GEOHYDROLOGY

GEOTECHNICAL

ENVIRONMENTAL

SOCIAL DEVELOPMENT

EMPR **L20 021 E**

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED BENDOR X129 TOWNSHIP ESTABLISHMENT ON PORTION 191 OF THE FARM TWEEFONTEIN 915 LS, POLOKWANE, CAPRICORN DISTRICT, LIMPOPO PROVINCE

May 2021

Commissioned by: KPD Property Development (Pty) Ltd
Document version 1.0
Compiled by JH Botha

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May 2021

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ENVIRONMENTAL ASSESSMENT PRACTITIONER

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Mr Foletji Mahlakoane	Department of Agriculture, Forestry & Fisheries (DAFF)
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Municipal Manager:	Capricorn District Municipality
Municipal Manager:	Polokwane Municipality
	Neighbours
	Registered Interested and Affected Parties

DOCUMENT HISTORY

Report no	Date	Version	Status
L20 021 E	21 May 2021	1.0	Consultation

RELATED DOCUMENTS

Report no	Date	Name
L20 031 E	21 May 2021	CBAR
	June 2020	Ecological Impact Assessment
	June 2020	Agricultural Soil Potential
	June 2020	Heritage Impact Assessment

Table of contents

LIST OF FIGURES

LIST OF APPENDICES

1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Name of EAP: AGES – Johan Botha
Contact details of EAP:
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Polokwane, 0699
Telephone number: 015 291 1577
Fax number: 087 940 0516

Expertise of EAP: Mr Botha has a master's degree in Geography and Environmental Management and 17 years of experience with the management and conducting of EIA's. Curriculum Vitae of the EAP is included in Appendix A to this report.

2 DESCRIPTION OF ASPECTS OF ACTIVITY COVERED BY THE EMPR

The EMPR will cover the following aspects of the activity during different phases of the project:

- **Air emissions and noise**

  Air emissions will mainly be the generation of dust and exhaust emissions during the construction phase and possibly smoke from fires and gravel roads during operation. Noise during construction will mainly be from construction vehicles and equipment. During operation noise will be from the movement of vehicles and background noise from the residential and vocal education areas.

- **Biodiversity aspect and impacts**

  The biodiversity aspects and impacts are the removal of indigenous vegetation on the development footprint of the township. This includes applications for the removal of protected tree species in terms of legislation. It also covers the impact on the faunal or animal component of the development area.

- **Training and Awareness**

  The training of workers and contractors in terms of environmental awareness and the mitigation of negative environmental impacts as a result of the construction of the township will form part of the EMPr.

- **Effluent handling and Storm water management**

  The handling of sewage effluent in both the construction phase and the operational phase will be discussed in the EMPr. The handling/management of storm water during the construction phase and the operational phase forms part of the EMPr.

- **Dangerous substances management**

  The management of dangerous substances and the mitigation of negative impacts of

for e.g., spillage of these substances is detailed in the EMPr.

- **Socio-Economic benefits**

  The socio-economic aspects, especially the enhancement of positive aspects of the creation of jobs and the supply of tertiary educational facilities and student accommodation are discussed in the EMPr.

- **Water Use**

  Water use for construction and for potable water use is discussed in the EMPr.

- **Waste management**

  The handling and disposal of the different kind of waste as well as mitigation measures to manage these aspects and impacts.

3 MAPS OF THE PROPOSED ACTIVITY

Figure 1. Location of Tweefontein P191 at Polokwane

BENDOR X129 PROPOSED VALUES

	Plot No.	Erven Areas	Construction Area / GBA	GLA	FAR	Coverage
INSTITUTION A	1	31144.79m²	32276.84m²	6858.83m²	0.23 (7262.29m²)	25.91%
VOCATIONAL FACILITY A	2	9329.64m²	12790.46m²	10871.89m²	0.31 (2877.85m²)	34.27%
INSTITUTION B	3	33224.75m²	17785.59m²	15117.75m²	0.48 (16007.03m²)	13.38%
VOCATIONAL FACILITY B	3	33224.75m²	15156.3m²	12882.86m²	0.4 (13640.97m²)	11.40%
INSTITUTION B	4	20569.45m²	25704.98m²	21849.23m²	1.12 (23134.48m²)	31.24%
COMMUNAL FACILITY	5	9884.973m²	3398.41m²	2888.65m²	0.31 (3058.57m²)	17.19%

INSTITUTION A		Block A - C	Block D	Block E	Block F
	Height (Storeys)	4 Storeys (13m)	4 Storeys (13m)	4 Storeys (13m)	4 Storeys (13m)
	Bed Count	600 (200 Beds per block)	500	350	550
	Total Bed Count	2000 Beds			
	Parking Count	333 Bays @ 1 Bay per 6 Beds			

VOCATIONAL FACILITY A		
	Height (Storeys)	4 Storeys (13m)
	Parking Count	109 Bays @ 8 Bays per 100m²

INSTITUTION B, PLOT 3		Block A	Block B	Block C	Block D	Block E
	Height (Storeys)	4 Storeys (13m)	4 Storeys (13m)	4 Storeys (13m)	4 Storeys (13m)	4 Storeys (13m)
	Bed Count	200	500	100	200	100
	Total Bed Count	1100				
	Parking Count	238 Bays @ 1 Bay per 6 Beds (Including the outstanding 55 bays of Institution B plot 4)				

VOCATIONAL FACILITY B		
	Height (Storeys)	4 Storeys (13m)
	Parking Count	129 Bays @ 8 Bays per 100m²

INSTITUTION B, PLOT 4		Block E	Block F & G	Block H	Block I	Block J & K
	Height (Storeys)	4 Storeys (13m)	4 Storeys (13m)	4 Storeys (13m)	4 Storeys (13m)	4 Storeys (13m)
	Bed Count	500	200 (100 Beds per block)	500	200	200 (100 Beds per block)
	Total Bed Count	1600				
	Parking Count	212 Bays @ 1 Bay per 6 Beds (The outstanding 55 bay's needed, have been placed on Institution B plot 4)				

COMMUNAL FACILITY		
	Height (Storeys)	2 Storeys (6m)
	Parking Count	29 Bays @ 8 Bays per 100m²

NOTES

REVISIONS

FOR INFORMATION

Client: K-SL Co-ownership

Project: KSL Varsity City

Drawing: Proposed BENDOR X129 SDP - Scheme 3

Scale	Size	Date	Drawn
1 : 2000		12/11/20	KE

Project No.	Drawing No.	Revision No.
50745-00	A(PR)2005	C

SVA LEAD BUILD DESIGN

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Figure 2. Layout plan of the proposed township development concept

4 GENERAL INFORMATION

AGES Limpopo (Pty) Ltd was appointed by KPD Property Development (Pty) Ltd to conduct an Environmental Impact Assessment to obtain the necessary environmental authorisation for the proposed Township Development on P191 of the Farm Tweefontein 915 LS, Polokwane Local Municipality, Capricorn District Municipality, Limpopo Province

4.1 LEGAL REQUIREMENTS

The Environmental Impact Assessment process is a requirement in terms of GNR 982, and 983, published on 4 December 2014 as amended under sections 24(5) and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and require environmental authorisation from the Limpopo Department of Economic Development, Environment and Tourism (LEDET).

4.2 PROJECT OBJECTIVE

This EMPR was drafted to ensure that negative environmental impacts are properly addressed and mitigated during the construction and operation of the township development on this property.

4.3 ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVE

The purpose of the EMPR is to comply with the requirements of LEDET to ensure responsible environmental management. The objective of the EMPR is also to provide adequate measures and or recommendations to ensure that the identified environmental impacts are kept to a minimum and that the most appropriate rehabilitation measures are correctly implemented to ensure the overall integrity of the site.

The mitigation measures stated in the EMPR must be adhered to as indicated for the different phases. It must be ensured that the responsible persons have access to the EMP and that all relevant parties are aware of the route that needs to be followed when appropriate action is required.

The Environmental Management Program must also be incorporated into the planning and appointment documents for contractors since this will ensure that:

- The contractors are aware of the EMPR upfront.
- The EMPR is presented in a form and language that is familiar to the contractors.
- The contractors can cost for compliance.
- The EMPR is binding within a well-defined legal framework.

4.4 ENVIRONMENTAL IMPACTS

Environmental impacts are associated with air quality, water quality, soil conditions and safety & security. The aspects that cause the environmental impacts, the specific impacts as well as a set of mitigation measures to apply during the operational phase were identified and detailed in section 15 of the EMPR.

5 ENVIRONMENTAL MONITORING

The roles and responsibilities of the developers of the township development must include:

- Ensuring that the necessary environmental authorizations and permits have been obtained.
- Monitoring and verifying that the EMPR is always adhered to and taking actions if the specifications are not followed.
- Monitoring and verifying that environmental impacts are kept to the minimum.
- Keeping record of all activities/incidences on site in the site diary concerning the environment.
- Inspecting the site and surrounding areas regularly regarding compliance with the EMPR.
- Keeping a register of complaints in the office and recording and dealing with any community complaints or issues.
- Ensuring that activities on site comply with other relevant environmental legislation.
- Issuing of warnings for contravention of the EMPR.
- Compile a monitoring checklist.
- Keep a photographic record of progress on site from an environmental perspective.
- Assisting the project manager in finding environmentally responsible solutions to problems.
- Keeping accurate and detailed records of these inspections.

6 ENVIRONMENTAL ASPECTS

During the construction phase there will be an Environmental Officer on site as well as a person responsible for adherence to the Occupational Health and Safety Act (Act No. 85 of 1993) (OHSAC). There is a lot of overlap in the OHSAC and responsible environmental management procedures during the construction period. The following aspects should be addressed by the Environmental Officer:

- Water pollution

  All personnel on site must attend monthly meetings to instruct all on site to avoid and limit any waste and/or spillages. Instructions on how to handle spillages on site must be displayed clearly in a step-by-step format, at the site office in terms of steps to follow. Training should be provided, and spill kits must be on site, all the time.

- Water usage

  Water for human consumption must be always available but should be managed and all leakages and wastage should be reported to the site manager immediately. This

issue must be included and reiterated in the monthly/weekly environmental meetings. Water used for construction purposes should be done with care and with adequate supervision both from the site manager and site officer. The on-site environmental officer must do quarterly monitoring of the water quality on site.

- Erosion and storm water management

  An erosion management plan is included in this EMPr in the next section and personnel should have access to this information (EMPr) and be given training accordingly.

- Air quality (dust suppression during construction activities)

  As a result of vegetation clearing activities as well as the traffic from construction and other vehicles, there will be dust formation in the general area. Dust suppression with water tanks must be done only when necessary.

- Noise levels

  Noise levels must be maintained at acceptable levels and only allowed during day light hours and on weekdays. This must be emphasized at weekly meetings.

- Pollution as a result of waste generation on site (both household and dangerous waste)

  Before construction commences and when new personnel arrive on site a short training course must be given in the principle of waste reduction, re-use and recycle. This must be a continuous process. The same applies here as in the case of potential water pollution in terms of household and/or dangerous waste. The training must also include steps to be taken in case of a spillage or wastage and the clean-up process to be explained to be understood by all involved. Everything should be in place for the removal of waste, including the availability of enough dust bins and containers, which should all be clearly marked and displayed.

- Fire

  Fire risks on site are discussed in section 8.2. Practical training should be provided by a qualified person in the use of a fire extinguisher and all other firefighting equipment to a dedicated firefighting team.

- Potential import of alien vegetation

  Personnel should be trained to be able to identify indigenous and alien vegetation. If this cannot be done by the on-site ECO, then a qualified and suitable person should provide a short, concise training programme to enable personnel to identify alien vegetation. This training should involve procedures to follow in the case of finding alien vegetation on site.

- Natural fauna (wildlife)

  Training should be provided in the handling of animals encountered on site, including procedures to follow when and if animals are found on site. If the on-site ECO is

unable to do so, a qualified person must be appointed to provide training in the form of a short concise course.

- Vegetation on site
  Workers and contractors must be instructed that the rocky ridge area is a no-go area because of environmental and heritage sensitivities.

- Heritage impacts
  Training must be provided to all the workers and contractors to respect the rocky ridge area as this is a sensitive heritage area.

7 ENVIRONMENTAL AWARENESS

The goal of the awareness plan is to help employees make environmentally conscious decisions in the workplace and in their private lives. The environmental awareness plan entails the management of staff and personnel on site during the construction phase.

During the construction phase the number of workers on site is high and the risks for pollution or any negative environmental impact is also high.

All personnel on-site must have access to the EIA Report and EMPr as well as course material where training and short courses have been presented. The principles must be emphasised at regular meetings (preferably monthly) and everything should be made available to new personnel coming on-site. A refresher training course should be delivered annually to all staff (depending on appointments). Records of all training course should be kept on site.

The description below illustrates the manner in which:

- The contractor intends to inform his/her employees of any environmental risk which may result from their work; and
- risks must be dealt with to avoid pollution or degradation of the environment.

7.1 METHODS OF INFORMING PERSONNEL

- The contractors can use the following methods to inform personnel:
- Use translators where necessary.
- Use the site owner to explain more difficult/technical issues and to answer questions.
- The use of pictures and real-life examples are encouraged as these tend to be more easily remembered.
- Make use of environmental awareness posters.
- Explain the “clean site” policy.
- Identify NO-GO areas.
- Environmental induction for all contractors, sub-contractors, and their staff.

8 EROSION MANAGEMENT PLAN

A major component of construction at development sites is the clearing and grading of land, which exposes, disturbs, and moves the soil. This inevitably increases an area's susceptibility to erosion. Since in these situations it is not feasible to eliminate all erosion risk factors and, thus, all erosion, the goal of implementing erosion control measures is primarily to minimize erosion.

Erosion, by the action of water and wind, is a natural process in which soil and rock material is loosened and removed. There are two major classifications of erosion:

- **Geological erosion,** which includes soil-forming as well as soil-removing, has contributed to the formation of soils and their distribution on the surface of the earth.
- **Man-made erosion**, which can greatly accelerate the natural erosion process, includes the breakdown of soil aggregates and the increased removal of organic and mineral particles; it is caused by clearing, grading, or otherwise altering the land. Erosion of soils that occurs at construction sites is **man-made erosion**.

Human activities can cause compaction of the soil, or disturbance of the soil. This hardening of the soil prevents water from effectively infiltrating the soil. This then results in larger volumes of water which moves quickly across a site carrying sediment to streams and rivers away from the site.

The main factor causing or helping erosion on is erosion by water. This is the loosening and removal of soil and rock particles from a piece of land by running water, mostly caused by rainstorms. There are several factors influencing or affecting erosion namely soil characteristics, climate, rainfall intensity and duration, vegetation or other surface cover and topography.

8.1 PROBLEMS CAUSED BY EROSION

The most important effect of erosion is the permanent loss of valuable topsoil at a site. If it is not controlled from the onset of a project and through the duration of the project, it will cause a loss of topsoil and can degrade the area permanently. The sediment that is transported by the rainwater can end up in surface streams and drainage lines and other water bodies.

8.2 ACTIONS TO STOP OR MINIMISE EROSION ON A SITE

The affected area must be stabilised as soon as possible during or after construction on the area. Preserving of existing vegetation or re-vegetation of disturbed soil as soon as possible after construction is usually the most effective way of controlling erosion.

A vegetation cover acts in the following ways to reduce potential erosion:

- Shielding the soil against the direct impact of raindrops falling on the ground.
- It improves the soil water storage porosity, and more water filters into the ground.

- It slows down runoff so that the sediment can settle on the land.
- It holds the soil in place through the plant root system.

Areas which cannot be re-vegetated must be shaped or changed to effectively slow down the speed of the water over the area or by preventing the water to flow over such an area by diverting it away from the site. Mechanical ways can also be used to minimise or control erosion on a site.

8.3 PRESERVING OF NATURAL VEGETATION

Natural vegetation, especially grasses, on the site that does not interfere with the construction process, should be left undisturbed or maintained to minimize damage. It will minimise erosion potential and is aesthetically pleasing which is beneficial. The more vegetation area that is preserved the less area exposed to erosion. This should be planned still before the construction activities on site starts.

- Do not grade the area to a “clean” state before construction starts. Only remove the rocks and vegetation that will be in the way of construction. The grass cover can be slashed or sprayed with herbicide to temporarily slow down the regrowth of the grasses during construction.
- Do not let any vehicles drive around in the construction area apart from the few designated driveways and access roads. This will prevent the compaction of the soil and the destruction of the vegetation in those areas.

8.3.1 ADVANTAGES OF PRESERVING NATURAL VEGETATION

- Can handle higher volumes of storm water runoff than newly seeded areas.
- Does not require time to establish. Increases the filtering capacity because the vegetation and root structure are usually denser in preserved natural vegetation than in newly seeded or base areas.
- Enhances aesthetics.
- Provides areas for infiltration, reducing the volume and velocity of storm water runoff.
- Usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.

It does however require good planning to be able to preserve natural vegetation.

8.3.2 PLANTING OF NEW VEGETATION

It is important to establish permanent vegetation to minimize soil exposure to water and wind erosion. Vegetation/plants that have fibrous root system with fast establishment of roots and ground cover are good options.

The grass cover can be sown by hand or machine sowing after scarifying the soil. Keep the planted area moist if possible so that the seeds can germinate quickly.

Do not move over these areas again until a grass cover has been established.

8.3.3 MULCHING

Like seeding, mulching is a method of applying plant or non-plant materials on the surface of the land to cover bare soil surface. Materials used are grass, hay, woodchips, wood fibres, straw, or gravel that is placed on the soil surface. The main goal of mulching is to protect the surface of the soil from the impact of erosive forces like the falling raindrops. In construction sites, mulch can be placed to minimize wind and water erosion.

However, the type of mulching selection depends on the land (i.e., slope). Heavy and large sized mulch would be more appropriate for a steep slope. In steep or gentle slopes, matting can be done to hold the mulch in place and reduce its movement by wind or water.

When used together with seeding or planting, mulching can aid in plant growth by holding the seeds, fertilizers, and topsoil in place, by helping to retain moisture (conserve moisture), and by insulating against extreme temperatures. If the mulch is plant-based or organic, it also increases the soil fertility. Mulching can provide immediate, effective, and inexpensive erosion control.

- Advantages of mulching
    - Provides immediate protection to soils that are exposed and that are subject to heavy erosion.
    - Retains moisture, which may minimize the need for watering.
    - Requires no removal because of natural deterioration of mulching.

- Disadvantages of mulching
    - It can delay germination of some seeds because cover reduces the soil surface temperature.
    - Mulch can be easily blown or washed away by runoff if not secured.
    - Mulch may absorb nutrients necessary for plant growth.

8.4 STRUCTURAL MEASURES TO CONTROL EROSION

8.4.1 BERMS

Berms can be constructed around a site on especially the upstream side to keep extra water out. This will minimise the volume of water flowing over a site which limits the erosion on the site

Berms can also be constructed on road surfaces with a gradient to slow down the velocity of the water and to divert the water off the road into storm water drains on the site.

8.4.2 STORM WATER DRAINS

The storm water drains can be packed with rocks on short intervals and at the end to slow down the velocity of the flowing water and to dissipate the energy of the water where it leaves the site.

8.4.3 GABIONS

Gabions of wire packed with rocks and lined with geotextile can slow down the water especially where the slope is steep. The geotextiles can also aid in trapping the sediment. This can be used in storm water drains next to roads by installing flat gabions on the drain surface to prevent unnecessary scouring of the soil surface in the drains if it is not constructed of concrete.

8.5 MONITORING OF EROSION ON SITE

During the planning stage of the construction period, the site manager must appoint a person who will be on site for the duration of the construction period. This person will have the responsibility to monitoring the risk of erosion and actual erosion arising from activities on site. His responsibilities must include:

- Monitoring the movements of vehicles and construction equipment on site to ensure that there is minimal movement in the veld areas off the normal roads and agreed drive areas on site.
- Monitor the preservation of the vegetation in open spaces to ensure the integrity of the vegetation and soil is kept intact.
- Ensure that only the necessary areas are cleared of vegetation according to the site plans.
- Ensure that only the planned roads are graded on the site.
- Ensure that gravel roads are kept moist during dry times to prevent the wind from blowing dust away and thus causing erosion in this manner.
- Regular monitoring for erosion to ensure that no erosion problems are occurring at the site because of the roads and other infrastructure. All erosion problems observed should be rectified as soon as possible.
- Monitor any erosion damage after rains events so that repairs to damaged areas can be done before the next rain event.
- Oversee the re-vegetation/mulching of cleared areas as soon that it is possible and to prevent unnecessary re-entry or movement in these areas.

9 MONITORING GUIDE

Construction at development sites will inevitably use equipment and vehicles that contain hazardous substances, or which has the potential to spill hazardous substances on the site. There will also be chemicals and other hazardous substances which are used on site, which needs to be stored on site. This creates the potential for possible spillages and the potential that these substances can pollute soil and water systems on site. It needs to be handled with care and strict control needs to be exercised over the handling and use of such substances.

9.1 POSSIBLE SOURCES OF DANGEROUS SUBSTANCES

The following substances are potentially stored or used on site:

- Most of the construction vehicles and equipment used on site runs on diesel. The diesel is stored either in stationary tanks or in mobile fuel trailers or bowsers on site.
- The oils needed for lubrication of the equipment and vehicles.
- Hydraulic oils used in drills and equipment like cranes, TLB's and graders.
- Paints used on site.
- Petrol cans for supplying construction equipment used on site.
- Other chemicals and detergents used on site.

9.2 MEASURES TO STORE DANGEROUS SUBSTANCES ON SITE

All hazardous substances on site must be handled in the following ways:

- All access to any of these substances must be controlled access which means that the substances must be locked away.
- All containers or storerooms where these substances are kept must have an impermeable floor and be able to contain the substance in the room/store where it may be cleaned up.
- Where the floor is not impermeable, the substances will be stored in a drip tray capable of containing any spills from these containers.
- Material Safety Data Sheets (MSDS) for the specific substances must be available in a central file and at the place where the substance is stored.
- All substances will only be issued against a signature - records will be kept.
- Stationary diesel tanks will be kept in a concrete bunding able to contain at least 110% of the volume of the tank. The tap to drain storm water inside this bunding must run through an oil/water separator. All oils and fuel from this separator must be taken to an oil recycling company. Keep records of all oil/fuel removed in this way.
- Fuel trailers must be parked either with sufficient drip trays underneath or it must be parked on an area where there is plastic sheeting underneath the soil to prevent ingress of the fuel/oil into the subsoil or groundwater. Polluted soil has to be removed from time to time to a site registered to accept this material.

9.3 HANDLING OF SPILLS

9.3.1 SMALL SPILLS ON THE GROUND

- Pick up the soil to a depth where it is clean from the substance and store it in a closed container from where it cannot leak and closed to rain.
- Have these soils removed by a registered contractor and keep records of volumes and details of each removal.

9.3.2 LARGE SPILLS ON THE GROUND

- Keep spill kits available on site.
- Contain the spill by either using a spill absorbent sock from the spill kit or by making a soil berm around the spill.
- Scoop or pump out as much as possible of the pollutant into a closed container.

- Remove the polluted soil to a depth below the pollutant and place on a large sail to prevent any leaching of the pollutant to the soil and groundwater.
- Close the sails to prevent the ingress rainwater.
- Have the soil removed form site by a company registered to do that to a permitted waste site or let the company treat the soil on site until the pollutant's levels are low enough to dispose of the soil on site again.
- If there is any possibility that there is pollution of groundwater or surface water, samples must be taken to be analysed to ensure that pollution can be treated if necessary.

9.4 TRANSPORTATION OF HAZARDOUS SUBSTANCES

- It is the responsibility of the transportation company to train their drivers and crews to handle the packaging and transportation of hazardous substances safely and environmentally responsible.
- All vehicles transporting hazardous substances to the development site must carry spill response kits as first line treatment of spillages of hazardous substances from their freight.
- Material Safety Data Sheets (MSDS) for the specific substances transported must be available in the vehicle used for the transportation of the substances.

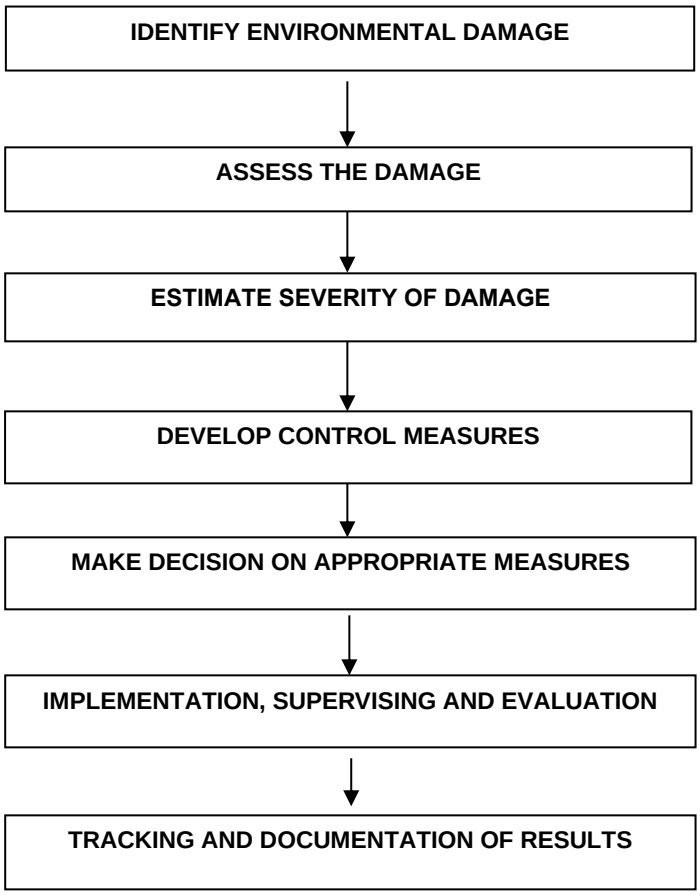
9.5 TRAINING OF STAFF

- All staff working on site and responsible for a specific area must be trained in the detection of incidents and the reporting there-of.
- All staff on site must be trained in the using of the spill response kit.
- All staff must be trained in the using of MSDS's and first aid kits should it be necessary during any spill incident.
- The staff must undergo an environmental consciousness course.

9.6 GENERAL

- All spill incidents must be reported to the environmental control officer who must then report it to the authorities as required by law.
- Each pollution incident must be entered into a register on site. All details about the spill, the emergency measures taken, and the clean-up done must also be part of the entry in the register.
- Preventative measures must be drawn up to prevent recurring of the incident. The incident register must be available for scrutiny by IAP's should it be requested.

10 MANAGING PROCESS FOR ENVIRONMENTAL DAMAGE/INCIDENTS



11 PHASES OF DEVELOPMENT

Planning and design Phase.	
Construction Phase.	
Operational Phase.	
Closure Phase.	

12 VALIDITY PERIOD OF CONSTRUCTION EMPR

The period for which the *Construction EMPr* for the dangerous goods storage facilities must remain valid is for 5 years from date of Environmental Authorisation. The *Construction EMPr* must become null and void on the day that construction of the facilities is finished, and the site becomes operational.

13 COMPLIANCE MONITORING/AUDITING AND REPORTING

Compliance with the conditions of the environmental authorisation and the **Construction EMPr** must be audited monthly during the **construction phase** and reported to the competent authority.

14 ROLES AND RESPONSIBILITIES FOR IMPLEMENTATION OF EMPr

Any appointed contractor shall have the following responsibilities:

- To implement all provisions of the construction EMPR. If the contractor encounters difficulties with specifications, he / she must discuss alternative approaches with the site manager prior to proceeding.
- To ensure that all staff and sub-contractors are familiar with the EMPR.
- To make personnel aware of environmental issues and to ensure they show adequate consideration of the environmental aspects of the project.
- To report any incidents of non-compliance with the EMPR to the site manager or site owner.

Any appointed Environmental Control officer (ECO) shall have the following responsibilities:

- The ECO must be appointed before commencement of any authorised activities.
- To ensure that the mitigation/rehabilitation measures and recommendations referred to in the environmental authorisation are implemented and to ensure compliance with the provisions of the approved EMPr.
- To keep records of all activities on site, problems identified, transgressions noted, and a schedule of tasks undertaken by the ECO.
- The ECO must be employed until all rehabilitation measures as required for implementation due to construction damages are completed and the site is ready for operation.

Any appointed Independent auditor shall have the following responsibilities:

- To audit the level of performance against and compliance of an organisation or project with the provisions of the requisite environmental authorisation and EMPr.
- To audit the capability of the measures contained in the EMPr to sufficiently provide for the avoidance, management, and mitigation of environmental impacts with the undertaking of the activity.

The Project Manager shall have the following responsibilities:

- To appoint suitable trained personnel responsible for monitoring and auditing of the activities at the township development to ensure that it complies with the provisions

of the environmental authorisation and EMPr.

15 NON-COMPLIANCES WITH THE EMPr

- Section 48 of R982 of 4 December 2014, of NEMA as amended, states that a person is guilty of an offence if that person fails to comply with regulation 34.
- Regulation 34 (1) of R982 requires that "The holder of an environmental authorisation must for the period during which the environmental authorisation and EMPr remains valid ensure that:

  (a) the compliance with the conditions of the environmental authorisation and the EMPr and the closure plan where applicable is audited; and

  (b) must submit an environmental audit report to the relevant competent authority.
- Regulation 34 (2-7) describes the contents, time frames and requirements for such audit reports.
- NEMA Section 49A (1) (c) states that "A person is guilty of an offence if that person fails to comply with or contravenes a condition of an environmental authorisation granted for a listed activity or specified activity or an approved environmental management programme;"
- The penalties for the offence mentioned is detailed in Section 49B (1) of NEMA and reads as follows: "A person convicted of an offence in terms of section 49A(1)(a), (b), (c), (d), (e), (f) or (g) is liable to a fine not exceeding R10 million or to imprisonment for a period not exceeding 10 years, or to both such fine or such imprisonment."

16 EMPR: IMPACTS AND MITIGATION MEASURES

PLANNING & DESIGN PHASE						
Impact Management Outcome: Minimise impact to the environment by adhering to planning and design principles and relevant legislation						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Planning and design phase.						
An incident/non-compliance register must be drawn up and kept up to date. These documents must be available to LEDET on request.	Developer	Draw up register	Before commencement of construction.	Developer	Once off Updated when applicable	Records
The layout and design of the proposed Bendor Ext 129 development must adhere to all requirements of the Polokwane Local Municipality.	Developer	Application at municipality	Before commencement of construction.	Developer	Once off	Records of approval
An Environmental Control Officer (ECO) must be appointed for the construction phase.	Developer	Appointment	Before commencement of construction.	Developer	Once off	Appointment letter
All the aspects pertained within the EMPR must be explained to the contractors.	Developer	Training of contractor prior to construction	Before commencement of construction.	ECO	Once off Weekly talks	Records
Environmental training for all staff and contractors must be implemented.	Developer	Training of contractor/ staff prior to construction	Before commencement of construction.	ECO	When new contractor or staff is appointed Weekly training/ talks.	Records
All authorizations required for the development of the site must be obtained prior to the project commencing.	Developer	Applications at different authorities	Before commencement of construction.	Developer	Once off	Records

AIR QUALITY - CONSTRUCTION PHASE						
Impact Management Outcome: Minimise impact to the environment through the control/mitigation of air quality impacts						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Earthworks-dust formation						
Construction areas must be dampened to prevent excessive dust formation when applicable during earthworks	Contractor	Water spray	During dry windy conditions	ECO	Daily	Visual check
Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces will be revegetated or stabilised as soon as is practically possible;	Contractor	Follow construction plan	During construction	ECO	Daily	Visual check
Movement and operation of vehicles and machinery (digging of trenches, removal of concrete and removal of solid waste e.g. plastics, cans, etc. on the construction site – smoke, fumes or dust						
Vehicles used on or entering the construction site must be in good working order/well serviced to reduce excessive smoke or fumes during operation.	Contractor	Service vehicles according to manufacturer's schedule	Continuous	ECO	Monthly	Records
Speed of construction vehicles must be kept as low as possible (10 km/h) to reduce the generation of dust.	Contractor	Set of Rules Speed humps	Prior to and during construction	ECO	Daily	Visual observation
Burning of waste (domestic/building rubble)-Smoke						
No waste must be burned on site. Waste generated must be kept in wind-, water- and animal-proof containers and removed on a weekly basis to the municipal registered landfill site.	Contractor	Supply waste containers Remove weekly	Continuous	ECO	Daily	Visual check & disposal records
A fire break must be made around the development area according to the regulations of the Veld and Forest Fire Act.	Contractor	Cut, grade or burn fire break	Prior to construction	ECO	Monthly	Visual check
Cooking must preferably be done on gas stoves. Open fires must only be allowed in designated places.	Contractor	Awareness training	Continuous	ECO	Daily	Visual check
Stockpile cleared vegetation and remove regularly form the site.	Contractor	Removal schedule	According to removal schedule.	ECO	Weekly	Records of removal

NOISE - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the control/mitigation of noise impacts at source						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Movement and operation of vehicles and machinery (digging of trenches, removal of concrete and removal of solid waste e.g. plastics, cans, etc. on the construction site - noise generation						
Contractors must comply with municipal noise regulations.	Contractor	Instruction to workers	Continuous	ECO	Daily	Observation
Construction machinery must be fitted with noise mufflers and be in good working order.	Contractor	Vehicle maintenance	Continuous	ECO	Daily	Observation
Speed of construction vehicles must be kept as low as possible (10 km/h) to reduce the generation of noise.	Contractor	Set of Rules Speed humps	Prior to and during construction	ECO	Daily	Visual check
All employees must be given the necessary ear protection gear where applicable.	Contractor	Physical handout	Daily	ECO	Daily	Visual check
Construction must only take place during the hours between sunrise and sunset on weekdays and Saturdays unless different arrangements are negotiated with the adjacent landowners.	Contractor	Construction rules	Construction period	ECO	Daily	Check working hours

GROUNDWATER AND SURFACE WATER - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the minimisation and control of groundwater and surface water pollution						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Site clearance						
Clearance of construction site must be restricted to the proposed footprint area to limit impacts on ground water and surface water.	Contractor	Site instruction Work according to layout plan	During construction phase	ECO	Daily	Visual check
Cleared areas must be paved as soon as practicable to limit the effect of erosion and siltation. Indigenous plant species must be given preference in re-vegetation areas.	Contractor	Site instruction Work according to layout plan	During construction phase	ECO	Monthly	Visual check
Sanitation seepage						
Chemical toilets must be placed on level ground.	Contractor	Correct placement	Continuous	ECO	Daily	Visual check

GROUNDWATER AND SURFACE WATER - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the minimisation and control of groundwater and surface water pollution						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Chemical toilets must be emptied/cleaned on a weekly basis by an approved contractor.	Contractor	Pump into tanker	Weekly	ECO	Weekly	Disposal Records
Daily inspection for any damages to the toilets must be done to ensure that no spillages take place.	Contractor	Visual Inspection	Daily	ECO	Weekly	Records
Spillage of fuel and lubricants from construction vehicles and machinery						
Machinery must be checked, serviced, and maintained according to a schedule to prevent oil and fuel leaks.	Contractor	Maintenance according to manufacturer's schedule.	Weekly	ECO	Monthly	Records
Machinery must as far as possible not be serviced or refuelled on the construction site or if not possible be serviced/parked on an area that must be covered by a plastic lining. Any spilled fuel or oil must be taken together with the plastic lining to an approved site that handles hazardous waste.	Contractor	Provide lined area and ensure correct disposal	Continuous	ECO	Weekly	Visual check & records of disposal
During servicing of vehicles or equipment, especially where emergency repairs are done outside a workshop area, a suitable drip tray must be used to prevent spills onto the soil.	Contractor	Prepare suitable emergency repair area with drip trays and plastic sheets	Prior to construction	ECO	Weekly	Visual check
Any spills must be treated and removed by a qualified contractor. All spillages must be cleaned up immediately. Large spillages must be reported and cleaned by a spill's response team.	Contractor	Appoint contractor to treat spill	When applicable	ECO	Monthly	Records
Temporary diesel storage must be less than 30 000 litres at the construction camp. Diesel tanks and other harmful chemicals and oils must be stored within a bunded area behind a lock. Any water from out of this bunding must flow through an oil/water skimmer.	Contractor	Ensure storage is below 30 000 litres and bunding is in place	Before storage of fuel and oil	ECO	Before storage of fuel and oil	Visual check
Drip pans must be used during re-fuelling and servicing of construction vehicles. Used parts like filters must be contained and disposed of through a contractor at a site licensed for dumping of these waste products.	Contractor	Utilise drip trays & appoint contractor to dispose of waste	During construction	ECO	Daily	Visual check & records of disposal
The mixing of cement and paints must be done at designated areas to prevent any spillages into surface and groundwater resources.	Contractor	Designate safe areas	Continuous	ECO	Daily	Visual check

GROUNDWATER AND SURFACE WATER - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the minimisation and control of groundwater and surface water pollution						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Solid and domestic waste removal						
Domestic waste must be kept in adequate wind-, water- and animal-proof waste bins or storage cages and must be disposed of weekly at a registered municipal landfill site. Waste must be sorted and recycled as far as practically possible.	Contractor	Provide bins or storage cages & arrange for removal	Weekly	ECO	Weekly	Visual check & records of disposal
Building rubble must be neatly stockpiled to the side of the site and then removed to a licensed disposal site on a weekly basis.	Contractor	Designate area for waste stockpile & arrange for removal	Weekly	ECO	Weekly	Visual check & records of disposal
Handling/use of dangerous substances						
Any dangerous substances that might be used during the construction phase must be handled with care and stored in a safe place behind a lock. All spillages must be cleaned up immediately.	Contractor	Store correctly	Always	ECO	Weekly	Visual check
Large spillages must be reported and cleaned by a spill response team.	Contractor	Appoint spill response team	When applicable	ECO	When applicable	Records
Dangerous waste (e.g. fuel, oils, etc.) must be taken to the nearest approved oil refiner or fuel recycling point for recycling and must not be stored for extended periods within the construction site.	Contractor	Appoint contractor for disposal of waste	Monthly	ECO	Monthly	Records
All storage for dangerous goods areas must be bunded and lined with an impermeable liner. The bunded area must be of sufficient capacity to contain a spill/leak from the stored containers.	Contractor	Construct such bunded areas on site	Prior to storage	ECO	Weekly	Visual check
All dangerous chemicals that must be used on site must have Material Safety Data Sheets (MSDS available on site).	Contractor	Acquire MSDS's	Prior to use of chemicals	ECO	Monthly	Check MSDS's
The contractors must ensure that diesel and other liquid fuel, oil is stored in appropriate storage tanks or in bowsers.	Contractor	Supply and erect surface tanks <30 000 litre total storage	When required	ECO	Monthly	Visual check
The tanks/bowsers must be stored on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 110% of the total capacity of all the storage tanks/bowsers.	Contractor	Construct bunding for tanks	When installing tanks	ECO	Once off	Inspection log sheet

GROUNDWATER AND SURFACE WATER - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the minimisation and control of groundwater and surface water pollution						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
The floor of the bund must be sloped, draining to an oil/water separator	Contractor	Construction of bunding and oil/water separator	When installing tanks	ECO	Once off	Visual check
Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained.	Contractor	Supply drip trays and sheeting	Always	ECO	Weekly	Visual check
An appropriately number of spill kits must be kept on-site relevant to the scale of the activity/s involving the use of dangerous substances and must be available at all times.	Contractor	Supply spill kits	Prior to operating the fuel tank(s)	ECO	Monthly	Visual check
Spillages of cement and paints						
The mixing of cement and paints must be done at designated areas to prevent any spillages into surface and groundwater resources.	Contractor	Designate areas	Continuous	ECO	Daily	Visual check
Regular clean-up programs must be put into effect through-out the premises to limit the impact of littering caused by construction activities.	Contractor	Appoint team to clean up	Weekly	ECO	Weekly	Visual check
No contaminants (soaps, detergents, lime, glues, paints, cement, or fuels) must be disposed of on the site.	Contractor	Site instruction & visual check	Daily	ECO	Daily	Visual check
Trenching for cables, excavation for storage tank foundations, sewage and water infrastructure						
Strict compliance that no foreign matter is deposited in trenches must be ensured. Any foreign matter must be removed immediately.	Contractor	Site instruction and visual check	Daily	ECO	Daily	Visual check
Storm water across cleared and polluted areas						
Construction areas must be kept clean so that storm water is not polluted.	Contractor	Construction according to plans	Continuous during construction	ECO	Weekly	Visual check
Slopes must be kept to the minimum. Erosion control measures must be implemented to control and minimise the amount of soil loss especially during the rainy season.	Contractor	Site instruction and visual check	Weekly	ECO	Weekly	Visual check
Unpaved, bare areas must be re-vegetated or paved as soon as practicable to limit erosion.	Contractor	Construction according to plans	During construction phase	ECO	Weekly	Visual check

GROUNDWATER AND SURFACE WATER - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the minimisation and control of groundwater and surface water pollution						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
An efficient storm water drainage system must be installed to effectively catch and drain surface water.	Contractor	Construction according to plans	During construction phase	ECO	Weekly	Visual check against plans
Contaminated water from dangerous goods bunding areas must flow through an oil/water separator and the oily substances must be reclaimed and recycled.	Contractor	Construction according to plans	During construction phase	ECO	Monthly	Signed off inspection sheet

WATER SUPPLY MANAGEMENT - CONSTRUCTION PHASE						
Impact Management outcome: Implement responsible water usage						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Construction process; Dust suppression measures; Domestic use & sanitation						
Water use must be kept to a minimum. It must be ensured that pipes and taps are not leaking – We are aware of possible damages by construction machines to underground water pipes.	Contractor	Site instruction & visual check Keep water use records	Daily	ECO	Daily	Visual check & water use records
Construction workers must be educated on the importance and ways to use water sparingly.	Contractor	Team talks	Weekly	ECO	Monthly	Training records
Low-flow taps or tap aerators and dual-flush toilets must be installed to reduce water consumption.	Contractor	Construction according to plans	During construction phase	ECO	After installation	Visual check

SOIL POLLUTION AND DEGRADATION - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the minimisation and control of soil pollution and degradation						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Site clearance						
Clearance of construction site must be restricted to the proposed footprint area to limit impacts on soils.	Contractor	Site instruction Work according to layout plan	During construction phase	ECO	Daily	Visual check
Cleared areas must be paved as soon as practicable to limit the effect of erosion and siltation. Indigenous plant species must be given preference in re-vegetation areas.	Contractor	Site instruction Work according to layout plan	During construction phase	ECO	Monthly	Visual check
Operation of construction vehicles and machinery						
Machinery must be checked, serviced and maintained daily to prevent oil and fuel leaks.	Contractor	Maintenance according to Manufacturer's schedule	Weekly	ECO	Monthly	Records
Any oil/fuel spills must be treated and removed by a qualified contractor.	Contractor	Appoint contractor to clean spill	When applicable	ECO	Monthly	Records
Spill trays must be used during refuelling of vehicles on site.	Contractor	Use spill trays	During construction	ECO	Daily	Visual check
Spillages from temporary sanitation facilities (chemical toilets)						
Temporary toilets must be emptied on a weekly basis by an approved contractor and proof of dumping at a sewerage works must be provided.	Contractor	Pump into tanker	Weekly	ECO	Weekly	Records of disposal
Chemical toilets (if used) must be placed on level ground.	Contractor	Correct placement	Continuous	ECO	Weekly	Visual check
When sanitation effluent is spilled it must be contained and cleaned up.	Contractor	Clean up instruction	Weekly	ECO	Weekly	Visual check
Daily inspection for any damages to the toilets must be conducted and any damage observed must be repaired immediately.	Contractor	Inspection program	Daily	ECO	Daily	Records
Trenching for cables, storage tank foundations, sewage and water infrastructure						
We must ensure that no solid or liquid waste, including building rubble end up in trenches. All backfilling must be with original and clean material only.	Contractor	Site instruction and visual check	Daily	ECO	Daily	Visual check

SOIL POLLUTION AND DEGRADATION - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the minimisation and control of soil pollution and degradation						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
A suitably qualified Geo-practitioner must be involved during the construction phase of the project, especially to inspect and assess conditions at variance with that encountered during the geotechnical investigation.	Developer	Appoint Geo-practitioner	At commencement of construction	ECO	Monthly	Meeting with ge-practitioner
The sidewalls of excavations in excess of 1.0 m must be shored to prevent injury or death due to the risk and probability of sidewall failure by collapse and/or overbreak.	Contractor	According to site instructions	During excavations	ECO	Daily	Visual check
Spillages of cement and paints						
The mixing of cement and paints must be done at designated to prevent any spillages into surface and groundwater resources.	Contractor	Designate areas	Continuous	ECO	Daily	Visual check
Daily clean-up programs must be put into effect throughout the premises to limit the impact of littering caused by construction activities.	Contractor	Appoint team to clean up	Weekly	ECO	Weekly	Visual check
No contaminants (soaps, detergents, lime, glues, paints, cement or fuels) must be disposed of on the site.	Contractor	Site instruction & visual check	Daily	ECO	Daily	Visual check
Storm water over cleared areas - Soil erosion and pollution						
Slopes must be kept to the minimum. Erosion control measures must be implemented to control and minimise the amount of soil loss.	Contractor	Site instruction and visual check	Weekly	ECO	Weekly	Visual check
Unpaved, bare areas must be re-vegetated or paved as soon as practicable to limit erosion.	Contractor	Construction according to plans	During construction phase	ECO	Weekly	Visual check
Topsoil stockpiles must not exceed 2 m in height.	Contractor	Site instruction & visual check	Daily	ECO	Daily	Visual check
Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.	Contractor	Site instruction & visual check	Daily	ECO	Daily	Visual check
All erosion damage must be repaired within a week after a rainstorm to allow for sufficient rehabilitation growth.	Contractor	Physical repair	After rainstorm	ECO	Monthly	Visual check
Solid and dangerous waste accumulation on/in soil						
Solid waste must be kept in adequate wind-, water- and animal-proof waste bins or storage cages and must be disposed of weekly at a registered municipal landfill site. Waste must be sorted and recycled as far as practically possible.	Contractor	Provide bins or storage cages & arrange for removal	Weekly	ECO	Weekly	Visual check & records of disposal

SOIL POLLUTION AND DEGRADATION - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the minimisation and control of soil pollution and degradation						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Dangerous waste must be disposed of at a registered waste disposal site.	Contractor	Appoint contractor to dispose of waste	Continuous	ECO	Monthly	Records
Building rubble must be stockpiled and then removed to a licensed disposal site on a weekly basis.	Contractor	Designate area for waste stockpile & arrange for removal	Weekly	ECO	Weekly	Visual check & records of disposal
No contaminants (soaps, detergents, lime, glues, paints, cement, or fuels must be discharged on site.	Contractor	Site instruction & visual check	Daily	ECO	Daily	Visual check
Contaminated soil must be rehabilitated using appropriate and applicable industry methods or removed to a suitable waste disposal facility.	Contractor	Appoint contractor to rehabilitate or dispose	When applicable	ECO	Monthly	Records
Daily clean-up -programmes must be put into effect throughout the premises to limit the impact of littering caused by construction activities.	Contractor	Team to clean up	Weekly	ECO	Weekly	Visual check
Handling/use/storage of dangerous substances (spillages)						
Any dangerous substances that are used during the construction phase must be handled with care and stored in a safe place behind lock.	Contractor	Store correctly and secure	Always	ECO	Weekly	Visual check
Temporary diesel storage on site must be less than 30 000 litres at construction camps. Water from out of this bunding must flow through an oil/water skimmer.	Contractor	Construct storage inside bunding and oil/ water separator	During construction	ECO	Monthly	Visual inspection
All diesel/oil spillages must be cleaned up immediately.	Contractor	Follow Clean up procedures	When applicable	ECO	Monthly	Incident record
Used oil must be taken to the nearest approved oil refiner for recycling and must not be stored for extended periods within the construction site.	Contractor	Appoint contractor to dispose of	Monthly	ECO	Monthly	Disposal Records
All storage areas for dangerous goods must be bunded and lined with an impermeable liner. The bunded area must be of sufficient capacity to contain a spill/leak from the stored containers;	Contractor	Construct bunded areas on site	When required	ECO	Monthly	Visual check
All dangerous chemicals that must be used on site must have Material Safety Data Sheets (MSDS);	Contractor	Acquire MSDS's	Prior to use of chemicals	ECO	Monthly	Check MSDS's

SOIL POLLUTION AND DEGRADATION - CONSTRUCTION PHASE						
Impact Management outcome: Minimise impact to the environment and people through the minimisation and control of soil pollution and degradation						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained;	Contractor	Supply drip trays and sheeting	Always	ECO	Weekly	Visual check
An appropriately number of and correctly sized spill kits kept on-site relevant to the scale of the activity/s involving the use of dangerous substance must be available at all times;	Contractor	Supply spill kits	Prior to operating the fuel tank(s)	ECO	Monthly	Visual check

ECOLOGY - CONSTRUCTION PHASE						
Impact Management outcome: Minimise and control impact to the ecological aspects during construction.						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Site clearance-loss of protected plants/other vegetation						
The ecological sensitive site must be a no-go area. This site must be fenced off and no construction worker may access it.	Developer	Fence area off and site instruction	Before start of construction	ECO	Before start of construction	Visual check
If any protected tree (*Sclerocarya birria* - marula) must be removed the necessary permits to do so must be obtained from DFFE prior to the removal of the trees.	Contractor	Apply for permit	Prior to removal	ECO	Once off	Tree removal permit
Killing, snaring or collection of animals						
Strict rules and penalties against the snaring, killing, catching or poaching of any animals (small mammals like rodents, birds, herpetofauna) must be enforced for all personnel and temporary workers. This restriction includes collection of fauna as pets, food or for use as muti.	Contractor	Site instruction and visual check	During construction phase	ECO	Daily	Visual check
Inappropriate use of herbicides and pesticides						
The use of poisons for the control of any animals or plant species must only be done with the input and consent from a pest control specialist.	Contractor	Appoint specialist	When applicable	ECO	When applicable	Inspection log sheet
Pesticide use must be limited to non-persistent, immobile pesticides and applied in accordance with label and application permit directions and	Contractor	Apply according to label	When applicable	ECO	Monthly	Application records

ECOLOGY - CONSTRUCTION PHASE						
Impact Management outcome: Minimise and control impact to the ecological aspects during construction.						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
stipulations for terrestrial and aquatic applications.						
A daily register must be kept of all relevant details of herbicide usage;	Contractor	Draw up register	Daily	ECO	Weekly	Register
Accidental fires						
Staff must be educated on the dangers of accidental fires. The necessary safety measures must be in place on site. This includes fire extinguishers, backup water tanks and the regular removal of stockpiled plant material.	Contractor	Training session	Monthly	ECO	Monthly	Training records
Fires must 6nly be allowed in the construction camp and extra care must be taken to prevent veldt fires from occurring from within the site.	Contractor	Site instruction	Monthly	ECO	Monthly	Inspection log sheet Incident records
Handling of solid waste						
Solid waste must be kept in adequate animal proof waste bins at the construction camp and construction sites	Contractor	Site instruction	Monthly	ECO	Monthly	Visual check
Regular clean-up programs must be put into effect along the access road and throughout the premises to limit the impact of littering caused by construction activities.	Contractor	Team to clean up	Weekly	ECO	Weekly	Visual check
Cutting and collection of firewood						
No trees must be cut for firewood. No fires may be made on site except on designated areas.	Contractor	Site instruction & visual check	Daily	ECO	Daily	Visual check
No indigenous trees on adjacent areas must be cut or wood be collected for firewood or any other purposes. Removal of vegetation must be confined to the site. Only the removal of vegetation that is essential for the development must be allowed.	Contractor	Fine for transgressors	When applicable	ECO	Daily	Visual check
Distribution of alien invader seeds						
The contractor is responsible for the eradication of alien invasive species during the construction phase. Control of such plants must involve killing the plants present, killing the seedlings and establishing and introducing alternative plant cover to suppress regrowth. Strict control measures must be implemented regarding the introduction of materials into the area/brought onto the site which must be inspected for potential invasive invertebrates	Contractor	Checking materials and area. Remove alien invasive vegetation when found on site.	Daily	ECO	Weekly	Visual checks

ECOLOGY - CONSTRUCTION PHASE						
Impact Management outcome: Minimise and control impact to the ecological aspects during construction.						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
and steps must be taken to eradicate these species before introduction to the site.						
Disturbance of area						
Where trenches or excavations pose a risk to animal safety (small mammals like rodents & herpetofauna), they must be adequately cordoned off to prevent animals falling in and being trapped and/or injured. This must be prevented by the constant excavating and backfilling of trenches.	Contractor	Site instruction & visual check	Daily during excavations	ECO	Daily	Visual check

VISUAL - CONSTRUCTION PHASE						
Impact Management outcome: Prevent unnecessary negative visual impact by ensuring that visual impacts are mitigated.						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Lights – nuisance						
Care must be taken that only the most important and necessary lighting is used at night at the construction site.	Contractor	Correct installation	Weekly	ECO	Weekly	Visual check
Littering (domestic waste and building rubble)						
All domestic waste and building rubble must be removed to a permitted waste facility site on a weekly basis.	Contractor	Check removal frequency	Weekly	ECO	Weekly	Visual check
Waste must be sorted and recycled as far as practically possible.	Contractor	Provide different bins for separation of waste	Daily	ECO	Weekly	Visual check
Wind-, water- and animal-proof refuse bins must be provided on site before removal to the registered dumping site.	Contractor	Provide bins on site	Daily	ECO	Weekly	Visual check
No solid waste must be buried in any excavations on site.	Contractor	Site instruction and visual check	Daily	ECO	Daily	Visual check
No waste must be burned on site.	Contractor	Site instruction and visual check	Daily	ECO	Daily	Visual check

VISUAL - CONSTRUCTION PHASE						
Impact Management outcome: Prevent unnecessary negative visual impact by ensuring that visual impacts are mitigated.						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Presence of construction vehicles and machinery						
Construction equipment must be organised neatly on site and unused equipment must be removed from site	Contractor	Site instruction and visual check	Daily	ECO	Weekly	Visual check

HERITAGE RESOURCES - CONSTRUCTION PHASE						
Impact Management outcome: Prevent/minimise negative impacts on heritage resources						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Earthworks and excavations						
The heritage site must be a no-go area. This site must be fenced off together with the ecological sensitive area and no construction worker may access it.	Developer	Fence area off and site instruction	Before start of construction	ECO	Before start of construction	Visual check
Construction activities must Immediately be halted, and an archaeologist must be called in should anything of heritage value be discovered.	Contractor	Stop all construction & call Archaeologist	When required	ECO	When required	Incident log sheet

SAFETY, SECURITY, SOCIO-ECONOMICS AND FIRE HAZARDS - CONSTRUCTION PHASE						
Impact Management outcome: Ensuring a safe/secure construction environment, enhanced socio-economic development and prevention of fires.						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Construction activities - safety of employees						
The Safety act (Act 85 of 1993) and the Regulations are applicable. The Act requires the designation of a Health and Safety representative when more than 20 employees are employed. This must be in force during construction.	Contractor	Apply conditions of the Act	Daily	ECO	Weekly	Incident log sheet

SAFETY, SECURITY, SOCIO-ECONOMICS AND FIRE HAZARDS - CONSTRUCTION PHASE						
Impact Management outcome: Ensuring a safe/secure construction environment, enhanced socio-economic development and prevention of fires.						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Security officials should be employed to protect the property from theft.	Contractor	Appoint officer	Start of construction	Safety & Health representative	Start of construction	Records
Proper access control (I.D. cards) must be enforced to ensure that no unauthorised persons enter the site.	Contractor	Supply and control issuing of cards	Prior to work on site	Safety representative	Daily	Records of workers
A first aid kit must be available at the site office.	Contractor	Supply and maintain First Aid kit	Daily	Safety & Health representative	Weekly	Visual check
All personnel must be informed of emergency procedures and contact numbers must be displayed prominently.	Contractor	Compile Emergency response plan & do training	Monthly	Safety & Health representative	Monthly	Training records
Personal Protective Equipment (PPE) and safety gear must be provided to all site personnel (e.g. hard hats, safety boots, masks etc.).	Contractor	Supply PPE	Daily	Safety & Health representative	Weekly	Records of issue
Open trenches or excavations must be marked with danger tape.	Contractor	Mark all dangerous areas	While trenches are open	Safety & Health representative	Daily	Incident/ inspection log sheet
Accidental fires						
An emergency plan must be in place so that any uncontrolled fire can be combated in the most efficient manner. An emergency response plan that is aligned with the local fire Department must be in place.	Contractor	Do training on Emergency plan	Monthly	ECO	Monthly	Training records
No solid waste or vegetation must be burned on the premises or surrounding areas.	Contractor	Site instruction and visual checks	Daily	ECO	Daily	Visual check
All employees must be properly trained in the use of firefighting equipment and the emergency procedures in case of a fire.	Contractor	Training cession	Monthly	ECO	Monthly	Training records
Firefighting equipment must be available and must be serviced and inspected regularly to ensure that it is in proper working order and easily accessible.	Contractor	Service and inspect	Monthly	ECO	Monthly	Visual check
Construction activities - socio-economic impact						
Local labour must be used wherever possible during the construction phase.	Contractor	Appoint local people	Construction phase	ECO	Monthly	Staff records
Where viable, the work must be executed in a labour-intensive manner to create as many jobs possible.	Contractor	Construction program	Construction phase	ECO	Weekly	Visual check

SAFETY, SECURITY, SOCIO-ECONOMICS AND FIRE HAZARDS - CONSTRUCTION PHASE						
Impact Management outcome: Ensuring a safe/secure construction environment, enhanced socio-economic development and prevention of fires.						
Impact Management actions (mitigation measures)	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe: implementation	Responsible person	Frequency	Evidence: compliance
Unhygienic working conditions						
Occupational Health and Safety standards must be implemented.	Contractor	Implement standards	Continuous during construction	Safety & health representative	Weekly	Records
Workplaces must be kept clean to ensure hygienic working conditions	Contractor	Implement health standards	Continuous during construction	Safety & health representative	Weekly	Visual check
Traffic – heavy vehicles entering and exiting the site during loading and off- loading of construction equipment – increase in traffic volume						
The necessary safety signage (construction boards) must be displayed at or near the construction site to notify pedestrians and motorists of the dangers and to restrict access to dangerous places on site.	Contractor	Construct signage on site	Construction phase	ECO	Monthly	Visual check