DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

for

KEURBOOMS LIFESTYLE VILLAGE

on

PORTION 38 OF FARM GANSE VALLEI 444, PLETTENBERG BAY

In terms of the

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

Prepared for Applicant: Intergreen (Pty) Ltd

Date: 23 February 2024

Candidate EAP: Mr Francois Byleveld (EAPASA Reg 2023/6770)
Primary EAP: Ms Louise-Mari van Zyl (EAPASA Reg 2019/1444)
Candidate EAP Email: francois@cape-eaprac.co.za
Primary EAP Email: louise@cape-eaprac.co.za

Report Reference: BIT729/07
Department Reference: 16/3/3/6/7/1/D1/6/0121/22
Case Officer: Jessica Christie

Cape EAPrac
Cape Environmental Assessment Practitioners

Tel: +27 44 874 0365 PO Box 2070, George 6530
Fax: +27 44 874 0432 17 Progress Street, George

www.cape-eaprac.co.za

DOCUMENT TRACKING

DOCUMENT HISTORY

DOC REF	REVISION	DATE	AUTHOR
BIT729/07	Draft EMPr	2024-02-23	Mr Francois Byleveld (Candidate EAP 2023/6770)

APPROVAL FOR RELEASE

NAME	TITLE	SIGNATURE
Ms Louise-Mari van Zyl (Primary EAP 2019/1444)	Ms	

DISTRIBUTION FINAL

DESIGNATION	NAME	EMAIL / FAX
DEA&DP: Case officer	Jessica Christie	Email
Applicant	Intergreen (Pty) Ltd	Email

APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:

***Cape EAPrac* Environmental Assessment Practitioners**

PO Box 2070

George

6530

Tel: 044-874 0365

Fax: 044-874 0432

Candidate EAP: Mr **Francois Byleveld** (MSc Geology [University of the Free State]) (Candidate EAPASA Registration Number: **2023/6770**) under supervision of the Primary EAP.

Primary EAP: Ms **Louise-Mari van Zyl** (MA Geography & Environmental Science [US]; EAPSA, Registration Number **2019/1444**. Ms van Zyl has over twenty years' experience as an environmental practitioner.

PURPOSE OF THIS REPORT:

Draft Environmental Management Programme

APPLICANT:

Intergreen (Pty) Ltd

CAPE EAPRAC REFERENCE NO:

BIT729/07

SUBMISSION DATE

23 February 2024

ENVIRONMENTAL MANAGEMENT PROGRAMME

for

KEURBOOMS LIFESTYLE VILLAGE

on

PORTION 38 OF FARM GANSE VALLEI 444, PLETTENBERG BAY

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

Report Issued by:

Cape Environmental Assessment Practitioners

Tel: 044 874 0365 PO Box 2070

17 Progress Street

Web: www.cape-eaprac.co.za George 6530

ORDER OF REPORT

Environmental Management & Maintenance Programme

Appendix 1	:	Locality Plans
Appendix 2	:	Site Development Plan
Appendix 3	:	No-Go Areas Map
Appendix 4	:	Environmental Guidelines For Construction
Appendix 5	:	Snake Information Poster
Appendix 6	:	Best Practise Guidelines Alien Vegetation Management
Appendix 7	:	Fossil Finds Poster
Appendix 8	:	Environmental Do's and Don'ts Poster
Appendix 9	:	Health and Safety
Appendix 10	:	EAP Company Profile

TABLE OF CONTENTS

1. INTRODUCTION 11
1.1 Purpose of the EMPr 18
1.2 Status of the EMPr 18
2 EMPR PHASING 18
2.1 Pre-Construction Phase 18
2.2 Construction Phase 19
2.3 Operational / maintenance Phase 19
2.4 Closure and Decommissioning Phase 19
3 LEGISLATIVE REQUIREMENTS 19
3.1 National Environmental Management Act (NEMA, Act 107 of 1998) 19
3.2 Environment Conservation Act, 1989 (ECA) 20
3.3 National Environmental Management: Biodiversity Act (NEM:BA) (Act 10 of 2004) 20
3.4 National Waste Management Strategy 21
3.5 National Water Act (NWA, Act 36 of 1998) 21
3.6 National Forest Act (Act 84 of 1998) 21
3.7 National Heritage Resources Act (Act 25 of 1999) 21
3.8 Occupational Health and Safety act (Act 85 of 1993) 22
4 ENVIRONMENTAL IMPACTS & MITIGATIONS 22
4.1 Mitigations 23
5 RESPONSIBILITIES 26
5.1 Holder of the EA 26
5.2 Engineers AND Contractors 26
5.3 Environmental Control Officer (ECO) 27
5.4 ECO Site Visit Frequency 28
5.5 Environmental Induction & Training 28
6 PRE-CONSTRUCTION DESIGN CONSIDERATIONS 29
6.1 Stormwater Management Preparation 29
6.2 Demarcation of Work and No-Go Areas 29
6.3 WATER RESOURCE PROTECTION 31
6.4 ENERGY RESOURCE PROTECTION 33
7 CONSTRUCTION CONSIDERATIONS 33
7.1 Stormwater Management 34
7.2 Dust control 35
7.3 Noise and Vibration 35
7.4 Traffic Control 37
7.5 Waste Management 38
7.6 Stockpile Management 39
7.7 Storing Fuels & Chemicals 40

7.8 Minimising Erosion 41
7.9 Rehabilitation & Botanical Management 43
7.10 Fauna Management 44
7.11 Social Requirements 44
7.12 Method Statements 45
7.13 Cement Batching 46
7.14 Heritage Requirements 47
8 OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS 48
8.1 Alien vegetation management / Landscaping 48
8.2 Stormwater Management 49
8.3 Fire Management 49
9 MONITORING, MAINTENANCE & VALIDTY OF EMPR 50
9.1 Monitoring 50
9.2 Monitoring Timeframes Summary 50
9.3 Environmental Audits 51
9.4 Audit Reports Frequencies and Format 51
10 DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS ... 53
11 NON-COMPLIANCE 53
11.1 Procedures 53
12 REFERENCES 55

FIGURES

Figure 1: Locality map of Portion 38 of Farm Ganse Vallei 444 (red outlined area) (CapeFarmMapper, 2023). 12
Figure 2: Minimum items required to accommodate the proposed development in the existing Plettenberg Bay sewer system. The GLS report worked on the original 17 unit proposal which has since been reduced following the outcome of the environmental process (GLS Consulting, 2022). 13
Figure 3: N2 road reserve (left) and Rietvlei Road road reserve (right). Required sewage infrastructure to be installed within the transformed areas of the road reserve. 13
Figure 4: Minimum required upgrade to the existing 75mm diameter pipeline within the Rietvlei Road road reserve to comply with the fire flow criteria. Note that the original 17 unit proposal considered by GLS has since been reduced to 12 units (GLS Consulting, 2022). 14
Figure 5: Minimum required upgrades to free up an additional 860kl/day from the Goose Valley Reservoir and to accommodate the proposed development on Portion 38 of Farm Ganse Vallei 444 (GLS Consulting, 2022). 15
Figure 6: Preferred pipeline route from Goose Valley Reservoir to existing distribution main in N2 road reserve 16
Figure 7: Preferred pipeline route from Goose Valley Reservoir to existing distribution main in N2 road reserve 16
Figure 8: Site development plan. 17
Figure 9: No-Go areas for the proposed development site. 30

TABLES

Table 1: Checklist in terms of Appendix 4 of Regulation 982 of 2014 EIA Regulations vii
Table 2: List of Mitigation Measures & Associated Management Requirements 23
Table 3: Site Clearance Methodology. 33
Table 4: Monitoring Timeframe Summary 50
Table 5: Audit Reports Timeframe Summary 51
Table 6: Environmental Audit Requirements 51

ENVIRONMENTAL MANAGEMENT PROGRAMME REQUIREMENTS

Appendix 4 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Management 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.	Author: Mr Francois Byleveld (Candidate EAP 2023/6770) Reviewed By: Ms Louise-Mari van Zyl (Primary EAP 2019/1444) See Appendix 10.
A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Section 1
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 1
A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all 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.	Section 4 – Environmental Impacts & Mitigations Section 5 - Responsibilities Section 6 – Pre-Construction Design Section 7 – Construction Phase Section 8 – Operation Phase
A description and identification of impact management outcomes required for the aspects contemplated above.	Section 4
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;	Section 4 Section 6 Section 7 Section 8

Requirement	Description
(ii) Comply with any prescribed environmental management standards or practises; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (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.	Section 9 Section 11
The frequency of monitoring the implementation of the impact management actions contemplated above.	Section 9
An indication of the persons who will be responsible for the implementation of the impact management actions.	Section 5
The time periods within which the impact management actions must be implemented.	Not Applicable
The mechanism for monitoring compliance with the impact management actions.	Section 9
A program for reporting on compliance, taking into account the requirements as prescribed in the Regulations.	Section 9
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.	Section 5 Section 6 Section 7 Section 8 Section 9
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.

EMPr Environmental Management 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, Intergreen (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.

Intergreen (Pty) Ltd proposes to develop a low density residential estate, with private amenities, on Portion 38 of Farm Ganse Vallei 444 (8.58ha), Plettenberg Bay (Bitou Municipality, Western Cape Province). The development allows for private, in-house care and support should ill/elderly residents require such services.

The property is situated east of the N2 national road and is bordered by the Goose Valley Golf Estate (west/south), Keurbooms Estuary (east) and the Meadows Residential Estate (north-west), as well as private residential development directly north of the site.

A large single residential dwelling with landscaped gardens surrounding the structure overlooking the estuary exist on the property. There are also existing stables and paddocks in the south-western corner of the property that is significantly more transformed. The property was historically used for keeping horses and grazing activities (**Error! Reference source not found.**).

Portion 38 of Farm Ganse Vallei 444 is currently zoned Agriculture Zone I and it is the intention of the applicant to subdivide the property into two (2) portions and rezone these portion to:

- Residential Zone II portion (3.17ha equating to 36% of the site) and
- Open Space Zone III portion (5.41ha equating to 64% of the site).

The proposed development within the Residential Zone II portion will entail the following infrastructure:

- Twelve (12) x sectional title group housing units (single storey), each with a double garage and two (2) additional parking bays. Each unit will cover ~655m^2 and will therefore calculate to 1.39 units per hectare over the entire site.
- Entrance gate (from Rietvlei Road).
- Guard house.
- Maintenance and staff rooms.
- Communal areas (clubhouse, conference room, gym, pool, doctor/nurse office and admin office).
- Six (6) x visitor parking bays at the communal buildings / facilities.
- Internal access roads (5.5m wide).
- External services (water line and sewer line within road reserves as part of Municipal infrastructure).

Importantly no formal development is proposed in the Open Space Zone III portion (~5.41ha) although existing pedestrian trails will be maintained.

Vehicular access to the proposed development will be directly from Rietvlei Road (Minor Road 7214) within a 9.45m wide right of way servitude (Portion 4 of Farm 444) along the northern boundary of Portion 38 of Farm Ganse Vallei 444. The Rietvlei Road connects directly with the N2 National Road and is an existing tar road. At the bottom of Rietvlei Road there is an existing public parking area from where the general public can access the estuary.

The proposed development will be a sectional title development (no subdivision), and therefore all the

outdoor spaces are considered communal open space that must be maintained by the development (Applicant/Managing Agent/Body Corporate) in perpetuity. Given that a large portion (~5.41 ha) of the property will be zoned private 'Open Space Zone III' within other internal recreational open space areas limited within the proposed Residential Zone II portion on the top flat portion of the site.

The proposed units have been specifically positioned within the transformed, flat portion of the site which avoids higher sensitive areas identified by the independent biodiversity/botanical/faunal/aquatic specialist studies.

All existing buildings/structures which do not form part of the newly proposed development (paddocks, entrance gate, dwelling) will be demolished.

Figure 1: Locality map of Portion 38 of Farm Ganse Vallei 444 (red outlined area) (CapeFarmMapper, 2023).

Sewage Network: The proposed development will be accommodated within the existing Goose Valley Main pumping station drainage area. The existing Goose Valley Main pumping station with an accompanying 200mm diameter rising main have sufficient capacity to accommodate the proposed development on Portion 38 of Farm Ganse Vallei 444.

Based on the outcome of the GLS (municipal) services evaluation for this application, the following additional infrastructure will be required to connect the proposed development to the existing municipal sewer system (Figure 2):

- Private pump station on Portion 38 of Farm Ganse Vallei (Item 4 in Figure 2). The location of the proposed pump station is indicated on the Site Development Plan (Appendix B1).
- Rising main (75mm diameter, approximately 470m long) in the Rietvlei Road road reserve (Item 5 in Figure 2).
- Outfall sewer (160mm diameter, approximately 120m long) in the Rietvlei Road road reserve and N2 road reserve (Item 6 in Figure 2).
- Outfall sewer (250mm diameter, approximately 445m long) in the N2 road reserve (Item 7 in Figure 2) where it will connect to the existing Goose Valley main pump station.

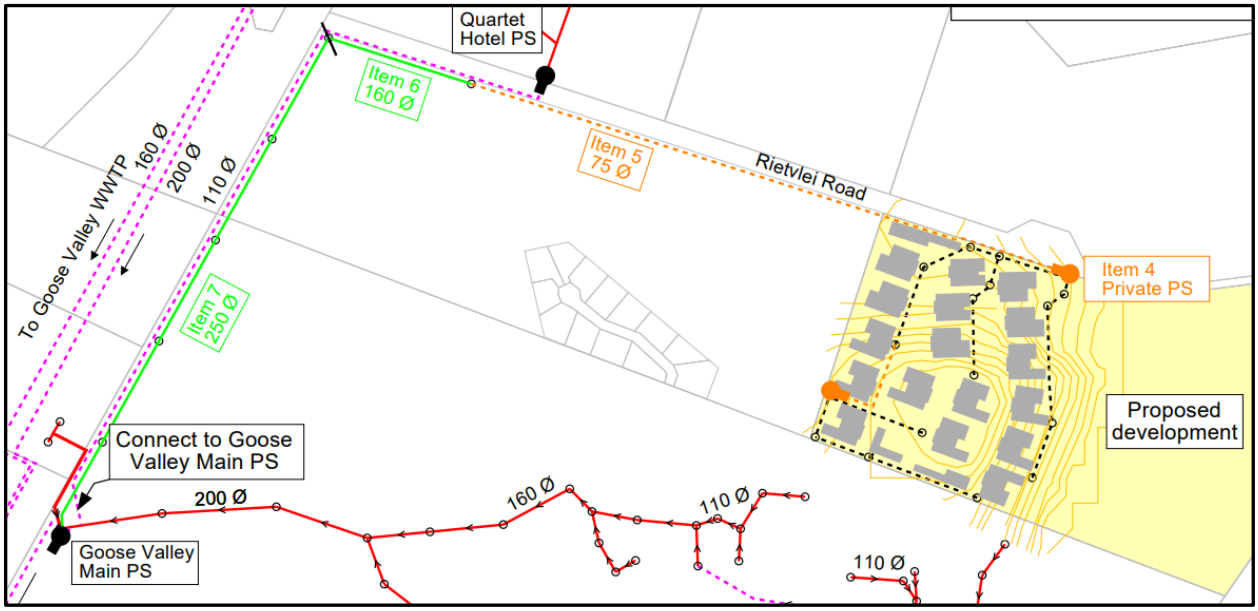


Figure 2: Minimum items required to accommodate the proposed development in the existing Plettenberg Bay sewer system. The GLS report worked on the original 17 unit proposal which has since been reduced following the outcome of the environmental process (GLS Consulting, 2022).

Figure 3: N2 road reserve (left) and Rietvlei Road road reserve (right). Required sewage infrastructure to be installed within the transformed areas of the road reserve.

The proposed internal sewage network (160mm diameter uPVC gravity pipe network with round precast concrete ring manholes) will drain towards the proposed private sewer pumpstation on the northern boundary of the property.

Water Network: The proposed development will be accommodated in the Goose Valley reservoir zone. Water reticulation will be connected to an existing 75mm diameter pipe located north-west of the property in Rietvlei Road road reserve.

According to the GLS (municipal) services investigation, the 75mm diameter pipe in Rietvlei Road road reserve will be upgraded to a 110mm diameter pipe (extending approximately 220m long) in the Rietvlei Road reserve in order to comply with the fire flow criteria (Item 1 in Figure 4).

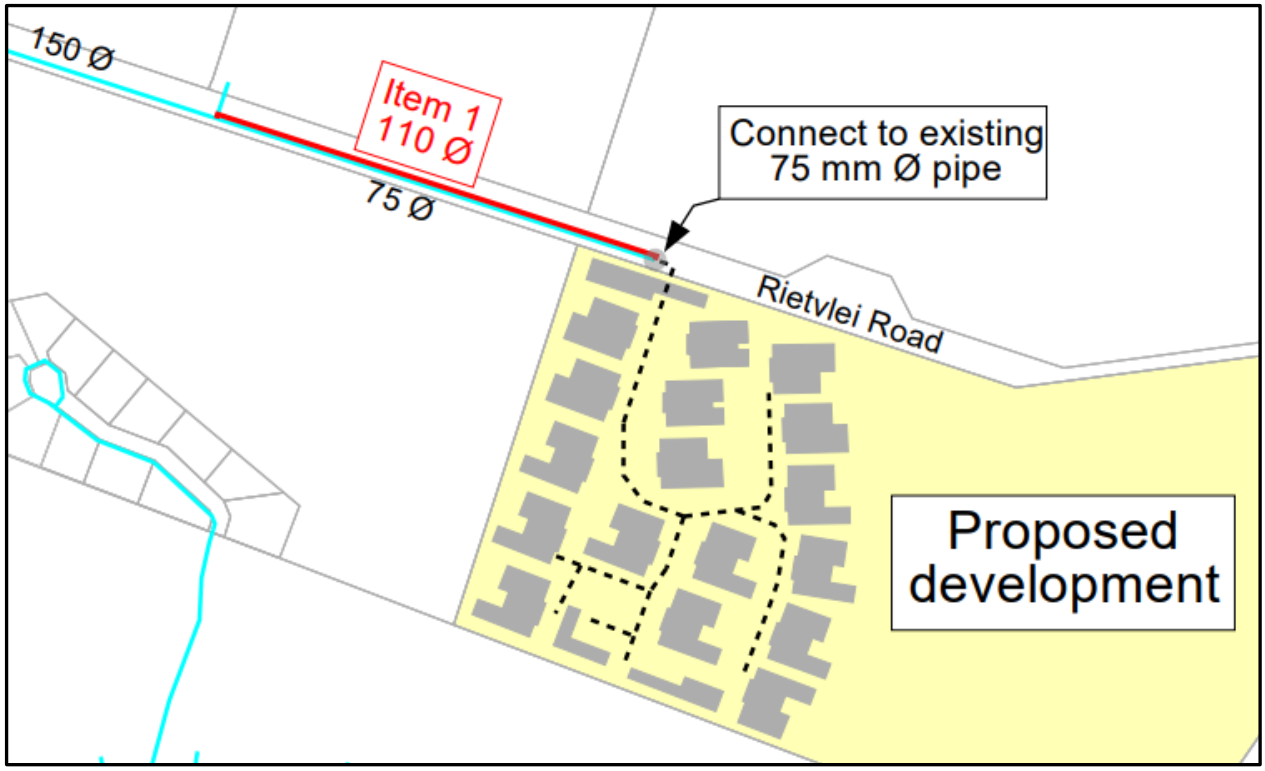


Figure 4: Minimum required upgrade to the existing 75mm diameter pipeline within the Rietvlei Road road reserve to comply with the fire flow criteria. Note that the original 17 unit proposal considered by GLS has since been reduced to 12 units (GLS Consulting, 2022).

The internal water reticulation system will be a metered network consisting of a combined domestic and fire water reticulation network (75mm diameter uPVC Class 12 potable water main). Provision will be made inside erf boundaries of every property for individual water meters (located 1m inside each erf boundary).

The Civil Engineering Report compiled by Vita Consulting Engineers (October 2023) comment on the following additional requirement:

The bulk water system to the Goose Valley, Wittedrift and Matjiesfontein reservoirs is at capacity and should be upgraded according to the master plan before additional developments within the reservoir supply areas can be accommodated.

GLS Consulting provided the following temporary solution:

- *A new link 160mm water line off the existing 160mm distribution main in the N2 road reserve to the existing municipal reservoir which will free up an additional 860kl/day.*
- *The additional 860kl/day will create capacity to accommodate developments on **Farm 444/38 (the study site**), as well as Farm 304/32 and Erf 6503.*

The civil engineer consulted with the Bitou Municipality 9 March 2023, who stated that they accept and support these measures put forward by GLS, on the following conditions:

- *Final design, installation, etc. costs for the infrastructure will be the responsibility of the developer/developers and will not be deductible from the Augmentation Levee's.*
- *The infrastructure (specifically the water line) is not intended to be a permanent solution and Augmentation Levee's for Water and Sewage will be used towards the permanent solution which the Bitou Municipality may in future apply for.*
- *The proposed pro-rata contribution towards the temporary infrastructure must be resolved between the developers of the different properties as part of the Service Level Agreement.*

- *A Service Level Agreement must be drafted for the development.*

At the time of the civil investigation, the implementation of the water line was to be undertaken by the developer of Portion 19 and 27 of Farm 444, as this development will be the first to have a civil contractor on site.

The requirement is for any pro-rata contributions (Farm 444/38, Farm 304/32 and Erf 6503) for the installation of the pipe will be paid directly to the developer of Portion 19 and 27 of Farm 444.

In the event the owner of Portion 19/27 of Farm 444 is unable to implement the waterline, the responsibility for installation of the section of water pipeline, will fall to the developers of either Farm 38/444, Farm 304/32 or Erf 6503. For this reason, the preferred route for the waterline has been considered as part of this application.

It is confirmed that should the waterline be installed above-ground i.e. laid on the surface and covered with rocks, it will follow the existing access road from the N2 up to the existing Municipal reservoir. This option will not result in the removal of any vegetation.

The alternative which is not preferred, is for the new line to be installed along the existing Municipal services servitude from the reservoir, however that will require the removal of vegetation along a steep slope, for which the Municipality will have to obtain prior Environmental Authorisation.

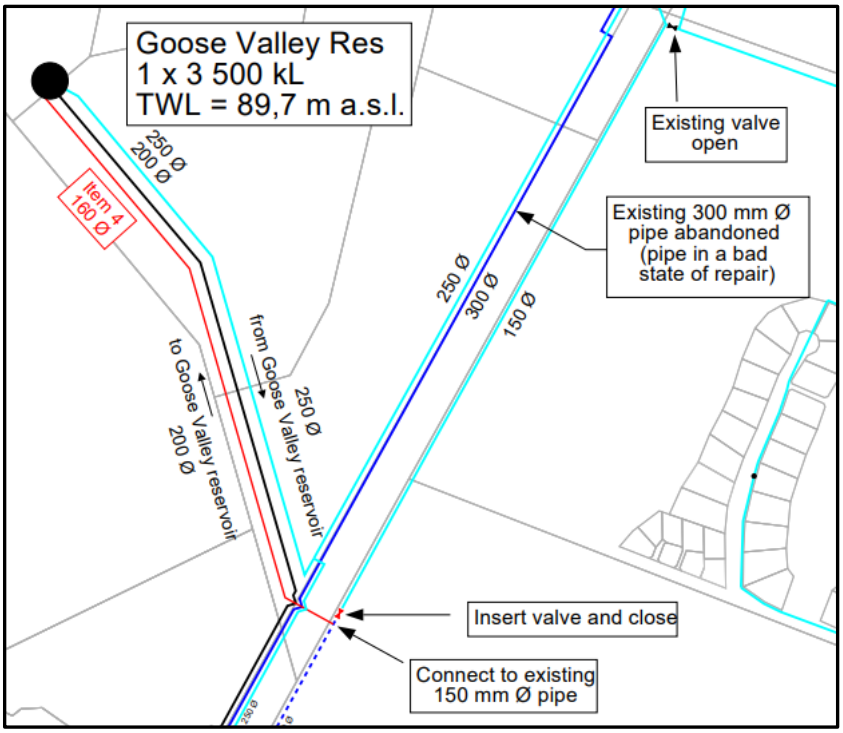


Figure 5: Minimum required upgrades to free up an additional 860kl/day from the Goose Valley Reservoir and to accommodate the proposed development on Portion 38 of Farm Ganse Vallei 444 (GLS Consulting, 2022).

Preferred route for required pipeline to Goose Valley Reservoir:

The preferred route for the new section of 160mm bulk water line off the existing 160mm distribution main in the N2 road reserve, follows the existing gravel road traversing Portion 72 of Farm 444 and Portion 74 of Farm 444 (Figure 6 and Figure 7) to the reservoir.

The total length of the pipeline following this preferred route is approximately 940m. This route is desirable as it will follow an existing gravel road that is already disturbed and will not result in vegetation removal as it will be laid on the surface.

Figure 6: Preferred pipeline route from Goose Valley Reservoir to existing distribution main in N2 road reserve.

Figure 7: Preferred pipeline route from Goose Valley Reservoir to existing distribution main in N2 road reserve.

Roads and Parking Areas:

The internal road network will be a 5.5m wide brick paved road with formal kerbs/edgings, roadside channels and a stormwater drainage network. Internal roads will not be subdivided and will form part of the communal areas maintained by the Body Corporate of the proposed development.

It is proposed for the gravel parts of Rietvlei Road to be hard surfaced within the constraints of the existing road.

Stormwater:

The pre-development site drains from the central portion (highest point on the property) towards the north-western and southern boundaries. No formal bulk municipal stormwater infrastructure is available in vicinity of the property. Due to the high permeability of the insitu dune sands, stormwater runoff permeates into the subsoil layers and therefore a formalised bulk stormwater connection is not required for the proposed development.

An open swale stormwater network will however be designed which will have sufficient capacity to manage and convey up to a 1:5 year rainfall event. The open swale stormwater network will follow the road network and will have inlet structures and pipe culverts at road crossings. If a rainfall event with a return period larger than 1:5 year occurs, the internal roadways will act as overland flow routes which will convey stormwater run-off towards the lower lying eastern portion of the property.

Provision will be made for a subsoil drainage network beneath the internal roads. The subsoil drainage network will consist of a 110mm diameter perforated pipe network installed 800mm below the final road level.

Due to the poor cohesion of the dune sands, the following erosion preventative measures will be included in the stormwater design:

- Minimize the concentration of stormwater to prevent high flow rates.
- Route run-off from hard surfaces into swales.
- Promote sheet flow into open swales.
- Formalise (armorflex) channels with an internal velocity more than 1m/s.
- Landscape unlined channels with appropriate vegetation.
- Install energy dissipation structures at high energy discharge points.

Solid Waste:

The collection of domestic waste from individual housing units will be administrated by the homeowners association / body corporate of the proposed development. Solid waste will be transferred to a communal refuse storage located at the entrance of the proposed development from where it will be removed as per the Municipal waste collection schedule. Adequate turning space for a standard refuse truck has been incorporated in the proposed entrance design.

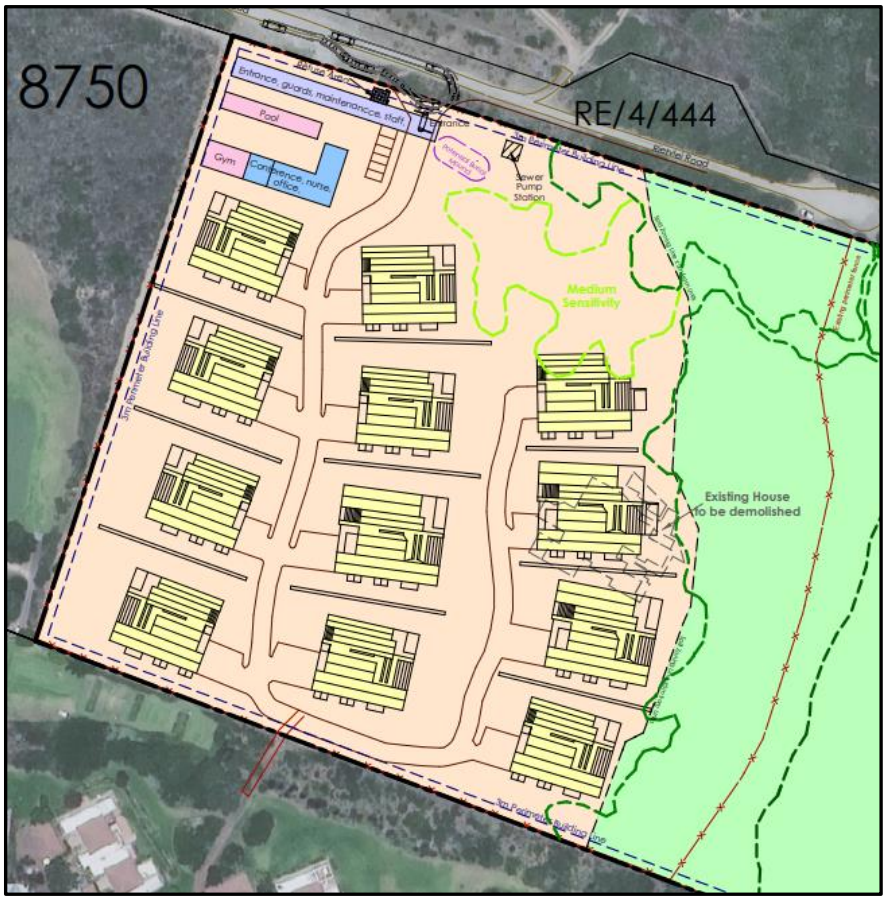


Figure 8: Site development plan.

This activity requires an Environmental Authorisation in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) before commencing, as well as for future maintenance and repairs of the structure.

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 National Water Act (NWA, 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 (Intergreen (Pty) Ltd), all contractors and sub-contractors to the site.

It 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 Keurbooms Lifestyle Village.

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 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.

The proposed activity is located within the urban area and does not require any kind of firebreak.

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.

Due to the nature of the proposed activity, the location of the site and the transformed nature of the surroundings, it is not likely that any heritage or archaeological features will be impacted upon.

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 to 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:

- Animal Species Compliance Statement (David Hoare Consulting).
- Aquatic Biodiversity Compliance Statement (Confluent Consulting).
- Integrated Heritage Impact Assessment (Perception Planning).
- Botanical Biodiversity Compliance Statement (David Hoare Consulting).

- Terrestrial Biodiversity Impact Assessment (David Hoare Consulting).

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

- Direct loss of habitat (degradation / loss of natural habitat)
- Invasion by alien invasive plant species (invasion by alien invasive plant species, leading to degradation of indigenous habitat)

4.1 MITIGATIONS

Table 2: List of Mitigation Measures & Associated Management Requirements

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational /Maintenance Phase
Mitigations / Recommendations				
Compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control.		✓	✓	✓
Use indigenous and site-appropriate plant species in any rehabilitation and landscaping.		✓	✓	✓
No additional clearing of vegetation should take place without a proper assessment of the environmental impacts, unless for maintenance purposes, in which case all reasonable steps should be taken to limit damage to natural areas.		✓	✓	✓
Obtain permits for any protected trees that may need to be pruned or removed.		✓	✓	✓
Protect natural areas outside of the development footprint.		✓	✓	✓
Stormwater must not be discharged directly into the estuary.		✓	✓	✓
Rainwater harvest tanks must be installed at the proposed residential units as well as communal buildings to reduce water entering the stormwater system.		✓	✓	✓
Make use of swales and retention ponds to attenuate stormwater runoff on site. This will increase infiltration and reduce the speed and volume of stormwater runoff discharged from the proposed development site.		✓	✓	✓
Make use of permeable paving to promote infiltration into the soil.		✓	✓	✓
Make use of retention ponds and artificial wetlands to capture stormwater runoff.		✓	✓	✓
Adhere to a 33m buffer around delineated estuary habitat.		✓	✓	✓

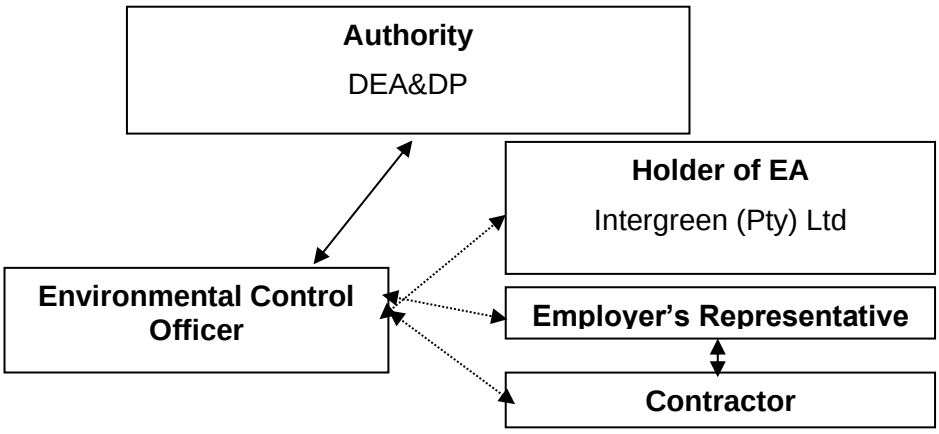
Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational /Maintenance Phase
Remnant thicket (inclusive of the 33m buffer area along the estuary habitat) must be demarcated prior to any site clearing/development commencing to ensure that no encroachment happens into this sensitive area.		✓	✓	
The thicket area must remain demarcated for the duration of the construction phase.		✓	✓	
Only existing walkways may be used to access to remnant thicket area.		✓	✓	✓
Landscaping must be done with indigenous vegetation (preferably endemic species) and ornamental plants may only be planted in plant boxes and pots with no invasive alien vegetation permitted on the estate.		✓	✓	✓
Occupation of units may only be permitted on condition that the necessary external link services and upgrades have been completed.		✓	✓	✓
Ensure that construction activities do not cause any preferential flow paths and concentrated surface runoff.		✓	✓	
Demarcate the construction area. This will ensure that construction vehicles do not compact soil or disturb any vegetation within the buffer zone.		✓	✓	
To reduce the transport of sediment, make use of silt fences and biodegradable coir logs which can be placed along contours.		✓	✓	
Vegetation clearing should be done in parallel with the construction progress. This will minimize erosion and runoff.		✓	✓	
Revegetate exposed areas once construction has been completed.		✓	✓	
Stormwater runoff that is generated by hardened surfaces should be discharged in retention areas such as swales and retention ponds. This will reduce concentrated runoff and erosion.		✓	✓	
Best Practise				
Applicant must appoint an ECO to oversee activities prior to construction as well as during construction.		✓	✓	
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.		✓	✓	
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.		✓	✓	

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational /Maintenance Phase
Rehabilitation of work areas to take place as soon as possible to minimise dust pollution.		✓	✓	
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.		✓	✓	
Demarcate (hoarding) all "No-Go" areas prior to any vegetation clearing/development commencing to ensure that contractors do not cause harm/damage to such sensitive features.		✓	✓	
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 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.		✓	✓	✓
The ablution/sanitary facilities provided at the construction site must conform to all relevant health and safety standards and codes. The facilities must be regularly serviced and appropriately maintained to reduce the risk of surface or groundwater pollution.		✓	✓	
All site staff must make use of supplied ablution facilities and under no circumstances must indiscriminate sanitary activities be allowed.		✓	✓	
Contractors must provide recycle bins on the property during construction and must ensure that staff is aware of what products can be recycled/reused. All waste generated on site during construction should be stored in waste bins and removed from site on a regular basis.		✓	✓	
Potable water may not be used during the construction phase.		✓	✓	
Littering by employees may not occur and persons must be employed on site to collect litter on site and immediate surroundings.		✓	✓	

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational /Maintenance Phase
Potential health hazards caused by certain conditions or activities must be reported to either the Municipal Health Services, Community Services Department or Garden Route District Municipality.		✓	✓	

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 environmental 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 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 ENVIRONMENTAL 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 and earthworks 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 STORMWATER MANAGEMENT PREPARATION

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 DEMARCATION OF WORK AND NO-GO AREAS

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 (Figure 9).

b. The thicket area must remain demarcated for the duration of the construction phase.

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. 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
d. 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

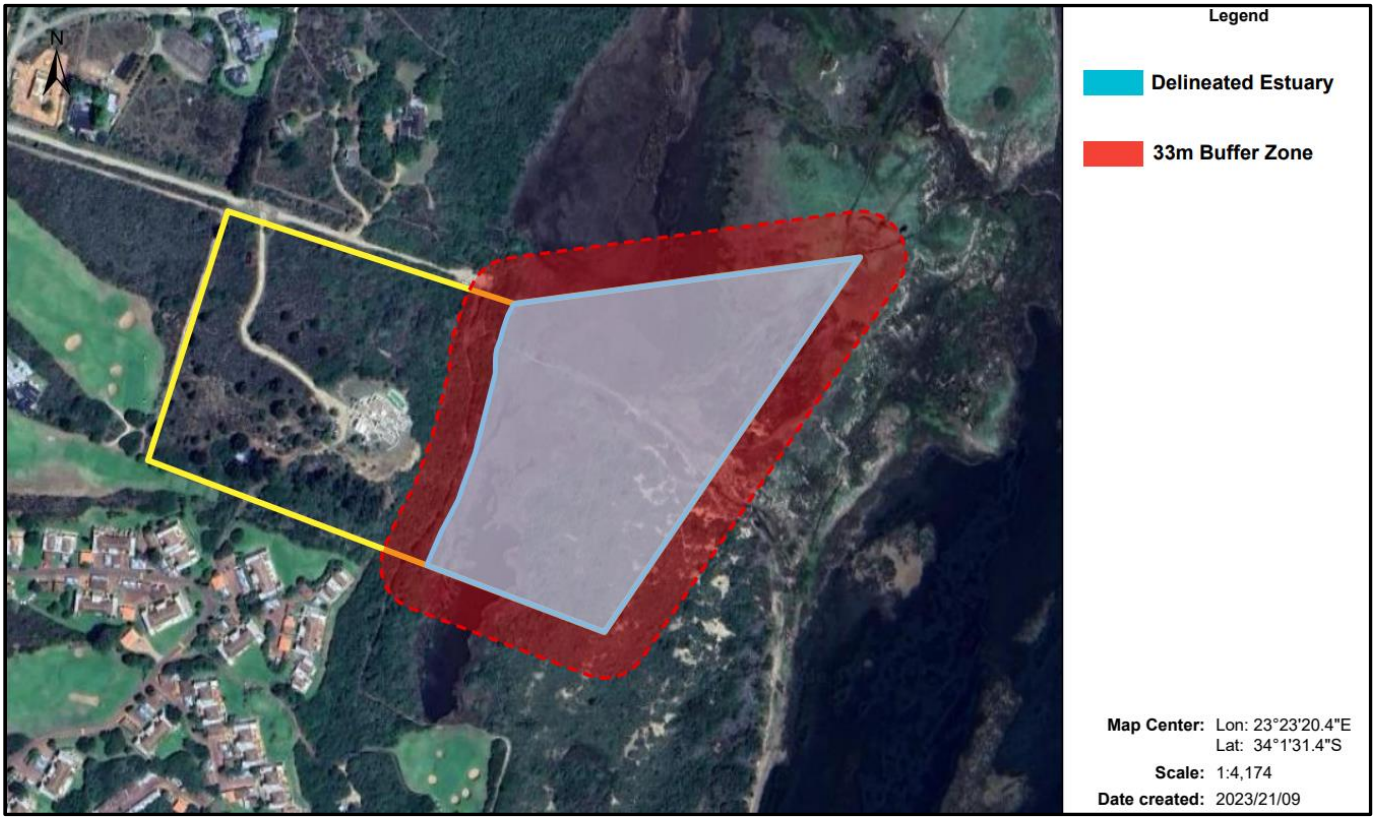


Figure 9: No-Go areas for the proposed development site.

6.3 WATER RESOURCE PROTECTION

Management Statement	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

Dual Flush Toilets

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.

Low flow shower heads

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).

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.

Low flow Taps

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.

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.

Washing machines

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:

- **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.

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.

Waterwise Landscaping

Waterwise landscaping principles must be incorporated into the detailed landscaping plans. The following principles apply to waterwise gardening:

- 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 home owners should consider all their requirements (number of people using facility, location of house, angles of roof) before making a choice.

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 watercourses or wetland areas (including 21m buffer).	Prior to construction.
3	**Demarcate work areas** using correct demarcation methods.	Prior to construction.
4	Demarcate **protected areas as no-go areas**.	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. Divert stormwater by placing sand bangs in the proposed area of construction which prevent the area from being saturated.
b. Install silt fences / haybales to prevent silt being transported along with 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.

Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. Consideration and provision shall be made for the following methods (or combination thereof): brush cut packing, mulch or chip cover, straw stabilising, watering, planting/sodding, soil binders and anti-erosion compounds, mechanical cover or packing structures (including the use of geofabric, log/pole fencing, etc.). Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised areas shall be repaired and maintained.

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.
- During dry, dusty periods, haul roads should be kept dampened to prevent excess dust. No potable water or seawater may be used for damping haul roads.
- 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 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 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.	Contractor	During construction	Audit	As required

	As required if complaints registered.				
d. Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 07:00 and 18:00 weekdays and 07:00 to 13:00 Saturday, except where, for practical reasons, the activity is unavoidable. No construction activities 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
e. All contract workers and associated employees must stay within the boundaries of Portion 38 of Farm 444.					
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 TRAFFIC CONTROL

Management Statement/Outcome	Impacts & Risks Avoided
To manage and minimise the nuisance effect created by construction traffic.	The development entrance access will be via Rietvlei Road. Increase in traffic during construction phase along the access route.
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

- 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.

7.5 WASTE MANAGEMENT

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 STOCKPILE MANAGEMENT

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 STORING FUELS & CHEMICALS

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 MINIMISING EROSION

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 Rietvlei Road).					
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/aquatic 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	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	Continuously	Audit	Visual / photographic

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. b. Construction vehicles limited to well defined haul roads.					
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

Targets

- 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.

Site Security

Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the developer and the contractor.

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.

7.12 METHOD STATEMENTS

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 EMPr 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	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance

		management action			
Method statement	Ad hoc	Contractor	As required	Audit	Once off

Based on the specifications in this EMPr, 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):

- Demarcation of “No-Go” areas.
- Site clearing.
- 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 and water quality control.
- Erosion control.
- Traffic control.
- Noise control.

7.13 CEMENT BATCHING

Management Outcome	Impacts & Risks Avoided
Minimises negative impacts to vegetation and soils on areas that will not be hard surfaced.	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.

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 management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records

7.14 HERITAGE REQUIREMENTS

Management Statement	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

- 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 ALIEN VEGETATION MANAGEMENT / LANDSCAPING

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	Holder of EA	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	Holder of EA	As required	Audit	Audit

Rehabilitate with appropriate indigenous vegetation to promote soft landscaping.

Replace vegetation if it dies off with indigenous vegetation.

Landscaping must be done with indigenous vegetation (preferably endemic species) and ornamental plants may only be planted in plant boxes and pots with no invasive alien vegetation permitted on the estate.

Only Kweek grass (*Cynodon Dactylon)* allowed for lawns. No Kikuyu grass (*Pennisetum clandestinum)* allowed.

8.2 STORMWATER MANAGEMENT

Management Statement	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 downstream of the property. Stormwater must infiltrate through the provided stormwater retention pond.

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

- 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.

8.3 FIRE MANAGEMENT

Management Outcome	Impacts & Risks Avoided
To prevent any uncontrolled fire events on the property.	Uncontrolled fires.

Management Actions

a. The Home Owners Association is responsible for the prevention of uncontrolled fires and the maintenance of fire fighting equipment.

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	Owner	As required	Audit	Audit

- HOA to ensure that no vegetation grows over the roofs of structures.
- HOA to maintain invasive alien species on the property. Alien invasive plants have a higher biomass than most natural vegetation types and the presence thereof increases the fuel load.
- HOA to maintain the outer firebreaks (roads) as well as inner access roads are kept clean and vegetation low to the ground with no over-hanging vegetation.
- Dry fuel loads (dead debris) underneath vegetation canopy must be kept clean.
- Gutters must be cleaned of any combustible material.
- Outside water taps with fire hoses must be checked and maintained in a working condition.
- Emergency escape routes illustrated with emergency numbers must be available.
- Chemical items stored according to legislation and fire extinguishers available.
- Clear all access roads within property.
- Fire places must have drums provided to throw out warm ash.
- Ensure that all fire fighting equipment are serviced, fully operational and ready to be used at any time.
- Awareness materials must be available and placed at strategic points within the property.

9 MONITORING, MAINTENANCE & VALIDTY OF EMPR

9.1 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, which then drive management reactions.

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.

9.2 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.

9.3 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.

9.4 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.	

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**
(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**
(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.	

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**
(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

It is not likely that decommissioning of this facility will take place in the near future. However, in the event that decommissioning does occur, all relevant legislation and policies must be complied with for the given period.

In general, in the future event that the facility be decommissioned, the following must be undertaken:

- Demolition of buildings and removal of rubble must be undertaken without impacting on areas outside of the development area.
- Rubble must be disposed of correctly and to a registered site if not reused on site.
- Decommissioning must comply with any relevant legislation valid at that time.

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 EMPr, 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:

[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.

- 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 EMPr, disagreement regarding the implementation or method of implementation of conditions of the EMPr, 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.

12 REFERENCES

Aquanotion, 2008. www.twoflush.com/conservbody.htm. Aquanotion Ltd, Alberta, Canada.

Cape EAPrac, 2024. *Pre-Application Draft Basic Assessment Report for Keurbooms Lifestyle Village on Portion 38 of Farm Ganse Vallei 444, Plettenberg Bay.* Cape Environmental Assessment Practitioners, George, South Africa.

Dabrowski, J.M. 2024. *Aquatic Biodiversity Compliance Statement: Proposed Residential Development and on Portion 38 of Farm 444, Plettenberg Bay.* Confluent Environmental.

Hoare, D., Vlok, W. 2024. *Animal Species Compliance Statement: Keurbooms Lifestyle Village on Portion 38 of Farm 444 in Plettenberg Bay in the Western Cape Province.* David Hoare Consulting (Pty) Ltd.

Hoare, D. 2024. *Plant Species Compliance Statement report: Keurbooms Lifestyle Village on Portion 38 of Farm 444 in Plettenberg Bay in the Western Cape Province.* David Hoare Consulting (Pty) Ltd.

Hoare, D. 2024. *Terrestrial Biodiversity Assessment: Keurbooms Lifestyle Village on Portion 38 of Farm 444 in Plettenberg Bay in the Western Cape Province.* David Hoare Consulting (Pty) Ltd.

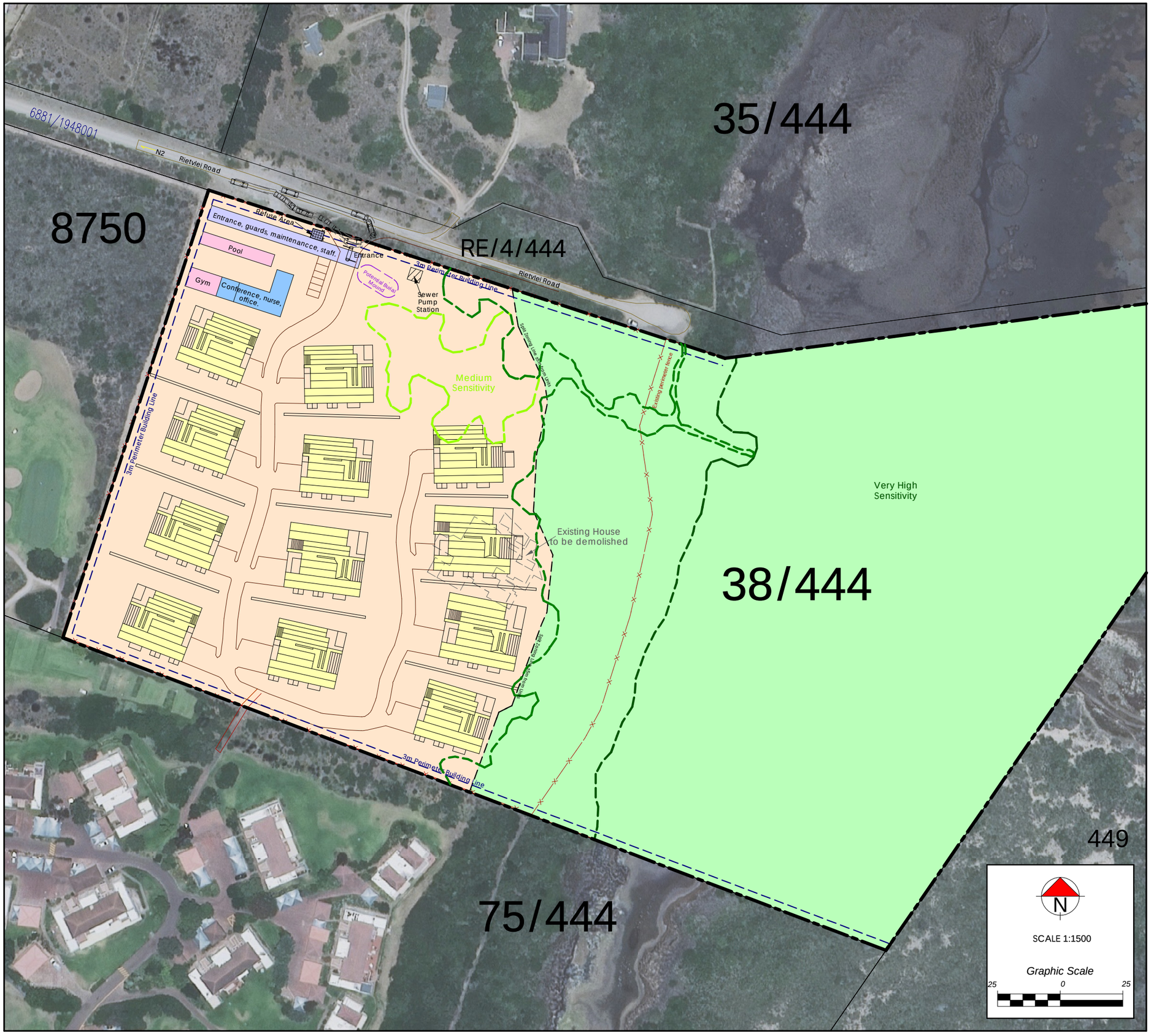
Appendix 1: Locality Map

Date created: July 11, 2023

0 0.5 1 2 km

Western Cape Government FOR YOU

Appendix 2: Site Development Plan



PORTION 38 OF THE FARM GANSE VALLEI NO 444

SITE DEVELOPMENT PLAN

LEGEND:

ZONING		QTY	HA	%
	Residential Zone II (Group housing)	1	3.17	36.9
	Open Space Zone III (Nature reserve)	1	5.41	63.1
	Medium Sensitivity Area			
	High Sensitivity Area			
	Very High Sensitivity Area			
TOTAL		2	8.58	100

NOTES

1. For erf data, refer SG6687/1948
2. Sizes & dimensions are approximate and subject to final survey
3. 1m contour intervals based on Contour Plan from SJM Surveys dated October 2008
4. (12) x Sectional Title Group Housing Units (655m² each)
5. 3m Perimeter Building Lines proposed
6. (2) x Garage bays / unit
   (6) x Visitor parking bays
7. Density (max 20u/ha) = 1.399 u/ha
8. Communal Open Space (min 80m²/unit) = > 7 ha
9. Internal Road Width = 5m

DRAWN:	HL	CHECKED:	MV
PLAN NO:	Pr22/11/F444Ptn38/SDP08		
PLAN DATE:	11 Dec 2023		
STORED:	z:\drawings\App\Pr2211-F444Ptn38/SDP08.drg		

MUNICIPAL STAMP

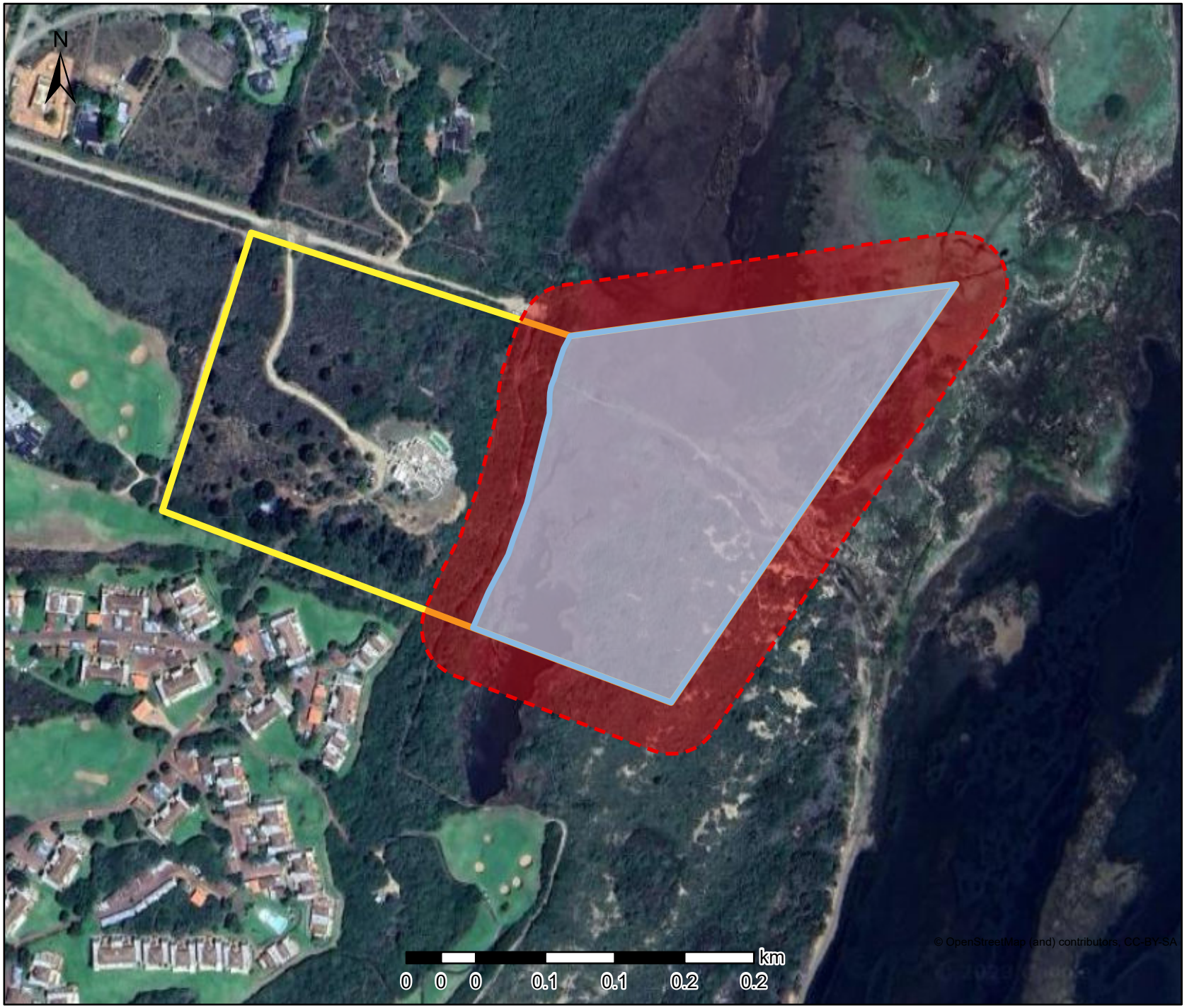
Marike Vreken
STADS & OMGEWINGSBEPLANNERS
URBAN & ENVIRONMENTAL PLANNERS

21 Trotter Street, PO Box 2180
KNYSNA 6570

(044) 382 0420
086 459 2987
e-mail: marike@vreken.co.za
www.vreken.co.za

Appendix 3: No-Go Areas Map

Estuary Buffer



Legend

- Delineated Estuary
- 33m Buffer Zone

Map Center: Lon: 23°23'20.4"E
Lat: 34°1'31.4"S

Scale: 1:4,174

Date created: 2023/21/09

Western Cape Government
FOR YOU

Appendix 4: Environmental Guidelines For Construction

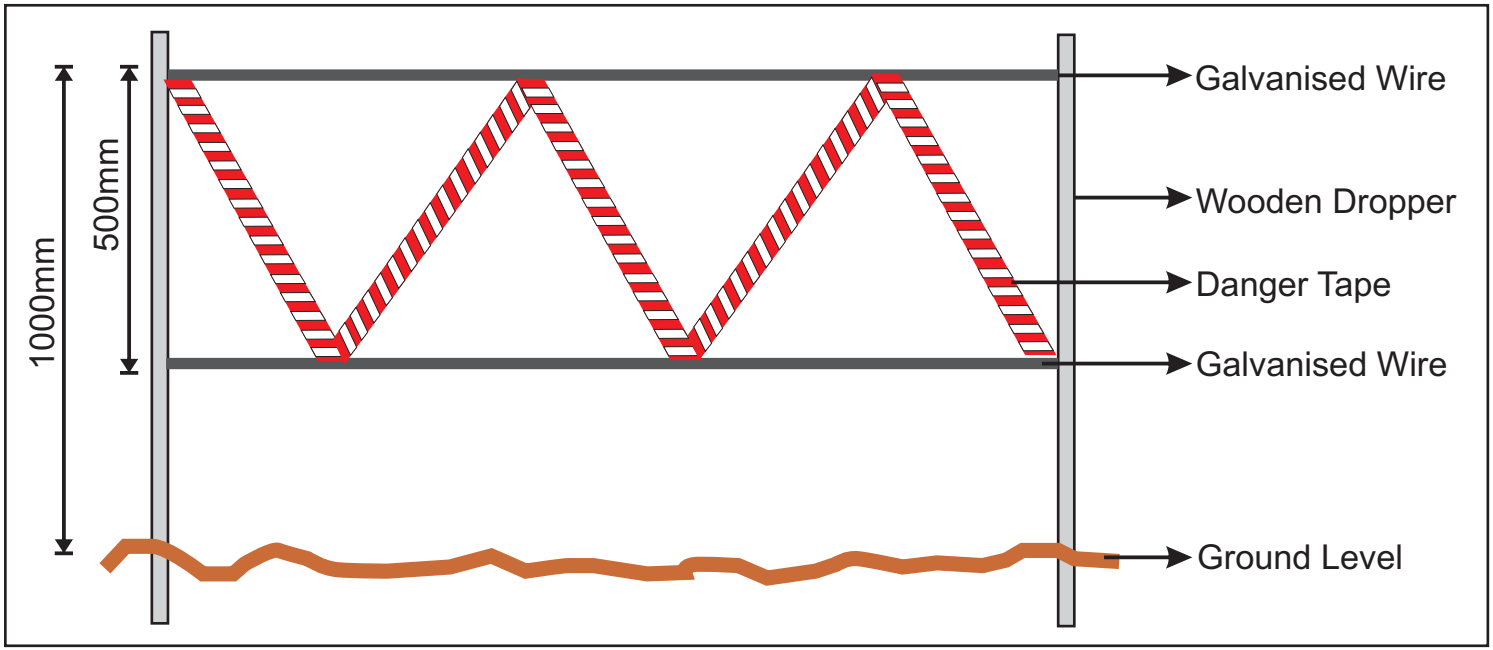


Plate A: Showing a cross section of a typical method of demarcation of no-go areas.

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 GO AREAS

- 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.

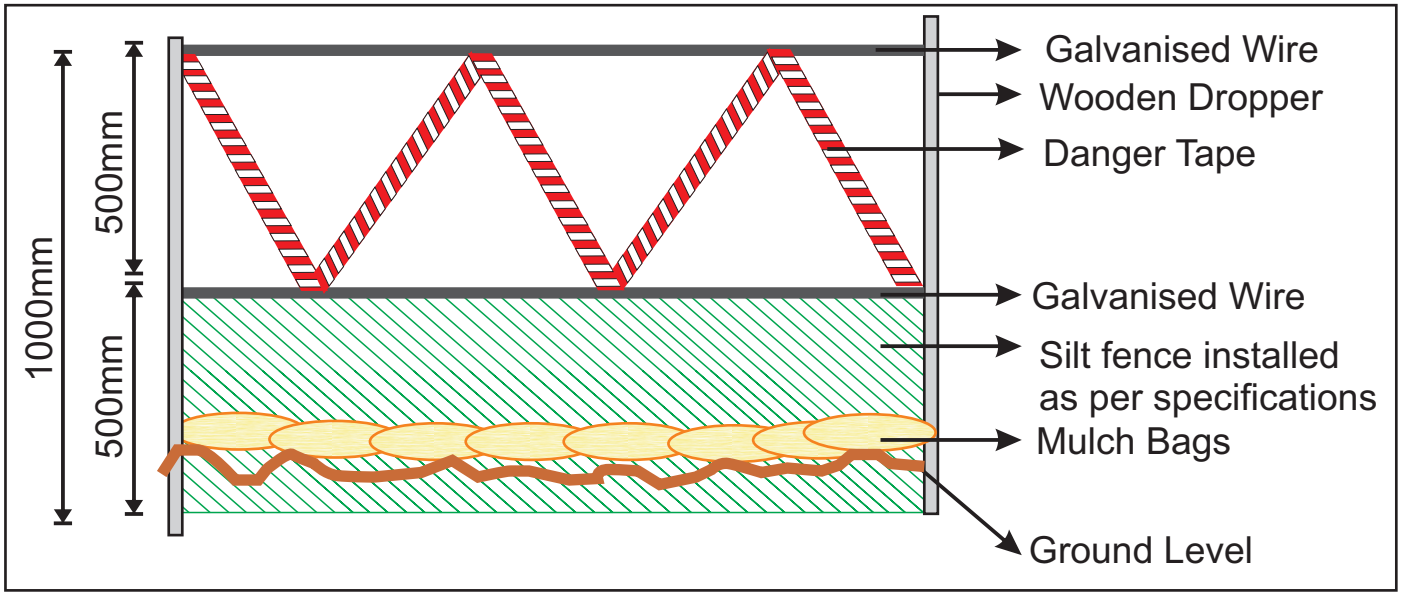
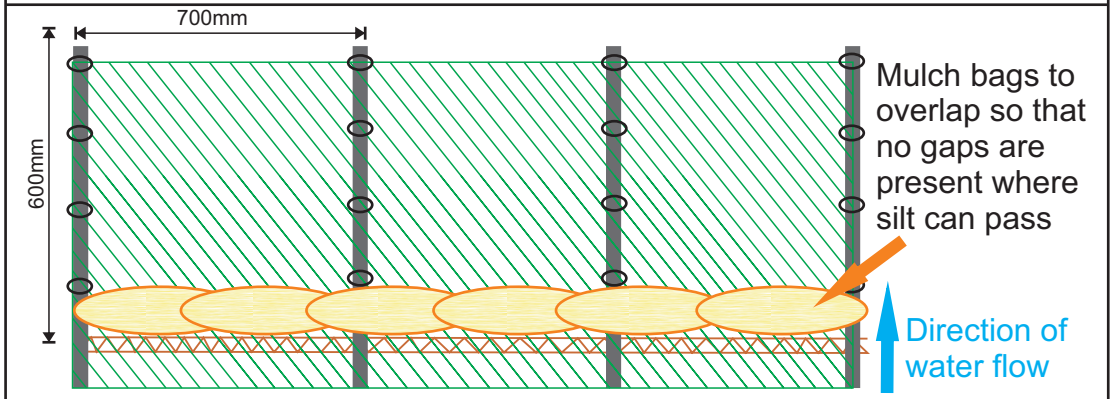


Figure 1: Demarcation of No - Go Areas During Construction

Cape Environmental Assessment Practitioners (Pty) Ltd

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.

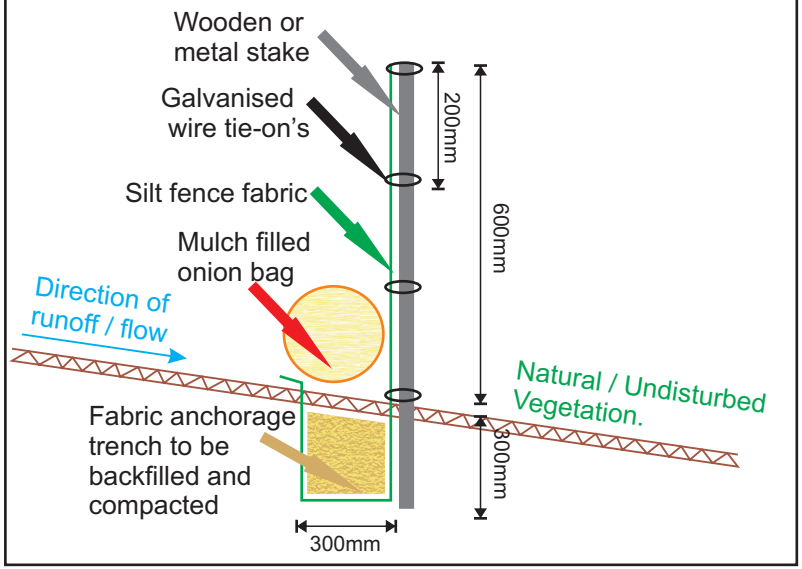
Technical Specifications

- Silt fence fabric to consist out of 50% shade cloth or a geotextile such as biddim (if biddum 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

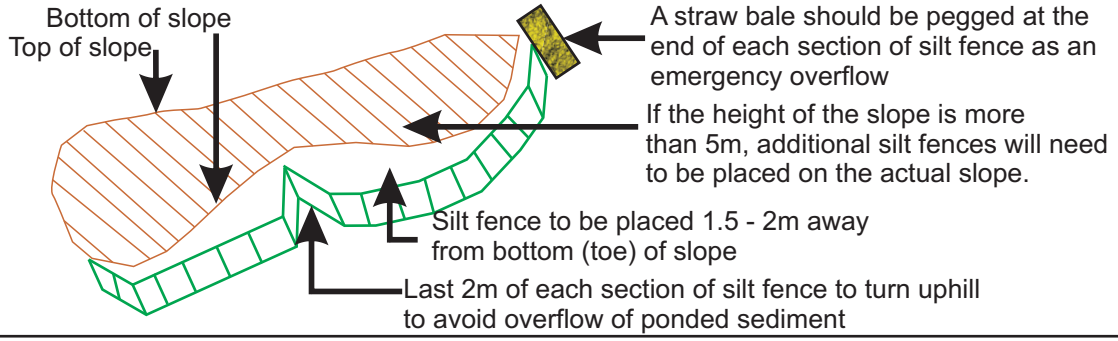
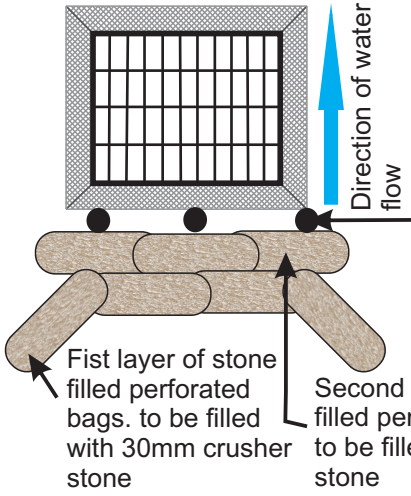


Figure 2: Specifications for Silt Fences

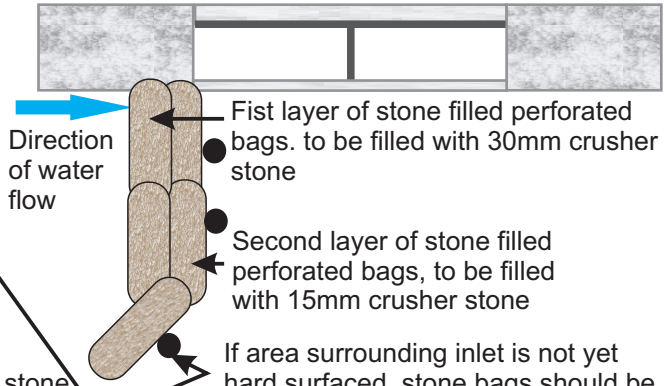
Cape Environmental Assessment Practitioners (Pty) Ltd

Inlet Protection

Drop Inlets



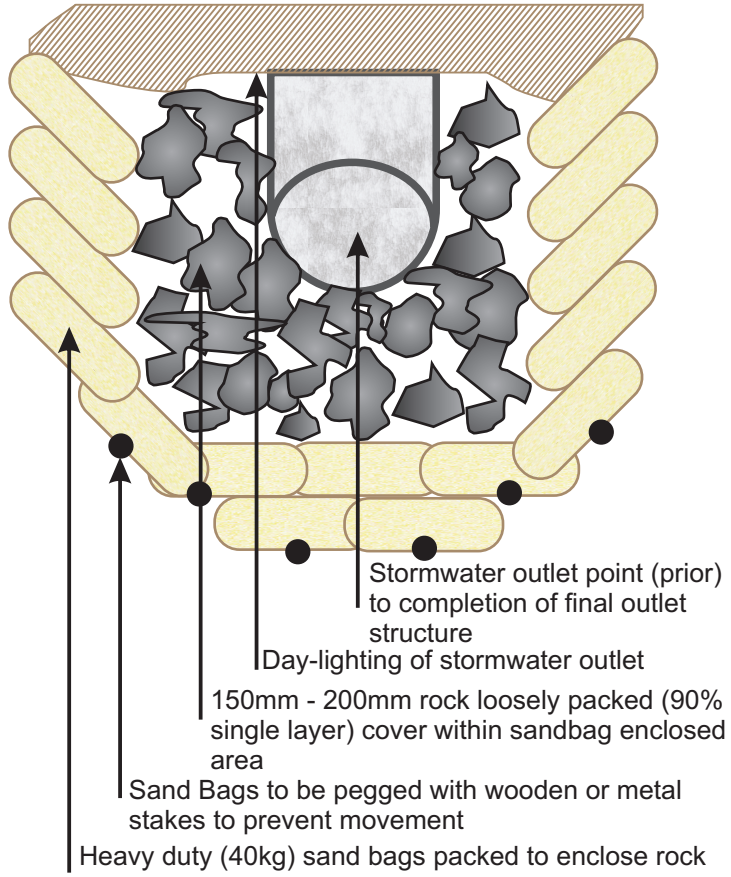
Kerb Inlets



- Should the inlet be positioned at a low point with water entering from a number of sides, a double row of stone bags (as detailed above) should be placed at each side where water enters.

- In low flow, high sediment areas, consideration should be given to cover the inlet structures with biddum (this will only work in low flow areas.)

Outlet Protection



- 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

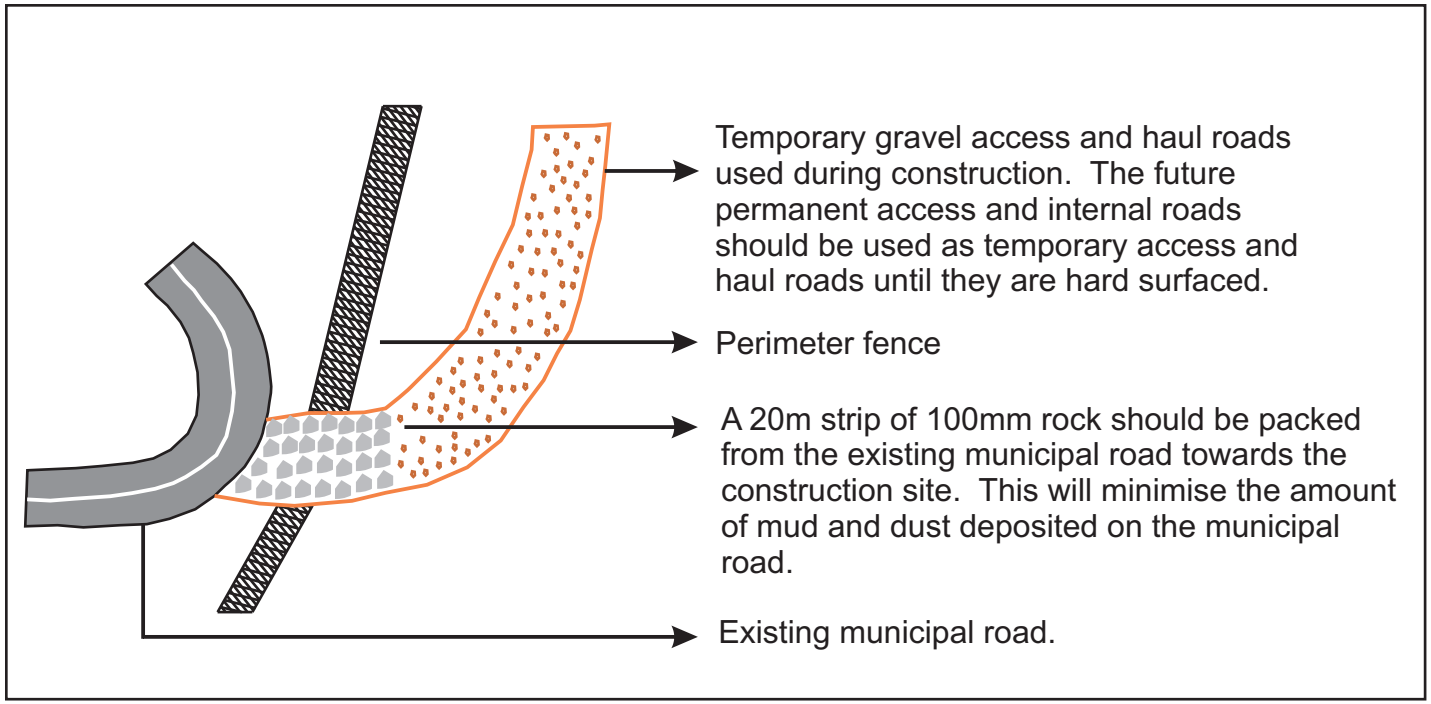
Cape Environmental Assessment Practitioners (Pty) Ltd

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

Cape Environmental Assessment Practitioners (Pty) Ltd

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

AFRICAN SNAKEBITE INSTITUTE.com ®

Cape Cobra
(*Naja nivea*)

Cape Cobra - juvenile
(*Naja nivea*)

Cape Boomslang - male
(*Dispholidus typus typus*)

Cape Boomslang - female
(*Dispholidus typus typus*)

Puff Adder
(*Bitis arietans arietans*)

Berg Adder
(*Bitis atropos*)

Rinkhals - banded phase
(*Hemachatus haemachatus*)

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

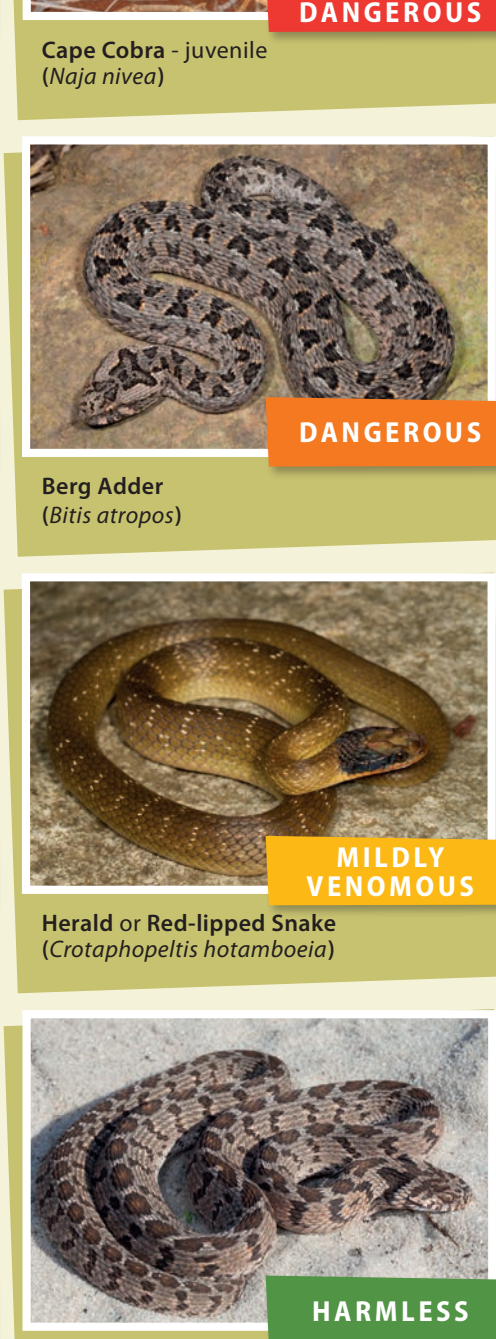
Karoo Sand Snake
(*Psammophis notostictus*)

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

Spotted Harlequin Snake
(*Homoroselaps lacteus*)

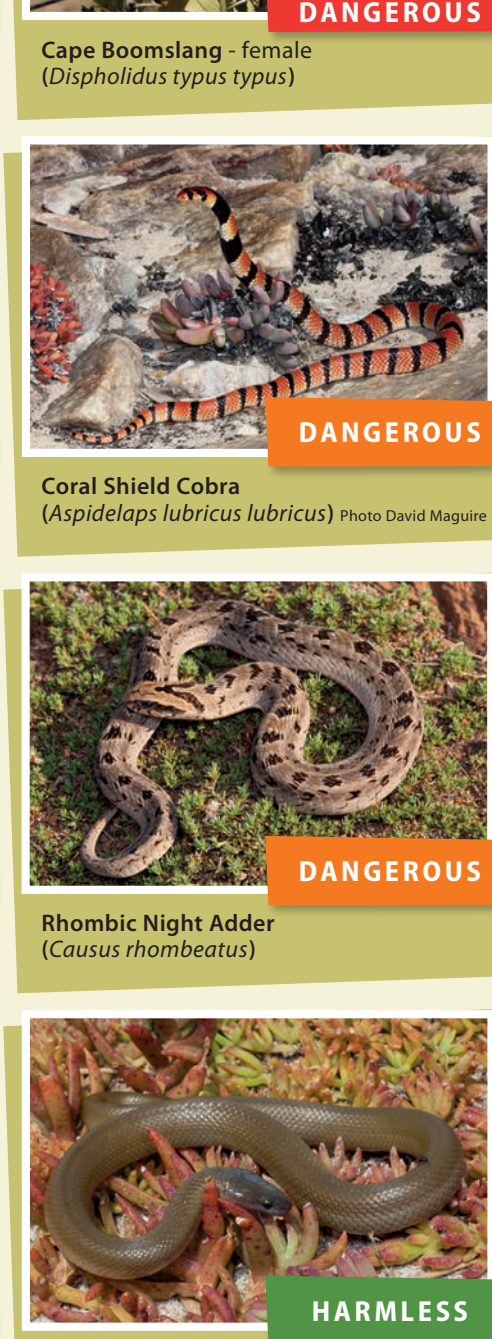
Rhombic Night Adder
(*Causus rhombeatus*)

Mole Snake
(*Pseudaspis cana*)



Rhombic Egg-eater
(*Dasypeltis scabra*)

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



Olive Snake
(*Lycodonomorphus inornatus*)

Brown House Snake
(*Boaedon capensis*)

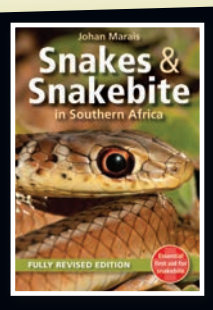
Common Brown Water Snake
(*Lycodonomorphus rufulus*) Photo Tyrone Ping

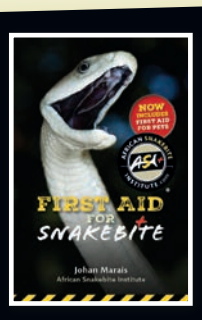
Delalande's Beaked Blind Snake
(*Rhinotyphlops lalandei*)

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

Johan Marais | African Snakebite Institute
+27 82 494 2039 | johan@asiorg.co.za

www.AFRICANSNAKEBITEINSTITUTE.com





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 that 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
Salix babylonica weeping willow CARA 2	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.
Melia azedarach Seringa CARA 3	**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.
Solanum mauritianum bug weed CARA 1	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.

SPECIES & CARA Category	CONTROL METHODS
Opuntia ficus-indica prickly pear CARA 1	Seedlings can be hoed, mature plants can be dug out. **Chemical control applications:** Inject into 4 – 12 pre-made holes per plant any of the following: MSMA ll 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. **Biological Control** is a very cost effective way of removing this species. **Disposal:** Leave standing until it rots away. It can be burnt in stacks after it has dried out.
Agave americana agave Proposed Invader species	Seedlings can be hoed, or dug out if mature. For **chemical control**, inject 2ml of MSMA into the bowl of the plant - 2l per 1000 plants. **Biological control** is the most cost effective way of dealing with this species. **Disposal:** Leave standing until it rots away.
Pinus pinaster Pine CARA 2	Can be pulled out by hand or hoed. Intermediate sized plants should be cut at ground level, with the root being left behind. Mature pine trees can be cut/sawed. Ring barking or filling can also be used. **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.
Pennisetum clandestinum Kikuyu CARA 2	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). The suitability of using herbicide near water should be considered i.e. some herbicides may pollute the downstream environment. Application of herbicides is more successful in conjunction with mechanical means.

SPECIES & CARA Category	CONTROL METHODS
Eucalyptus spp. Blue gums CARA 1 & 2	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 *Eucalyptus* can be cut/sawed. Herbicides should be applied to the stump as soon as possible thereafter (within 30 mins). 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. 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. **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.
Poplar canescens grey poplar CARA 2	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!!!) 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 (Triclophyr 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. 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.

SPECIES & CARA Category	CONTROL METHODS
Arundo donax spanish reed CARA 1	Hand removal, removal of rhizomes is essential to avoid resprouting. **Foliar Spray** can be done using Mamba 10% solution.
Acacia cyclops rooikrans CARA 2	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.
Acacia longifolia long-leafed wattle CARA 1	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 Esterl) 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 frilling 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.

SPECIES & CARA Category	CONTROL METHODS
Acacia saligna port Jackson CARA 2	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. 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 4l/ha. Cut stumps of large/mature trees can be treated with 300ml of Timbrel 3A (Triclophyr 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. **Biological control** is available, once the fungus has become established in an area; it is preferable not to use any other control measures. **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.
Acacia mearnsii black wattle CARA 2	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). 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. 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 (Triclophyr 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. **Biological control** is available, when cutting down the trees, the stump fungus should be applied to the cut stumps.

SPECIES & CARA Category	CONTROL METHODS
Acacia pycnantha golden wattle CARA 1	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 (Triclophyr 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.

***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

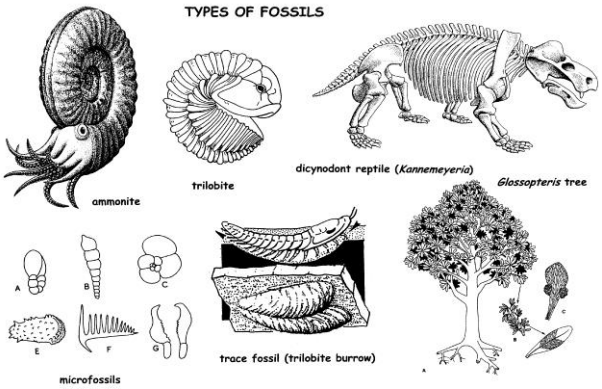
Fax: +27 (0) 21 976 1889

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:

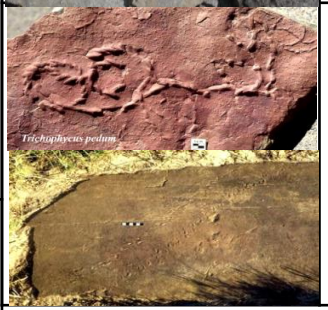
Immediately inform the ECO or Site Agent. He/she will then contact HWC and write a report and if necessary operations will stop in that specific area until the fossil is recovered

Heritage Western Cape
ceoheritage@westerncape.gov.za
021 483 5959
www.hwc.org.za

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.

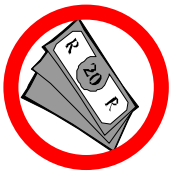
Below there is a list of few examples of fossils which may be identified during excavations in the Western Cape.

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

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 Environmental Assessment Practitioners (Pty) Ltd

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** - Cadidate 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 & Baron Vutoyi** - 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

PO Box 2070
6530 George

17 Progress Street
6529 George

www.cape-eaprac.co.za

Tel: +27 44 874 0365
Cell: +27 71 603 4132

The Team

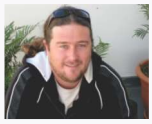
Doug Jeffery - Director

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 Practitioner / GIS / ECO



Dale graduated from the Technicon Pretoria in 1999 with a National Diploma in Nature Con-servation. 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 other Assessment, Public Participation & Stakeholder Engagement, GIS & Mapping, Biophysical Inventories, Retrospective Damage Assessment, Air Quality License Applications, Waste Management License Applications, Environmental Impact Assessments, Environmental Management Policies and Plans, Environmental Control, Monitoring and Auditing, Environmental Awareness and Training Programs, Environmental Education and Interpretation and Environmental Feasibility Assessments. Heis registered as and EAP with the Environmental Assessment Practitioners Association of South Africa.

email: dale@cape-eaprac.co.za

Siân Holder - Consultant / ECO

Siân has a National Diploma in Nature Conservation, a BTech Nature Con (NMMU) and a Masters Degree in Environmental Education (Rhodes University). She worked at Tsitsikamma National Park as an Environmental Education Officer on environmental education programmes for Wilderness Foundation SA. She then served as the Experiential Education Manager and wilderness guide for Wilderness Foundation. She joined the environmental consulting vocation in 2008.

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 EAP*rac 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 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 and 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

Project Assistant /
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 SisuluUniversity. 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).
- Baron Vutoyi - BSc Honours in Environmental Sciences from NWU (2015). He is a registered with SACASP as a Professional Natural Scientist.

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

PO Box 2070
6530 George

17 Progress Street
6529 George

www.cape-eaprac.co.za

Tel: +27 44 874 0365
Cell: +27 71 603 4132