APPENDIX H: 2nd DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

2nd DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED WATER TREATMENT WORKS ON ERF RE/557 AND ERF 672, HEIDELBEG, WESTERN CAPE

DEA&DP PRE-APPLICATION REF NR: 16/3/3/6/7/1/D6/13/0278/23
DEA&DP APPLICATION REF NR: 16/3/3/1/D5/7/0002/26

Prepared for: Hessequa Municipality
PO Box 20
Riversdale
6670
Tel: 028 713 7942

Prepared by: Johmandie Pienaar
Enviro-EAP (Pty) Ltd
School Street 2
Agulhas
7282
Tel: 072 240 3092
Fax: 086 435 4691
Email: admin@enviro-eap.co.za

5 March 2026

	Title: **2nd Draft Environmental Management Programme** **Proposed Water Treatment Works on Erf RE/557 and Erf 671, Heidelberg, Western Cape**
	Date: March 2026 / **Report Status:** 2nd Draft

Carried Out By: Enviro-EAP (Pty) Ltd School Street 2 Agulhas 7282 Tel: 072 240 3092 Fax: 086 435 4691 Email: admin@enviro-eap.co.za	**Client:** Hessequa Municipality PO Box 20 Riversdale 6670 Tel: 028 713 7942
Author: Johmandie Pienaar	**Client Contact Person:** Shahida Kennedy (see contact details above)

Verification	Capacity	Name	Signature	Date
By Author	Principal EAP	Johmandie Pienaar		5 March 2026

COMMITMENT AND DECLARATION OF UNDERSTANDING BY CONTRACTOR AND DEVELOPER FOR THE PROPOSED WATER TREATMENT WORKS ON ERF RE/557 AND ERF 672, HEIDELBERG, WESTERN CAPE

I, the undersigned ……., as duly authorized by the Contractor, have studied and understand the contents of this document. On behalf of the Contractor, I confirm that the Contractor undertakes to adhere to the conditions as set out herein, unless specifically otherwise agreed to in writing.

Signed at …….. on this …….. Day of ……20……

…….
For Contractor

I, the undersigned ……, as duly authorized by the Developer have studied and approve the contents of this document on behalf of the Developer, for implementation by all Contractors involved at the site.

Signed at …….. on this …….. day of ……20…….

…….
Developer's Representative

DEFINITIONS

Auditing:	A systematic and objective assessment of an organization's activities and services conducted and documented on a periodic basis based to a (e.g. ISO 19011:2003) standard.
Biodiversity:	The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.
Contractor:	An employer, as defined in section 1 of the Occupational Health and Safety Act 85 of 1993, who performs construction work and includes principal contractors
Environment:	A place where living, non-living and man-made features interact, and where life and diversity is sustained over time.
Evaporation:	The change by which any substance (e.g. water) is converted from a liquid state into and carried off as vapour.
Developer:	One who builds on land or alters the use of an existing building for some new purpose
Independent:	Is independent and has no interest in any business related to the development site, nor will receive any payment or benefit other than fair remuneration for the task undertaken
Groundwater:	Subsurface water in the zone in which permeable rocks, and often the overlaying soil, are saturated under pressure equal to or greater than atmospheric.
Landowner:	Holder of the estate in land with considerable rights of ownership or, simply put, an owner of land
Monitoring:	A systematic and objective observation of an organisation's activities and services conducted and reported on regularly.
Natural vegetation:	All existing vegetation species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on a site.
Pollution:	The result of the release into air, water or soil from any process or of any substance, which is capable of causing harm to man or other living organisms supported by the environment.
Protected Plants:	Plant species officially listed under the Threatened or Protected Species regulations as well as on the Protected Plants List (each province has such a list), and which may not be removed or transported without a permit to do so from the relevant provincial authority.
Red Data Species:	Plant and animal species officially listed in the Red Data Lists as being rare, endangered or threatened.
Rehabilitation:	Making the land useful again after a disturbance. It involves the recovery of ecosystem functions and processes in a degraded habitat. Rehabilitation does not necessarily re-establish the pre-disturbance condition, but does involve establishing geological and hydro logically stable landscapes that support the natural ecosystem mosaic.
Site:	Property or area where the proposed development will take place

ACRONYMS

DEA&DP:	Department of Environmental Affairs and Development Planning
DWS:	Department of Water and Sanitation
ECO:	Environmental Control Officer
EA:	Environmental Authorisation
EIA:	Environmental Impact Assessment
EM:	Environmental Manager
EMP:	Environmental Management Programme
EO:	Environmental Officer
ER:	Engineer's Representative
AP:	Interested and Affected Party
IEM:	Integrated Environmental Management
MS:	Method Statement
PM:	Project Manager
SANS:	South African National Standards

TABLE OF CONTENTS

COMPLIANCE OF THIS EMPr WITH APPENDIX 4 ENVIRONMENTAL MANAGEMENT PROGRAMME [Appendix 4 amended by GN 326 of 7 April 2017 and by GN 517 of 11 June 2021.]

1 Content of environmental management programme (EMPr)

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

(a) details of-

(i) the EAP who prepared the EMPr; and

(ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;

(Refer to Chapter 1 of the EMPr)

(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;

(Refer to Chapter 1 of the EMPr)

(c) 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 should be avoided, including buffers;

(Refer to Chapter 1 of the EMPr)

(d) a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-

(i) planning and design;

(Refer to Chapter 7 of the EMPr)

(ii) pre-construction activities;

(Refer to Chapter 7 of the EMPr)

(iii) construction activities;

(Refer to Chapter 7 of the EMPr)

(iv) where relevant, operation activities ; and

(Refer to Chapter 7 of the EMPr)

(v) rehabilitation of the environment after construction and in the case of a closure activity

(Refer to Chapters 9 and 10 of the EMPr)

(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to-

(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;

(ii) comply with any prescribed environmental management standards or practices; and

(iii) comply with any applicable provisions of the Act regarding closure, in the case of a closure activity;

(Refer to Chapters 7-10 for proposed impact management actions/mitigation measures)

(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);

(Refer to Chapters 2, 4, 7 and 8 of the EMPr)

(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);

(Refer to Chapters 2, 4, 7 and 8 of the EMPr)

(i) an indication of the persons who will be responsible for the implementation of the impact management actions;
(Refer to Chapters 2 and 4 of the EMPr)

(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;
(Refer to Chapters 2, 4 and 7 of the EMPr)

(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);
(Refer to Chapters 2, 4, 7 and 8 of the EMPr)

(l) a program for reporting on compliance, taking into account the requirements as prescribed by the regulations;
(Refer to Chapters 2, 4 and 7 of the EMPr)

(m) an environmental awareness plan describing the manner in which-

(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and

(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and

(Refer to Chapters 7 and 11 of the EMPr)

(n) any specific information that may be required by the competent authority.
(None requested at this stage)

(2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.

DEVELOPER's COMMITMENT

The Hessequa Municipality ("HM") has committed itself to a set of values that include the maintenance of good relations and transparent communications with all stakeholders, and the dynamic engagement of the larger community.

HM undertakes to implement suitable management systems for all the areas and aspects of this operation. This will ensure that development itself and management of the project will comply with legal, technical, environmental and transformation policies and standards.

HM, in drafting this EMP for implementation, intends to enable continuous improvement in legal compliance and the sustainable operation of the site.

This EMP intends to further guide the achievement of the strategic objectives of the organization at the project site and seeks to ensure that the basic requirements of ISO 14001: 2015 are satisfactorily met.

The EMP intends to change the way in which the owners, the construction process they have commissioned and the contractor plan for and manage resources to achieve sustainability.

The satisfactory implementation of the EMP on site will require both the full support and commitment of all personnel.

CHAPTER 1

1.1. Executive Summary

This EMP has been prepared principally in compliance with the requirements of Section 24N and Section 34 of the National Environmental Management Act 107 of 1998. This document, together with the conditions in the Environmental Authorisation, must be adhered to.

The EMP must be included as part of all contract documentation for all contractors in the construction phase of the development.

The Author and Enviro-EAP Legal Consulting (Pty) Ltd ("Enviro-EAP")

Enviro-EAP is an independent consulting company and has no interest in any business related to the development site, nor will it receive any payment or benefit other than fair remuneration for the task undertaken, as required in terms of the NEMA Regulations.

This report has been prepared by Johmandie Pienaar, of Enviro-EAP, an environmental consultancy, engaged in providing professional services in the field of environmental planning, -systems, -auditing and -biodiversity assessment and -management.

Johmandie Pienaar holds a Baccalaureus Technologiae Degree (Cum Laude) in Nature Conservation from the Cape Peninsula University of Technology (2008).

She has completed the following short courses at the Centre for Environmental Management;

- Implementing Environmental Management Systems (ISO 14001)(2009);
- Occupational Health and Safety Law for Managers (2010);
- Implementing an OHS Management System based on OHSAS 18001 (2010)
- Occupational Health and Safety Management System OHSAS 18001 Audit: A Lead Auditor Course Based on ISO 19011 and ISO 17021 (2011).

Johmandie has trained as an Environmental Assessment Practitioner since March 2009 and has been involved in the compilation, coordination and management of Basic Assessment Reports, Environmental Impact Assessments, Environmental Management Programmes, Waste Licence Applications, Water Use Licence Applications and Baseline Biodiversity Surveys for numerous clients.

Johmandie has also been involved in conducting environmental and occupational health and safety legal compliance audits for a number of clients.

The client has appointed Enviro-EAP to prepare an Environmental Management Programme that meets the technical standards as required by DEA&DP.

1.2. Project Description

This section of the report is included in compliance with Section 24N (2) (e) of the National Environmental Management Act 107 of 1998.

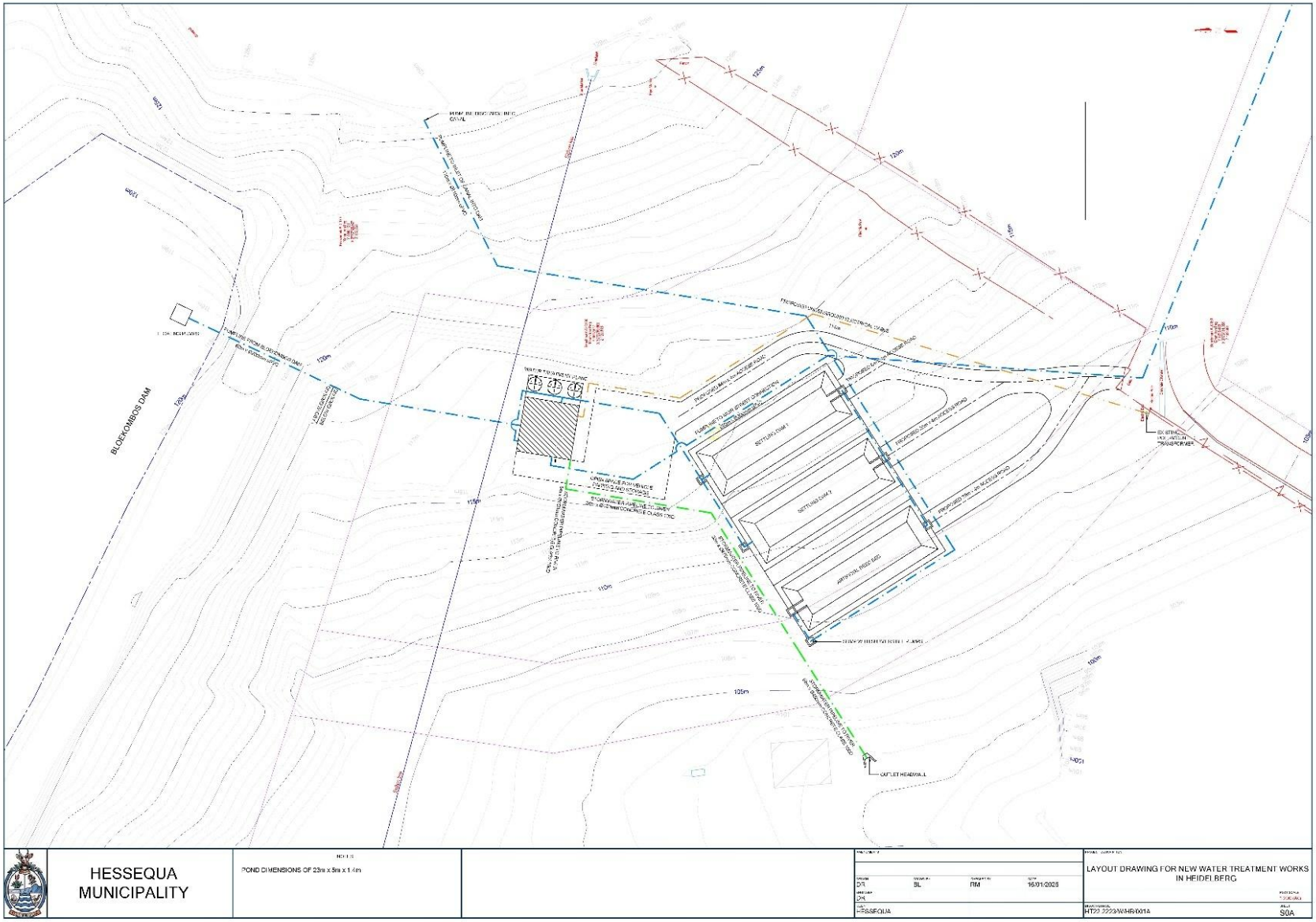
Project - The Hessequa Municipality proposes to construct a Water Treatment Works ("WTW") on the erven 672 and RE/557 just below the southern wall of the Bloekombos Dam at Heidelberg – Western Cape. Water will be pumped from the Bloekombos Dam and treated at the proposed Treatment Works from where it will be pumped along a new pipeline to be laid within the road reserve along Muir Street from where it will connect with existing bulk distribution system in Heidelberg. The proposed development site is accessed off Muir Street.

The expected footprint for the WTW infrastructure will be approximately 0.5ha and consist of the following:

- WTW package plant with maximum capacity of 3 000m³/day (3Ml/day) 120m² footprint.
- Surface abstraction by floating pumps from Bloekombos Dam on a variable demand basis along an 60m long x 200mm uPVC pipeline above ground where it goes over and along the dam wall and below ground from the foot of the dam wall to the WTW.
- 2 x Sludge settling ponds (27m x 12m x 1.8m deep with 518m³ capacity each) for backwash water collections and sludge settlement.
- 1 x Artificial reed bed pond (27x 12m x 1.8m deep with 518m³ capacity) with aal the backwash water from the two settling ponds passing through the reed bed and returned to the Bloekombos Dam via the canal.
- The proposed cut and fil construction of the three ponds will have 3m high support embankments with a total 1200m² footprint.
- A collector sump and pumps for return flow of supernatant from sludge dams back into Bloekombos dam via the canal to optimise water use. Return flow water to be pumped along an underground 170mm x 110m long uPVC pipe to the canal inlet point at the Dam.
- A pump station and 200mm x 620m uPVC pipeline for final water distribution from the WTW into the bulk distribution system in Heidelberg via Muir Street.
- Vehicle parking and materials storage area 280m²
- Stormwater Pipeline to western non-perennial drainage line of 85m x 450mm concrete class 100D outlet headwall within non-perennial drainage line. Only the site rainwater runoff will be piped into the non-perennial drainage line.
- Widening and re-alignment of existing 3m wide access road from Muir Street by 1m (84m long x 4m wide), and three 4m access roads total distance 72m to sludge dams.
- A 3 phase 400/230V nominal supply at 50hz from nearest transformer with 55m long underground cable.

The area just below the Bloekombos Dam where development is proposed contains disturbed pioneer indigenous vegetation species originally part of Endangered - Eastern Ruens Shale Renosterveld. A small portion of the proposed development area, mostly falling within the proposed road widening and realignment section, is mapped as Terrestrial CBA. It is expected that the development will lead to the clearance of ±1 200m² indigenous vegetation. The Boekombos Dam is identified as partially artificial and partially natural NFEPA wetland, however the western non-perennial drainage line has not been mapped as a NFEPA wetland. Significant transformation of the original natural features of the site and surrounds, including the non-perennial drainage line has taken place historically as significant encroachment and dense stands of Eucalyptus trees is present within the immediate site and its surrounds most likely caused due to previous agricultural crop planting, plantation and dam construction and maintenance activities.

See proposed site development plan below:


BLOEKOMBOS DAM
SETTLING DAM 1
SETTLING DAM 2
SETTLING DAM 3
OUTLET HEADWALL
HESSEQUA MUNICIPALITY
POND DIMENSIONS OF 23m x 8m x 1.4m
LAYOUT DRAWING FOR NEW WATER TREATMENT WORKS IN HEIDELBERG
HESSEQUA
HT23 2223/WHR/001A
SIZE
SIZE A0

CHAPTER 2

This section of the report is included in compliance with Section 24N (2) (d) of the National Environmental Management Act 107 of 1998.

It deals with issues relating to the implementation of the EMP.

2.1 Organizational Structure

The organizational structure identifies and defines the responsibilities and authority of the various persons and organizations involved in the project. All instructions and official communications regarding environmental matters must follow the organizational structure.

The EMP must be an agenda item at the monthly site and operations meetings and the responsible client representative(s) may attend these meetings in order to provide input with respect to compliance with the EMP.

In some instances, an Environmental Consultant may be appointed to provide this input.

2.2 Responsibilities and Functions of the Environmental Control Officer

The ECO will be responsible for monitoring, reviewing and verifying compliance with the EMP and/or EA by all contractors and site management during site visits.

The ECO duties in this regard will include the following:

With the assistance, where necessary of the ER, to ensure all necessary environmental authorizations and permits have been obtained and are available and visible on site at the ER offices.

- monitor and verify that the EMP and/or EA is adhered to at all times and by taking action if the specifications are not followed;
- monitor and verify that environmental impacts are kept to a minimum;
- review and approve construction method statements, with input as appropriate from the ER;
- assist the contractor in finding environmentally responsible solutions to problems;
- report on the environmental issues at the site meetings and other meetings that may be called regarding environmental matters, if requested by ER;
- inspect the site and surrounding areas regularly with regard to compliance with the EMP and/or EA;
- monitor that environmental awareness training have been provided to all new personnel coming onto site;
- advise management on the removal of person(s) and/or equipment not complying with the specifications, after collaboration with the ER. Recommendations must be recorded by the ER in a Site Instruction Book.
- ensure that activities on site comply with known legislation of relevance to the environment;
- recommend the issuing of penalties via the developer for contraventions of the EMP and/or EA;
- keep a photographic record of progress on site from an environmental perspective; and
- undertake a continual internal review of the EMP and/or EA and submit a report to the developer and the responsible DEA&DP Environmental Official as according to EA conditions.

2.3 Agreed Work Plan and Site Visit Schedule of ECO

After initial construction start-up site visit it is recommended that an ECO site visit be conducted once a month during construction. During operation it is recommended that an ECO visit be conducted annually.

Information recording activity on site, and any guidelines or instructions emanating there from will be routinely made available electronically to the developer and applicable contractors and a copy of the report must be available at the site office.

Clearly matters of urgency or immediate action may be channelled appropriately on an urgent basis.

2.4 Site Manager

The site manager will have the following environmental control responsibilities:

- In conjunction with the ECO will present the environmental education programs to all persons employed on site.
- Consult with the ECO, landowner, developer and any contractor to resolve all environmental issues.
- Issue any instructions from the ECO to the management team via a formal site instruction book or appropriate management tool used for the purpose.
- Take responsibility for the penalty system. The ECO and developer recommendations must be considered when deciding whether or not to impose a penalty.
- The engineer will, via the ECO actions, be accountable for the overall implementation of the Environmental Management Programme.
- Keep a site diary and complaints register.

2.5 Contractors

As part of any tender, the tendering contractor must submit a first draft of a contractor's programme, to the developer that must include the environmental considerations to be followed prior to appointment.

The appointed Contractor's representative will have the following responsibilities:

- Ensure that all staff is familiar with the Environmental Management Programme, which explains the environmental policy for the project.
- Allow for sufficient time between surveying the exact locations where services will be intended and actual construction, for the ECO to facilitate and instruct for the removal of plants, seeds and cuttings if necessary.
- The contractor must keep his personnel fully aware of environmental issues and ensure they show adequate consideration to all environmental aspects.
- Establish environmental signs to be erected on the construction site at locations identified by the ECO and approved by the engineer.
- Be responsible for the cost of the restoration of any damage caused, in environmentally sensitive areas, as a result of contractor responsibility regarding negligence. This must be done in accordance with the engineer / ECO's specifications.
- Take responsibility and active steps to avoid any increase in the fire hazard.
- The contractor must take responsibility for implementing all the relevant provisions of the EMP, or if he encounters difficulties with the specifications, he must discuss alternative approaches with the ECO and engineer prior to proceeding.

Failure to comply with the EMP may result in the application of fines as set out, and any reported non-compliance may result in the suspension of work or termination of a contract.

2.6. Record keeping of activities, inclusive of recording of non-compliances and corrective actions

The site manager must keep a record of all activities relating to environmental matters on site, including:

- meetings attended;
- method statements;
- issues arising on site;
- cases of non-compliance with the EMP;
- corrective action taken and penalties issued.

This information will be recorded in an appropriate manner in a site diary, registers, issues/warning book, etc.

2.7 Compliance with other legislation

It is important that all on site staff are aware of other relevant legislation that may relate to the activities taking place on site, especially local authority required compliances.

CHAPTER 3

APPLICABLE LEGISLATION, POLICY AND ENVIRONMENTAL PRINCIPLES

Take Note: the list below is by no means a comprehensive list, but a list of relevant applicable Acts. It does not identify the specific applicable sections and regulations. The Developer is ultimately responsible to identify and ensure that compliance with all relevant legislation, policies etc. is taking place on site at all times.

3.1. Potential Applicable Legislation/Policies/Guidelines/By-laws Identified

1. ADVERTISING ON ROADS AND RIBBON DEVELOPMENT ACT, 21 OF 1940
2. BASIC CONDITIONS OF EMPLOYMENT ACT 75 OF 1997
3. COMPENSATION FOR OCCUPATIONAL INJURIES AND DISEASES ACT 130 OF 1993
4. CONSERVATION OF AGRICULTURAL RESOURCES ACT, 43 OF 1983
5. CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, 1996
6. ENVIRONMENT CONSERVATION ACT, 73 OF 1989, WESTERN CAPE NOISE CONTROL REGULATIONS
7. EMPLOYMENT EQUITY ACT, 55 OF 1998
8. ENVIRONMENT CONSERVATION ACT, 73 OF 1989
9. FENCING ACT, 31 OF 1963
10. HAZARDOUS SUBSTANCES ACT, 15 OF 1973
11. LABOUR RELATIONS ACT 66 OF 1995
12. NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT, 103 OF 1977
13. NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 107 OF 1998
14. NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT 39 OF 2004
15. NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 10 OF 2004
16. NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 59 OF 2008
17. NATIONAL FORESTS ACT, 84 OF 1998
18. NATIONAL HERITAGE RESOURCES ACT, 25 OF 1999
19. NATIONAL VELD AND FOREST FIRE ACT, 101 OF 1998
20. NATIONAL WATER ACT 36 OF 1998

21. OCCUPATIONAL HEALTH AND SAFETY ACT 85 OF 1993
22. TOBACCO PRODUCTS CONTROL ACT 83 OF 1993
23. WATER SERVICES ACT 108 OF 1997
24. HESSEQUA LOCAL MUNICIPALITY BY LAWS

CHAPTER 4

COMPLIANCE

This section of the report is included in compliance with Section 24N (2) I of the National Environmental Management Act 107 of 1998.

4.1. Monitoring and Auditing

4.1.1 Introduction

In keeping with current environmental and associated legislation, all environmental management procedures and actions must be reviewed and refined on an ongoing basis.

This is in accordance with the dynamic nature of environmental management and allows for the timeous identification and mitigation of issues as they come to light.

The process of review and refinement, built into the requirements of the EMP, is known as monitoring and auditing.

4.1.2. Roles and responsibilities

Efficient implementation of the performance specifications, effective monitoring and auditing, as well as clear responsibility and accountability allocation requires that various role-players be defined for the construction implementation project.

Depending on the nature and scale of a project, implementing teams could be composed of any number of role-players, each with their own specified responsibilities.

Therefore, for the purpose of this document, the following role-players are defined, based purely on responsibility and accountability allocation. The actual designation of role-players may vary, but the responsibilities will largely remain as stated.

4.1.2.1. Developer/landowner or custodian of the land

The developer/landowner or custodian of the land is the person or organization with decision-making capacity for the land in question, and thus ultimately accountable for what takes place on that land.

4.1.2.2. Contractor

Contractors are appointed to undertake the works as specified in the contract. It is the responsibility of the contractor to do whatever is necessary from their side to ensure that he or an appointed advisor is well versed in environmental studies, so that they may accurately and efficiently carry out the requirements of the environmental specification.

The contractor is liable for any and all remedial work required in terms of the environmental specification, resulting from his environmental negligence, mismanagement and / or non-compliance.

4.1.2.3. Environmental Control Officer

An environmental control officer will manage and undertake monthly environmental inspections for the duration of the construction phase of the project as required.

The contractors or line management are answerable to the ECO for non-compliance with the performance specifications. Issues of non-compliance raised by the ECO/EO must be taken up by the project manager, and resolved as per the conditions of his contract.

Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation and not allowed for in the performance specification) must be endorsed by the project manager.

4.2. The Monitoring Procedure

Environmental monitoring is the continuous evaluation of the status and condition of environmental elements. Its purpose is to detect change that takes place in the environment over time and involves the measuring and recording of physical, social and economic variables associated with development impacts.

Many techniques for environmental monitoring have been proposed, each detailing a specific protocol. Regardless of which technique is used, the ultimate aim is that each environmental management specification be checked by means of a system in which a score may be allocated for:

- Full compliance
- Satisfactory performance
- Unsatisfactory performance and
- No action taken

Completed monitoring reports will be submitted to the project engineer, developer/landowner and the contractor, who will attend to issues. These reports must be kept on file and be made available upon request by any environmental authority requesting such.

All persons employed, the contractor or his sub-contractors, must abide by the requirements of these performance specifications as they apply to the works. Any employees, the contractor or his sub-contractors found to be in breach of any of the environmental specifications, may be ordered to vacate the site forthwith and/or be subject to a disciplinary process.

The order may be given orally or in writing by the ECO. Confirmation of an oral order will be given as soon as practicable, but lack of confirmation in writing must not be a cause for the offender to remain on site, or not be subject to a disciplinary process. Supervisory staff, the contractor or his sub-contractor may not direct any person to undertake any activities that would place such person in contravention of the EMP, legislation and specifications.

The contractor and staff are deemed not to have complied with the performance specifications if:

- There is evidence of wilful or accidental contravention of any specification included in the specification;
- There is evidence of the contractor carrying out activities not permitted in terms of the EMP, contract and / or the specification;
- There is evidence of environmental negligence and / or mismanagement resulting in negative

impacts on the environment;
- Has failed to meet with the requirements of the approved schedule.

The contractor and developer/landowner will be informed via ECO monthly reports, as well as by means of direct instruction (if necessary) as to what corrective actions are required in terms of environmental compliance.

Disregard for an instruction, and failure to respond adequately to complaints from the public will be construed as non-compliance. Non-compliance may lead to parties being penalised.
In more serious cases, the ECO may give notice, and halt operations until such a time that the corrective action is taken and the site complies with the performance specifications.

In more serious cases, the ECO may give notice, and halt operations until such a time that the corrective action is taken and the site complies with the performance specifications.

In cases of persistent non-compliance, the contractor or staff may be evicted from site after disciplinary process is followed. Only the developer/landowner may issue such instruction, retaining any costs required to remedy situations perpetuated by environmental negligence, mismanagement and / or non-compliance.

4.3. The Auditing Procedure

Environmental auditing is the process of comparing the impacts predicted with those that have actually occurred during implementation.

An environmental performance audit examines and assesses practices and procedures that, in the event of failure, would cause an environmental impact or result in an environmental risk. During each of the lifecycle phases, various issues will be monitored. The performance audit will ensure that the monitoring was correctly undertaken and that compliance was best achieved.

To these ends the project will be audited versus this EMP for effectiveness. ISO/SANS 19011:2013 auditing standards will be applied.

Audits will be undertaken at completion of the construction phases. Audit reports will be submitted to management, who will attend to all noted issues.

These reports must be kept on record and be made available upon request by the developer/landowner/custodian of the land and any environmental authority or I&AP requesting such.

4.4. Compliance Auditing and Monitoring Schedule/s

Construction Phase	**Submission of Audit Report To**
Once-off Pre-construction ECO compliance monitoring	Construction Site Manager and Municipality DEA&DP Development Management
Monthly ECO compliance monitoring	Construction Site Manager and Municipality DEA&DP Development Management
Annual ECO compliance monitoring report (External Audit Report must be prepared by an independent person that is not the ECO or the EAP for this project. The External Audit Report must contain all the information required in Appendix 7 of the NEMA EIA Regulations, 2014 (as amended).)	Construction Site Manager, Municipality and DEA&DP

Completion of Construction Phase ECO compliance monitoring (at the end of each construction phase completion)	Construction Site Manager, Municipality and DEA&DP
Operational Phase	
Annual external audit report to be compiled by ECO	Municipality and DEA&DP

4.5 Retentions and Penalties

It is recommended that a penalty retention system be combined with the penalty system to both motivate and compel the contractor to adhere to the EMP for the duration of the contract.

In this way incentives may be created to perform (i.e. in the form of the retention amounts that will only be paid to the contractor at the end of the contract), without creating the misunderstanding that adherence to the EMP is optional.

Persistent non-compliance will not only result in the contractor forfeiting any retention amount, but he will also be fined.

Of importance is that the contract specifies exactly how the penalty and retention system will operate, as well as how any funds resultant from retentions and penalties will be utilised.

All such funds must be used to improve environmental conditions on the site in general..

4.5.1. The retention system

For this system, a percentage value for each of the sections priced for in the environmental bill of quantities is retained until the full completion of the contract works.

If the monitoring process reveals persistent and/or wilful non-compliance with any aspect of the environmental performance specifications, then the full retention associated with that particular item will be withheld.

The project may then apply these retained funds to rectify the problem on site possibly making use of other or alternate resources at his disposal.

At the end of the contract or action, all remaining environmental retention amounts will be paid out to the contractor or staff pending approval by the ECO, after having confirmed full compliance with the relevant performance and rehabilitation specifications.

4.5.2. Penalty System

A system of penalties will be introduced to reinforce environmentally sensitive and prudent behaviour. The maximum penalties that will be fined per incident that may be enforced are listed below. The penalty amount will be determined (inter alia) by the severity of the offence.

Any defacing or cutting down trees, existing infrastructure, not specified to be removed	R5000 each
Disturbance to natural veld and wetlands outside of approved development area	R1000 / m^2
Catching or harming wild animals	R3000 plus charges at SAPS
Litter resulting from operation	R250 / offence / day
Entering a no-go area on foot	R500

Entering a no-go area in a vehicle	R5000
Making a fire outside an approved fireplace	R20 000
Disposal of any litter or construction material in a no-go or non-specified area	R1000 / m^2
Dumping of cement, concrete, fuel or oil in an area or other than that authorised and suitable	R10 000
Any damage to plant life in a no-go area	R1000
Failure to use portable / toilets	R100 / observed incident or evidence of human excrement in the veld
Waste of water resources during construction phase	R1000/day
Any actions contrary to the Environmental Policy which continue after an initial penalty	Termination of contract.

In addition to the above, all costs incurred by the client/developer to remedy any damage will be the responsibility of the offender.

Should the monitoring process reveal acts of persistent and / or wilful non-compliance with the environmental performance specifications, then the contractor or staff member will be fined according to the specified value of that item.

4.6. Method Statements

Upon request from the ECO the contractors must provide written statements for discussion with the ECO on environmentally sensitive aspects of the contract. Environmentally sensitive aspects include by example excavations, work close to sensitive areas, collection and storage of top soil and vegetation, erosion control, wash water control, waste control, etc.

Methods Statement (MS) Content

It is important to note that the ECO may request further methods specification, if it be deemed necessary in his view.

Examples of standard Methods Statement which may be requested by the ECO:

- MS to specify the fire drill procedure to be followed in the event of a fire.
- MS to state how pollution will be prevented from entering any environmental system. To include the methods of filtering out pollution such as oil, petrol and waste from any working areas or roads.
- MS to specify special measures that will be needed in the event of large pollution spills.
- MS to indicate the timing and sequence of events to follow in sensitive areas to give sufficient time for the ECO to survey these areas and remove plants.
- MS on how recommended no-go/no-development areas will be demarcated and remain demarcated throughout construction phase.
- MS on water saving management plan that will be implemented during construction.

The Method Statement must include a site plan, preparatory steps, materials, and supervision details.

Example of Environmental Method Statement Form:

METHOD STATEMENT

CONTRACT:…….. **DATE:**……..

PROPOSED ACTIVITY (give title of method statement and reference number from the EMP):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:	End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible):

Note: please attach extra pages if more space is required

DECLARATIONS

1) ENVIRONMENTAL SITE OFFICER/ ENGINEERS REPRESENTATIVE [select correct term]

The work described in this method statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

_____ _____
(signed) (print name)

Dated: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this method statement and the scope of the works required of me. I further understand that this method statement may be amended on application to other signatories and that the ECO / EO and ER will audit my compliance with the contents of this method statement

_____ _____
(signed) (print name)

Dated: _____

3) APPROVING AUTHORITY (Engineer)

The works described in this method statement are approved.

_____ _____ _____
(signed) (print name) (designation)

Dated: _____

CHAPTER 5

This section of the report is included in compliance with Section 24N (2) I of the National Environmental Management Act 107 of 1998.

5.1. Good Housekeeping

The developer/landowner will ensure the maintenance of "good housekeeping" practices during operations.

This will help avoid several disputes regarding responsibility and will allow for the smooth running of the operation as a whole.

Good housekeeping extends beyond the environmentally sensitive construction methods to include the care for and preservation of the surrounding environment.

5.2. Record Keeping

The developer/landowner will ensure that a filing system, identifying all documentation related to the EMP, is established.

A list of reports likely to be generated during the project is set out below.

All applicable documentation must be included in the environmental filing system catalogue or document retrieval index.

- Approved EMP, authorizations, licenses or permits;
- Final design documents and diagrams issued;
- All communications detailing changes of design/scope that may have environmental implications;
- Daily, weekly and monthly site monitoring reports (where applicable);
- Complaints register;
- Environmental training manual;
- Environmental training attendance registers;
- Incident and accident reports;
- Evidence of all disposed contaminated products, waste or residues, which have been generated during construction;
- Emergency preparedness and response plans;
- Copies of all relevant environmental legislation;
- Permits and legal documents as part of emergency preparedness teams e.g. fire teams, etc.;
- Crisis communication manual;
- Disciplinary procedures;
- Monthly site meeting minutes during construction;
- All method statements for all phases of the project.

All documentation should be kept on site, must be readily available at all times and made available to any person on request.

5.3 Document Control

The developer/landowner will be responsible for establishing a procedure for document control.

The document control procedure must comply with the following requirements:

- Documents must be identifiable by organisation, division, function, activity and contact person;
- Every document must identify the person and their positions, responsible for drafting and compiling the document, for reviewing and recommending approval, and final approval of the document for distribution;
- All documents must be dated, provided with a version number and reference number, filed systematically, and retained for a specified period.

The owner will ensure that documents are periodically reviewed and revised where necessary, and that current versions are available at all locations where operations essential to the functioning of the EMP are performed. All documents will be made available to the external auditor.

5.4 Reporting Requirements

All advice and recommendations made by the ECO must with the project engineer/engineers compliance be recorded on site in the site instruction book/suitable register for his attention.

All spills will need to be documented and reported to DWS and other relevant authorities.

CHAPTER 6

6.1. Public Communication Protocols

This section of the report is included in compliance with Section 24N (2) I of the National Environmental Management Act 107 of 1998.

The developer/landowner must be responsible for regulating public access to information and compliance reporting.

The developer/landowner must respond to third party or public queries and complaints.

The developer/landowner must also be responsible for maintaining the compliance register to record complaints received and action taken.

CHAPTER 7

This section of the report is included in compliance with Section 24 N 2 (d – g) and 3 (a – b) of the National Environmental Management Act 107 of 1998.

Copies of the specialists reports as listed in the table below must be kept at the construction site office and all management and staff members must be aware of and implement the relevant specialist's recommendations as and when required.

Specialist Recommendations to be adhered to before and During Commencement of Construction, Operational and Decommissioning Phases

AQUATIC BIODIVERSITY COMPLIANCE STATEMENT. PROPOSED WATER TREATMENT WORKS ON ERF RE/557 AND ERF 672 HEIDELBERG. NICOLAAS HANEKOM. FEBRUARY 2026

1. **WHERE REQUIRED, PROPOSED IMPACT MANAGEMENT OUTCOMES OR ANY MONITORING REQUIREMENTS FOR INCLUSION IN THE EMPR**

Developments can have both direct and indirect impacts on aquatic features such a surface or groundwater resources even if on site nor within the immediate vicinity of the development. Direct impacts are those that pollute or transform groundwater or surface water resources. Indirect impacts are those that may overtime lead to degradation or transformation of aquatic features such as erosion.

The proposed prospecting activities can have the following potential impacts on aquatic features:

- Erosion
- Groundwater pollution
- Increased sediment loads
- Surface water resources pollution
- Transformation and degradation

The Department of Environmental Affairs screening report from the national web based environmental screening tool reported a "low sensitivity for Aquatic Biodiversity". The site sensitivity verification and the specialist assessment do not differ from the designation of "low" aquatic biodiversity.

The main Water Treatment Works are located outside NFEPA mapped wetlands. The aquatic plant species that were recorded in the western non-perennial river were Phragmites australis, Juncus kraussii, Typha capensis and Pennisetum alopecuroides. The non-perennial river is located approximately 16m west of the main Water Treatment Works and flows underneath the railway line through a culvert. The damning of the non-perennial river at the railway line resulted in the development of a pond with associated wetland vegetation. The development will not have a significant impact on the non-perennial river and its associate wetland. The only potential negative impacts on the aquatic functioning of the non-perennial river are the discharge of stormwater into the non-perennial drainage line and the potential overflow of backwash water from the WTW into the non-perennial drainage line. The proposal to treat overflow in the settling dams and incorporate an artificial reed bed from where the overflow will be pumped back into the Bloekombos dam is preferred from an aquatic perspective. This aspect of the proposed WTW is intended to eliminate risks to the non-perennial river/unchanneled valley bottom wetland which otherwise would have received the overflows thereby altering the flow regime and potentially causing water quality impairment in these downstream receiving freshwater ecosystems.

The non-perennial river with its associated wetlands west of the WTW has a PES of E: The loss of natural habitat, biota and basic ecosystem functions is extensive, and the EIS is moderate. Department of Water and Sanitation (DWS) 2015 publication: Section 21 (c) and (i) water use Risk Assessment Protocol (excel spreadsheet) is used to assess the sensitivity of the proposed WTW on the mapped and delineated freshwater ecological features and is also used by the DWS to determine if the proposed development requires authorization and what type of authorisation either General Authorisation or Water Use License. The DWS Risk Assessment confirmed the aquatic impact risks to be Low.

The following impact management measures must be implemented and included in the EMPr, and should they be implemented the proposed development activities should not have any significant negative impacts on any aquatic features such surface or groundwater resources or their hydrological functioning:

- Undertake development activities only in identified and specifically demarcated areas. The impact area is the WTW infrastructure and a 2m wide buffer allowing for safe construction activities which will then allow for a no-go area outside this demarcated area and a buffer between the construction area and any freshwater ecological features of at least 14m to protect the identified features. The delineated feature and its buffer is considered as No-Go areas and if any construction activities are required within the No-Go areas then this should only be permissible via an ECO-approved method statement.
- Storm water and erosion control measures must be implemented during the construction phase and monitored to prevent siltation, flooding or erosion.
- All roads need to be maintained and monitored. Visible signs of possible erosion must be immediately rehabilitated.'
- Construction and operational activities of the development must not lead to environmental pollution and waste management measures must be implemented in accordance with an Environmental Management Programme.
- Stormwater discharge into the non-perennial drainage line must not cause erosion and this should be monitored on a regular basis and especially after heavy rains. The stormwater outlet should be constructed from energy dissipating structures (such as gabions and /or reno mattresses) to slow down the velocity of water inflow and allow to seep through the buffer area and not be discharged directly into the non-perennial stream.
- The Water Treatment Works and its associated stormwater discharge point within the non-perennial drainage line must be monitored and aquatic state of the non perennial drainage line and its associated wetland ecosystem recorded on a 6 monthly basis by an Environmental Control Officer during the operational phase. Should any leakage, erosion or environmental degradation be noticed during monitoring this must be addressed by the ECO by providing the municipality with the appropriate rectification and prevention measures to be implemented.

ANIMAL SPECIES COMPLIANCE STATEMENT FOR THE PROPOSED WATER TREATMENT WORKS ON ERF RE/557 AND ERF 672 HEIDELBERG, NICOLAAS HANEKOM, FEBRUARY 2026

WHERE REQUIRED, PROPOSED IMPACT MANAGEMENT ACTIONS AND OUTCOMES OR ANY MONITORING REQUIREMENTS FOR INCLUSION IN THE EMPR

Development within a rural setting can have both direct and indirect impacts on animal species of the development sites and surrounds. Direct impacts are those that destroys indigenous animal species habitats. Indirect impacts are those that may overtime lead to degradation or transformation of indigenous animal species habitats such as erosion.

The proposed development activities can have the following potential impacts on indigenous animal species of the site and surrounds:

- Habitat destruction or degradation

- Disturbance during breeding season and foraging for food
- Physical death of species

The following impact management measures must be implemented and included in the EMPr, and should they be implemented the proposed development activities should not have any significant negative impacts on any indigenous animal present on the site or surrounds:

- Development activities must be limited to identified and demarcated development footprint areas and only existing roads may be used to gain access to the site.
- Invasive vegetation to be removed during construction activities to be disposed of at landfill site in such a manner that seeds must not be able to spread from the disposal site or during transportation.
- No trapping or hunting of any fauna or avifauna species may take place on the property.
- Any tortoises or fauna or avifauna species present on the site when construction activities are taking place must be safely moved to the northeastern indigenous vegetation areas not to be impacted upon. This must be done in a manner not to harm the animals/birds and any relocation must be recorded and reported to the Environmental Control Officer.
- No disturbance should be allowed outside of the proposed 0.5ha development area. This includes no excavations; no storage of topsoil no new or widened roads, and all forms of temporary disturbance.
- Implement erosion and storm water runoff management measures to prevent (or if prevention is not possible limit) any erosion from occurring on the development areas and surrounds.
- Should areas outside of the proposed development footprint area be disturbed this must be actively rehabilitated with indigenous vegetation.

PLANT SPECIES COMPLIANCE STATEMENT FOR THE PROPOSED WATER TREATMENT WORKS ON ERF RE/557 AND ERF 672 HEIDELBERG. NICOLAAS HANEKOM, FEBRUARY 2026

WHERE REQUIRED, PROPOSED IMPACT MANAGEMENT ACTIONS AND OUTCOMES OR ANY MONITORING REQUIREMENTS FOR INCLUSION IN THE EMPR

Developments within rural areas containing indigenous vegetation (albeit pioneer and significantly disturbed indigenous vegetation species) can have both direct and indirect impacts on plant species of the development sites and surrounds. Direct impacts are those that destroys indigenous plant species habitats. Indirect impacts are those that may overtime lead to degradation or transformation of surrounding indigenous plant species habitats such as erosion.

The proposed development activities can have the following potential impacts on indigenous plant species of the site and surrounds:

- Destruction/removal of indigenous vegetation due to clearance and erosion.
- Degradation of adjacent indigenous vegetation areas due to alien vegetation encroachment.

The following impact management measures must be implemented and included in the EMPr, and should they be implemented the proposed development activities should not have any significant negative impacts on any indigenous plant species on the site or surrounds:

- Clearly demarcate the proposed development area of 0.5ha and treat all surrounding areas falling outside of the proposed 0.5ha development area as no-go area and undertake development activities only in identified and specifically demarcated areas as proposed. Refer to proposed figure 5 as included below.
- Demarcation method to be approved by an Environmental Control Officer (ECO) before site clearance activities commences.
- No disturbance should be allowed outside of the proposed 0.5ha development area. This includes no dumping of fill, no roads, soil or materials stockpiles and all forms of temporary disturbance.
- Implement erosion and storm water runoff management measures as according to EMP requirements to prevent (or if prevention is not possible limit) any erosion from occurring on the activity areas and surrounds.
- Should areas outside of the proposed development footprint area be disturbed this must be actively rehabilitated with indigenous vegetation.

Figure 5: Heidelberg Water Treatment Works proposed 0.5Ha construction footprint area. All areas falling outside of the proposed construction footprint area must be regarded as no-go/no-development area.

CONCLUSION AND RECOMMENDATIONS

The sampling and analysis of the site was optimum and provides suitable data and results to present an informed decision on the local ecology and terrestrial biodiversity features. During the site visit, the different biodiversity features, habitat, vegetation and landscape units present were identified and recorded in the field. Walk-through-surveys were conducted of representative habitats and areas of interest. Searches for listed species of conservation concern at the site were conducted, but none were observed which required the recording of their location. The presence of sensitive habitats such as wetlands or pans and unique edaphic environments, such as rocky outcrops or quartz patches, are present and therefore was recorded and mapped. The existing access road that will be used were incorrectly mapped as CBA and the proposed infrastructure is located outside mapped CBA. The Eastern Scale Renosterveld are degraded due to existing Eucalyptus tree plantation and portions of the proposed development footprint were levelled previously. No species of conservation concern were recorded.

The results of the information gathered from the site survey does differ from the Environmental Screen report result of Very High Terrestrial Sensitivity. No SCC were recorded or will be impacted. 338.21m2 was incorrectly mapped as CBA. This mapped area is located on the existing road and pipeline route that will be used. The vegetation impacted by the proposed development area is characterized and dominated by pioneer grasses and does not represent the vegetation structure of Eastern Ruens Shale Renosterveld. The vegetation was impacted by previous levelling of a portion of the site and roads and the rest of the area by Eucalyptus tree plantation and consist mainly of pioneer plants. **Approximately 1200m2 degraded endangered vegetation with a very low ecological sensitivity will be permanently cleared. It is therefore expected that the proposed development will have low negative terrestrial biodiversity and ecological impacts on the terrestrial biodiversity features provided that appropriate mitigation measures are included in the EMPr and adhered to.** No biodiversity offset is required in terms of the National Biodiversity offset Guidelines.

No additional survey or further assessment is in the author's view recommended.

Layout/design Alternative 3 is preferred as it includes a stormwater canal to prevent potential erosion and contamination around the WTW, it also includes an artificial reed bed system as part of the sludge management system from where all overflow will be discharge back into the Bloekombos Dam decreasing the potential to cause pollution. Potential impacts on terrestrial plant and animal species and their potential associated habitat could be sufficiently mitigated/managed by implementing the mitigation measures as proposed within this report.

To achieve this objective the following management and mitigation measures are proposed and must be incorporated into the Environmental Management Plan:

- Clearance of indigenous vegetation must be kept to a minimum clearly demarcating the proposed development area before construction commencement, maintaining the demarcation throughout the construction phase and only clearing the area required for construction.
- All unused construction materials must be removed from site immediately after construction completion.

- No waste pollution may occur due to the construction activities and all waste must be contained and disposed of at the municipal landfill site.
- Construction activities must be controlled to ensure that the adjacent vegetated areas are not negatively impacted.
- Invasive vegetation to be removed during construction to be disposed of at landfill site in such a manner that seeds must not be able to spread from the disposal site or during transportation.
- The discharge of stormwater and overflow must not lead to waste pollution or erosion at discharge points.
- Waste traps must be installed at the inlet to the stormwater pipes which must be cleared of waste on a monthly basis by the municipality. Any waste at the stormwater discharge areas must also be removed by the municipality and disposed of at the municipal landfill site on a monthly basis.
- Ongoing monitoring of erosion at the outlet structures must be done by the municipality, should any signs of erosion be detected immediate rectification and further prevention measures must be put in place under the guidance of a qualified ecological specialist so as to prevent any additional cumulative impacts on the environment.
- The impacted site must be monitored for alien vegetation encroachment and should alien vegetation encroach on the impacted site it must be removed and monitored in accordance with CapeNature approved alien vegetation management practices.
- Replacement of topsoil and revegetation of the impacted indigenous vegetation areas must be completed within one month of construction completion and under guidance of a qualified ecological specialist. Revegetation must only be done with locally sourced indigenous vegetation.
- Monitoring of rehabilitated areas must be done by an ECO for at least one year after construction completion on a three-monthly basis to determine success of rehabilitation and to monitor other potential impacts such as erosion. Should the ECO find that rehabilitation is not satisfactory he/she must recommend additional measures to be implemented.
- All services infrastructure must be maintained in a good condition by the municipality not leading to any environmental degradation or pollution.

Provided that activities are restricted to the property and the mitigation measures to reduce the impacts of the activities are implanted, then the activities are not likely to result in long-term degradation of the receiving environment or significant net loss of terrestrial biodiversity.

AN ENGINEERING GEOLOGICAL INVESTIGATION TO ESTABLISH THE GEOTECHNICAL CONDITIONS FOR PROJECT RM15876 PROPOSED NEW WATER TREATMENT WORKS FOR HESSEQUA LOCAL MUNICIPALITY IN HEIDELBERG IN THE WESTERN CAPE PROVINCE OF SOUTH AFRICA. MARIUS PROUDFOOT. JUNE 2025

11. DRAINAGE

It would be recommended that storm water be addressed throughout the area to be developed including the internal road network during the construction phase.

12. DEVELOPMENT POTENTIAL & POSSIBLE MITIGATION MEASURES

From the available field data and laboratory test results, the following assessment can be made:

12.1 Roads & Parking areas

The Road Indicator & California Bearing Ratio test results indicate that almost all the materials encountered in the trial holes have weathered to a clay and have a TRH14 materials classification of less than G10 (<G10) except for the silty clay & clayey sand encountered in TH1 & TH3 between the depths of 140mm to 520mm and 1260mm to 2000mm below ground level which have a TRH14 materials classification of G10.

Therefore, apart from the silty clay & clayey sand encountered in TH1 & TH3 between the depths of 140mm to 520mm and 1260mm to 2000mm below ground level which have a TRH14 materials classification of G10 and is suitable for use as fill up to top of formation, none of the remainder of the materials are suitable for any phase of construction. We will also recommend undercutting and spoiling these poor-quality materials wherever they fall within the pavement structure up to a depth of 500mm below top of fill and replacing with a suitable material.

Materials for the remainder of the pavement layers and shortfall of will have to be imported from commercial or alternative sources.

2.2 Pipelines

None of the material encountered in the excavations met the criteria for bedding due to either the grading or the Plasticity Index (Selected Granular Material) as per the requirements of SABS 1200 LB paragraph 3.1 which requires the material to be granular, non-cohesive in nature that is singularly graded between 0.6mm and 19.0mm and is free draining. Therefore, material for bedding will have to be imported from suitable commercial or alternative sources.

The materials are also not suitable as selected fill material (Fill Blanket) due to the excessive Plasticity Index. SABS 1200 LB paragraph 3.2 require a material with a Plasticity Index not exceeding 6

There could be a problem with the compacion of these materials due to there fine grained nature and high Plasticity Index. The Grading Modulus of these materials range between 0.2 and 0.4.

2.3 Foundation Recommendations and Solutions

The Foundation Indicator tests results indicate that all the materials tested have a low & medium potential expansiveness. The expansiveness classification was done in accordance with the Van der Merwe activity curves.

The expansiveness classification was done in accordance with the Van der Merwe activity curves. The Plasticity Index of the whole sample 8% & 17% respectively and with the clay fraction (0.002mm sieve) 17.3mm and 20.1mm.

Dynamic Cone Penetrometer (DCP) tests were performed at all the trial hole positions. The estimated safe bearing pressure as determined with the DCP at a depth of 500mm below ground level ranged between 200kPa & >200kPa, at DCP refusal depth of the estimate safe bearing pressure exceed 200kPa (>200kPa).

Three (3) Collapse Potential tests were carried out on undisturbed samples taken of the founding material. Sample number 9910, TH1 – was tested at depths of between 521mm to 1086mm dark Grey and dark Brown clay and gave a 0.07% collapse after saturation @ 200kPa. Sample number 9912, TH2 – was tested at depths of between 910mm to 1420mm and the Brown, Red clay gave a 0.28% collapse after saturation @ 200kPa. Sample number 9915, TH3 – was tested at depths of between 250mm to 1260mm and the, dk, Olive, Grey clay gave a 0.26% collapse after saturation @ 200kPa. A Collapse Potential of 0.07%, 0.28% & 0.26% equates to a settlement of 0.7mm, 2.8mm & 2.6mm per meter profile.

The California Bearing Ratio test gave maximum swells of 1.39%, 1.54%, 1.69%, 2.44% 1.78%, 2.52%, 2.22% & 1.38% respectively this would roughly equate to a heave of 13.9mm, 15.4mm, 16.9mm, 24.4mm, 17.8mm, 25.2mm 22.2mm &13.8mm per meter profile.

With the available laboratory and field data and as per SANS 10400-H: The Application of The National Building Regulations – Part H: Foundation, Table1 - Site class designation of single-storey and double-storey structures type 1 masonry buildings, a designation of a H2 site class will be applicable.

Movements of between 15mm & 30mm can be expected.

The following foundation design & building procedures will apply for a H2 site classification:

- Stiffened or cellular raft of articulated lightly reinforced masonry. Site drainage and plumbing/service precautions.
- Piled foundations with suspended floor slabs with or without ground beams. Site drainage and plumbing/service precautions.
- Split Construction - Combination of reinforced masonry and full movement joints. Suspended floors or fabric reinforced ground slabs acting independently from the building. Site drainage and plumbing/service precautions.
- Soil Raft – Remove all or necessary parts of the expansive horizon to 1.0 meter beyond the perimeter of the building and replace with inert backfill compacted to 93% MOD AASHTO density at -1% to 2% of optimum moisture content. Normal

construction with lightly reinforced strip foundations and light reinforcement in masonry. Site drainage and plumbing/service precautions.

13. CONCLUSIONS

While every effort made during the fieldwork phase of this investigation to identify the various soil horizons, their problems and distribution, it is impossible to guarantee that isolated zones of poorer material have not been missed. The investigation was, however, thorough and conditions are not expected to vary from those described in this report.

The engineers are nevertheless strongly urged to inspect service trenches and foundations once opened to assure themselves that conditions are not at variance with those described in this report. Disparities in founding material type should be referred to an expert.

It must be borne in mind that the overall interpretation of geotechnical conditions is based upon point information derived from the respective test position and that conditions intermediate to these have been inferred by interpolation, extrapolation, and professional judgement.

14. CLOSURE

We have employed accepted geotechnical engineering and engineering geological procedures, and our opinions and conclusions are made in accordance with generally accepted principles and practices of these professions. The contents of this report are valid as of the date of preparation. However, changes in the condition of the site can occur over time as a result or either natural processes or human activity.

In addition, advancements in the practice of geotechnical engineering and engineering geology and changes in applicable practice codes may affect the validity of this report. Consequently, this report should not be relied upon after an eclipsed period of twelve months without a review by this firm for verification of validity. This warranty is in lieu of all other warranties, either expressed or implied.

Although not anticipated at this site, we should note that our investigation did not include the evaluation or assessment of any potential environmental hazards or groundwater contamination that may be present.

GOALS FOR PLANNING AND DESIGN PHASE

Overall Goal for Planning and Design Phase: Undertake the planning and design phase of the development in a way that:

- Ensures that the design of the development responds to the identified environmental constraints and opportunities.

- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Ensures that adequate regard has been taken of any landowner concerns and that these are appropriately addressed through design and planning (where appropriate).
- Ensures that the best environmental options are selected for the project.
- Enables the development construction activities to be undertaken without significant disruption to other land uses in the area.
- In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE PD1: ENSURE THE DESIGN OF THE DEVELOPMENT RESPONDS TO THE IDENTIFIED ENVIRONMENTAL CONSTRAINTS AND OPPORTUNITIES

The most sensitive landscape features for planning purposes in the study area is the surrounding medium botanical sensitivity area, wetlands and sandy soil of the development sites which could make certain areas more susceptible to erosion. Access roads and construction camp areas should be placed so as to minimise the impacted area and construction sites should be clearly demarcated and no additional areas outside of the approved development footprint areas may be impacted upon.

Project Component/s	Access roads Construction area Development Layout
Potential Impact	Design fails to respond optimally to the environmental consideration.
Activities/Risk Sources	Poor consideration of the natural landscape features.
Mitigation: Target/Objective	Ensure that the design of the developments responds to the identified environmental constraints and opportunities.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Design the proposed development taking into account all environmental impacts and aspects as identified during the assessment process.	Municipality Developer Town planner Engineer EAP	Design Phase
The developer together with the inputs of the engineer, EAP and town planner must determine which technological alternatives will suit the proposed development site the best and which are reasonable and feasible to implement, also taking into account funding available for the development. Some of these technological alternatives to be considered for the proposed development include: • Type of construction materials used. • Reduce hard surfacing as far as possible to encourage rain water to seep back into the ground rather than being carried away into the drainage systems. • Designed paved areas so that water run-off is slowed down and where possible used soak away and permeable paving that allows water to filter into the ground. • Aim for and promote zero waste in planning, operation, management, maintenance and	Municipality Developer Town planner Engineer EAP	Design Phase

demolition of the structures. I.e. build waste avoidance into the process at a design phase, by specifying products and materials that have less wasteful production processes and don't create wasteful emissions during construction, maintenance and demolition of a structure.		
Access roads to be carefully planned along existing access roads to minimise the impacted area and prevent unnecessary over compaction of soil.	Municipality Developer Town planner Engineer EAP Contractor	Design phase
As far as possible new roads must link with existing roads infrastructure.	Municipality Developer Town planner Engineer EAP Contractor	Design phase
The holder of an environmental authorisation has the responsibility to notify the competent authority of any alienation, transfer and, change of ownership rights in the property on which the activity is to take place.	Municipality Developer	Pre-construction
Fourteen (14) days written notice must be given to the Department that the activity will commence. The notification must include a date on which the activity will commence as well as the reference number.	Municipality Developer	Pre-construction
ECO to be appointed prior to the commencement of any authorised activities. Once appointed the name and contact details of the ECO must be submitted to the DEA&DP.	Municipality Developer	Pre-construction
All safety requirements for the construction and operation of proposed infrastructure must be factored in during the planning phase i.e. traffic management.	Municipality Developer	Pre-construction

Performance indicator	Design meets objectives and does not degrade the environment. Design responds to the mitigation measures and recommendations in the BA report. Minimal impact on the surrounding environment
Monitoring	Ensure that the design implemented meets the objectives and mitigation measures in the BA report through review of the design by the EAP, Project Manager, Developer and the Contractor prior to the commencement of construction.

OBJECTIVE PD2: ENSURE EFFECTIVE COMMUNICATION MECHANISMS WITH THE VARIOUS STAKEHOLDERS

On-going communication with affected and surrounding landowners and key departments is important to maintain during the construction and operational phases of the developments. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project Component/s	Communication protocols
Potential Impact	Communication failure that can lead to a number of detrimental impacts such as failure to comply with EMP requirements due to not receiving correct or any instructions.

Activities/Risk Sources	Communication between all relevant parties
Mitigation: Target/Objective	Effective communication with all relevant parties Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Compile and implement a grievance mechanism procedure for the public to be implemented during both the construction and operational phases of the facility. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.	Developer Contractor	Pre-construction Construction phase Operational phase
Discuss and agree upon communication protocols during pre-construction site meeting	Contractor Developer ECO	Pre-construction Construction phase

Performance indicator	A public complaint register is available at the site office and public complaints recorded in the register and dealt with swiftly. Pre-construction meeting minutes indicates communication protocols were discussed and agreed upon.
Monitoring	An complaint or finding must be recorded, addressed and monitored by the ECO as according to the requirements of the EMP.

OBJECTIVE PD3: PRE-CONDITIONS

The following pre-conditions shall be fully met before any construction activities may commence:

- ECO to be appointed prior to the commencement of any authorised activities. Once appointed the name and contact details of the ECO must be submitted to the DEA&DP.
- Plan and conduct pre-construction activities in an environmentally acceptable manner
- Fourteen (14) days written notice must be given to the Department that the activity will commence. The notification must include a date on which the activity will commence as well as the reference number.

A site meeting between the contractors, representatives of the developer and the ECO must take place at least 5 days prior to commencement of construction work to:

- Demarcate micro construction sites, services routes, access routes, working boundaries and no-go areas. Demarcate no-go areas before any land clearing occurs under the supervision of an ECO. Demarcation must be clearly visible and effective and no-go area must remain demarcated throughout construction phase;
- Discuss methods of stockpiling (vegetation, topsoil, sub-soil, shell-grit, etc.);
- Check required toilets and fire-fighting facilities to be in place;
- Discuss and agree restricted access to construction site and location of construction camp;
- Sign the Declaration of Understanding (Contractors);
- Discuss and agree communication channels/protocols including contact details;
- Discuss and agree areas of responsibility;
- Discuss and agree the demarcation and control of construction and building sites.
- Conduct flora and fauna search and rescue as required
- Discuss and implement adherence to site specific specialist recommendations
- Discuss and agree on site specific method statements to be submitted by the contractor to the ECO for approval before commencement

Minutes of this site meeting must be kept, and are to be distributed to all parties.

The following equipment must be on every micro or sub site before any construction work is due to start:

- Sufficient and suitable chemical toilet facilities.
- Sufficient refuse bins, which are weather and wind proof, with proper lids.
- 1 x type ABC (all purpose) 12.5 kg fire extinguisher

This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted:

- to the site manager and municipality during the pre-construction ECO site visit.
- to the site manager and municipality monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted)
- to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase
- to the DEA&DP, site manager and municipality at the completion of the construction phase

OBJECTIVE PD4: LAYOUT PLAN CONTROLS

The contractor must ensure that a copy of the signed approved layout plan is available at the office on site at all times for inspection by the developer or his representative(s). Any variation to the approved layout plan must be submitted to the developer for signed approval and may only be implemented once the approved variation is available to the contractor and available on site at the office. The variation of changes to the layout must be approved by the competent authority as per the EA conditions.

This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted:

- to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted)
- to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase
- to the DEA&DP, site manager and municipality at the completion of the construction phase

OBJECTIVE PD5: ADVERTISING

The contractors may place no advertising material on the property unless prior formal written permission has been obtained from the landowner.

This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted:

- to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted)
- to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase to the DEA&DP, site manager and municipality at the completion of the construction phase.

CONSTRUCTION PHASE

Goal for Construction Phase

Overall Goal for Construction:
Undertake construction in a way that:

- ensures that construction activities are properly managed in respect of environmental aspects and impacts;
- enables construction activities to be undertaken without significant disruption to other land uses in the area, in particular concerning noise impacts, dust, farming practices, traffic and road use, and effects on local residents;

- minimises the impact on the surrounding area;
- minimises impacts on avifauna and other fauna using the site; and
- minimises the impact on the heritage and historical value of the site;
- minimises traffic impacts; and
- minimises possible health impacts.

Objectives

In order to meet these goals, the following objectives have been identified, together with the necessary actions and monitoring requirements.

OBJECTIVE C1: WORKING HOURS

Construction Sites	
Mondays to Fridays	06h00 – 17h00
Saturdays	06h00 – 17h00

Project Component/s	Construction site Access roads		
Potential Impact	Surrounding landowners and residents are exposed to noise generated from the development site.		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	Effective communication with affected and surrounding landowners; Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
Contractors may only be present on the site during the standard working time hours.		Contractor	Construction phase
Performance indicator	Construction only taking place during approved working hours.		
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase.		

OBJECTIVE C2: SECURITY, SAFETY AND EMERGENCIES

Project Component/s	Construction site Access roads Adjacent residential areas		
Potential Impact	Safety of the public, surrounding landowners and residents Safety of personnel working on site Safety of visitors on site		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	To protect all involved from incidents and injury		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
Access to the construction sites must be strictly controlled and secured as construction will take place in close proximity to residential areas. Notices should be		Contractor	Construction phase

displayed at all public entrances to the property, warning visitors that they are entering a construction site and that all visitors must report to the site office.		
Telephone numbers of emergency services, including the local fire-fighting services, must be posted conspicuously in the contractor's office and near the telephone. No firearms are permitted on the construction site, other than those authorised by the developer for the property security service provider if needed.	Contractor	Construction phase
All personnel must wear Personal Protective Equipment during the construction as required.	Contractor	Construction phase
If an environmental emergency such as fire, oil/fuel spills, sewage pipe burst, floods etc. occurs on site during the construction phase immediate actions must be taken to manage and contain the situation by the contractor/s and municipality. Within 24hours of emergency detection the ECO must be informed of the incident, where after ECO will conduct a site visit and recommend further remediation and/or rehabilitation methods to be implemented. Depending on type and extent of emergency that occurred specialists may be contacted to provide specific recommendations. An incident report must be completed and sent to municipal and governmental authorities.	Contractor Municipality ECO	Construction phase
Performance indicator	All required notices posted at public entrances and at the site office. All personnel wearing PPE as required All emergency situations contained and reported as soon as possible and preventative measures put in place.	
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase.	

OBJECTIVE C3: SPEED LIMIT

Project Component/s	Construction site Access roads		
Potential Impact	Speeding motorists and construction vehicles could injure personnel, members of the public or cause damage to property/infrastructure.		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	To protect all involved from incidents and injury.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
For security and safety reasons the speed limit on the property for all contractors' vehicles is 30 km per hour.		Contractor	Construction phase

The contractor is responsible for ensuring that all his employees, sub-contractors and delivery vehicles adhere to this rule. A notices should be displayed at the entrance of the construction sites indicating that the speed limit is 30km/h		
Performance indicator	Notice boards at site entrance indicating a speed limit of 30km/h. All vehicles entering construction sites adhering to 30km/h speed limit	
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase.	

OBJECTIVE C4: CONTRACTOR'S CAMP

Project Component/s	Construction camp	
Potential Impact	Degradation of the natural environment inside/outside of the development area.	
Activities/Risk Sources	Activities associated with site construction	
Mitigation: Target/Objective	To protect and mitigate impacts on the environment.	
Mitigation: Action/Control	**Responsibility**	**Timeframe**
The location and extent of the contractor's camp area will be discussed and approved by the developer/landowner and ECO.	Developer Contractor ECO	Construction phase
The contractor's camp is to accommodate the site offices, temporary waste storage area, and bunded concrete/cement mixing area, contractor stores, servicing, parking and refuelling area for vehicles and machinery, as well as adequate ablution and accommodation facilities for employees.	Contractor	Construction phase
The construction camp is not to be established within within a no-go area	Contractor	Construction phase
Performance indicator	ECO in conjunction with the landowner and contractor will approve construction camp area outside of no-go areas. Construction camp to be neatly fenced and to accommodate all facilities as listed above and elsewhere in EMP.	
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase.	

OBJECTIVE C5: DELIVERIES TO CONTRACTORS

Project Component/s	Construction site Construction camp Access roads		
Potential Impact	Increased traffic, congestion and noise for surrounding landowners / residents and other road users. Impact on the natural environment.		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	To protect and mitigate impacts on the environment, surrounding land uses, landowners, and personnel working on site.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
Contractors will at all times be responsible for compliance by their delivery service providers as engaged. Delivery times will be limited to working times as defined in this document.		Contractor	Construction phase
Contractors have the responsibility of advising the property security staff of deliveries expected and to be executed.		Contractor	Construction phase
Contractors shall further ensure that drivers of service providers are informed of all procedures and restrictions e.g. which access road to use, speed limits, no-go areas, demarcated construction areas, and maximum allowed vehicle mass etc., as applicable before their first visit to site.		Contractor	Construction phase
Washing of service provider delivery vehicles and equipment will not be allowed on the property and must be carried out elsewhere.		Contractor	Construction phase
Performance indicator	All delivery vehicles and staff adhere to the rules of the site.		
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase.		

OBJECTIVE C6: DEMARCATION, SITE CLEARANCE AND FENCING

Project Component/s	Construction site Access roads Construction camp No-go areas		
Potential Impact	Safety of the public, surrounding landowners and residents Safety of personnel working on site Safety of visitors on site Protection of sensitive environmental features		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	To protect and mitigate impacts on the environment, surrounding land uses, landowners, and personnel working on site.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
Demarcate no-go areas before any land clearing occurs under the supervision of an ECO		Contractor ECO	Construction phase

The ECO together with the site manager must indicate each construction site and/or access route to be demarcated and demarcation methods to be used before construction commences and construction personnel will not be allowed beyond the construction perimeter of the site. Physical demarcation of construction sites should at the very least be via colour coded posts at least 1,5m high. Relatively small construction areas can be fenced with wooden or metal post at 3m centres with 1 plain wire strand tensioned horizontally at 900mm from ground level. Commercially available danger tape may also be wrapped around the wire strand. For large areas, like fairways, these posts are to be at 15m centres with 5 equidistant easily visible lime spot markings in between.	Contractor ECO	Construction phase
Demarcation must be clearly visible and effective and no-go area must remain demarcated throughout construction phase	Contractor	Construction phase
Site clearance along the border of the no-go areas must be done under the supervision of an ECO.	Contractor ECO	Construction phase
Personnel should be restricted to the construction camp site and immediate construction areas only.	Contractor	Construction phase
Construction areas and access routes must be clearly demarcated to restrict access/egress across such demarcated lines and minimise environmental impact.	Contractor ECO	Construction phase
All activities including stockpiling must occur within this demarcated area.	Contractor	Construction phase
The Contractor responsible for impacting on areas outside of the demarcated construction areas must fund reinstatement or rehabilitation of damaged areas and features.	Contractor	Construction phase
The onus here will fall on the contractors to ensure all respect these no-go lines.	Contractor	Construction phase
Failure to ensure discipline will lead to the immediate erection of more physically challenging structures.	Contractor	Construction phase
No run-off oil, cement, or any other building material is to be permitted, or allowed to enter the no-go areas	Contractor	Construction phase
In the event that sensitive features outside of demarcated development areas are threatened by construction activities, the temporary fencing off of these areas or the construction area, when working in a mainly natural environment, is recommended and will be determined by the ECO.	Contractor ECO	Construction phase
Remove and conserve topsoil layer and overburden material for rehabilitation after construction activities have ceased.	Contractor	Construction phase Rehabilitation
Removal of soil must be kept to a minimum as far as possible and should only take place in areas where development will take place as part of the approved development footprint.	Contractor	Construction phase
Performance indicator	Demarcated construction areas and/or no-go areas remain demarcated and undisturbed throughout construction phase.	
Monitoring	This will be monitored by the ECO during site visits and recorded,	

	reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase.

OBJECTIVE C7: INDIGENOUS FAUNA AND FLORA

Project Component/s	Construction site Access roads Construction camp No-go areas		
Potential Impact	Impact on indigenous fauna and flora.		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	To protect and mitigate impacts on the indigenous fauna and flora.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
Indigenous plants or wild animals including reptiles, amphibians, birds, etc. may not be damaged or harmed or interfered with. Vegetation removed as part of the legitimate development requirements is excluded.		Contractor	Construction phase
Trapping, poisoning and/or killing of animals is specifically and strictly forbidden.		Contractor	Construction phase
All indigenous vegetation and soil materials must be stockpiled and stored (at site identified by ECO), and used for rehabilitation of the disturbed areas upon construction completion.		Contractor ECO	Construction phase
Demarcate proposed no-development areas before construction commences and maintain demarcation throughout construction phase to ensure that it is not impacted upon.		Contractor	Construction phase
Personnel should be restricted to the construction camp site and immediate construction areas only.		Contractor	Construction phase
Site clearance along the border of the no-go areas must be done under the supervision of an ECO.		Contractor ECO	Construction phase
Rehabilitate impacted indigenous vegetation areas outside of the development areas immediately if disturbed.		Contractor	Construction phase Rehabilitation phase
Conduct search and rescue of vegetation species of conservation concern and tortoises under the supervision of a qualified ECO before construction site clearance commence.		Contractor	Construction phase
Performance indicator	No indigenous fauna and flora and their habitats outside of approved development footprint areas are impacted upon. All vegetation and materials removed from site during excavations stockpiled and re-used for rehabilitation of disturbed sites.		

Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase.

OBJECTIVE C8: ALIEN INVASIVE PLANTS

Project Component/s	Construction site Access roads Construction camp		
Potential Impact	Alien/invasive plant species spread into natural/indigenous vegetation areas.		
Activities/Risk Sources	Activities associated with site construction and associated disturbance of natural areas		
Mitigation: Target/Objective	To protect and mitigate impacts on the environment.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
The contractor must clear all weeds and alien invasive plant from the proposed development sites, access routes and construction camp.		Contractor	Construction phase
No on-site burying, dumping or stockpiling of any weeds or invasive species must occur. They should be removed from the site and dumped at a suitable dumping site from which seed cannot escape.		Contractor	Construction phase
The contractor must make sure of and implement all legal requirements regarding herbicide application procedures if herbicide is to be used to control weeds/invasive plants. The instructions on the herbicide labels must be strictly followed throughout application.		Contractor	Construction phase
The contractor shall take all necessary precautions to prevent overspray of herbicides outside of the demarcated construction areas and onto natural veld.		Contractor	Construction phase
All personnel working with any herbicide, pesticide or fertilizer must be registered and comply with the requirements set in these registrations.		Contractor	Construction phase
All equipment associated to herbicides and pesticides must be maintained in accordance to the set standards.		Contractor	Construction phase
The disposal of all redundant and empty containers of herbicides and pesticides must be controlled and disposed of at a waste management facility licensed to do so under the National Environmental Management: Waste Act.		Contractor	Construction phase
Undertake construction activities only in identified and specifically demarcated areas.		Contractor	Construction phase
An important aspect of on-going maintenance is the monitoring of the rehabilitated sites and access road verges for alien plant species.		Contractor	Construction phase
Ensure building materials brought onto site are free of		Contractor	Construction phase

alien seeds.		
Materials such as sand and stone should, wherever possible, be sourced from local areas which are free of alien plants.	Contractor	Construction phase
Rehabilitation of disturbed area should be done with seeds collected in the area during rehabilitation and with topsoil as derived of the development site	Contractor	Construction phase Rehabilitation phase
Performance indicator	All possible introduction and spreading of alien invasive plant species are controlled.	
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase	

OBJECTIVE C9: STORM WATER MANAGEMENT

Project Component/s	Construction site Access roads Construction camp No-go areas	
Potential Impact	Erosion due to poor storm water management. Pooling of water / flooding in portions of the development site due to poor storm water management.	
Activities/Risk Sources	Activities associated with site construction	
Mitigation: Target/Objective	To protect and mitigate impacts on the environment.	
Mitigation: Action/Control	**Responsibility**	**Timeframe**
To minimise or prevent erosion and overflowing/flooding the work must be done as far as possible during the dry season.	Contractor	Construction phase
Areas disturbed during construction must be re-shaped as according to surrounding contours and stabilised as soon as possible.	Contractor	Construction phase
All roads need to be maintained and monitored and visible signs of possible erosion immediately rehabilitated.	Contractor	Construction phase
All areas impacted during construction must be maintained and monitored and visible signs of possible erosion immediately rehabilitated and prevention measures put in place.	Contractor Municipality	Construction phase
It will be the responsibility of the developer to ensure contractors apply erosion control measures throughout the period of risk and that the works are protected from damage that may be caused by rainwater runoff.	Contractor Municipality	Construction phase
Stormwater discharge flow must be managed and restricted in such a manner that it does not cause erosion.	Contractor Municipality	Construction phase
Adequate provisions of stormwater management including inter alia channels, litter traps etc. must be	Contractor Municipality	Construction phase

used to divert stormwater away from the activities that could lead to its contamination.		
The following erosion preventions and stormwater management measures must be considered and implemented as/when required: • a suitable soil conservation work to be constructed and thereafter be maintained to divert run-off water from other land or to restrict the run-off speed of run-off water, • the placement of protection berms where needed, • to establishment permanent cover vegetation to prevent soil erosion,	Contractor Municipality	Construction phase

Performance indicator	All signs of erosion are controlled and affected areas rehabilitated.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase

OBJECTIVE C10: ARCHAEOLOGY AND PALAEONTOLOGY MANAGEMENT

Project Component/s	Construction site Access roads Construction camp
Potential Impact	The loss of cultural or heritage resources.
Activities/Risk Sources	Activities associated with site construction
Mitigation: Target/Objective	To protect and mitigate the potential loss of cultural and heritage resources.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Should any heritage or fossil remains be exposed during any excavation or related activities, activities on the relevant site must stop immediately and these finding must be reported to the provincial heritage resource authority of the Western Cape, Heritage Western Cape (in terms of the National Heritage Resources Act, 1999 (Act No.25 of 1999) via the ECO.	Contractor ECO	Construction phase
Heritage remains uncovered or disturbed during earthworks must not be further disturbed until inspection and verification by a professional has been conducted.	Contractor Heritage Professional	Construction phase
While there is a very small chance that fossil may occur the Fossil Chance Find Protocol should be added to the EMPr. If any indicators of fossils are found by the environmental officer, or other responsible person then they should be rescued and HWC notified.	Contractor Heritage Professional	Construction phase

Performance indicator	Protection of heritage resources
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase

	(or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase

HWC PROCEDURE: CHANCE FINDS OF PALAEONTOLOGICAL MATERIAL
June 2016

Introduction
This document is aimed to inform workmen and foremen working on a construction and/or mining site. It describes the procedure to follow in instances of accidental discovery of palaeontological material (please see attached poster with descriptions of palaeontological material) during construction/mining activities. This protocol does not apply to resources already identified under an assessment undertaken under s. 38 of the National Heritage Resources Act (no 25 of 1999).

Fossils are rare and irreplaceable. Fossils tell us about the environmental conditions that existed in a specific geographical area millions of years ago. As heritage resources that inform us of the history of a place, fossils are public property that the State is required to manage and conserve on behalf of all the citizens of South Africa. Fossils are therefore protected by the National Heritage Resources Act and are the property of the State. Ideally, a qualified person should be responsible for the recovery of fossils noticed during construction/mining to ensure that all relevant contextual information is recorded.

Heritage Authorities often rely on workmen and foremen to report finds, and thereby contribute to our knowledge of South Africa's past and contribute to its conservation for future generations.

Training
Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO

It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.

Actions to be taken
One person in the staff must be identified and appointed as responsible for the implementation of the attached protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material.

Once a workman notices possible fossil material, he/she should report this to the ECO or site agent.

Procedure to follow if it is likely that the material identified is a fossil:

i. The ECO or site agent must ensure that all **work ceases** immediately in the vicinity of the area where the fossil or fossils have been found;

ii. The ECO or site agent must **inform HWC of the find immediately.** This information must include photographs of the findings and GPS co-ordinates;

iii. The ECO or site agent must compile a **Preliminary Report and fill in the *Fossil Discoveries: HWC Preliminary Record Form*** within 24 hours without removing the fossil from its original position. The **Preliminary Report** records basic information about the find including:

- The date
- A description of the discovery
- A description of the fossil and its context (e.g. position and depth of find)
- Where and how the find has been stored
- Photographs to accompany the preliminary report (the more the better):
  - ➔ A scale must be used
  - ➔ Photos of location from several angles
  - ➔ Photos of vertical section should be provided
  - ➔ Digital images of hole showing vertical section (side);
  - ➔ Digital images of fossil or fossils.

Upon receipt of this **Preliminary Report**, HWC will inform the ECO or site agent whether or not a rescue excavation or rescue collection by a palaeontologist is necessary.

v. **Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags.** This protection should allow for the later excavation of the finds with due scientific care and diligence. HWC can advise on the most appropriate method for stabilisation.

vi. If the find cannot be stabilised, **the fossil may be collect with extreme care** by the ECO or the site agent and put aside and protected until HWC advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs.

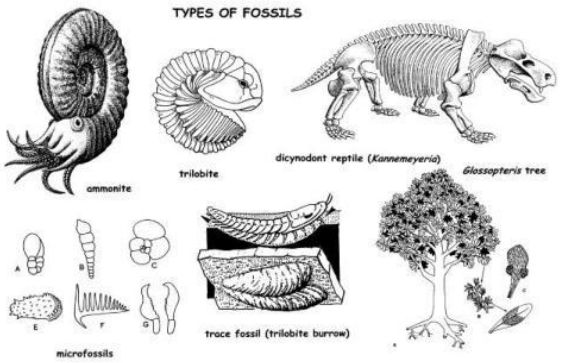
No work may continue in the vicinity of the find until HWC has indicated, in writing, that it is appropriate to proceed.

FOSSIL DISCOVERIES: HWC PRELIMINARY RECORDING FORM		
Name of project:		
Name of fossil location:		
Date of discovery:		
Description of situation in which the fossil was found:		
Description of context in which the fossil was found:		
Description and condition of fossil identified:		
GPS coordinates:	Lat:	Long:
If no co-ordinates available then please describe the location:		
Time of discovery:		
Depth of find in hole		
Photographs (tick as appropriate and indicate number of the photograph)	Digital image of vertical section (side)	
	Fossil from different angles	
	Wider context of the find	
Temporary storage (where it is located and how it is conserved)		
Person identifying the fossil	Name: Contact:	
Recorder	Name: Contact:	
Photographer	Name: Contact:	

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

OBJECTIVE C11: DIESEL FUEL AND LUBRICANT HANDLING PROGRAMME

Project Component/s	Construction site Access roads Construction camp No-go areas
Potential Impact	Contamination of soil, storm and ground water resources as a result of an oil/diesel/lubricant spill/leak.
Activities/Risk Sources	Activities associated with site construction
Mitigation: Target/Objective	To protect and mitigate impacts of contaminants on the environment and hydrological features.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Servicing of construction vehicles and machinery to take place off site at a vehicle workshop.	Contractor	Construction phase
All vehicles must be in a good condition and inspected on a daily basis with no leakages leading to possible contamination of soil or water supplies.	Contractor	Construction phase
All waste oils, fuels and lubricants are considered hazardous waste to be stored separately in bunded areas and disposed of at a licensed hazardous waste handling facility and for which safe disposal certificates must be kept.	Contractor	Construction phase
It is the responsibility of each landowner, lease holder or developer to ensure that they are aware of and adhere to the requirements of the NEM:WA as it pertains to their operations.	Contractor/landowner/ lease owner/developer	Construction phase
The following conditions related to the temporary fuel tanks must be implemented: • The fuel tanks must be designed and installed in accordance with relevant Oil Industry standards and SANS codes where applicable for the aboveground storage tanks. The tanks must be located within a bund (110 % of the tanks capacity) in order to contain potential spills. • During fuel tanker delivery, the tanker driver must be present at all times during product offloading. Should an incident occur the supply vehicle emergency cut-off switch must be activated to immediately stop fuel delivery. Flexible hoses with dry-break couplings and emergency isolation must be used. All spillage incidences and actions taken consequent thereto must be reported to the ECO and recorded in the site register. • All fuel and flammable liquids should be stored under secure and fenced conditions and in a bunded site with the volume of the bunding capable of holding 110% of the liquid. • The applicant must ensure that effective stock inventory monitoring and regular	Contractor	Construction phase

auditing take place for the early identification of possible leaks. • The requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), must be adhered to. Within three months of the tanks ceasing to be used the tanks must be removed at the expense of the applicant, and the site, including all associated infrastructure must be rehabilitated to the satisfaction of the relevant authority.		
Refuelling: • Refuelling of equipment must be conducted from the bunded fuel tank and pump at the contractor's camp. • Fuel tanks must be bunded and supplied with a concrete apron. Any spills on the concrete apron or floor below the tank are to be treated with OT8 or Spillsolve or equivalent as per the product instructions. • A 500 litre drawn trailer to convey diesel to the equipment for re-fuelling may also be used. Such trailer will be drawn by a specified vehicle and driver, with alternate nominated as approved by the Site Manager. Such tow vehicle may travel at 20kms per hour maximum at any time, be clearly identifiable as such, and may only tow the diesel cart should the pre requisite drip trays and emergency equipment be on the vehicle at the time. • Staff will require instruction in the identification of diesel and oil leaks and the use of Spillsolve (or equivalent) products.	Contractor	Construction phase
On-Site emergency repairs: • Only small mobile plant and emergency repairs are to take place on site. These will require the provision of drip trays and funnels to ensure that no oil or fuel leakages occur onto the ground. Should such spill take place, then the oil saturated soil is to be placed in suitable containers and disposed of at a hazardous waste disposal site. • Any contamination of soil is to be treated with Spillsolve or similar product. Contaminated water as a result of an oil or fuel spillage on the area should similarly be treated in appropriate way, and the polluted water should be specifically removed and not allowed to merge with run-off water collected in the trap collecting all run offs from the slab.	Contractor	Construction phase
Collection of contaminated spares and waste oils:	Contractor	Construction

• Contaminated spares, oil filters, gaskets, water, etc. must be collected in separate holders at the designated storage facility for disposal at a licensed H:h (hazardous waste handling) site. • Staff will require instruction in: -Deleterious effects of oil / fuel on the environment -Identification of oil leaks -Handling of oil / fuel leaks into soil -Location and method in storage of contaminated spares -Fire prevention and emergency drills in case of an accident		phase
Any oil or diesel spills etc. must be reported to the site manager and rehabilitation measures must be taken immediately and contaminated soil disposed of at a licensed hazardous waste handling facility.	Contractor	Construction phase

Performance indicator	Ensure that fuel storage, re-fuelling, emergency repairs, collection of contaminated spares and waste oils takes place as according to requirements and that no spillages occur and if it does occur that it is handled and cleaned up accordingly.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase

OBJECTIVE C12: SERVICES

Project Component/s	Construction site Bulk services and network services Sewerage network Power supply Water resources/supply Access roads
Potential Impact	Damage/loss of services infrastructure or supply.
Activities/Risk Sources	Activities associated with site construction
Mitigation: Target/Objective	To protect and mitigate impacts on existing services infrastructure and surrounding land users; landowners and residents.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Care and due cognisance must be taken of existing services, service routes and services restrictions. The contractor shall be held liable for damages, expenses or costs incurred for any interruption in supply, variation, frequency, or failure of any utility provider to supply service if the contractor is found to be responsible for unplanned service interruptions.	Contractor	Construction phase
All relevant sections and regulations of the National Water Act, 1998 (Act 36 of 1998) regarding water use	Contractor	Construction phase

must be adhered to.		
Implement water saving requirements as per Circular C1 of 2018 - Water Crisis Response Policy Guidelines for the Western Cape attached as Addendum 1 to this EMP	Contractor	Construction phase
Performance indicator	Protection of existing infrastructure and minimising use of existing services.	
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase	

OBJECTIVE C13: ROADS AND TRAFFIC

Project Component/s	Access and internal roads	
Potential Impact	Increased traffic/congestion. Construction vehicles pose a potential risk to other road uses and the natural environment if they do not use designated routes.	
Activities/Risk Sources	Activities associated with site construction	
Mitigation: Target/Objective	Designation of specific routes for construction vehicles to reduce impact on the environment and other road users.	
Mitigation: Action/Control	**Responsibility**	**Timeframe**
Only existing access routes to the property will be used during construction work, so as to control the movement of construction vehicles. Traffic safety measures shall be considered in determining entry or exit points to public roads.	Contractor	Construction phase
The contractor shall ensure that access to construction sites and associated infrastructure and equipment is designated off-limits to the public at all times during construction.	Contractor	Construction phase
Traffic safety measures shall be considered in determining entry or exit points to public roads.	Contractor	Construction phase
Adhere to speed limit and road rules.	Contractor	Construction phase
Work during normal working hours and only use demarcated access and internal roads	Contractor	Construction phase
Only allow drivers with valid driver's licenses to drive and/or operate construction vehicles	Contractor	Construction phase
Performance indicator	Necessary no entry signs and speed limit signs etc. posted at all entrances and only one designated access route to the development site is used.	
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase	

OBJECTIVE C14: DUST, ODOUR, NOISE AND VISUAL IMPACT CONTROL

Project Component/s	Constructions site Access roads Construction camp
Potential Impact	Excessive dust and noise production and visual impacts on surrounding land users
Activities/Risk Sources	Activities associated with site construction
Mitigation: Target/Objective	Minimisation of dust and noise production and visual impacts on surrounding land users

Mitigation: Action/Control	**Responsibility**	**Timeframe**
The contractor is to take appropriate measures to minimise the generation of dust as a result of construction works, to the satisfaction of the affected surrounding land users.	Contractor	Construction phase
Dust, odour and noise must be controlled appropriately and must not cause any nuisance conditions during hours of operation of the facilities and/or infrastructure.	Contractor	Construction phase
Vegetation must be stripped from demarcated construction sites only shortly before commencing with the construction process.	Contractor	Construction phase
During high velocity wind conditions, the contractor or his representative to evaluate the situation and make recommendations as to whether dust suppression measures are adequate, or whether to suspend work until wind speeds drop to an acceptable level.	Contractor	Construction phase
The use of potable water for dust suppression is discouraged and alternative sources of water should be considered and discussed with municipality if required.	Contractor	Construction phase
Construction noise levels must not pose a nuisance to the surrounding communities and all construction working hours must be limited to normal working hours unless arranged with municipality.	Contractor	Construction phase
All machinery and construction vehicles must be serviced regularly and be in a good working condition to prevent excessive noise generation.	Contractor	Construction phase
Only work in approved development areas to ensure that visual footprint is kept to a minimum and ensures that construction camp and area are neat and kept clear of windblown construction waste.	Contractor	Construction phase
Construction material will be stored at the contractor's camp, as well as on the construction site within the demarcated working areas at each construction point. Special permission may be obtained from the ECO to store material on suitable substitute or ancillary locations should the need arise, and as communicated by the project engineer	Contractor	Construction phase
Construction camp must be neatly fenced and construction site must be neat and tidy.	Contractor	Construction phase
Stockpile construction materials in one specific area.	Contractor	Construction phase
Proposed construction activities must be limited to development footprint site.	Contractor	Construction phase

Plant additional vegetation where needed after construction during site rehabilitation if required.	Contractor	Construction phase Rehabilitation phase
Performance indicator	No excessive dust or noises are produced at the construction sites and no visual impact outside of approved development areas is observed.	
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase	

OBJECTIVE C15: TOPSOIL AND MATERIAL REMOVAL AND STOCKPILING

Project Component/s	Construction site	
Potential Impact	Loss of topsoil and refill materials	
Activities/Risk Sources	Activities associated with site construction - excavation	
Mitigation: Target/Objective	Conserve topsoil and excavated materials to be used for rehabilitation after construction completion	
Mitigation: Action/Control	**Responsibility**	**Timeframe**
Depending on type of topsoil available and rehabilitation required after construction completion the ECO will determine if it is required to, prior to construction or earthworks commencing, remove and conserve a minimum of 100 mm topsoil from demarcated construction sites and keep it separately stockpiled (within the demarcated working area or on designated areas).	Contractor ECO	Construction phase
Topsoil stockpiles must be convex and should not exceed 1.8 metre in height, and if required be covered by anchovy net as necessary to prevent wind erosion.	Contractor	Construction phase
Topsoil must not be compacted in any way, especially by vehicles riding over it.	Contractor	Construction phase
Surplus sub-soil that becomes available during construction work and building operations must be used as fill material on site.	Contractor	Construction phase
Plant material stockpiled must be chopped in ± 300 mm pieces and scattered over the disturbed areas to be rehabilitated at construction completion	Contractor	Construction phase
Performance indicator	Topsoil separately stored and safeguarded from erosion at designated areas and re-used on sites to be rehabilitated at construction completion.	
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase	

OBJECTIVE C16: APPROPRIATE USE OF CONSTRUCTION MACHINERY

Project Component/s	Construction site Access roads Construction camp		
Potential Impact	Environmental disturbance due to incorrect use of machinery		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	Use the correct machinery for the proposed tasks and ensure that machinery is properly operated		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
The contractor must at all times carefully consider what machinery is appropriate to the task to minimise the extent of environmental damage.		Contractor	Construction phase
No machinery is to operate outside of any demarcated working area.		Contractor	Construction phase
Operators of machinery must be suitably qualified.		Contractor	Construction phase
All machinery and heavy vehicles to be parked at night at the defined contractor's camp.		Contractor	Construction phase
Performance indicator	Correct and successful use of construction machinery on site by qualified personnel.		
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase		

OBJECTIVE C17: ANTI-EROSION MEASURES

Project Component/s	Construction site Access roads Construction camp		
Potential Impact	Wind/water erosion as a result of construction activities.		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	Reduce the impact of erosion by implementing anti-erosion measures.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
The contractor shall take all appropriate and active measures to prevent and if prevention is not possible to mitigate erosion, especially wind and water erosion, resulting from activities on site to the satisfaction of the ECO.		Contractor	Construction phase
During construction, the contractor shall protect areas susceptible to wind and water erosion, by installing all the necessary temporary and permanent works if required and indicated by the ECO. Measures can include brush packing, anchovy net stabilisation, etc.		Contractor ECO	Construction phase
Demarcate no-go areas before any land clearing occurs under the supervision of an ECO. Demarcation must be clearly visible and effective and no-go area must remain		Contractor	Construction phase

demarcated throughout construction phase.		
Access to roads and other areas must be controlled to avoid disturbance of areas outside the development footprint. Personnel should be restricted to the construction camp site and immediate construction areas only.	Contractor	Construction phase
Undertake dust suppression as needed, without using potable water resources.	Contractor	Construction phase
Appropriate and effective storm water management measures must be put in place to ensure that erosion and environmental degradations outside of the proposed development footprint area does not occur, but the storm water measures implemented must not impede storm water flow to such an extent that it is completely stopped. Current hydrological processes outside of the proposed development footprint area must continue to function as is.	Contractor	Construction phase
Rehabilitate or stabilise eroded areas immediately to prevent increase in erosion	Contractor	Construction phase Rehabilitation phase

Performance indicator	All possible erosion impacts are controlled and rehabilitated.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase

OBJECTIVE C18: LIGHTS

Project Component/s	Construction site Access roads Construction camp	
Potential Impact	Light pollution at night	
Activities/Risk Sources	Activities associated with site construction	
Mitigation: Target/Objective	No significant light pollution must be caused during the construction activities	
Mitigation: Action/Control	**Responsibility**	**Timeframe**
The Contractor must ensure that any lighting installed on the site for his activities or security purposes does not interfere with road traffic or cause a direct disturbance to nearby residents, the surrounding community or other users of the area.	Contractor	Construction phase

Performance indicator	Non-intrusive lighting to be installed at construction areas.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase

	• to the DEA&DP, site manager and municipality at the completion of the construction phase

OBJECTIVE C19: EATING, WASHING, REST AND ABLUTION FACILITIES

Project Component/s	Construction site Construction camp		
Potential Impact	Environmental pollution		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	Prevent potential environmental pollution and disturbance outside designated areas.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
The contractor must designate restricted places for personnel to eat, wash and rest, within the specified working areas.		Contractor	Construction phase
The contractor must provide adequate weather proof refuse bins at the designated areas that are emptied on a weekly basis and not overflowing at any time.		Contractor	Construction phase
The feeding of, or leaving food for, animals is strictly prohibited		Contractor	Construction phase
The contractor is responsible for the provision of sufficient and suitably placed chemical toilets.		Contractor	Construction phase
Toilets must be of a neat construction and must be provided with doors and locks and must be secure to prevent wind damage.		Contractor	Construction phase
The contractor must ensure that toilets are serviced and emptied by the service provider when full/required.		Contractor	Construction phase
Waste must be disposed of at a registered/licenced waste disposal site.		Contractor	Construction phase
Performance indicator	Weather proof waste bins provided at designated eating, washing, rest and construction areas. Secure ablution facilities. Waste bins and ablution facilities not overfull and emptied on a regular basis.		
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase		

OBJECTIVE C20: INTEGRATED WASTE AND HAZARDOUS MATERIALS MANAGEMENT PLAN

Project Component/s	Access roads Construction camp Storage areas Construction site Adjacent land and environmental systems
Potential Impact	Incorrect storage, handling, transporting and disposing of hazardous substances resulting in the contamination of soil, storm and ground water resources. Incorrect storage, handling, transporting and disposing of general solid

	waste resulting in litter, storm water pollution, and creating a nuisance to adjacent landowners/residents. Incorrect storage, handling, transporting and disposing of effluent/liquid waste resulting in the contamination of the storm water system, adjacent property, or hydrological systems. Incorrect storage, handling, transporting and disposing of garden waste, alien vegetation or natural vegetation during the clearing phase of the development site. Poor waste management practices, resulting in waste not being reduced, re-used or recycled.
Activities/Risk Sources	Activities associated with site construction
Mitigation: Target/Objective	Protect and mitigate impacts on the environment and hydrological features Ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons Ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons Comply with waste management guidelines Minimise production of waste Ensure appropriate waste storage and disposal

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap) and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control.	Contractor	Construction phase
Spillage of oils and fuels must be minimized with the use of drip trays in the garage/workshop areas.	Contractor	Construction phase
An integrated waste management approach that is based on waste minimisation must be used and must incorporate reduction, recycling, re-use and disposal where appropriate. Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Construction phase
Please note that section 28 (1) of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended (NEMA) states: "Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorized by law or cannot reasonable be avoided or stopped, to minimize and	Contractor	Construction phase

rectify such pollution or degradation of the environment". Failure to adhere to section 28(1) of NEMA is an offence and thus particular care of the environment must be taken.		
All general and hazardous waste must be stored separately and disposed accordingly. Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors and disposal at appropriately licensed waste disposal sites	Contractor	Construction phase
The National Information Systems Regulation must be adhered to in terms of registering and reporting of hazardous waste generated on site via the Integrated Pollutant Waste Information System (IPWIS).	Contractor	Construction phase
All stored fuels to be maintained within a sealed bund and on a sealed surface. The bund must be at least 110% of the volume of the total containers adhering to the requirements of SABS 089:1999 Part 1	Contractor	Construction phase
Fuelling areas situated around fuel tanks must be provided with an impervious layer or drip trays must be used during refuelling;	Contractor	Construction phase
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function	Contractor	Construction phase
Oily water from bunds at the substations must be removed from site by licensed contractors	Contractor	Construction phase
The storage of any flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with MSDS files	Contractor	Construction phase
Any storage and disposal permits/approvals which may be required for hazardous substances must be obtained, and the conditions attached to such permits and approvals will be compiled with and copies kept on site in the environmental file	Contractor	Construction phase
Transport, storage and disposal of all hazardous substances must be in accordance with the relevant legislation and regulations	Contractor	Construction phase
Washing of construction vehicles and equipment will only be allowed at the construction camp in bunded areas.	Contractor	Construction phase
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants. Corrective action must be undertaken immediately if a complaint is received, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Construction phase
Implement an effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and	Contractor	Construction phase

storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems. Leakage of fuels must be avoided at all times and if spillage occurs, it must be remediated immediately.		
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents Spilled cement, fly ash and concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site. Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Construction phase
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area. Waste and surplus dangerous goods must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal and copies of the safe disposal slips must be kept in the environment file on site.	Contractor	Construction phase
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Construction phase
An incident/complaints register must be established and maintained on-site.	Contractor	Construction phase
The sediment control and water quality structures used on-site must be monitored and maintained in a fully operational state at all times	Contractor	Construction phase
Upon the completion of construction, the area must be cleared of potentially polluting materials	Contractor	Construction phase
Dispose of all solid waste collected at an appropriately registered waste disposal site. Waste disposal shall be in accordance with all relevant legislation and under no circumstances may waste be burnt on site	Contractor	Construction phase
Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Contractor	Construction phase
The storage of waste must comply with the National Environmental Management: Waste Act, (Act No. 59 of 2008) National Norms and Standards for Storage of Waste, 2013	Contractor	Construction phase
Waste may not be stored for a period exceeding 90 days during construction and operations of the proposed development without adherence to the National Norms and Standards for the Storage of Waste in terms of Government Notice (GN) No.926 of 29 November 2013, if the volumes stored exceed 80m3 of hazardous waste or 100m3 of general waste. If these thresholds are triggered, the Facility must also be registered on the Department's	Contractor	Construction phase

Integrated Pollutant and Waste Information System (http://ipwis.pgwc.gov.za/ipwis3/public) and the information must be updated regularly thereafter.		
Vegetation removed during the construction phase must be chipped for composting or be disposed of appropriately and may not be disposed of on the adjacent land.	Contractor	Construction phase
All waste oils, fuels and lubricants are considered hazardous waste to be stored separately in bunded areas and disposed of at a licensed hazardous waste handling facility and for which safe disposal certificates must be kept.	Contractor	Construction phase
It is the responsibility of each landowner, lease holder or developer to ensure that they are aware of and adhere to the requirements of the NEM:WA as it pertains to their operations.	Contractor/landowner/ lease owner/developer	Construction phase
The disposal of waste should be considered as a last resort after having considered waste minimization, such as avoidance, reuse and recycling of waste.	Contractor	Construction phase
Emergency incidents that fall within the definition of section 30(1)(a) of the National Environmental Management Act (NEMA), Act 107 of 1998, must be dealt with as the section required and the responsible person must ensure containment and notify the Health and Safety Office, Sakiwo Sakabo, From the Cape Agulhas Municipality on 023 425 5500/073 901 5389/ SakhiwoS@capeagulhas.gov.za as well as the Pollution and Chemicals Management unit of the DEA&DP on 021 483 0752/ 2571/ Simon.Botha@westerncape.gov.za.	Contractor	Construction phase
Local small businesses (Wastepreneurs) must be considered for uptake and beneficiation of recyclable material generated by the development to stimulate local economic development.	Contractor	Construction phase
Clear signage pertaining to waste handling and disposal must be displayed including storage bins for the separation of waste on site.	Contractor	Construction phase
No waste must be buried or burnt on site during construction or operation stages.	Contractor	Construction phase
Performance indicator	Limited chemical spills outside of designated storage areas No water or soil contamination by spills No complaints received regarding waste on site or indiscriminate dumping Provision of all appropriate waste manifests for all waste streams. No construction waste outside of designated waste storage areas. No overflowing waste storage areas	
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the	

	completion of the construction phase

OBJECTIVE C21: FIRES

Project Component/s	Construction site Construction camp		
Potential Impact	Uncontrolled fire on/off site, resulting in damage to the environment, property, injuries/death to personnel on site, or injuries/death to the public.		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	To protect and mitigate the safety of people, property, and the environment on and off site.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
No open fires will be allowed on site and adequate firefighting equipment should be available on site in good working order at all times as prescribed by the fire management protocols.		Contractor	Construction phase
Performance indicator	No fire occurred due to construction activities and no fires allowed. Management actions are in place should a fire occur.		
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase		

OBJECTIVE C22: MEASURES TO PROTECT SURFACE AND GROUNDWATER HYDROLOGICAL FEATURES SUCH AS WATERCOURSES/ WETLANDS

Project Component/s	Construction site Construction camp Adjacent natural environments/features		
Potential Impact	Destruction of natural hydrological systems and the pollution of ground water resources.		
Activities/Risk Sources	Activities associated with site construction		
Mitigation: Target/Objective	To protect and mitigate impacts on the environment and hydrological features.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
All relevant sections and regulations of the National Water Act, 1998 (Act 36 of 1998) regarding water use must be adhered to.		Contractor	Construction phase
No pollution of surface water or ground water resources may occur due to any activity on the property.		Contractor	Construction phase
Runoff must not be polluted and allowed to pool in construction areas, as this could cause contamination to the ground water resources.		Contractor	Construction phase
No activities, including swimming, washing, recreation, ablution, vehicle washing, etc. will be permitted in any of the watercourses. Water is to be protected and conserved at all times.		Contractor	Construction phase

The disturbed areas should receive ongoing monitoring and management of erosion and invasive plant growth	Contractor Municipality	Construction phase
All potential hazardous materials i.e. fuels, cement etc. should be properly stored and contained within the construction camp.	Contractor	Construction phase
Disposal of waste from the site should also be properly managed.	Contractor	Construction phase
Construction workers should be given ablution facilities at the construction site and regularly serviced.	Contractor	Construction phase
All construction activities and personnel on site to stay within demarcated construction areas	Contractor	Construction phase
Proper waste bins to be provided to construction staff and all waste to be regularly removed to municipal landfill site	Contractor	Construction phase
Any oil or diesel spills etc. must be reported to the site manager and rehabilitation measures must be taken immediately and contaminated soil disposed of at a licensed landfill site	Contractor	Construction phase
Construction vehicles must be checked for leakages on a daily basis and repaired before allowed to work within watercourses if a leakage is detected	Contractor	Construction phase
Control access to roads and construction areas to avoid disturbance of areas outside the development footprint	Contractor	Construction phase
Undertake storm water management measures as required	Contractor Municipality	Construction phase
Rehabilitate or stabilise eroded areas immediately to prevent increase in erosion.	Contractor Municipality	Construction phase
Monitor construction areas frequently for sign of erosion and if signs of erosion are detected implement repair and preventative measures immediately	Contractor	Construction phase
All infrastructure areas should be kept free of debris, intrusive growth of invasive alien plants and sediment build-up.	Contractor Municipality	Construction phase
All concrete mixing to be contained within a suitably bunded area preventing any runoff from the concrete mixing area.	Contractor	Construction phase
Ground water contamination must be prevented. Wastewater from the construction and the associated operational activities must be on par with the quality standards of the relevant authority.	Contractor	Construction phase
Any activities involving cement must be tightly controlled to prevent its passage into the river – uncured cement will increase pH and thus potentially affect ammonia toxicity.	Contractor	Construction phase
All refuelling areas must be adequately bunded.	Contractor	Construction phase
Construction work (i.e. site clearance and construction) must be carried out and completed in the low flow and low rainfall season (mid to late summer) as far as possible to minimise the impact on the flow in the drainage line.	Contractor	Construction phase
Should the construction works take place during the rainfall period, any contaminated runoff from the construction site or activities should be prevented from entering the environment.	Contractor	Construction phase

Appropriate and effective storm water management measures must be put in place to ensure that erosion and environmental degradations outside of the proposed development footprint area does not occur, but the storm water measures implemented must not impede storm water flow to such an extent that it is completely stopped. Current hydrological processes outside of the proposed development footprint area must continue to function as is.	Contractor	Construction phase

Performance indicator	Impacts on hydrological features minimized and mitigated.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase

OBJECTIVE C23: CONCRETE/CEMENT MIXING

Project Component/s	Concrete/cement mixing
Potential Impact	Environmental pollution
Activities/Risk Sources	Contaminated runoff from concrete mixing area
Mitigation: Target/Objective	To protect and mitigate impacts on the environment and surrounding land users.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Concrete mixing to be sited only on proposed development footprint area which must be demarcated and outside of any watercourses or wetlands and such that impacts on the environment are minimised.	Contractor	Construction phase
The concrete mixing areas should demonstrate good maintenance practices, including regular sweeping to prevent dust build-up.	Contractor	Construction phase
The concrete mixing area should be designed and constructed such that clean storm water is diverted away from contaminated areas	Contractor	Construction phase
The concrete mixing area should be bunded and lined with an impervious liner capable of containing all contaminants found within the water they are designed to collect.	Contractor	Construction phase
Where possible, waste concrete should be used for construction purposes at the project site	Contractor	Construction phase

Performance indicator	No concrete/cement mixing taking place within a watercourse or wetland or on un-bunded and permeable surfaces. No runoff escaping from bunded concrete mixing area.
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase

	• to the DEA&DP, site manager and municipality at the completion of the construction phase

OBJECTIVE C24: REHABILITATION AND SITE CLEAN UP AFTER CONSTRUCTION

Project Component/s	All areas affected during construction		
Potential Impact	Un-stabilised disturbed areas, environmental pollution due to construction waste, unfinished construction sites		
Activities/Risk Sources	Activities associated with construction completion		
Mitigation: Target/Objective	To protect and mitigate the safety of people, property, and the environment on and off site.		
Mitigation: Action/Control		**Responsibility**	**Timeframe**
Stabilisation and rehabilitation of disturbed sites must take place immediately after construction operations have been completed.		Contractor Municipality	Construction phase
No construction equipment, vehicles or unauthorised personnel must be allowed onto areas that have been stabilised/rehabilitated.		Contractor	Construction phase
The contractors must ensure that all temporary structures, equipment, waste, materials and facilities used or created on site for, or during construction activities, are removed once the project has been completed.		Contractor	Construction phase
Only indigenous vegetation must be used to rehabilitate disturbed areas.		Contractor Municipality	Construction phase
The disturbed areas should receive ongoing monitoring and management of erosion and invasive plant growth.		Contractor Municipality	Construction and rehabilitation phase
Performance indicator	Constructions site are cleared of any temporary works forming part of the construction phase and disturbed areas have been rehabilitated to the satisfaction of the ECO and freshwater ecologist		
Monitoring	This will be monitored by the ECO during site visits and recorded, reported and proof included in the audit reports to be submitted: • to the site manager monthly during the construction phase (or if construction will be less than a month at least one ECO audit will be conducted) • to the DEA&DP, site manager and municipality as part of the annual compliance report during the construction phase • to the DEA&DP, site manager and municipality at the completion of the construction phase		

This following section defines the management programme for each of the identified goals during the operational phase. The programme is presented in the form of a table, which includes the components described. This programme consists of the following components:

Goals

Over-arching environmental goals for the management phase of the development

Objectives

The objectives are in place in order to meet these goals. These take into account the findings from existing studies and monitoring programmes.

Management Actions

The actions needed to achieve the objectives, taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation.

Monitoring

Key actions to verify that objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

Criteria/ Targets

The criteria or targets indicate the efficacy of the management programme. The targets should be readily measurable, understandable to the layperson, cost-effective to monitor, and meet legal requirements.

Remedial Actions

Specifies actions needed to be taken if the targets are not met; or if there is an unforeseen event.

The following 7 are specified goals:

Goal 1: Waste Management and Pollution Control
Goal 2: Water Quality and Storm Water Management
Goal 3: Erosion Control
Goal 4: Emergency Procedures
Goal 5: Vegetation Management, inclusive of Alien management
Goal 6: Infrastructure Maintenance Management

Goal 1: Waste Management and Pollution Control

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going Integrated Waste Management e.g. staff, equipment, budget.	Pollution and odours	1. The waste accumulated at the infrastructure and surrounds needs to be managed in terms of the National Environmental Management Waste Act, 2008 (Act 59 of 2008) by the municipality and the final disposal of the waste must take place at the appropriate licensed waste disposal site or recycling facility. 2. Solid waste may only be disposed of at an authorised solid waste facility in terms of abovementioned legislation. 3. Waste accumulation to be monitored and removed from the sites and surrounds on a monthly basis by the municipality. 4. Waste accumulated at stormwater outlets/discharge points must be removed by the municipality at least monthly and after heavy rains. 5. All vehicles transporting waste must be closed to avoid possible pollution of waste on transport routes. 6. Waste needs to be sorted and recycled as far as possible. The minimising of waste must be promoted and alternative methods of waste management must be investigated. 7. All waste types to be handled, stored, transported and disposed of	Annual audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** Municipality to implement actions and appoint an ECO to conduct annual compliance audit.	No accumulated waste or pollution within watercourses and at development sites.	If pollution on site is detected immediate actions must be taken to contain the pollution. Within 24hours of detection the applicant must be informed of the incident, where after a site visit will be conducted and recommend further rehabilitation methods to be implemented. Depending on type and extent of pollution occurred specialists may be contacted to provide specific recommendations. An incident report to be compiled and sent to relevant government authorities.

		according to relevant legislature. 8. Squatting and rubble dumping adjacent to the new development is not allowed and must be controlled by the municipality and regular inspections conducted to ensure control. 9. An integrated waste management approach must be implemented, based on waste minimisation, reduction, recycling, re-use and disposal where possible. 10. Waste may not be stored for a period exceeding 90 days without adherence to the National Norms and Standards for the Storage of Waste in terms of Government Notice (GN) No.926 of 29 November 2013, if the volumes stored exceed 80m3 of hazardous waste or 100m3 of general waste. If these thresholds are triggered, the Facility must also be registered on the Department's Integrated Pollutant and Waste Information System (http://ipwis.pgwc.gov.za/ipwis3/public) and the information must be updated regularly thereafter. 11. During the event of environmental pollution the relevant authorities including the Directorate Pollution Management must be informed within 14 days as per Section 30(10) of NEMA, and the necessary step must be implemented as soon as			

		possible to rehabilitate polluted areas and prevent re-occurrence of environmental pollution. 12. Dust, odour and noise must be controlled appropriately and must not cause any nuisance conditions during hours of operation of the facilities and/or infrastructure. 13. Please note that section 28 (1) of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended (NEMA) states: "Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorized by law or cannot reasonable be avoided or stopped, to minimize and rectify such pollution or degradation of the environment". Failure to adhere to section 28(1) of NEMA is an offence and thus particular care of the environment must be taken. 14. No waste must be buried or burnt on site during construction or operation stages.			

Goal 2: Water Quality and Storm Water Management Measures

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going Water Quality and Storm Water Management e.g. staff, equipment, budget.	Pollution, odours and erosion	1. All relevant sections and regulations of the National Water Act, 1998 (Act 36 of 1998) regarding water use must be adhered to. 2. No storm water runoff from any premises containing waste, may be discharged into a water resource. Polluted storm water must be contained. 3. Storm water infrastructure should be monitored at least on a 3 monthly basis and any degradation or faults attended to immediately. 4. Ensure no pollution of any water resources, including surface water, storm water and groundwater takes place as a result of any activities on the site. 5. Storm water should be directed away from the roads and into the existing natural flow paths/drainage lines on site. 6. All waste within the storm water channels must be removed on a monthly base and after heavy rains. 7. If any erosion and/or degradation of the channel are noticed immediate action must be taken by the municipality to rectify the situation. (Corrective and preventative measures taken will depend upon type and extent of	Annual audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** Municipality to implement actions and appoint an ECO to conduct annual compliance audit.	No accumulated waste or signs of erosion or pollution within watercourses at development sites.	If pollution on site is detected immediate actions must be taken to contain the pollution. Within 24hours of detection the applicant must be informed of the incident, where after a site visit will be conducted and recommend further rehabilitation methods to be implemented. Depending on type and extent of pollution occurred specialists may be contacted to provide specific recommendations. An incident report to be compiled and sent to relevant government authorities

		erosion and/or degradation occurring). 8. Operate and maintain stormwater infrastructure as per EMP requirements. 9. Monitor for erosion of surrounding undeveloped areas and implement storm water management measures as recommended in the environmental management program. 10. Stormwater discharge flow must be managed and restricted in such a manner that it does not cause erosion. 11. Rehabilitate or stabilise eroded areas immediately to prevent increase/spread of erosion. 12. Only use existing access road to the site for operational purposes and avoid disturbance of "new" areas outside the existing access roads and infrastructure footprint. 13. Stormwater infrastructure must not cause erosion of the surrounding remaining undeveloped areas, but still allow current hydrological processes to continue as is. 14. The municipality must maintain all stormwater infrastructure on a regular basis to ensure that it is working effectively and is not blocked with waste.			

Goal 3: Erosion Control

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources) for on-going erosion control management (e.g. staff, equipment, budget)	Erosion, sink-holes and or blocking of storm water systems. Damage to Infrastructure.	1. On-going monthly monitoring and management of roads, roadways and areas susceptible to erosion. 2. Ensure suitable vegetation cover or surface on non-hardened surfaces. 3. Control runoff of storm water to prevent soil erosion. 4. Avoid the formation of sink-holes on sensitive soils. 5. Management and control of erosion within and along watercourses, infrastructure, rehabilitated areas and housing areas. 6. The following erosion preventions and stormwater management measures must be considered and implemented as/when required: • a suitable soil conservation work to be constructed and thereafter be maintained to divert run-off water from other land or to restrict the run-off speed of run-off water, • the placement of protection berms where needed, • to establishment permanent cover vegetation to prevent soil erosion, 7. Any rehabilitation and remedial action concerning soil erosion in the event it does occur on the property needs to be in accordance with	Annual audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** Municipality to implement actions and appoint an ECO to conduct annual compliance audit.	No signs of erosion within watercourses at development sites.	If erosion is detected immediate actions must be taken to contain the erosion. Depending on type and extent of erosion occurred specialists may be contacted to provide specific recommendations.

		regulation 14 of CARA. According to regulation 14 (1)" If a land user disturbs or denudes any land on his farm unit for purposes other than prospecting or mining activities: (c) – such land user shall by means of as many of the following measures as are necessary in his situation, effectively restore and reclaim that disturbed or denuded land. (i) Topsoil shall be removed and kept separate with a view to replacing it later on the disturbed or denuded land. (ii) Topsoil shall be used to stabilise the sides of a hollow that has been caused by the exploitation or removal of material and, where possible, to reclaim part of the disturbed or denuded land. (iv) The flow pattern of run-off water, the topography and the slope shall, depending on the volume of material exploited or removed, be restored as closely as possible to the original conditions. (v) Suitable vegetation shall be established on the land concerned in order to expedite the restoration and reclamation thereof. (vii) A suitable soil conservation work shall be constructed and thereafter be maintained in order to protect the land concerned against excessive soil loss through the action of water and wind or in order to collect			

		sediment from run-off water."			

Goal 4: Emergency Procedures

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources for on-going safety, security and emergency procedures. e.g. staff, equipment, budget.	Pollution, floods, fire and health risks.	1. Emergency plans in case of flooding, fires, pollution to be compiled and implemented by the municipality. Local community members to be informed and made aware of emergency protocols to be followed. 2. Sufficient Fire Fighting equipment to be available at nearest fire station. 3. Yearly pre-season testing and servicing of firefighting equipment.	Annual audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** Municipality to implement actions and appoint an ECO to conduct annual compliance audit.	Necessary emergency plans in place and available to the public	Emergency response procedures to be followed as required. An incident report to be compiled and sent to relevant government authorities

Goal 5: Vegetation Management, inclusive of Alien Vegetation.

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocations of sufficient resources e.g. staff, equipment, budget,) for On-going alien and vegetation management	Degradation and replacement of indigenous ecosystem characteristics i.e. indigenous flora and fauna habitat.	1. Any alien and invasive vegetation that occur on property owned by the municipality should be controlled or removed as prescribed by the Alien and Invasive Species Regulations of 2014. 2. All disturbed areas should be cleared and kept clear of weeds and alien invasive plants except where	Annual audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** Municipality to implement actions and appoint an ECO to conduct annual compliance audit.	On-going removal of weeds and alien invasive plants at disturbed sites.	No remedial actions required, only on-going alien vegetation clearing and monitoring as indicated.

		Eucalyptus Trees are to remain for visual screening purposes. 3. Rehabilitate disturbed areas with locally indigenous vegetation species within one year of disturbance and monitor successful rehabilitation of disturbed sites. 4. A site specific storm water management plan must be compiled for the operational phase of the proposed development and implemented in such a manner as to prevent any additional storm water run-off entering the adjacent indigenous vegetation areas and potentially causing erosion leading to further habitat fragmentation. 5. Should any erosion, illegal waste dumping, vegetation clearance, informal settlement establishment etc. occur within the no-go areas the municipality must ensure that these impacts are rectified as soon as possible and take active steps to rehabilitate the impacted areas and prevent these impacts from re-occurring.			

Goal 6: WWTW Infrastructure Operation and Maintenance Management

Objectives	Risks	Actions	Monitoring	Criteria/Targets	Remedial Actions
Ensure allocation of sufficient resources e.g. staff, equipment, budgets, for on-going infrastructure maintenance management	Degradation of built infrastructure leading to additional impacts such as traffic congestion, environmental degradation etc.	1. An Operating and Maintenance Manual must be compiled within 6 months after completion and commissioning of the WTW. The municipality will be responsible for managing and maintaining the WTWs in such a manner that it does not cause environmental pollution or degradations. 2. The WTWs must also be operated in compliance with the Water Use License to be issued by BOCMA and all monitoring requirements must be adhered to. 3. No pollution of surface water or ground water resources may occur due to any activity at the WTWs. 4. The infrastructure must be monitored and kept free of silt/sediment, waste or debris built-up and intrusive growth of invasive alien plants at least annually before the main rainfall season and all excess silt built-up, waste or debris must be removed immediately. 5. Constructed access roads to the sites must be used to gain access. No new access roads may be cleared. 6. All of the sites must be constantly	Annual audits of operations vs EMP to identify those requirements that are not being met. **Responsibility:** Municipality to implement actions and appoint an ECO to conduct annual compliance audit.	1. Adequate annual Budgets 2. On-going employment of ECO and maintenance staff	To be determined

		monitored for any sign of erosion and if erosion is detected immediate action must be taken to rehabilitate the impacted area and prevent any further erosion. 7. Undertake storm water management measures as required. 8. Infrastructure should be cleaned regularly, at least once a month and after heavy rains and runoff to ensure that all waste is removed and not washed off site. 9. Should any erosion, illegal waste dumping, vegetation clearance, informal settlement establishment etc. occur within no-go areas the municipality must ensure that these impacts are rectified as soon as possible and take active steps to rehabilitate the impacted areas and prevent these impacts from re-occurring. 10. All domestic waste windblown or illegally dumped within the site must be removed by the municipality at least on a monthly basis.			

CHAPTER 8

ENVIRONMENTAL REPORTING

The facility must ensure that "Any emergency incident, originating at the facility, which falls within the definition of section 30(1) a of the National Environmental Management Act (NEMA), Act of 1998, must be dealt with by the facility in accordance with Section 30 of NEMA". In the event of any incident the facility must ensure containment by the responsible person and notify the Sub-Directorate: pollution information and chemicals management section at (021) 483 2760 / 2968.

In order to ensure that the necessary environmental issues are adequately addressed and recorded, the following environmental reporting shall be undertaken:

- Incident reporting; and
- Compliance reporting

In terms of NEMA Section 30 the following shall apply during the occurrence of an "incident" due to the proposed activities:

NEMA SECTION 30 - CONTROL OF INCIDENTS

(1) In this section

(a)"incident" means an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property;

(b) "responsible person" includes any person who
(i) is responsible for the incident;
(ii) owns any hazardous substance involved in the incident; or
(iii) was in control of any hazardous substance involved in the incident at the time of the incident;

(c) "relevant authority" means
(i) a municipality with jurisdiction over the area in which an incident occurs;
(ii) a provincial head of department or any other provincial official designated for that purpose by the MEC in a province in which an incident occurs;
(iii) the Director-General;
(iv) any other Director-General of a national department

(2) Where this section authorises a relevant authority to take any steps, such steps may only be taken by

(a) the person referred to in subsection (1)(c)(iv) if no steps have been taken by any of the other persons listed in subsection (1)(c);

(b) the person referred to in subsection (1)(c)(iii) if no steps have been taken by any of the persons listed in subsection (1)(c)(i) and (c)(ii);

(c) the person referred to in subsection (1)(c)(ii) if no steps have been taken by the person listed insubsection (1)(c)(i):

Provided that any relevant authority may nevertheless take such steps if it is necessary to do so in the circumstances and no other person referred to in subsection (1)(c) has yet taken such steps.

(3) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available

(a)the nature of the incident;

(b) any risks posed by the incident to public health, safety and property;

(c) the toxicity of substances or by-products released by the incident; and

(d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to

(i) the Director-General;
(ii) the South African Police Services and the relevant fire prevention service;
(iii) the relevant provincial head of department or municipality; and
(iv) all persons whose health may be affected by the incident.

(4) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident

(a) take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;

(b) undertake clean-up procedures;

(c) remedy the effects of the incident;

(d) assess the immediate and long-term effects of the incident on the environment and public health;

(5) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, within 14 days of the incident, report to the Director-General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including

(a) the nature of the incident;

(b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;

(c) initial measures taken to minimise impacts;

(d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and

(e) measures taken and to be taken to avoid a recurrence of such incident.

(6) A relevant authority may direct the responsible person to undertake specific measures within a specific time to fulfil his or her obligations under subsections (4) and (5): Provided that the relevant authority must, when considering any such measure or time period, have regard to the following:

(a) the principles set out in section 2;

(b) the severity of any impact on the environment as a result of the incident and the costs of the measures being considered;

(c) any measures already taken or proposed by the person on whom measures are to be imposed, if applicable;

(d) the desirability of the state fulfilling its role as custodian holding the environment in public trust for the people;

(e) any other relevant factors.

(7) A verbal directive must be confirmed in writing at the earliest opportunity, which must be within seven days.

(8) Should

(a) the responsible person fail to comply, or inadequately comply with a directive under subsection (6);

(b) there be uncertainty as to who the responsible person is; or

(c) there be an immediate risk of serious danger to the public or potentially serious detriment to the environment,

a relevant authority may take the measures it considers necessary to

(i) contain and minimise the effects of the incident;
(ii) undertake clean-up procedures; and
(iii) remedy the effects of the incident.

(9) A relevant authority may claim reimbursement of all reasonable costs incurred by it in terms of subsection (8) from every responsible person jointly and severally.

(10) A relevant authority which has taken steps under subsections (6) or (8) must, as soon as reasonably practicable, prepare comprehensive reports on the incident, which reports must be made available through the most effective means reasonably available to

(a) the public;

(b) the Director-General;

(c) the South African Police Services and the relevant fire prevention service;

(d) the relevant provincial head of department or municipality; and

(e) all persons who may be affected by the incident

See below for a template of an Incident Report to serve as a guideline for the recording and addressing of emergency incidents as and when they occur.

Document Type:	Emergency Incident Report		
	Title:	**(PROPERTY WHERE INCIDENT OCCURRED, DATE AND TYPE OF INCIDENT)**	
	Document Status:	Pilot reporting format	
Reference:	[A reference that may be used in future correspondence]	**Initial Submission Date:**	[Date of initial submission of the report to the Department: Environmental Affairs and Tourism]
Revision No.:	example	**Compiled by:**	[Full name and contact details of the person submitting the report]

This form provides a template for the emergency incident report required in terms of section 30(5) of the National Environmental Management Act (Act No. 107 of 1998) (hereinafter "NEMA") in which the responsible person or, where the incident occurred in the course of that person´s employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including: (a) the nature of the incident; (b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects; (c) initial measures taken to minimise impacts; (d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and (e) measures taken and to be taken to avoid a recurrence of such incident.

In terms of section 30(1)(a) of NEMA, an "incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In line with section 24 of the Constitution of the Republic of South Africa (Act No. 108 of 1996), "serious" is taken to be a measure of the impact of an incident where such an incident has had, could have had, is having, or will have a negative impact on human health or well-being.

RESPONSIBLE PERSON
In terms of section 30(1)(b) of NEMA, the "responsible person" includes any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident

RESPONSIBLE PERSON			
In terms of section 30(1)(b) of NEMA, the "responsible person" includes any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident			
Name:	[Full name of person, company, etc.]	**Designation:**	[designation of responsible person (n/a for companies, etc.)]
Postal Address:	[Full postal address including postal code]	**Physical Address:**	[Full physical address]
Telephone (B/H)	[Business hours contact telephone number and area code]	**Telephone (A/H)**	[After hours contact telephone number and area code]
Nature of Business:	[Brief summary of the nature of the business]		

EMERGENCY INCIDENT SUMMARY INFORMATION							
Mark the appropriate boxes							
Fire:		**Spill:**		**Explosion:**		**Gaseous Emission:**	
Injuries		**Reportable injuries:**		**Hospitalisation:**		**Fatalities:**	
Open water impacts:		**Ground water impacts:**		**Atmospheric impacts:**		**Soil impacts:**	
Own emergency response involved		**Fire prevention services involved**		**Government hazardous materials emergency response involved**		**More than 1 governmental emergency response service involved**	
Emission of non-toxic substances at low concentrations		**Emission of non-toxic substances at high concentrations**		**Emission of toxic substances at low concentrations**		**Emission of toxic substances at high concentrations**	
No evacuation required		**Immediate area evacuated**		**Immediate surrounds evacuated**		**Evacuation of the general public**	

INITIAL EMERGENCY INCIDENT REPORT				
In terms of section 30(3) of NEMA, the responsible person or, where the incident occurred in the course of that person´s employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available: (a) the nature of the incident; (b) any risks posed by the incident to public health, safety and property; (c) the toxicity of substances or byproducts released by the incident; and (d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to: (i) the Director General; (ii) the South African Police Services and the relevant fire prevention service; (iii) the relevant provincial head of department or municipality; and (iv) all persons whose health may be affected by the incident.				
Description	**Date:**	**Time:**	**Medium:**	**Contact Details:**
Director General:	[submission date]	[submission time]	[Fax, phone, SMS, letter, etc.)	[who was the report made to?]
SAPS:				

INITIAL EMERGENCY INCIDENT REPORT				
In terms of section 30(3) of NEMA, the responsible person or, where the incident occurred in the course of that person´s employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available: (a) the nature of the incident; (b) any risks posed by the incident to public health, safety and property; (c) the toxicity of substances or byproducts released by the incident; and (d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to: (i) the Director General; (ii) the South African Police Services and the relevant fire prevention service; (iii) the relevant provincial head of department or municipality; and (iv) all persons whose health may be affected by the incident.				
Description	**Date:**	**Time:**	**Medium:**	**Contact Details:**
Relevant fire prevention service:				
Relevant province or municipality				
Affected persons:			Provide details of who was contacted and how they were contacted as Annexure A to this report	

INCIDENT DETAILS			
In terms of NEMA section 30(5)(a) and (d), the responsible person must report on the nature of the incident as well as the causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure			
Incident start time:	[The exact time that the unexpected event started]	**Incident duration:**	[the duration of the unexpected event]
Duration of danger:	[The time taken from the start of the event to the time when the impacts of the event no longer posed a threat to anyone's health or well-being]	**Duration of exposure:**	[The duration of conditions that had a direct impact anyone's health or well-being]
Incident description	[Brief description of the incident detailing, but not limited to, a description of: (i) what happened; (ii) how it happened; (iii) where it happened; (iv) the timing and sequence of events; and (v) why it happened. A detailed discussion may be included as an annex.]		
	Plans, diagrams, maps or any other graphical material relating to the incident description must be attached as annexures B1, B2, etc.		
Wind speed and direction	[The wind speed and direction at the point of the incident at the time of the incident]	**Ambient air temperature**	[ambient air temperature at the time of the incident]
Weather conditions	[Sunny, light rain, mist, heavy rain, etc.]	**Other relevant meteorological conditions**	[Temperature inversion, floods, etc]

POLLUTANTS RELEASED DURING INCIDENT					
In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity.					
List all the pollutants directly released during the incident (i.e. exclude those pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.)					
Substance or mixture of substances	**Reference Number**	**Phase**	**Total Quantity emitted**	**Unit**	**Nature of emission**
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released into the environment]	[the unit of measure in respect to the quantity]	[emitted from truck, underground pipe, stack, etc.]

SECONDARY POLLUTANTS RESULTING FROM INCIDENT					
In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.					
List all the pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.					
Substance or mixture of substances	**Reference Number**	**Phase**	**Total Quantity emitted**	**Unit**	**Nature of emission**
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released into the environment]	[the unit of measure in respect to the quantity]	[emitted from truck, underground pipe, stack, etc.]

1. POLLUTANT CONCENTRATIONS					
In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.					
List all the pollutants detailed in sections **Error! Reference source not found.** and **Error! Reference source no t found. Error! Reference source not found.**.					
1.1 Substance or mixture of substances	**1.2 Reference Number**	**1.3 Estimated pollutant concentration**			
		1.4 10m	**1.5 100m**	**1.6 500m**	**1.7 Concentration unit (e.g. ppm)**
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[estimate the concentration of the pollutant in water, soil and/or air within a 10m radius of the epicentre of the incident]	[estimate the concentration of the pollutant in water, soil and/or air within a 100m radius of the epicentre of the incident]	[estimate the concentration of the pollutant in water, soil and/or air within a 500m radius of the epicentre of the incident]	[[Provide the unit of concentration used in columns 1.4, 1.5 and 1.6.]

INCIDENT IMPACT	
In terms of NEMA section 30(5)(b), the responsible person must report on possible acute effect on persons and the environment and data needed to assess these effects;	
Minor injuries	[Describe the number and types of any minor injuries that resulted from the incident or efforts to manage the incident or the impacts thereof]
Reportable injuries	[Describe the number and types of any injuries requiring statutory reporting that resulted from the incident or efforts to manage the incident or the impacts thereof]
Hospitalisation	[Describe the number and types of any injuries that required professional medical care that resulted from the incident or efforts to manage the incident or the impacts thereof]
Fatalities	[Describe the number and cause of any fatalities that resulted from the incident or efforts to manage the incident or the impacts thereof]
Biological impacts	[Describe any impacts on biological life, other than human life, e.g. fish kills, plant mortality, etc.]
Impact area	[Describe the area possibly affected by the incident or the impacts thereof including: (i) size of the area; (ii) socio-economic context; (iii) population density; (iv) sensitive environments (if any), etc.]
Data	Attach relevant impact reports, medical reports, death certificates, post mortem reports, environmental monitoring data, etc. as Annexes C1, C2,… to this report

EXISTING PREVENTION PROCEDURES AND/OR SYSTEMS	
Foresight	[Briefly describe whether the incident could have, or had, been foreseen, e.g. was it included in any environmental impact assessment, risk assessment, health and safety plan, etc.]
Procedures and/or systems	Attach any relevant safety, health and environmental plans (including any statutory planning requirements) that detail what actions should be taken in the event of the incident that is the subject of this report
Procedure and/or systems failures	[Describe any failures or shortfalls in procedures and/or systems that may have contributed to the incident]
Technical measures	[Describe any technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurance of the incident]
Technical failure	[Describe any failures of technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurance of the incident]

2. INITIAL INCIDENT MANAGEMENT	
In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.	
2.1 Evacuation	[Describe any evacuation activities including information on the number of people evacuated and whether these people were staff or otherwise]
2.2 Technical measures	[Describe all technical measures taken to address the incident]
2.3 Mitigation measures	[Describe all measures taken to minimise the impact]
2.4 Emergency Services	[Describe any governmental emergency services involvement]

3. CLEANUP AND/OR DECONTAMINATION	
In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.	
3.1 Cleanup and/or decontamination	[Provide a detailed description of all cleanup and/or decontamination activities and the environmental quality and impacts resulting from these activities as well as contact details for any contracted service providers in an annex.]

Permissions and Instructions

Provide details of any permissions and/or instructions received from any organ of state during initial incident management, cleanup and/or decontamination

3.2 Type	3.3 Statuat e	3.4 Issued By	3.5 Details
[Describe the nature or type of permission or instruction]	[Provide a reference to the legal mandate for the permission or instruction]	[Provide contact details for the permitting or instructing authority]	[provide a summary of the activities carried out in terms of the permission or instruction]

3. CLEANUP AND/OR DECONTAMINATION			
In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.			

MITIGATION MEASURES			
In terms of NEMA section 30(5)(e), the responsible person must report on measures taken and to be taken to avoid a recurrence of such incident.			
Measure	**Objective**	**Cost**	**Timing**
[Briefly describe each of the measures taken, and to be taken, to avoid a recurrence of such incident]	[Briefly describe the objective of the measure, i.e. the desired outcome of the measure]	[Estimate the cost of the measure in terms of capital costs and/or recurrent costs]	[Provide information on the timing for the full implementation of the measure]

4. AUTHORISATIONS			
Provide detail on all authorisations (including permits, licenses, certificates, etc.) in respect of the activity to which the incident relates.			
4.1 Type	**4.2 Statuate**	**4.3 Issued By**	**4.4 Issue & Expiry Date**
[Describe the nature or type of authorisation, e.g. Registration Certificate]	[Provide the reference for the authorisation, e.g. section X of the National Environmental Management Act (Act No. 107 of 1989)]	[Provide contact details for the issuing authority]	[provide the date of issue and expiry]

HISTORY			
Provide details on any and every similar incident involving the responsible person in the last 24 months. Similar incidents include those that: (i) involved similar circumstances; (ii) involved similar emissions; (iii) involved similar personal; and/or (iv) involved similar impacts.			
Incident title	**Report reference**	**Date of incident**	**Summary of event**
[Provide the title used in the relevant emergency incident report]	[Provide the reference in respect of the relevant emergency incident report]	[Date of incident]	[Provide a summary of the event]

Signed by, or as a mandated signatory for, the responsible person:		Date:	

CHAPTER 9

DECOMMISSIONING PHASE

As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased.

Examples of potential residual impacts and risks include contamination of soil and groundwater, stock that has been abandoned (e.g. oil drums, scrap equipment, old chemicals) and old (unserviceable) structures.

Closure and decommissioning impacts are likely to be similar to the construction phase impacts. The management actions and control under the Construction Phase need to be implemented to mitigate the negative impacts on the environment and to restore the property to its natural state. It is however highly unlikely that the development will be decommissioned and closed in the near future.

A decommissioning phase is where a structure is removed or otherwise modified to make it incapable for re use for the original design purpose.

The results of environmental monitoring during the decommissioning phase will be used to assess the impact of the decommissioning on the surrounding environment and demonstrate compliance with regulatory requirements.

The actual scope of the decommissioning environmental monitoring will be established following consultation with the regulatory authorities. The format of decommission management strategy will probably be similar to that of earlier development phases and consist of the following:

- Management Principles
    - Develop monitoring procedures in accordance with standard protocols and the requirements of the environmental legislation.
    - Undertake environmental monitoring during the decommissioning phase as shown below.

Environmental monitoring during the decommissioning phase will include terrestrial and aquatic indigenous habitat rehabilitation monitoring.

CHAPTER 10

REHABILITATIONS AND SITE CLEAN-UP

The contractors must ensure that all temporary structures, equipment, materials and facilities used or created on site for, or during construction, operational and decommissioning activities, are removed once the phase has been completed.

Stabilisation and rehabilitation must take place immediately after the construction/decommissioning operations have been completed. No vehicles or unauthorised personnel must be allowed onto areas that have been rehabilitated.

The areas impacted must be stabilised and shaped according to the natural surrounding contours. If topsoil was removed the topsoil must be used to stabilise the impacted areas.

Erosion and Alien vegetation monitoring of the rehabilitated areas and surrounds must be conducted on an annual basis and if sign of erosion or alien vegetation return is detected it must be managed as according to the requirements of the EMP.

CHAPTER 11

ENVIRONMENTAL AWARENESS INDUCTION COURSE MATERIAL

This section of the report is included in compliance with Section 24N (3) (c) of the National Environmental Management Act 107 of 1998.

WHAT IS THE ENVIRONMENT?

- Soil
- Water
- Plants
- People
- Animals
- Air we breathe

WHY MUST WE LOOK AFTER THE ENVIRONMENT?

- It affects us all as well as future generations
- We have a right to a healthy environment
- A Policy and System will be signed

HOW DO WE LOOK AFTER THE ENVIRONMENT?

- Report problems to your supervisor/ foreman
- Team work
- Follow the rules in the EMP

WORKING AREAS

Workers & equipment must stay inside the site boundaries at all times

RIVERS & STREAMS

- Do not swim in or drink from streams
- Do not throw oil, petrol, diesel, concrete or rubbish in the stream
- Do not work in the stream without direct instruction
- Do not damage the banks or vegetation of the stream

ANIMALS

- Do not injure or kill any animals on the site
- Ask your supervisor or Contract's Manager to remove animals found on site

TREES AND FLOWERS

- Do not damage or cut down any trees or plants without permission
- Do not pick flowers

SMOKING AND FIRE

- Put cigarette butts in a rubbish bin
- Do not smoke near gas, paints or petrol
- Do not light any fires without permission
- Know the positions of fire fighting equipment
- Report all fires
- Do not burn rubbish or vegetation without permission

PETROL, OIL AND DIESEL

- Work with petrol, oil & diesel in marked areas
- Report any petrol, oil & diesel leaks or spills to your supervisor
- Use a drip tray under vehicles & machinery
- Empty drip trays after rain & throw away where instructed

DUST

Try to avoid producing dust

NOISE

- Do not make loud noises around the site, especially near schools and homes
- Report or repair noisy vehicles

TOILETS

- Use the toilets provided
- Report full or leaking toilets

EATING

- Only eat in demarcated eating areas
- Never eat near a river or stream
- Put packaging & leftover food into rubbish bins

RUBBISH

- Do not litter – put all rubbish (especially cement bags) into the bins provided
- Report full bins to your supervisor
- The responsible person should empty bins regularly

TRUCKS AND DRIVING

- Always keep to the speed limit
- Drivers – check & report leaks and vehicles that belch smoke
- Ensure loads are secure & do not spill

EMERGENCY PHONE NUMBERS

Know all the emergency phone numbers:

- Ambulance:
- Fire:
- Police: 10111

FINES AND PENALTIES

- Spot fines of between R20 and R2000
- Your company may be fined
- Removal from site
- Construction may be stopped

PROBLEMS - WHAT TO DO!

- Report any breaks, floods, fires, leaks and injuries to your supervisor
- Ask questions!

INTEGRATED WASTE MANAGEMENT

An integrated waste management approach that is based on waste minimisation must be used and must incorporate reduction, recycling, re-use and disposal where appropriate. Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).

Make sure that you are aware of the location of the various types of waste storage areas and make use of the appropriate temporary waste storage areas when disposing of and collecting waste from the construction site. Make use of the correct waste storage area when disposing of recyclable and non-recyclable waste and do not mix the different types of recyclable waste i.e. wood, paper, metal, plastic.

When waste storage areas as full immediately inform the site manager so that recyclable and non-recyclable waste can be disposed at the correct facilities and to prevent windblown waste.

ATTENDANCE REGISTER FOR ……	
PLACE …….	TRAINER……
NAME & SURNAME	SIGNED
SIGNED …….	DATE & TIME ……

CHAPTER 12

COMPLIANCE WITH THE ENVIRONMENTAL AUTHORISATION

All conditions of the Environmental Authorisation must be adhered to onsite during the construction-, operational-, decommissioning- and rehabilitation phases of the proposed project. A copy of the Environmental Authorisation (and all other relevant license, permits, legislation etc.) must be available on site together with the EMP and all contractors on site must sign the Declaration of Understanding as proof of awareness and understanding of all the conditions to be adhered to on site in terms of the EA and EMP.

CHAPTER 13

UPDATING/ADAPTING THE EMP

Although care has been taken to address all known relevant environmental issues for the development, it might become necessary to add or amend certain procedures or instructions to improve the efficiency of the EMP. Only those additions to, or amendments of, this EMP that will either improve environmental protection or can be proven not to have any negative effects would be considered to be included, and any amendments to the EMP must first be approved by the ECO and competent authority/ies i.e. DEA&DP before the EMP can be amended and implemented as such.

The name, address and contact phone number of the site supervisor/s must be included in the EMP once appointed by the applicant.

REFERENCES

City of Cape Town (2002) Environmental Management Programme (Version 5) for Civil Engineering Construction Activities.

DEA&DP: ENVIRONMENTAL MANAGEMENT PROGRAMME. VER 5 (04/2002). Guideline Document for the ECO / ESO and the ER

Department of Water Affairs and Forestry, February 2005. Environmental Best Practice Specifications: Construction Integrated Environmental Management Sub-Series No. IEMS 1.6. Third Edition. Pretoria.