have three full-time, on-site ECOs, working on PV Solar construction sites in the Northern Cape:

- ♦ Onke Nandipha - BSc in Environmental Sciences (2017) and a BSc Honours in Geography (2018) from Walter Sisulu University. He is registered as a Candidate EAP with EAPASA.
- ♦ Charmaine Mudau - BA in Geography and Environmental Management from the University of the Free State (2014) and a BSc Honours in Geography from UNISA (2020).

Their knowledge and understanding of environmental management make them a valuable asset on site.

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charmaine@cape-eaprac.co.za