



ENVIRONMENTAL MANAGEMENT PROGRAMME

for

BYEVANGER DAM

on

Portion 3 of 36 Buffelsfontein & Portion 66 of 42 Voorbaat, Ladismith

In terms of the

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

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Date: 23 August 2021

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Report Reference: KAN557/04

Department Reference: 14/2/4/1/D3/8/0027/19

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DOCUMENT TRACKING**DOCUMENT HISTORY**

DOC REF	REVISION	DATE	AUTHOR
KAN557/04	Draft	2021-08-23	Ms Melissa Mackay

APPROVAL FOR RELEASE

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DISTRIBUTION

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PURPOSE OF THIS REPORT:

Environmental Management Programme for 24G Rectification Application

APPLICANT:

JG Nel Familietrust

CAPE EAPRAC REFERENCE NO:

KAN557/04

SUBMISSION DATE

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Environmental Impact Regulations (as amended)

Submitted for:

Stakeholder Review & Comment

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Environmental Management Plan

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ENVIRONMENTAL MANAGEMENT PROGRAMME REQUIREMENTS

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

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

Requirement	Description
Details and expertise of the EAP who prepared the EMPr; including curriculum vitae.	Ms Melissa Mackay of Cape Environmental Assessment Practitioners. See Cover Page. Appendix 6.
A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	<u>Section 1</u>
A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that must be avoided, including buffers	Appendix 1
A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all the phases of the development including – (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities.	<u>Section 4</u> – Environmental Impacts & Mitigations <u>Section 5</u> - Responsibilities <u>Section 6</u> – Pre-Construction Design <u>Section 7</u> – Construction Phase <u>Section 8</u> – Operation Phase
A description and identification of impact management outcomes required for the aspects contemplated above.	<u>Section 4</u>
A description of the proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated above will be achieved and must, where applicable include actions to – (i) Avoid, modify, remedy control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practises; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	<u>Section 4</u> <u>Section 6</u> <u>Section 7</u> <u>Section 8</u>
The method of monitoring the implementation of the impact management actions contemplated above.	<u>Section 9</u> <u>Section 11</u>
The frequency of monitoring the implementation of the impact management actions contemplated above.	<u>Section 9</u>

Requirement	Description
An indication of the persons who will be responsible for the implementation of the impact management actions.	<u>Section 5</u>
The time periods within which the impact management actions must be implemented.	Not Applicable
The mechanism for monitoring compliance with the impact management actions.	<u>Section 9</u>
A program for reporting on compliance, taking into account the requirements as prescribed in the Regulations.	<u>Section 9</u>
<p>An environmental awareness plan describing the manner in which –</p> <p>(i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and</p> <p>(ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.</p>	<p><u>Section 5</u></p> <p><u>Section 6</u></p> <p><u>Section 7</u></p> <p><u>Section 8</u></p> <p><u>Section 9</u></p>
Any specific information that may be required by the competent authority.	Not Applicable.

ABBREVIATIONS AND ACRONYMS

BSP	Biodiversity Sector Plan - to inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on biodiversity.
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983) - provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.
CBA	Critical Biodiversity Area - areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan.
DEA	National Department of Environmental Affairs – the national authority responsible for the sustainable environmental management and integrated planning.
DEA&DP	Department of Environmental Affairs and Development Planning – the provincial authority for sustainable environmental management and integrated development planning. The competent authority is this case.
DAFF	Department of Agriculture, Forestry and Fisheries – the national authority responsible for the agricultural, forestry and fishery sector and its management. DAFF is mandated to enforce the National Forestry Act (NFA). Permits for the removal or pruning of protected tree species e.g. Milkwoods must be obtained from this entity.
DWS	Department of Water & Sanitation Affairs – National authority mandated to enforce the National Water Act (NWA).
EA	Environmental Authorisation – Authorisation obtained on completion of an Environmental Impact Assessment in terms of the National Environmental Management Act (NEMA).
ECA	Environment Conservation Act, 1989 - To provide for the effective protection and controlled utilization of the environment and for matters incidental thereto.
ECO	Ecological Control Officer – independent site agent appointed to observe and enforce the implementation of environmental policies and principles on a development site.
EIA	Environmental Impact Assessment - a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.
EMPr	Environmental Management Programme – an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented and that positive benefits of the projects are enhanced.
GIS	Geographic Information System - system designed to capture, store, manipulate, analyse, manage, and present all types of geographical data.

GPS	Global Positioning System - a radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world.
NEMA	National Environmental Management Act (Act 107 of 1998, as amended) – national legislation that provides principles for decision-making on matters that affect the environment.
NEM:BA	National Environmental Management: Biodiversity Act (Act No.10 of 2004) – provides for the management and conservation of South African biodiversity within the framework of NEMA.
NFA	National Forestry Act (Act No.84 of 1998) - provides for the protection of forests, as well as specific tree species within South Africa.
NSBA	National Spatial Biodiversity Assessment – aims to assess the state of South Africa’s biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors.
NWA	National Water Act (Act No.36 of 1998) - ensures that South Africa's water resources are protected, used and managed.

1. INTRODUCTION

Cape Environmental Assessment Practitioners (Cape EAPrac) was appointed by the Applicant, JG Nel Familietrust to develop an Environmental Management Programme (EMPr) which will be used to promote and ensure environmental monitoring and control during all phases (construction, operation and possible decommissioning) associated with the clearing of vegetation and activities within watercourses to relocate the existing dam on Portion 3 of 36 Buffelsfontein & Portion 66 of 42 Voorbaat, near Ladismith in the Western Cape.

The applicant had an existing earth wall dam on the non-perennial watercourse that failed. When looking at repairing the dam, they moved the dam wall northwards into the valley in order to make use of the steeper area and better material. The dam was also expanded from its original size to approximately 149 621m³, with an area of ±3.6ha.

These activities required an Environmental Authorisation (EA) in terms of NEMA before they may proceed, and since the previous and current owners activities took place without an EA, the process being followed in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) is a 24G Rectification process. This document provides part of a series of documents that is being circulated for public and stakeholder input before being provided to the provincial competent authority, the Department of Environmental Affairs & Development Planning (DEA&DP) for decision making.

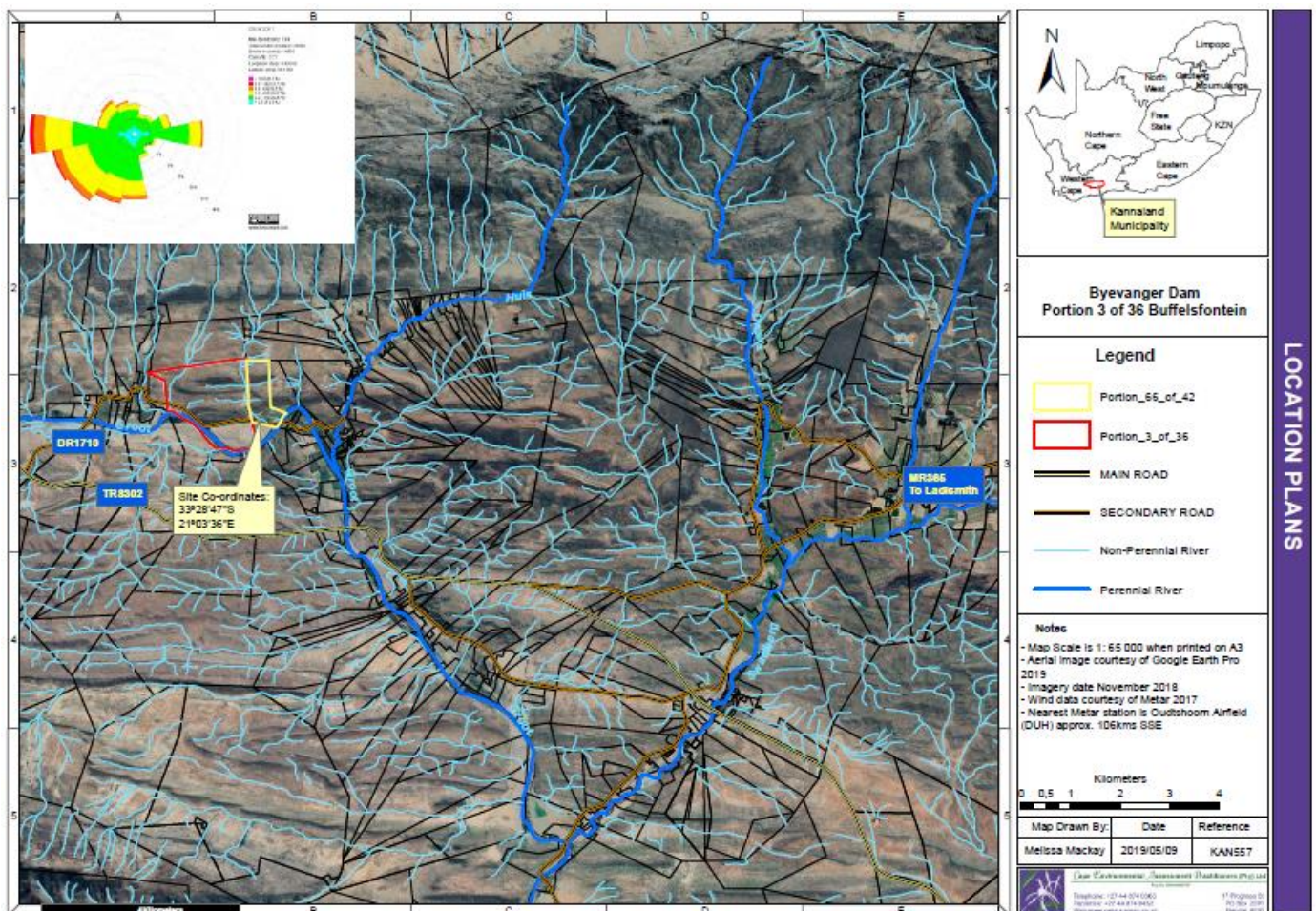


Figure 1: Location Plan

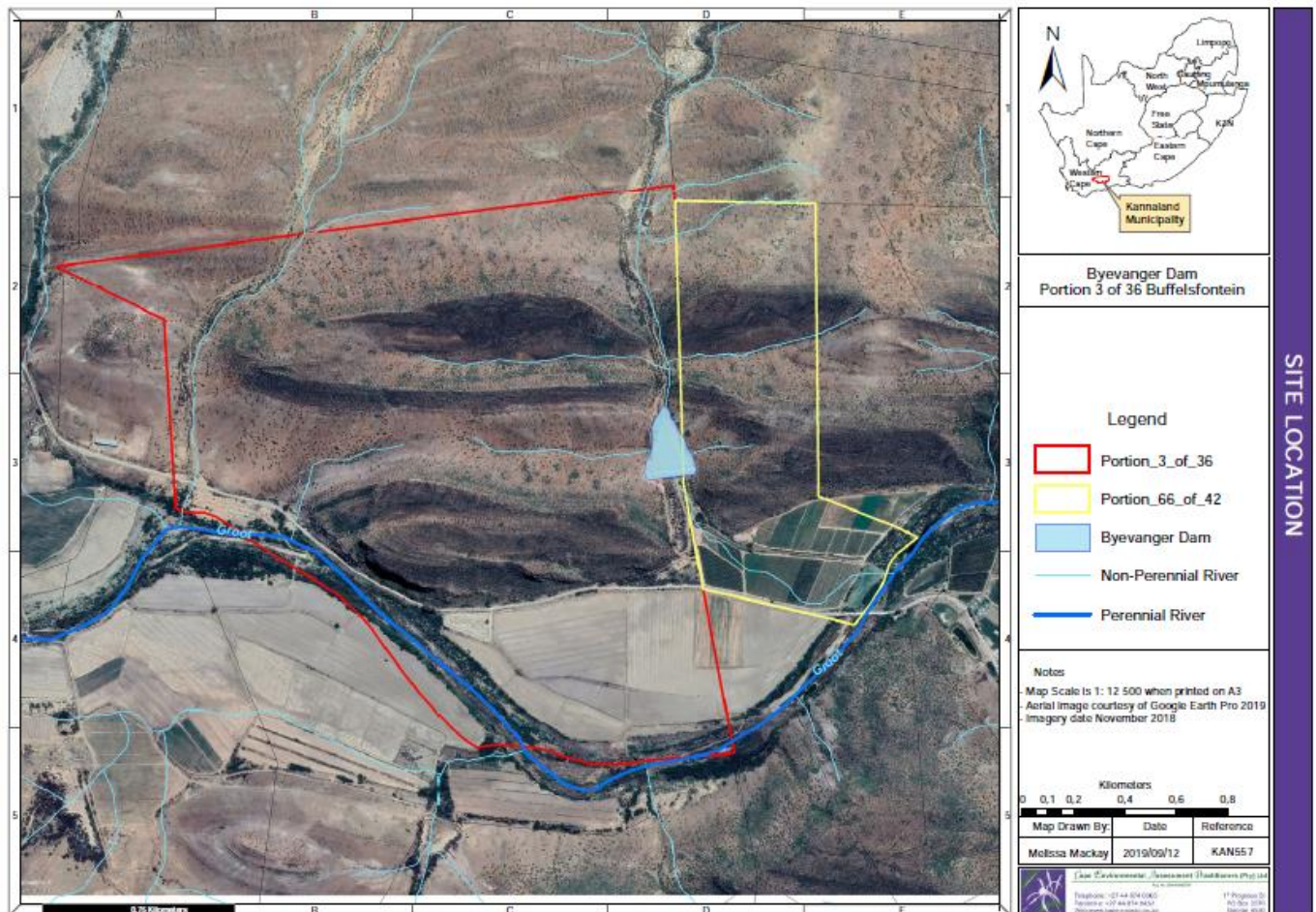


Figure 2: Property location

The property has been utilised for mixed use agriculture, mostly associated with crop production such as plums, figs, peach, pomegranate, onion seed and lucerne, for many decades. The J G Nel Family Trust owns the farm Vanzylsdamme. The farm VanZylsdamme consists of 49 divisions, that make up a total of 9951,6954 hectares.

The area has been under severe drought for several years now and water security is a crucial concern to all the farm entities in the area. The Byevanger dam is an in-channel dam. The Trustees/owners stated that the objective of building the dam was to replace the broken Rooikrans dam. The Rooikrans dam, existed close to the current dam. Storage in the Rooikrans dam was verified for 10000m³. It was an off-channel dam and was situated in a lower position in the valley than the Byevanger dam. It was also an older dam that was built before the Floriskraal dam was built (1957). Floods in the valley above the dam damaged the old dam wall and lands below the dam. In 2014 it was damaged in a flood to such an extent that it could not be repaired. The owners decided after the last floods to move the dam wall upstream to get a better position for the wall and overflow of the dam in case of floods.

This EMPr contains **management requirements** and **recommendations** made by *Cape EAPrac*, the appointed specialists (freshwater) as well as in terms of the regulations contained in the **National Environmental Management Act** (NEMA, Act 62 of 2008), the **National Environmental Management: Waste Act** (NEM:WA, Act 59 of 2008) and best practice principles. The EMPr should be updated to include any conditions of the **Environmental Authorisation** (EA) as issued.

1.1 PURPOSE OF THE EMPR

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

of the proposal. The EMPr is a dynamic document that is flexible and responsive to new and changing circumstances.

The document is binding on the Applicant, all contractors and sub-contractors and visitors to the site. It must be included as part of any tender documents / agreements, as well as contractual documents between the Applicant and any contractors. Copies of this EMPr must be kept on site and all **senior personnel** are expected to familiarise themselves with the content of this EMPr.

Any changes or deviations to this EMPr must be authorised by the competent authority.

1.2 STATUS OF THE EMPR

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

The EMPr is valid for the duration of the project with each applicable phase corresponding to the identified requirements.

2 EMPR PHASING

2.1 PRE-CONSTRUCTION PHASE

The pre-construction phase refers to the design phase of the project. This will ensure that any requirements and best practise mechanisms are built into the planning / design phase to be developed in the construction and operational phase. In term of this application, the pre-construction refers to the changes proposed by the specialists to improve and mitigate the areas that were unlawfully cleared.

2.2 CONSTRUCTION PHASE

The construction phase refers to the actual construction of the development on the property and includes all earthworks and installation of bulk services (water, sewerage, roads, stormwater, electricity etc.). In terms of this application, this phase relates to the remedial work that will have to be performed to implement the recommendations of the specialist.

2.3 OPERATIONAL PHASE

The Operation Phase of this project relates to the ongoing management required to ensure sustainable agricultural practises and farm management. In terms of this application, this mostly refers to alien invasive management control and dam maintenance.

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

2.4 CLOSURE AND DECOMMISSIONING PHASE

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

Agriculture is a long term commitment to production on land. This means that enterprise is a long term one and it is thus not known when, if at all, closure may occur. However, since this is an unknown co-efficient, specific management recommendations are not included with this EMP. In the event that decommissioning is required, all relevant legal processes must be complied with.

3 LEGISLATIVE REQUIREMENTS

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

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

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

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

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

NEMA aims to provide for cooperative environmental governance by establishing principles for decision-making on all matters relating to the environment and by means of Environmental Implementation Plans (EIP) and Environmental Management Plans/Programmes (EMPr), of which this CMP is one.

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

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

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

Since the applicant commenced with the listed activity without applying for prior Environmental Authorisation, this application falls under the ambit of the NEMA 24G Rectification requirements.

3.2 ENVIRONMENT CONSERVATION ACT, 1989 (ECA)

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

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

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

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

The South African National Biodiversity Institute (SANBI) released the National Biodiversity Assessment (NBA) 2018. The NBA is the primary tool for monitoring and reporting on the state of biodiversity in South Africa and is prepared as part of the SANBI mandate under the National Environmental Management: Biodiversity Act (Act 10 of 2004). This report provided some changes in classification of ecosystem types and classifications.

In the case of this application, the property is zoned for agriculture and has a history of agricultural practise. There are some areas heavily infested with alien invasive vegetation on the site, particularly in the vicinity of watercourses. The clearing of the AIS is a requirement of NEM:BA and as such an AIS Control Plan was developed (see appendices).

The vegetation type on the site has been identified as follows:

- Western Gwarrieveld, LC (2011), LC (2018); and
- Matjiesfontein Quartzite Fynbos, LC (2011), LC (2018)

The clearing activities took place within the watercourse upstream of the old Rooikrans dam.

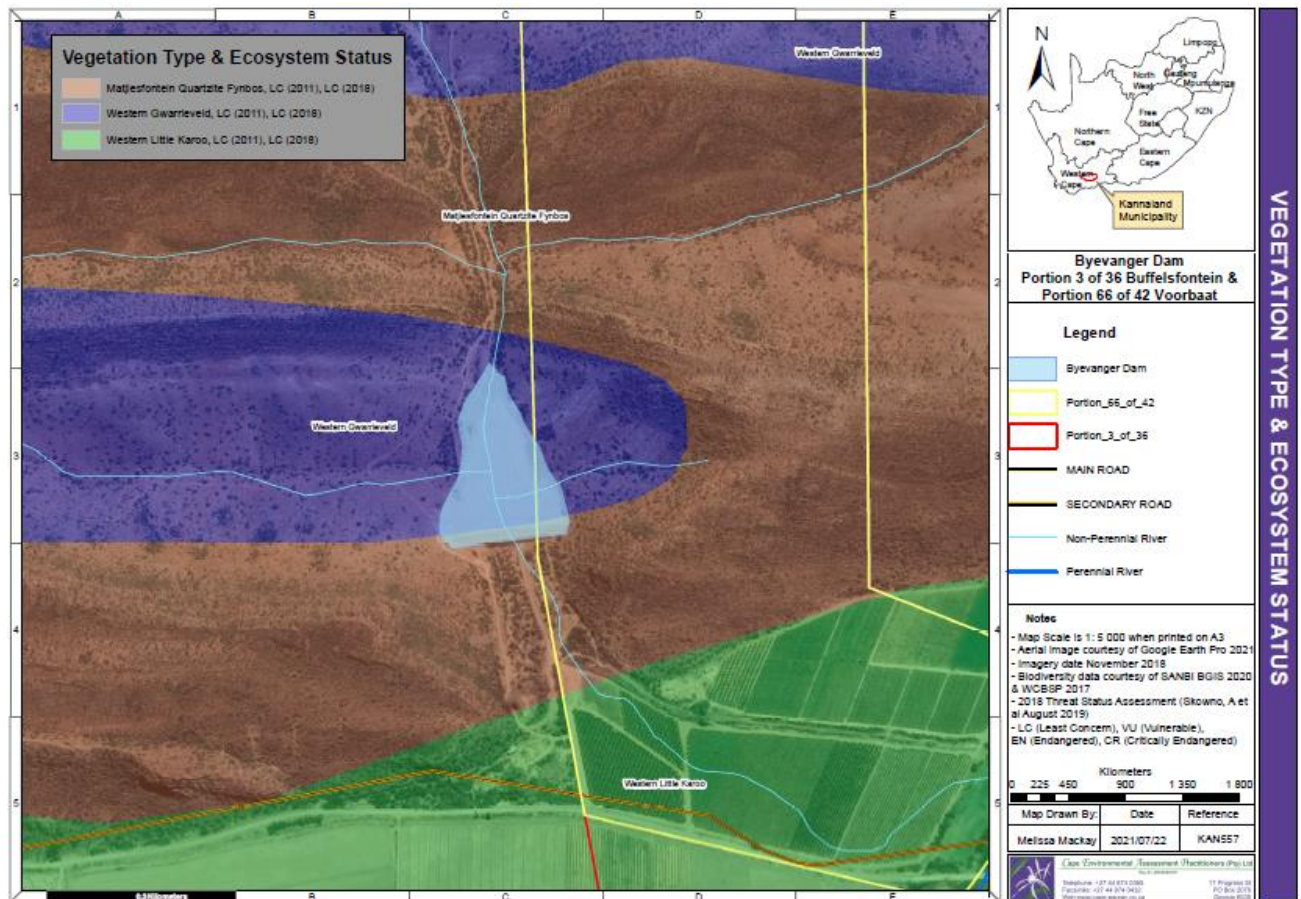


Figure 3: Vegetation Type & Ecosystem Status

3.4 NATIONAL WASTE MANAGEMENT STRATEGY

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

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

In the case of the property, an integrated waste management system must be adopted, which includes waste minimisation, waste recycling and the proper storage and disposal of waste, which does not impact of the health of the environment and human health.

3.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT (CARA)

The CARA aims to provide for the conservation of natural agricultural resources by maintaining the production potential of land, combating and preventing erosion and weakening or destruction of water resources, protecting vegetation and combating weeds and invader plant species.

As with NEM:BA, alien invasive plant / weed species listed in terms of CARA must be controlled and/or removed. In the case of the operation of the development, the conservation of soil and water resources is applicable, in the sense that measures must be in place to avoid the pollution or degradation of these resources within the open space areas of the property.

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

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

beneficial use, facilitating social and economic development, and providing for water quality and environmental protection.

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

A Water Use License Application (WULA) has been submitted to the Breede Gouritz Catchment Management Agency (BGCMA) for the new position of the dam, impact on watercourse banks and for the increased storage of water in the new dam.

3.7 NATIONAL FOREST ACT (ACT 84 OF 1998)

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

In the case of the development, no protected trees have been identified on the developable areas.

3.8 NATIONAL VELD AND FOREST FIRE ACT (ACT 101 OF 1998)

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

All landowners are required in terms of this Act to prepare and maintain **firebreaks** on the boundary of their property and any adjoining land. Only the Minister may exempt a landowner from providing firebreaks.

In areas that are considered a high fire risk, especially in vegetation types that tend to be fire driven ecosystems, it is recommended that a fire management plan is put in place, or the owner becomes a member of the local FPA and fall under the umbrella of the regional fire management strategy. **This area is not a high fire risk, but fire management in mountainous areas are always possible.**

The clearance of high risk AIS is an important tool in this area to minimise fire risk and improve water security.

3.9 NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The purpose of the National Heritage Resources Act is to:

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

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

The development does not impact on any heritage resources. In terms of the proposed development, if any evidence of archaeological remains are unearthed, this must be communicated to the Heritage Western Cape immediately. See the Heritage Requirements in this report for detailed instructions as to communicating any finds.

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

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

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

3.11 SANS 10400 APPLICATION OF THE NATIONAL BUILDING REGULATIONS

The application of the National Building Regulations contains performance parameters relating to fire safety, sanitation systems, moisture penetration, structural safety, serviceability and durability. It also takes into account how the above can be established to reflect social expectations in a manner which supports sustainable development objectives.

3.12 NATIONAL BUILDING REGULATIONS

The National Building Regulations and Building Standards Act as amended must be complied with. This act addresses, inter alia:

- Specifications for draftsmen, plans, documents and diagrams;
- Approval by local authorities;
- Appeal procedures;
- Prohibition or conditions with regard to erection of buildings in certain conditions;
- Demolition of buildings;
- Access to building control officers;
- Regulations and directives; and
- Liability.

4 ENVIRONMENTAL IMPACTS & MITIGATIONS

The following specialist impact assessments were undertaken for the proposal:

- Aquatic Impact Assessment

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

- Loss of indigenous vegetation; and
- Impacts on riparian areas and non-perennial watercourse.

4.1 IMPACTS & MITIGATIONS

Impacts	Significance rating of impacts after mitigation (Low, Medium, Medium-High, High, Very High):
Planning, Design & Construction	
Fragmentation of the watercourse <ul style="list-style-type: none"> • Develop operating rules which reduce fragmentation of the watercourse. I.e. Manage the release of flows that consider ecological requirements downstream. 	Moderate (-)
Alignment of the watercourse with dam outlets <ul style="list-style-type: none"> • Review layout plans and ensure that physical connectivity with the original watercourse and the Groot River is maintained. This must be achieved through aligning outlets with the original watercourse 	Negligible (-)
Disturbance of river bed & banks <ul style="list-style-type: none"> • Any sensitive plants identified by the botanical specialist should be relocated for protection if they are located in the construction area. • A limited disturbance area of 10m adjacent to the footprint of the dam and associated infrastructure is permissible. No more than 5 m upstream of the full supply area must be disturbed in the watercourse. These areas must be demarcated using temporary fencing and be considered absolute no-go zones. • Areas below the high water level mark in the basin of the dam may be used 	Moderate (-)
Sedimentation of downstream watercourses (in the event of rainfall during construction phase) <ul style="list-style-type: none"> • Alignment between the original watercourse leading to the Groot River and outlets from the dam should be prioritised in 	Negligible (-)

<p>case of heavy rainfall requiring the discharge of water exceeding the lawful allocation.</p> <ul style="list-style-type: none"> • The next priority should be to establish sediment traps or stabilisation on areas prone to erosion such as the downstream side of the dam embankment, area below the spillway (once alignment has been planned), and the access road. Allowance must be made to clear sediment from the traps if erosion occurs during the construction period. Traps should be implemented immediately as construction has not concluded at the site, and there are many exposed areas susceptible to erosion if it rains heavily. • If active erosion results in the formation of gullies, these areas must be infilled with topsoil and covered with hessian or a geotextile (e.g. GeoJute) prior to revegetation. • Where sedimentation downstream occurs as a direct result of construction activities (past or future) this must be removed manually (using spades) under the supervision of a freshwater ecologist or environmental site officer. • Large quantities of sediment are already present in the basin of the previous dam which is located downstream of the new dam wall. Alignment of the spillway, outflow and watercourse are urgently required to prevent this sediment from being deposited in the Groot River. Any sediment accumulated in the original watercourse must be manually removed using spades 	
<p>Water quality impacts downstream</p> <ul style="list-style-type: none"> • Vehicle parking and refuelling areas must be located > 50m from the high water mark and edge of the watercourse, and be clearly defined. • Any fuel storage areas must be bunded to prevent spills spreading if they occur. • Waste collection and removal must be arranged on a regular basis, and allowance must be made for conducting a litter clean-up for up to a 100m downstream and upstream of the watercourse. • Follow recommended mitigation measures for sedimentation of downstream watercourses as above 	<p>Negligible (-)</p>
<p>Removal of vegetation</p>	<p>Moderate (-)</p>

<ul style="list-style-type: none"> • A botanical specialist must assess the remaining vegetation prior to further clearance to determine the presence / absence of important taxa. • Only vegetation within the full supply area of the dam basin may be cleared. • Where vegetation can be rescued and replanted it should be used on site to stabilise exposed soil prone to erosion. Large Spekboom are likely to survive replanting and should be utilised as opposed to discarded. A botanical specialist must be consulted in this regard. 	
<p>Import of alien seed and plants to the site</p> <ul style="list-style-type: none"> • Any imports of foreign material to the site should be cleared with a botanical specialist to ensure they do not pose a risk and do not originate from areas with high levels of alien invasion. • Alien plants must be continually removed from disturbed areas throughout the construction period. This activity should commence immediately as there are already alien plants on the perimeter of the dam basin. 	Negligible (-)
Socio-Economic	None
Cultural / Historical	None
Noise	Negligible
Visual / Sense of Place	None
Operational	
<p>Risk of reduced flows reaching the Groot River</p> <ul style="list-style-type: none"> • Operating rules must consider the release of water that is sensitive to ecological requirements downstream (informed by the above study). The success of this measure is also dependent on restoring the alignment of the original watercourse with the Groot River. ** Update ** The results of the hydrological study conducted by Mr. B. Haasbroek indicate that no water release is required for maintenance of the EWR in the Groot River. 	Minor (-)
<p>Creation of lentic habitat for aquatic biota</p> <ul style="list-style-type: none"> • Ensure no alien fauna or flora are introduced or allowed to persist in the dam when it is inundated 	Minor (+)

<p>Risk of alien fish introductions for recreation</p> <ul style="list-style-type: none"> Consider the hydrological regime of the dam before introducing fish to determine whether it can realistically sustain a fish population. Do not introduce any fish without ensuring their introduction is legal by consulting the NEMBA act. 	<p>Neutral</p>
<p>Racial and gender imbalances addressed in benefiting from water use</p> <ul style="list-style-type: none"> Implement the dam to improve water security 	<p>Medium positive</p>
<p>Transformation in the water and agricultural sector</p>	<p>High positive</p>
<p>Rural development in terms of food security and agrarian reform addressed</p> <ul style="list-style-type: none"> Implement the dam to improve water security 	<p>Medium positive</p>
<p>Social discrepancies in wealth and opportunities addressed</p> <ul style="list-style-type: none"> Implement the dam to improve water security 	<p>Medium to high positive</p>
<p>Job opportunities that will address unemployment and create sustainable livelihoods</p> <ul style="list-style-type: none"> Implement the dam to improve water security 	<p>High positive</p>
<p>Local economic growth stimulated</p> <ul style="list-style-type: none"> Implement the dam to improve water security 	<p>Medium positive</p>
<p>Cultural / Historical</p>	<p>None</p>
<p>Noise</p>	<p>Negligible</p>
<p>Visual</p>	<p>None</p>
<p>Decommissioning</p>	
<p>Farming, and in particular crop farming is a long term projected use of the property Thus in terms of decommissioning, it is not possible to foresee the closure of the facility in the near future. The requirements for closure must comply with any legislative mechanisms in place at the time of closure as a minimum.</p>	
<p>Decommissioning</p>	<p>None</p>
<p>Other - Cumulative</p>	
<p>Alterations in surface flows reaching the Groot River</p> <ul style="list-style-type: none"> Management actions for water quantities in the Gouritz River Estuarine Management Plan (Royal Haskoning, 2018) state that water use activities and licenses in the 	<p>Could be significant but unlikely for this dam on its own to cause impact.</p>

catchment should be assessed for compliance with Reserve requirements. If the ecological reserve requirements are not being met abstraction activities may be declared as streamflow reduction activities and temporarily controlled, limited or prohibited.	
Transformation in the water and agricultural sector <ul style="list-style-type: none"> Implement the dam to improve water security 	High positive
Job opportunities and rural development <ul style="list-style-type: none"> Implement the dam to improve water security 	Medium - High positive
Racial and gender imbalances <ul style="list-style-type: none"> Implement the dam to improve water security 	Medium – High positive

5 RESPONSIBILITIES

This section deals with the responsibilities of various parties during the Construction Phase of any development.

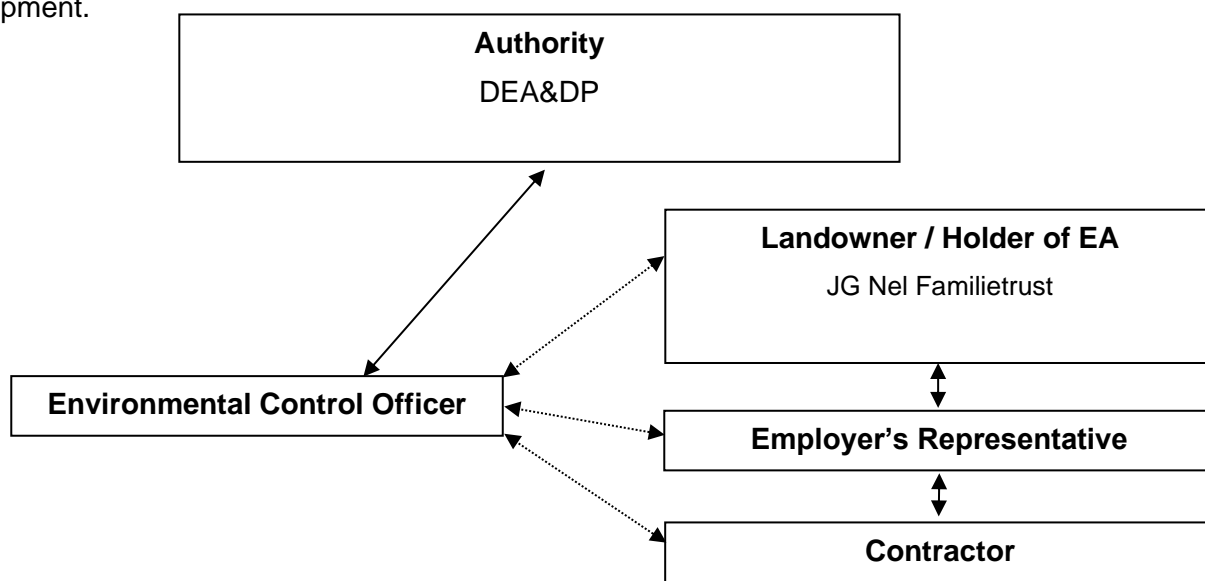


Figure 4: Responsibilities

5.1 HOLDER OF THE EA

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

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

- Ensure that **all tender documentation** include reference to, and the need for compliance with, the EA and EMPr as well as any other legally binding documentation, which include and are not limited to:
 - the Municipal Approval/s (, service agreements & building plans etc.);

- Be conversant with, and ensure that all Contractors, Sub-contractors, Engineers (and future senior site managers / personnel) are made aware of, and understand the conditions and recommendations, contained in the abovementioned documentation;
- Ensure that all Contractors, Sub-contractors, Engineers (during construction activities), as well as all future visitors and service providers (during operation) are made aware of their 'Duty of Care to the Environment' and that any damage or degradation of the natural environmental within the bounds of the property will be not be tolerated and must be dealt with / remedied at the cost of the perpetrator;
- Take remedial and/or disciplinary action in circumstances where persons are found to be in contravention of the abovementioned legally binding documentation.

5.2 ENGINEERS, CONTRACTORS & SERVICE PROVIDERS

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

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

- Be conversant and compliant with the EA, the EMPr, and any relevant License, Permit or any legally binding documentation relevant to their operations;
- Have a responsibility to adhering to any conditions and recommendations laid out in above mentioned documentation;
- Prevent actions that may cause harm to the environment;
- Be responsible for any remedial activities in response to an environmental incident within their scope of influence;
- Liaise with the holder of the EA in complying with the EMPr, and in the event that any industry regulated standards are in contradiction with the EMPr or any other authorisations.
- Review and amend to any construction activities to align with the EMPr and Best Practice Principles;
- Ensure compliance of all site personnel and / or visitors to the EMPr and any other authorisations.

6 PRE CONSTRUCTION DESIGN CONSIDERATIONS

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

6.1 WATER RESOURCE PROTECTION	
Management Statement	Impacts & Risks Avoided
To minimise the destruction of water resources by improving consumption methods	Protection of water resources during construction
Management Actions	
a. Erosion control mechanisms	

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of roads crossing the watercourse by ECO to confirm presence and effectiveness of mechanisms	Weekly	Contractor	Permanent or until riparian vegetation is matured	Audit	Monthly

Additional Considerations where necessary:

- Implement a riparian buffer zone along watercourses where no heavy machinery is permitted to enter, and vegetation is to be rehabilitated;
- • A cover crop of indigenous grass should be planted within the buffer zone to protect the soil and improve the micro-climate for the germination of indigenous plant seeds that may be preserved in the seed bank;
- Implement a riparian buffer zone along watercourses where no heavy machinery is permitted to enter, and vegetation is to be rehabilitated;
- •A cover crop of indigenous grass should be planted within the buffer zone to protect the soil and improve the micro-climate for the germination of indigenous plant seeds that may be preserved in the seed bank.;

6.2 DEMARCATIION OF WORK AND NO-GO AREAS

Management Statement	Impacts & Risks Avoided
To clearly define the work area and avoid impacting on non-works areas.	Negative construction impacts on natural and rehabilitated areas

Management Actions

- a. Clearly identify and demarcate the watercourse and its buffer zone.

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

- b. Fuel and chemicals may only be stored in a designated work area.

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

7 CONSTRUCTION CONSIDERATIONS

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

7.1 WORKING IN WATERWAYS & FLOODPLAINS					
Management Statement			Impacts & Risks Avoided		
To minimise stress on aquatic communities when working in a waterway.			Avoid negative impacts associated with land clearing affecting watercourses		
Management Actions					
a. Plan in-stream works so that the contact time is minimised.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor	Continuously during construction	Audit	Monthly
b. Establish special practices so that impacts on the waterway and disturbance of its banks are minimised.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance

Visual / photographic	As required	Contractor	Continuously during construction	Audit	Monthly
c. Stabilise banks and in stream structure so that they do not contribute to the sediment load.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor	Continuously during construction	Audit	Final Rehabilitation statement
d. Avoid times of the year when environmental damage is expected to be highest.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor	Continuously during construction	Audit	Monthly
e. Prepare a contingency plan for high-rain events.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor	Continuously during construction	Audit	Monthly
f. Prepare a reinstatement plan if work in a stream is planned or the structure of a waterway will be altered.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor	Continuously during construction	Audit	Final Rehabilitation statement

g. Erosion control mechanisms on road crossings					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of roads crossing the watercourse by ECO to confirm presence and effectiveness of mechanisms	Weekly	Contractor	Permanent or until riparian vegetation is matured	Audit	Monthly

Additional Considerations where necessary:

- Any sensitive plants identified by the botanical specialist should be relocated for protection if they are located in the construction area.
- A limited disturbance area of 10m adjacent to the footprint of the dam and associated infrastructure is permissible. No more than 5 m upstream of the full supply area must be disturbed in the watercourse. These areas must be demarcated using temporary fencing and be considered absolute no-go zones.
- Areas below the high water level mark in the basin of the dam may be used

7.2 STORMWATER MANAGEMENT

Management Statement	Impacts & Risks Avoided
To minimise the generation of contaminated stormwater.	Minimise sedimentation, erosion and / or nitrification of the watercourse

Management Actions

- a. Minimise the quantity of stormwater entering cleared areas.

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

7.3 DUST CONTROL

Management Statement		Impacts & Risks Avoided			
To ensure there is no health risk or loss of amenity due to emission of dust to the environment.		Ensure land coverage with crops / vegetation to minimise dust from vehicles			
Management Actions					
a. Implement a dust prevention strategy, developed at the project planning stage (See Method Statement Report and Rehabilitation Plan)					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Once off	Owner / contractor	Pre implementation	Audit	Once off
7.4 <u>NOISE & VIBRATION</u>					
Management Statement		Impacts & Risks Avoided			
To ensure nuisance from noise and vibration does not occur.		Limited impact due to the location of the property			
Management Actions					
a. Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	Initially when vehicle or machinery is introduced to the site and thereafter monthly. As required if complaints registered.	Contractor	During construction and operation	Audit	As required
b. Enclose noisy equipment such as generators and pumps.					

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	Initially when vehicle or machinery is introduced to the site and thereafter monthly. As required if complaints registered.	Contractor	During construction	Audit	As required

c. Provide noise attenuation screens, where appropriate.

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	Initially when vehicle or machinery is introduced to the site and thereafter monthly. As required if complaints registered.	Contractor	During construction	Audit	As required

d. Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm weekdays and 7 am to 1 pm Saturday, except where, for practical reasons, the activity is unavoidable.

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	As required if complaints registered.	Contractor	During construction	Audit	As required

7.5 WASTE MANAGEMENT

Management Statement			Impacts & Risks Avoided		
To minimise the waste load discharged to the environment.			Improve waste disposal methods during construction Reduce waste volumes to landfill sites		
Management Actions					
a. Reduce wastes by selecting, in order of preference, avoidance, reduction, reuse and recycling.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Record of volumes of material removed	As required	Contractor	As required	Audit	Records
b. Maintain a high quality of housekeeping and ensure that materials are not left where they can be washed or blown away to become litter.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Photographic	Weekly	Contractor	As required	Audit	Records
c. Provide bins for construction workers and staff at locations where they consume food.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Photographic	Weekly	Contractor	As required	Audit	Records
d. Conduct ongoing awareness with staff of the need to avoid littering.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance

Induction	Once off	Contractor	As required	Audit	Attendance register
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7.6 STOCK PILE MANAGEMENT					
Management Statement			Impacts & Risks Avoided		
To manage soil stockpiles so that dust and sediment in run-off are minimised.			Pollution due to dust and sediment run off		
Management Actions					
a. Minimise the number of stockpiles, and the area and the time stockpiles are exposed.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Photographic	As required	Contractor	As required	Audit	Records
b. Keep topsoil and underburden stockpiles separate.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	Daily when stripping topsoil	Contractor	Continuously during construction	Audit	Records
c. Locate stockpiles away from drainage lines, at least 10 metres away from natural waterways and where they will be least susceptible to wind erosion.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	Daily when stripping topsoil	Contractor	Continuously during construction	Audit	Records

d. Ensure that stockpiles and batters are designed with slopes no greater than 2:1 (horizontal/vertical).					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly
e. Stabilise stockpiles and batters that will remain bare for more than 28 days by covering with mulch or anchored fabrics or seeding with sterile grass.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly
f. Establish sediment controls around unstabilised stockpiles and batters.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly
g. Suppress dust on stockpiles and batters, as circumstances demand.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly
7.7 <u>STORING FUELS & CHEMICALS</u>					

Management Statement			Impacts & Risks Avoided		
To ensure that fuel and chemical storage is safe, and that any materials that escape do not cause environmental damage.			Avoid hydrocarbon pollution to soil and watercourses		
Management Actions					
a. Minimise fuels and chemicals stored onsite.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
b. Install bunds and take other precautions to reduce the risk of spills.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
c. Implement a contingency plan to handle spills, so that environmental damage is avoided.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
7.8 <u>CEMENT BATCHING</u>					
Management Statement			Impacts & Risks Avoided		

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

To ensure prevention of unnecessary fires that may cause risk to the environment and human health.			Prevents unnecessary fires from causing damage to the vegetation and soils, as well as protecting infrastructure and lives.		
Management Actions					
a. In case of an emergency, the contact details of the local fire and emergency services must be readily available (see contact list on page x above)					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Emergency information to be displayed on site	Once off	Contractor	Once off	Audit	Photographs

7.10 <u>MINIMISING EROSION</u>					
Management Statement			Impacts & Risks Avoided		
To minimise the quantity of soil lost during construction due to land-clearing.			<ul style="list-style-type: none"> • Avoid overland flow by capture and store water from roof • Avoid siltation by installing silt traps 		
Management Actions					
a. Schedule measures to avoid and reduce erosion by phasing the work program to minimise land disturbance in the planning and design stage.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
b. Keep the areas of land cleared to a minimum, and the period of time areas remain cleared to a minimum					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance

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

7.11 <u>BOTANICAL MANAGEMENT</u>					
Management Statement			Impacts & Risks Avoided		
To ensure that degradation to existing botanical components are minimised and that any rehabilitation is undertaken with conservation orientated approach.			To minimise the disturbance to existing flora To minimise the introduction and/or spread of weed species		
Management Actions					
a. Implement the AIS management on an ongoing basis					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor	Continuously	Audit	Visual / photographic

7.12 <u>SOCIAL REQUIREMENTS</u>					
Management Statement			Impacts & Risks Avoided		
To ensure equitable, fair and safe social interaction on construction sites			Loss of employment opportunities to the region		
Management Actions					
a. It is strongly recommended that the Contractor make use of local labour as far as possible for the construction phase of the project.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Employment records	Ad hoc	Contractor	Ad hoc	Audit	Once off
b. Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the Developer and the Contractor.					

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Site records	Ad hoc	Contractor	Ad hoc	Audit	Once off

7.13 HERITAGE REQUIREMENTS

Management Statement	Impacts & Risks Avoided
To minimise the impacts of development, operation and maintenance of the Project on the heritage values in the Project area.	Ensure heritage impacts are minimised, and impacts outside of the approved disturbance area are avoided.

Management Actions

- a. No disturbance of heritage values outside of the approved disturbance area.

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Site records	Ad hoc	Contractor	Ad hoc	Audit	Once off

- Should any heritage remains of potential cultural value be exposed during excavations, these must be immediately reported to the ECO and the Provincial Heritage Resource Authority of the Western Cape, namely Heritage Western Cape in terms of the national Heritage Resources Act (Act No. 25 of 1999). Heritage remains uncovered or disturbed during earthworks may not be disturbed further until the necessary approval has been obtained from Heritage Western Cape.
- Should any archaeological remains including (but not limited to) fossil bones, fossil shells, coins, indigenous ceramics, colonial ceramics, marine shell heaps, stone artefacts, bone remains, rock art, rock engravings and any antiquity be discovered during construction, they must be immediately reported to the ECO and Heritage Western Cape and not disturbed further until the necessary approval has been obtained.
- Should any human remains be uncovered, they must immediately be reported to the ECO and the HWC archaeologist, who can be contacted on **(021) 483 9685**. Construction in the area must cease immediately and the site may not be disturbed further until the necessary approval has been obtained.

7.14 METHOD STATEMENTS

Management Statement	Impacts & Risks Avoided
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To ensure efficient communication mechanisms in the implementation of environmental performance requirements			Prevention of potential impacts are avoided during construction by means of correct communication		
Management Actions					
a. Method statements are written submissions by the Contractor to the ECO in response to the requirements of this EMPr or to a request by the ECO. The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	Ad hoc	Contractor	As required	Audit	Once off
<p>Based on the specifications in this EMPr, the following method statements are required as a minimum (more method statements may be requested as required at any time under the direction of the ECO):</p> <ul style="list-style-type: none"> • Demarcation of No-Go areas • Site clearing • Hazardous substances and their storage. • Cement and concrete batching. • Solid waste control system. • Fire control and emergency procedures • Petroleum, chemical, harmful and hazardous materials storage, if any. 					

7.15 WATER MANAGEMENT

Southern Africa is the second region in the world to be confronted by a debilitating water deficit (the first was the Middle East and North Africa) (Turton, 2000). Within the region, South Africa stands out as one of the most water-scarce countries. The country is also characterised by extremely variable rainfall, both geographically and over time. In the 12% of the country that is suitable for the production of rain-fed crops, productivity tracks rainfall, making farming a challenging business. Climate change predictions are that rainfall will be more infrequent but more intense. This will shrink the country’s arable land and increase agricultural unpredictability. Farmers will find it increasingly difficult to increase productivity to meet the growing demand for food. This highlights the need for sound cropping and rangeland production practices to retain soil integrity despite these predicted intense rainfall events.

It has been shown over and over that managing soils and removal of alien vegetation are the two most effective management strategies to improve water yield.

The following Best Practice in terms of water use must be implemented where applicable to this application:



Increasing supply

- ✓ Remove invasive alien plants and replace with indigenous vegetation.
- ✓ Restore and protect wetlands (remove alien plants, control burning and grazing, do not cultivate).
- ✓ Leave at least a 30-40 m natural vegetation buffer zone between cultivated land and a river, and a 25-70 m buffer around a wetland.

Reducing demand

- ✓ Build up soil organic matter to reduce evaporative water loss and maximise the soil's water-holding capacity.
- ✓ Use more efficient irrigation systems, such as drip irrigation.
- ✓ Ensure efficient irrigation techniques that take into account soil type, crop type, soil water status and weather conditions.
- ✓ Maintain irrigation systems regularly.
- ✓ Where necessary, register water use with the Department of Water Affairs.
- ✓ Record actual water use to compare against registered use.
- ✓ Implement water-harvesting and water-recycling techniques where possible.
- ✓ Use drought-resistant crop and livestock varieties.

Figure 5: Best Practise Water Use (WWF,2010)

7.16 BEST PRACTISE PRINCIPLES

Implementing Best Practise in agriculture is strongly supported both in terms of NEMA and by conservation organisations. As a general rule the following principles should be incorporated into the farming business:

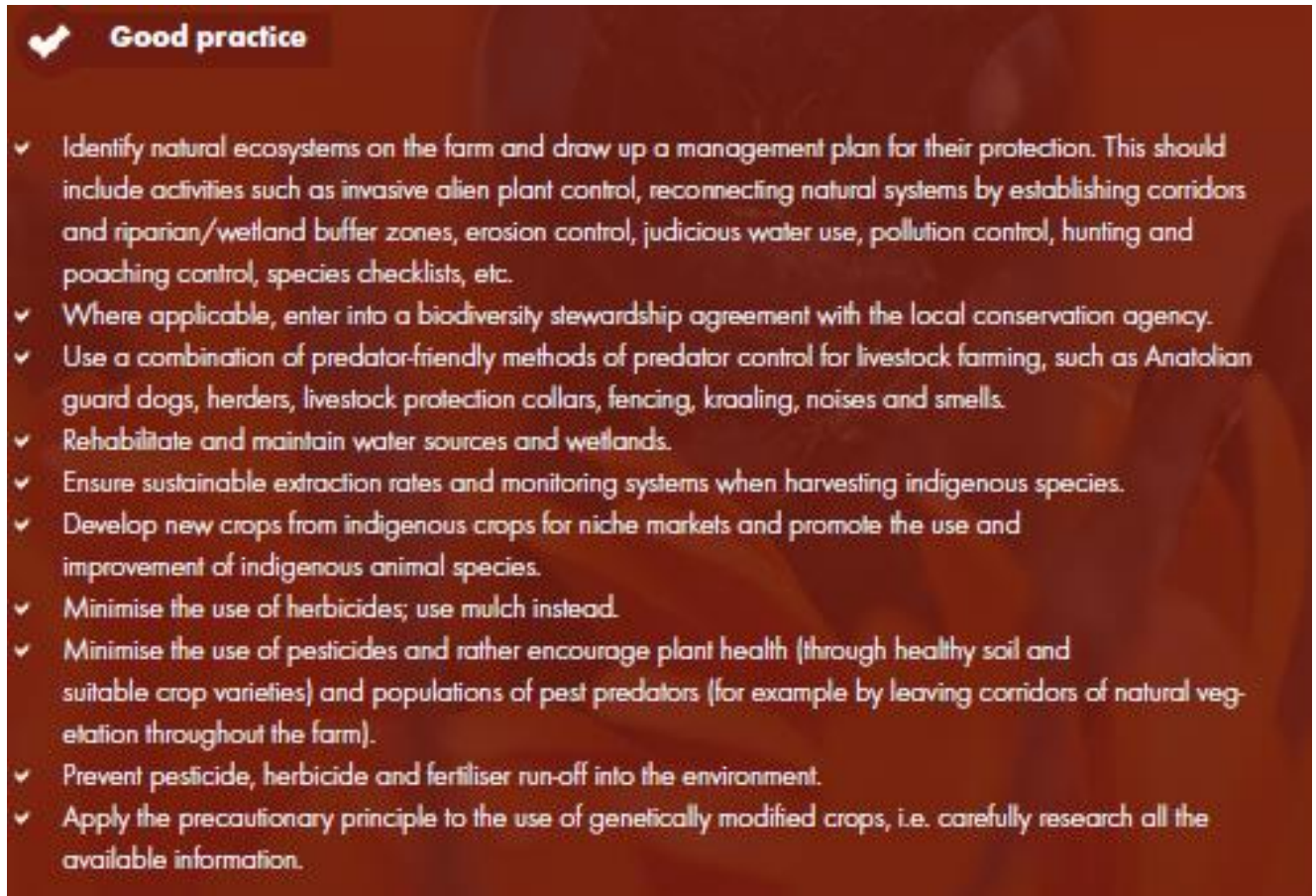


Figure 6: WWF Best Practise Principles (WWF, 2010)

7.17 HEALTH AND SAFETY

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

8. General duties of employers to their employees:

- (1) Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.
- (2) Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular-
 - (a) the provision and maintenance of systems of work, plant and machinery that, as far as is reasonably practicable, are safe and without risks to health;
 - (b) taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment;
 - (c) making arrangements for ensuring, as far as is reasonably practicable, the safety and absence of risks to health in connection with the production, processing, use, handling, storage or transport of articles or substances;
 - (d) establishing, as far as is reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures must be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures;

- (e) providing such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of his employees;
- (f) as far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken;
- (g) taking all necessary measures to ensure that requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used;
- (h) enforcing such measures as may be necessary in the interest of health and safety;
- (i) ensuring that work is performed and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and
- (j) causing all employees to be informed regarding the scope of their authority as contemplated in section 37 (1) (b).

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

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

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

8 OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

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

8.1 <u>ALIEN INVASIVE MANAGEMENT</u>					
Management Statement			Impacts & Risks Avoided		
To ensure management and prevention of the spread of alien invasive vegetation leading to biodiversity impacts			To minimise the disturbance to existing flora To minimise the introduction and/or spread of weed species		
Management Actions					
a. The following alien invasive plant species are known to occur on the property and must be removed / eradicated as part of the initial site clearing and rehabilitation:.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
AIS Control	Ongoing	Contractor / landowner	As required	Audit	Audit
<p>Import of alien seed and plants to the site</p> <ul style="list-style-type: none"> • Any imports of foreign material to the site should be cleared with a botanical specialist to ensure they do not pose a risk and do not originate from areas with high levels of alien invasion. • Alien plants must be continually removed from disturbed areas throughout the construction period. This activity should commence immediately as there are already alien plants on the perimeter of the dam basin. <p>Risk of alien fish introductions for recreation</p> <ul style="list-style-type: none"> • Consider the hydrological regime of the dam before introducing fish to determine whether it can realistically sustain a fish population. • Do not introduce any fish without ensuring their introduction is legal by consulting the NEMBA act. 					

8.2 IRRIGATION MANAGEMENT

Irrigation infrastructure should be developed in such a way that the right amount of water is applied to the crop at the right time so that energy is used as efficiently as possible, production is optimized and as little water as possible is lost to non-beneficial consumption. Technology and good agricultural practices should be used to optimize irrigation water management. These include:

- Remove invasive alien plants and replace with indigenous vegetation. Invasive alien plants that establish in watercourse are spread downstream.

- Restore and protect watercourses (remove alien plants, control burning and grazing, do not cultivate).
- Build up soil organic matter to reduce evaporative water loss and maximise the soil's water-holding capacity.
- Use more efficient irrigation systems.
- Ensure efficient irrigation techniques that take into account soil type, crop type, soil water status and weather conditions.
- Implementing and monitoring soil moisture to determine correct irrigation schedules.
- Implementing and monitoring flow rates to provide correct and up to date data on water usage.
- Record actual water use to compare against registered use.
- Implement water-harvesting and water-recycling techniques where possible.
- Use drought-resistant crop and livestock varieties.
- Planting of crops in correct soil types to ensure optimal growth with efficient water usage.
- Implement and monitoring of water pressure in pipes.
- Ensuring that all equipment (pumps, pipes and irrigation mechanisms) are maintained and in good working order. This will minimise leaks and other water loss and ensure a longer life cycle for equipment.
- Use of cut off valves on storage facilities (where applicable) to prevent overflow.
- Efficient use of energy by means of timing and control devices.

9 MONITORING

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

Any required monitoring reports as considered in Section 5.3 of this EMPr must be made available to the competent authority as required.

The type and frequency of monitoring must include:

- During construction photographs must be taken from pre identified fixed points and a comprehensive record maintained;
- Incident Reports.
- Records of water use and irrigation volumes must be maintained;
- The spillway and dam wall must be monitored after each rainfall event to identify hotspot areas for erosion.

9.1 MONITORING TIMEFRAMES SUMMARY

Table 2: Monitoring Timeframe Summary

MONITORING TIMEFRAMES		
Type	Frequency	Criteria
Management team record keeping during construction	Monthly	Site photographs, method statements
	6 month post construction	Completion Statement
Erosion hotspot monitoring	After rainfall events	Evaluate the road for erosion hotspots and keep a record of these inspections.
Auditing	Annually for the first 2 years after construction completion	Compliance with the EA, EMPr, municipal permits, BGCMA requirements and any other approvals

9.2 ENVIRONMENTAL AUDITS

Annual post construction audits must be undertaken annually for a period of two (2) years.

This audit report must include the monitoring results as above, where applicable to construction.

9.3 AUDIT REPORTS FREQUENCIES AND FORMAT

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

Table 3: Audit Reports Timeframe Summary

ENVIRONMENTAL AUDIT TIMEFRAMES		
Type	Frequency	Criteria
Construction Audit	Annually for a period of two (2) years	Yearly from date of completion of construction activities
Final Construction Audit	6 months after final aquatic specialist monitoring	At least 6 months from the date of the final aquatic specialist report
Operational Audit	None	

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

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

Table 4: Environmental Audit Requirements

<p>Appendix 7 of Regulation 326 of the 2014 EIA Regulations, as amended contains the required contents of an Environmental Audit Report. The checklist below serves as a summary of how these objectives & requirements were incorporated into this Audit Report.</p>	
Objective	Description
<p>The objective of the environmental audit report is to -</p>	
<p>(a) Report on –</p> <p>(i) the level of compliance with the conditions of the environmental authorisation and the EMPr, and where applicable, the closure plan; and</p> <p>(ii) the extent to which the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan achieve the objectives and outcomes of the EMPr, and closure plan.</p>	
<p>(b) Identify and assess any new impacts and risks as a result of undertaking the activity.</p>	
<p>(c) Evaluate the effectiveness of the EMPr, and where applicable, the closure plan.</p>	
<p>(d) Identify shortcomings in the EMPr, and where applicable, the closure plan.</p>	
<p>(e) Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan.</p>	
Requirement	Description
<p>(1) An Environmental audit report prepared in terms of these Regulations must contain -</p>	
<p>(a) Details of –</p> <p>(i) The independent person who prepared the environmental audit report; and</p> <p>(ii) The expertise of independent person that compiled the environmental audit report.</p>	
<p>(b) A declaration that the independent auditor is independent in a form as may be specified by the competent authority.</p>	
<p>(c) An indication of the scope of, and the purpose for which, the environmental audit report was prepared.</p>	

(d) A description of the methodology adopted in preparing the environmental audit report.	
(e) An indication of the ability of the EMPr, and where applicable the closure plan to – (i) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis; (ii) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and (iii) Ensure compliance with the provisions of environmental authorisation, EMPr, and where applicable, the closure plan.	
(f) A description of any assumptions made, and any uncertainties or gaps in knowledge.	
(g) A description of an consultation process that was undertaken during the course of carrying out the environmental audit report.	
(h) A summary and copies of any comments that were received during any consultation process.	
(i) Any other information requested by the competent authority.	

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

10 DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

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

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

- Only identified infrastructure must be removed within a demarcated area to prevent unnecessary damage to the surrounding area;
- Materials that can be recycled must be correctly sorted and stacked for removal to appropriate waste stream sites;
- The footprint area of the facility must be rehabilitated.

11 NON-COMPLIANCE

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

It is the responsibility of the ECO to report matters of non-compliance to the Employer's Representative (e.g. Project Engineer), who in turn is tasked with reporting such matters to the Holder of the EA. It is the responsibility of the Holder of the EA, and not the ECO, to report such matters of non-compliance to the competent Authority.

11.1 PROCEDURES

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

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

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

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

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