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ENVIRONMENTAL MANAGEMENT PROGRAMME FOR:

THE PROPOSED CONSTRUCTION OF A NEW CONCRETE BRIDGE OVER MOOIRIVIER, A FUNCTIONAL STORMWATER OVERFLOW FOR RETENTION DAM, WASTEWATER TREATMENT WORKS TO COMPLIMENT IRRIGATION, ROUTE NWU SEWER USAGE VOLUME TO TREATMENT PLANT AND UPGRADE THE EXISTING STORMWATER CANAL ON PORTION 24 AND PORTION 412 OF THE FARM POTCHEFSTROOM TOWN AND TOWNLANDS 435 AND PORTION 1 OF ERF 1302, REGISTRATION DIVISION: IQ; NORTH WEST PROVINCE.



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GLOSSARY

- **“Corrective action”** - Action taken to correct a detected non-conformity
- **“Cradle-to-Grave”** - A policy of controlling Hazardous Waste from its inception to its ultimate disposal.
- **“Duty of care”** This requires that any person who generates, transports, treats or disposes of waste must ensure that there is no unauthorised transfer or escape of waste from his control. Such a person must retain documentation describing both the waste and any related transactions. In this way he retains responsibility for the waste generated or handled.
- **“Environment”** - Surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation
- **“Environmental management system”** - A tool that systemizes the way an organization goes about its environmental business and demand yearly improvements on targets set by the company
- **“Environmental performance criteria”** - Environmental objective, target or any other intended level of environmental performance set by the management of the organisation and used for the purpose of environmental performance evaluation
- **“Environmental performance evaluation”** - Process to facilitate management decisions regarding an organisation’s environmental performance by selecting indicators, collecting and analysing data, assessing information against environmental performance criteria, reporting and communicating and periodically reviewing and improving this process
- **“Environmental performance indicator”** - Specific expression that provides information about an organization’s environmental performance
- **“Environmental Policy”** - Statement by the organization of its intentions and principles in relation to its overall environmental performance that provides a framework for action and the setting of environmental objectives and targets
- **“General waste”** - The generic term for waste that if properly managed does not pose an immediate threat to man or the environment. It may comprise of the following:
 - Clean building rubble (no contamination with any hazardous waste e.g. asbestos or used oil etc.)
 - Garden refuse, Domestic waste, Plastic, Timber, Scrap steel, Rubber, Glass, Paper & cardboard
- **“Generator”** - An industry or company whose activities result in the production of waste. The responsibility for a Hazardous Waste remains from cradle-to-grave with the Generator of the waste and the Generator is held liable for any damage that the waste may cause to humans or to the environment.

- **“Hazardous waste”** - Waste that has the potential, even in low concentrations, to have a significant adverse effect on public health and the environment because of its inherent toxicological, chemical and physical characteristics. It may comprise of the following:
 - Used batteries and some degreasers (contain acids and alkali's)
 - Waste containing asbestos fibres/products
 - Oily waste (used oil rags, filters, drums, oil contaminated soil)
 - Used grease, Left-over paints, solvents and resins (and empty containers)
 - Sewerage sludge, Redundant chemicals
 - Lead, nickel, cadmium (heavy metals) found in electrical/electronic appliances
 - Mercury (heavy metal) found in fluorescent tubes and other electrical appliances.
 - Pesticides, insecticides, fertilisers, herbicides and their containers.
- **“Impact”** - Any change to the environment, whether harmful or beneficial, wholly or partially resulting from the organisation’s environmental aspects
- **“Integrated Waste Management Approach”** (also referred to as the waste management hierarchy):
 - prevent and avoid the production of a waste by applying the “cradle-to-grave” principle (where possible) e.g. bulk procurement of goods or sending packaging back to suppliers;
 - minimise or reduce the volume of a waste or the hazard rating (in the case of hazardous waste by for example purchasing less hazardous materials);
 - resource recovery by recycling of waste or the recovery of energy from that waste’;
 - treatment of waste to reduce the volume or hazardousness;
 - as a last resort the safe disposal of waste so that it will not pollute the environment or cause health hazards
- **“Non-compliance”** - Non fulfilment of a requirement or legislation.
- **“Objective”** - Overall goal that the organisation sets itself to achieve, which may be quantitative, but because it is overall, is usually expressed in qualitative terms
- **“Preventative action”** - Action taken to prevent or eliminate the cause of a potential non-conformity
- **“Recycle”** - The use, re-use or reclamation of a material so that it re-enters the industrial process rather than becoming a waste
- **“SANS”** The South African National Standard
- **“Sustainable development”** - Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
- **“Target”** - Detailed or specific performance requirement, which is quantified where possible that needs to be met in order to achieve the objectives. The target will be quantitative in order that performance against can be measured.

- **“Waste”** - An undesirable or superfluous by-product, emission, or residue of any process or activity which has been discarded, accumulated or stored for the purpose of discarding or processing. It may be gaseous, liquid or solid or any combination thereof. And may originate from a residential, commercial or industrial area. This definition excludes industrial waste water, sewage, radioactive substances, and mining, metallurgical and power generation waste. Government Gazette No. 12703, August 1990.
- **“Waste stream”** - A continuous flow of waste from an industry, activity, process or group.

Draft

LIST OF ABBREVIATIONS

BAP	Basic Assessment Process
BAR	Basic Assessment Report
DEA	Department of Environmental Affairs
DEDECT Tourism	Department of Economic Development, Environment, Conservation and Tourism
EA	Environmental Authorisation
ECO	Environmental Control Officer
EO	Environmental Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
NEMA	National Environmental Management Act (Act No. 107 of 1998)
PPE	Personal Protective Equipment
SDS	Safety Data Sheets
SHE	Safety Health and Environmental

1. AN EMPR MUST COMPLY WITH SECTION 24N OF THE ACT AND INCLUDE-

A. DETAILS OF THE EAP

- i) The EAP who prepared the report
- ii) Expertise of the EAP

NAME OF PRACTITIONER	QUALIFICATIONS	CONTACT DETAILS
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B. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1)(h) herein as required).

The applicant (**North West University**) intend to construct concrete bridge over Mooirivier, a functional overflow for retention dam, wastewater treatment works, route NWU sewer usage volume to treatment plant, upgrade the existing stormwater canal and subsequently demolish the existing damaged bridge on Portion 24 and Portion 412 of the Farm Potchefstroom Town and Townlands 435 and Portion 1 of Erf 1302, Registration Division: IQ; North West Province.

The activities will take place at the North West University Potchefstroom Campus at Fanie du Toit Sports grounds Loop street. Loop Street is a 6 meter wide municipal link road within a 20 meter wide road reserve.

The area has an existing old bridge which was damaged by floods experienced in Potchefstroom in 2022. Currently the bridge is not in use, therefore, the applicant would like to align new bridge with Loop Street Road and centre line.

The following is anticipated to be undertaken:

- Stormwater improvements along the open channel parallel to the extended road section of Loop Street within the property of the NWU
- Construct a new bridge to replace the existing damaged bridge to the east of the site area, and
- Demolish/remove the damaged bridge together with reinstatement of the bridge site
- Construct a wastewater treatment works (WWTW) for reclaimed effluent to be used for irrigation throughout the sports complex, including pump station for the reclaimed water, and the reticulation piping
- Lining the existing irrigation storage dam for improved water security
- Minor roadworks associated with the new and replacement infrastructure

The EMPr deals with the design, construction, operational and decommissioning phases of the development and its associated environment, which will require management to maintain or improve the quality of the environment as well as activities on site which may have potentially negative impacts on the environment. Although this document provides guidelines as to how these aspects should be managed, it should be seen as an open ended document which requires regular review and updating, as new information becomes available in order for it to remain relevant to the requirements of the site and the environment.

Milnex Management Services (Pty) Ltd has compiled this Environmental Management Programme (EMPr) for the proposed development. This document considers the impacts that are likely to arise from the implementation of the project and the mechanisms that are recommended to minimise the severity of these impacts. The EMPr covers the principles, responsibilities and requirements applicable in order to implement effective environment management, during all the phases of the project's implementation.

C. COMPOSITE MAP

The application area is situated near Potchefstroom on the JB Marks Council Municipality, in the Dr Kenneth Kaunda District Municipality at the North West University Potchefstroom Campus at Fanie du Toit Sports grounds Loop street. Loop Street is a 6 meter wide municipal link road within a 20 meter wide road reserve , North West Province (Figure 1). Table below shows the contact details of the project proponent.

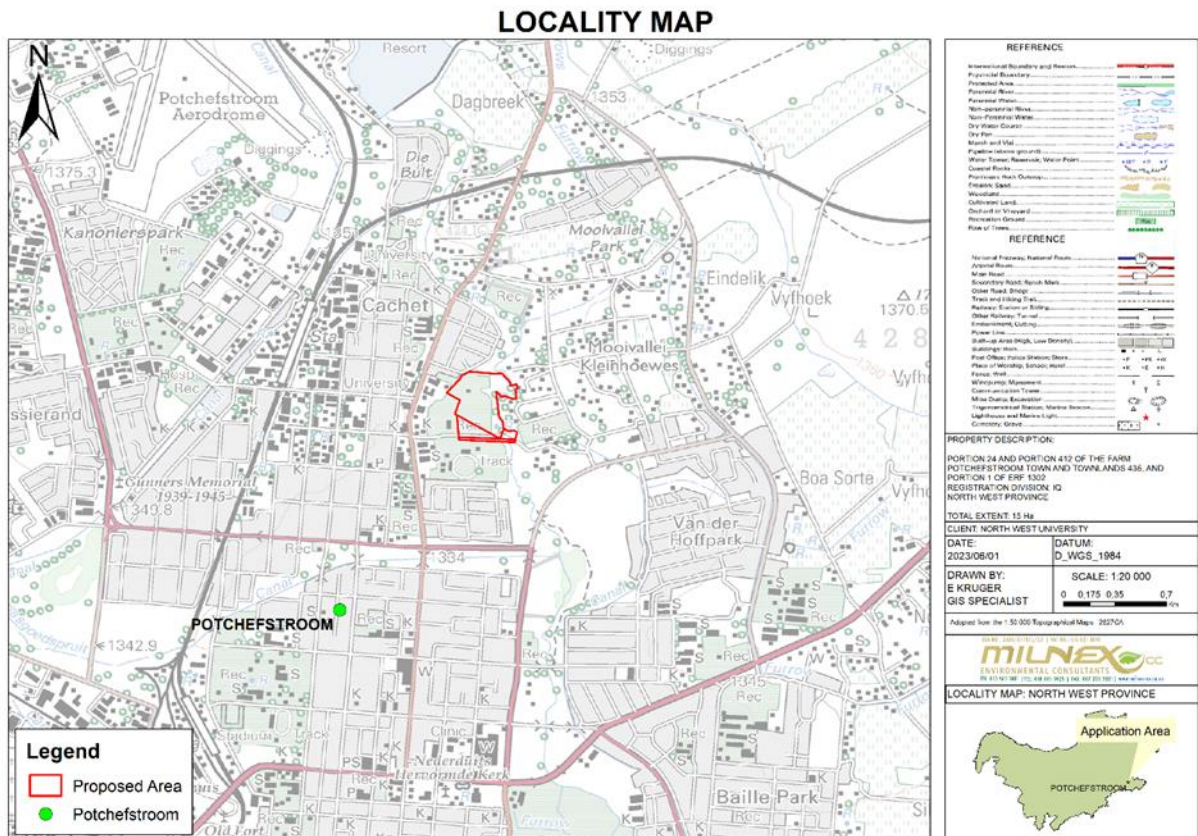


Figure 1: Locality map for the proposed area

Table 1: Property details

Project applicant:	North West University		
Trading name (if any):	North West University		
Contact person:	Pieter van Heerden		
Physical address:	11 Hoffman Street Potchefstroom		
Postal address:			
Postal code:	2520	Cell:	072 447 1790
Telephone:	018 299 4406	Fax:	-
E-mail:	Pieter.vanheerden@nwu.ac.za		

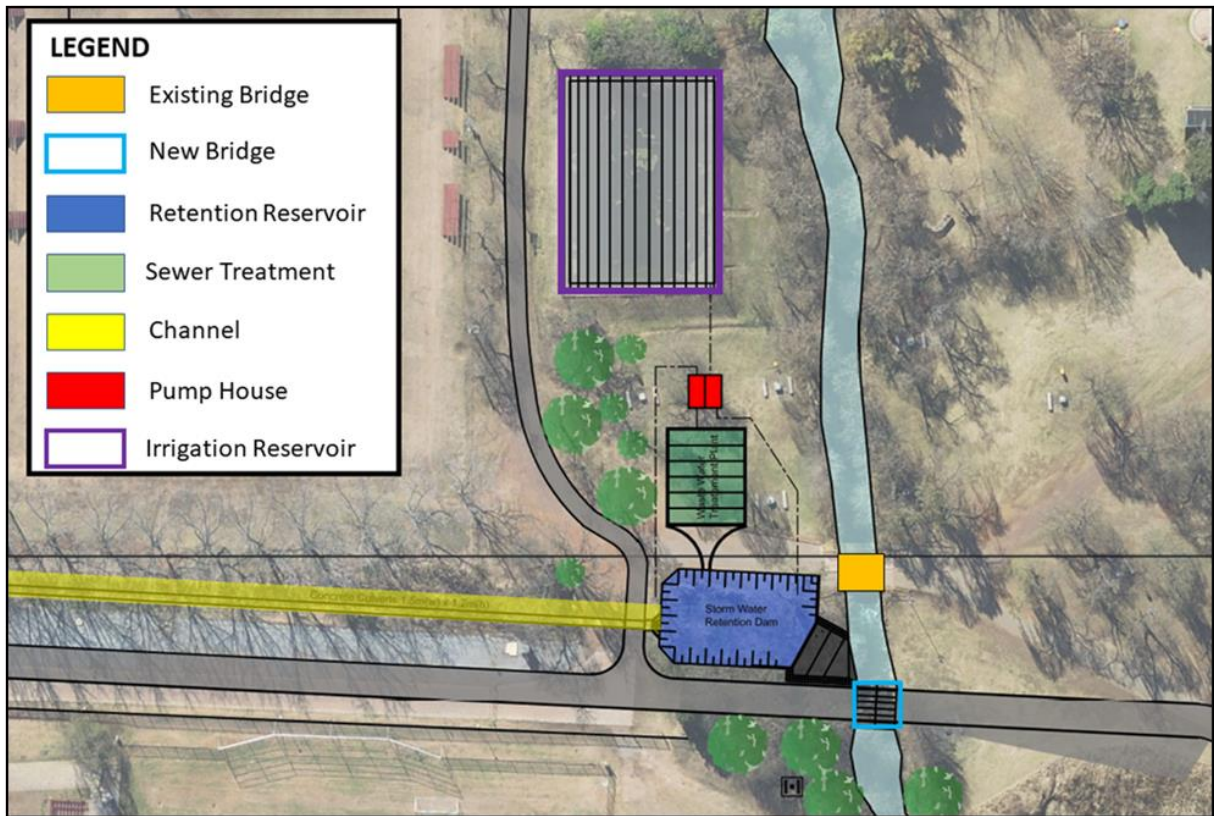


Figure 2: Site layout for the proposed area

D. DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

i. Planning and design

This section of the EMPr incorporates pro-active environmental management measures with the goal of attaining sustainable development which can be achieved during this phase. Pro-active environmental measures help minimize the chance of negative impacts occurring. Necessary corrective actions are proposed to further limit potential impacts. The planning phase should include measures that will dictate how the proposed activities should be carried out.

ii. Pre-construction activities

It must be noted that no biophysical, social or cultural impacts are envisaged during the preconstruction phase. The construction phase will be temporary in nature. These activities will include, but not be limited to the following:

- Planning and Design
- Site preparation

iii. Construction activities

This section of the EMPr provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. This specification will form part of the contract documentation and, therefore, the contractor will be required to comply with the specifications to the satisfaction of the Site Manger in terms of the construction contract.

The construction phase of the proposed application activities will include the following activities:

- Stormwater system construction
- Routing stormwater runoff from the new built portions safely,
- The replacement of the open channel to the north of Loop Street with an underground pipe culvert system, for a length of approximately 290 metres
- WWTW and Sewerage system construction
- Bridge site construction
- Reservoir liner construction

iv. Operation

The operational phase of the proposed application activities will include the following activities:

- Stormwater improvements along the open channel parallel to the extended road section of Loop Street within the property of the NWU
- Construct a new bridge to replace the existing damaged bridge to the east of the site area, and
- Demolish/remove the damaged bridge together with reinstatement of the bridge site
- Construct a wastewater treatment works (WWTW) for reclaimed effluent to be used for irrigation throughout the sports complex, including pump station for the reclaimed water, and the reticulation piping.
- Lining the existing irrigation storage dam for improved water security
- Minor roadworks associated with the new and replacement infrastructure.

v. Rehabilitation of the environment after construction and where applicable post closure

This section provides management for the operational and maintenance phase of the project. Environmental actions, procedures and responsibilities as required within these phases are specified. Through taking pro-active measures during the design and planning phases as well as the construction phase; potential environmental impacts originating during the operational phase can be minimized or even prevented.

vi. Decommissioning

The only area which may need decommissioning is the existing bridge.

No decommissioning is foreseen for new activities in the near future for the proposed project. However, should decommission be required, an additional Environmental Authorisation and closure plan will be submitted to the competent authority for approval and it will comply to the relevant legislation at the time of closure

vii. Where relevant, operation activities

This section provides management for the operational and maintenance phase of the project. Environmental actions, procedures and responsibilities as required within these phases are specified. Through taking pro-active measures during the design and planning phases as well as the construction phase; potential environmental impacts originating during the operational phase can be minimized or even prevented.

E. DESCRIPTION AND IDENTIFICATION OF IMPACT MANAGEMENT OUTCOMES REQUIRED FOR THE ASPECTS CONTEMPLATED IN PARAGRAPH D

This section provides an indication of the significant potential positive and negative environmental impacts relating to the proposed development as explained under **section E** (Impact Assessment of the Basic Assessment Report):

i. Socio-Economic Impacts

- Increased dust and noise generation as a result of the construction activities (**during the construction and decommissioning phases**);
- Change in the visual character of the area (**during the construction, operational and decommissioning phases**);
- Waste generation (**during the construction, operational and decommissioning phases**);
- Potential impacts on traffic flow (**construction and operational phase**); and
- Job creation (**during the construction, operational and decommissioning phases**).

ii. Biophysical Impacts

- Potential impacts on soil (**during the construction, operational and decommissioning phases**);
- Potential impacts on groundwater and surface water (**during the construction and decommissioning phases**),
- Odour (**Operational**),
- Impact on biosecurity and transmission of diseases (**operational**).

F. DESCRIPTION OF PROPOSED IMPACT MANAGEMENT ACTIONS IDENTIFYING THE MANNER IN WHICH THE IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES CONTEMPLATED IN PARAGRAPHS (D) & (E) 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;
- Development must be sustainable;
 - Pollution must be avoided or minimised and remedied;
 - Waste must be avoided or minimised, re-used or recycled;
 - Negative impacts must be minimised; and responsibility for the environmental health and safety consequences of a policy, project, product or service exists throughout its life cycle.

These principles are taken into consideration when a government department exercises its powers, for example during the granting of permits and the enforcement of existing legislation or conditions of approval.

DUTY OF CARE

Section 28(1) of NEMA

This may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways to minimise these risks
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants and
- Eliminating the source of pollution; and remedying the impacts of the pollution

The authority may direct industry to rectify or remedy a potential or actual problem. If such directive is not complied with, the authorities may undertake the work and recover the responsible industry.

- ii. Comply with any prescribed environmental management standards or practices;

The **National Environmental Management Act (NEMA)** provides the legislative framework for Integrated Environmental Management (IEM) in South Africa. **Section 24** stipulates that all activities that may significantly affect the environment and require authorisation by law must be assessed prior to approval. NEMA also provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of the state and to provide for matters connected therewith.

Section 2 of NEMA establishes a set of principles that apply to the activities of all organs of state that may significantly affect the environment.

POLLUTERS PAYS

Section 28(1) of NEMA states that “every person who causes, has caused may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring”. If such pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution

The “polluter pays principle” holds that the person or organisation causing pollution is liable for any costs involved in cleaning it up or rehabilitating its effects. It is noted that the polluter will not always necessarily be the generator, as it is possible for responsibility for the safe handling, treatment or disposal of waste to pass from one competent contracting party to another. The polluter may therefore not be the generator but could be a disposal site operator or a transporter. Through the 'duty of care' principle, however, the generator will always be one of the parties held accountable for the pollution caused by the waste.

Accordingly, the generator must be able to prove that the transferral of management of the waste was a responsible action. The polluter pays principle according to NEMA dictates that “the cost of remedying pollution, environmental degradation and consequent adverse effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.”

CRADLE TO GRAVE

“Cradle to Grave” refers to the responsibility a company takes for the entire life cycle of a product, service or program, from design to disposal or termination. In terms of the DWAF Minimum Requirements for the Handling and Disposal of Hazardous Waste (1994) “any person who generates, transports, treats or disposes of waste must ensure that there is no unauthorised transfer or escape of waste from his control. Such a person must retain documentation describing both the waste and any related transactions. In this way, he retains responsibility for the waste generated or handled.” Duty of Care offers one strategy to implement sustainable development.

iii. Comply with any applicable provisions of the Act regarding closure, where applicable; and

Not applicable

- iv. Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;

Not applicable

G. THE METHOD OF MONITORING THE IMPLEMENTATION OF THE IMPACT MANAGEMENT ACTIONS CONTEMPLATED IN PARAGRAPH (F)

Environmental monitoring programme is part of the EMPr performance assessment and also part of the internal and external auditing. Monitoring programmes are to be established for a range of site activities that can have a significant impact on the environment. The ECO or External Consultant will assess data collected from monitoring activities and compare it against relevant standards and objectives. Results of routine monitoring shall be included in the internal and external audit.

Monitoring System and Reporting

A comprehensive monitoring system shall be developed which includes a detailed environmental monitoring system. The monitoring system shall be implemented or achieved during construction and operation phases. The EMPr outlines a large number of management actions to be implemented and the environmental performances that must be reported. The ECO will maintain a written record of the implementation of these actions. If for any reason these actions and monitoring system are not implemented or achieved, the ECO must inform the Project Manager.

The objective of the environmental monitoring system is to:

- Prevent and/or minimize the environmental impact associated with the proposed activities;
- Check compliance with license requirements;
- Ensure conformance with the environmental legislations and objectives;
- Act as a pollution early warning system; and
- Ensure consistent auditing and reporting protocols.

H. THE FREQUENCY OF MONITORING THE IMPLEMENTATION OF THE IMPACT MANAGEMENT ACTIONS

I. RESPONSIBLE PERSONS

J. THE TIME PERIODS FOR IMPLEMENTATION;

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
COMPLIANCE APPOINTMENTS	The applicant must appoint an ECO during the planning phase for the construction phase of the development.	Project Manager	Once-off	Pre-construction
	The applicant must ensure the nomination of the Community Liaising Officer residents to nearby residents for EMP auditing purposes for the construction and operational phases (monitoring assistance)	Project manager, ECO	Once-off	Pre-construction
CONTINGENCY PLANNING	Contingency plans for fire, explosions and water contamination etc.; must be planned in conjunction with neighbouring landowners and the local fire department.	Applicant	Once-off	Pre-construction
FIRE DESIGN	Incorporate high velocity water spray systems as a means of fire extinguishment of a possible outbreak in the facility.	Design Engineer, Project manager	Once-off	Pre-construction
NOISE ATTENUATION	Ensure that noise nuisance comply with SANS 10103 for the environment and surrounding areas.	Contractor/ Project manager	As necessary	Pre-construction

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
ENSURE CONTRACTORS ARE AWARE OF THE REQUIRED MANAGEMENT MEASURES STIPULATED IN THE EMPR.	The Project Manager shall ensure the services of an independent acoustics engineer to undertake inspection and monitoring of the installed alarms to ensure that alarms comply with the SANS noise conditions.	Project manager	Once-off	Pre-construction
	This EMPr must form part of the contractual agreements with the specific contractors.	Contractor	Once-off	Pre-construction
SITE CLEARING: REMOVAL OF TOPSOIL & VEGETATION	<ul style="list-style-type: none"> • Keep the footprint of the disturbed area to the minimum and designated areas only. Vegetate and wet stockpiles to limit erosion. • Stockpile soil in the correct layers, avoid excessive height, and slope • Consultation with relevant authorities is recommended to find out if a tree removal permit is required. An ecological audit will be required for fauna and flora. • Only clear vegetation when and where necessary. • Only remove topsoil where necessary • Dust suppression must be undertaken to reduce the dust particle from spreading. 	Project manager Contractor	Once-off	Construction

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
ENSURE ALL CONSTRUCTION STAFF IS FAMILIAR WITH THE ENVIRONMENTAL AWARENESS PLAN.	<ul style="list-style-type: none"> The contractor is expected to have safety “tool box” talks in accordance with the risks and trends associated with the project. Proof of these talks shall be kept on site. The contractor will develop a specific emergency procedure and plan. 	SHE representative	Daily	All stages
INCREASE EMPLOYMENT OPPORTUNITIES.	<ul style="list-style-type: none"> Labour (skilled and unskilled) and contractors employed for the proposed development should be sourced locally where feasible. Local business will be used where unskilled labour is required. Reputable local business will be used where available. 	Contractor	Once off	Construction and Decommission
MINIMISE THE IMPACT ON SURROUNDING LAND USES AND EMPLOYEES DUE TO ODOUR EMISSIONS.	<ul style="list-style-type: none"> Sulphurous odours are normally the first indication that the WWTW is not functioning optimally. The source of odour must be investigated immediately and appropriate corrective measures taken. The tanks and pipes must remain sealed to prevent odours On-going maintenance check-ups around the treatment should be undertaken for any leaks. Should there be any leaks, the above mentioned management measure should be used. Ensure that the treatment plant is operating optimally at all times. 	Project manager	Every cycle	Every cycle

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
PREVENT NUISANCE TO SURROUNDING LANDOWNERS	<ul style="list-style-type: none"> • A complaints and incidents register will be kept on site. 	Project manager	Daily	Every cycle
REDUCE MISCONDUCT BY EMPLOYEES ON SITE.	<ul style="list-style-type: none"> • No alcohol /drugs are permitted on the construction site. • No firearms allowed on site, unless used by security personnel. 	Project manager Contractor	All stages	On-going
PREVENT INCIDENTS POSING A RISK TO THE HEALTH AND SAFETY OF EMPLOYEES.	<ul style="list-style-type: none"> • Correct Personal Protective Equipment (PPE) must be worn at all times by the personnel on site. Personnel must be trained on the use of PPE. • Each contractor will employ their own Safety Officer to monitor the safety conditions during the construction phase. • No unauthorised ignition sources will be permitted on site and debris/waste shall not be burnt under any circumstances. • Erect suitable warning and information signage near any hazardous storage facility. Handling of hazardous chemicals must only be done by trained personnel. • All provisions of the Occupational Health and Safety Act (Act No 85 of 1993) and must be fully complied with. • Safety Data Sheets (SDSs) must be readily available on site for hazardous substances. 	SHE representative	All stages	On-going

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
<p>PREVENT THE LOSS OF SOIL RESOURCES AS A RESULT OF SOIL STRIPPING.</p>	<ul style="list-style-type: none"> Workers should at all times be made aware of the health risks associated with any hazardous substances/dangerous goods used, through talk topics and awareness campaigns. In the event of an emergency relating to hazardous substances, procedures detailed in the SDS shall be implemented. 			
	<ul style="list-style-type: none"> Topsoil stripped will be stockpiled and reused for rehabilitation purposes following construction activities. Disturbed areas will be revegetated with indigenous vegetation following construction activities. Before replacing topsoil, remove all visible weeds from the placement area and from the topsoil. All excavations will be backfilled with sub soil and topsoil in the reverse order to which the soil profiles were removed. 	<p>SHE Representative, Contractor</p>	<p>Construction</p>	<p>Once off</p>
<p>GROUNDWATER QUALITY IMPACTS DUE TO ON-SITE CONSTRUCTION WORKS: HYDROCARBON SPILLS</p>	<ul style="list-style-type: none"> Drip trays should be placed underneath all construction vehicles, when vehicles are stationary. Do not service any vehicle within 500m of the Mooirivier. Spill kits should be available at all times. All construction workers should be familiar with the use of spill kits and the relevant spill protocols on site; 	<p>SHE Representative, ECO, Project manager</p>	<p>Construction and Operational</p>	<p>Daily</p>

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
SEWAGE SPILLS WHEN WORKING ON THE SEWAR LINE	<ul style="list-style-type: none"> All fuel containers should be placed on top of a bunded impermeable layer to ensure that the hydrocarbon product does spill onto the subsurface soil; All hydrocarbon spills should be reported. 			
GREY WATER IRRIGATION	<ul style="list-style-type: none"> Ensure that all cut off valves are properly closed before commencing any work; Ensure that all liquids and solids within the section to be worked on is properly drained; Impermeable sheets may be placed underneath the sections of be to be worked on to ensure that the waste material do not infiltrate into the subsurface; No work should be conducted on the sewage line during rainfall events to ensure that the wastewater do not infiltrate the subsurface soil and to prevent surface runoff that may enter the Mooirivier. 	SHE Representative, ECO, Project manager	Construction and Operational	Daily
GREY WATER IRRIGATION	<ul style="list-style-type: none"> The quality of the grey water to be used as irrigation water must be monitored for quality on a regular basis to ensure that the underlying aquifer is not impacted on. The water quality should comply with GN665 standards as per section 21 (e) of the water. Groundwater monitoring is essential for ensuring that the groundwater is not impacted. The use of monitoring boreholes will act as an 	ECO SHE Representative	Operational	Quarterly

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
	<p>early detection mechanism for groundwater contamination;</p> <ul style="list-style-type: none"> • The use of appropriate chemicals and procedures to ensure that the microorganisms do not contaminate the water resource is crucial; • Irrigation cycles should be climatically orientated where irrigation does not take place on the sports field when they are saturated due to precipitation. • Irrigating fields during times where the fields are saturated may lead to surface water runoff and can cause pollution of the Mooiriver. Soil moisture probes can be installed to aid in irrigation schedules. • Irrigation should not cause waterlogging or excess drainage below the plant roots zone. • If the water is applied at sustainable rates (i.e., using smaller amounts frequently rather than large volumes occasionally), water logging should not be a problem. This method also helps to maximise moisture uptake and minimize potential leaching; • Vegetative cover in the buffer area between the irrigated area and any watercourse should be maintained wherever possible, particularly 			

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
<p>PREVENT THE RISK OF SOIL CONTAMINATION AS A RESULT OF UNCONTROLLED STORMWATER RUNOFF OR WASH WATER RUNOFF.</p>	<p>riparian vegetation, to minimise the movement of runoff and eroded soil into surface waters;</p> <ul style="list-style-type: none"> Stormwater plans should be in place to ensure that water does not reach the Mooiriver. 			
	<ul style="list-style-type: none"> Care must be taken to collect contaminated wash water from cleaning activities. All visible remains of excess concrete must be physically removed on completion and disposed of. Washing off the remains into the ground is not acceptable. In terms of the National Building Regulations, on site drainage will be provided prior to construction to combat soil erosion. Divert dirty water (water used to clean containers and from the disinfection area) to a septic tank and nowhere else. This water must not be allowed to seep into the soil or run towards the non-perennial watercourse. Under no circumstances may open areas or the surrounding vegetation be used as toilet facilities. 	<p>Project Manager</p>	<p>Construction and Operational</p>	<p>Daily</p>
<p>PREVENT CONTAMINATION OF SURFACE WATER RESOURCES</p>	<ul style="list-style-type: none"> Safe disposal certificate will be obtained and kept on site for the disposal of sewage. 	<p>SHE Representative</p>	<p>Construction and decommission</p>	<p>On-going</p>
	<ul style="list-style-type: none"> No waste or refuse will be allowed to access the stormwater infrastructure. 	<p>Project manager</p>	<p>Construction and Decommissioning</p>	<p>Once off</p>

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
AND ONSITE EROSION AS A RESULT OF CONTAINED RUNOFF.	<ul style="list-style-type: none"> Stormwater systems will be inspected and repaired timeously. The development footprint will be landscaped in order to prevent pooling of water. No hazardous chemical must be discarded in the sewage or storm water system. Energy dissipaters will be places at discharge points to reduce surface water runoff and possible pollution. 		Operational	
STORMWATER & RETENTION DAM	<ul style="list-style-type: none"> Good site grading to help manage storm water Stormwater from the dam catchment will be stored in the dam. Stormwater Management to control drainage and run-off. Stormwater generated during the construction phase will be managed through stormwater mitigation measures as described in the Environmental Management Programme. It must be noted that the proposed dam will incorporate a spillway of the dam wall, which will cater for peak flood periods 		Operational	

**BRIDGE (RIVER CROSSING
INFRASTRUCTURE)**

<p>Suggested mitigations as per the Freshwater Ecological and Impact Assessment</p> <ul style="list-style-type: none"> • <i>To ensure rehabilitation efforts/mitigation for the bridge structure are assigned the best environmental protection, the specialist strongly recommends that the gabion structure incorporate vegetation in the structure as this option provides several ecological benefits over the standard non-living gabion structure</i> • <i>The structure must incorporate strategically placed tiebacks to protect against the edges flanking out and the centre from bulging out and failure of the structure which commonly occurs in South Africa;</i> • <i>The base layer of gabions must be placed below the expected maximum scour depth;</i> • <i>The flanks of the gabion walls must not be exposed and must be angled at 45 degrees and be deeply set into the embankment to beyond the expected maximum erosion depth;</i> • <i>All areas surrounding the gabion structure must be vegetated (hydroseeded and watered) towards the end of the construction phase to prevent the loss of the soils holding the structure in place;</i> 	<p>Project Manager</p>	<p>Construction and Operational</p>	
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ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
IRRIGATION DAM UPGRADE & LINING	<ul style="list-style-type: none"> • Ideally a gentler angle of the slope is preferred as the gentler gradient offers greater vegetation establishment potential over steeper angles; and • This green method can also be used for the stepped/terraced gabion baskets (where implemented) 			
	<ul style="list-style-type: none"> • The irrigation dam should be progressively emptied over a week so as to minimize the increased flow within the system. • After construction the irrigation dam should be progressively filled in order to minimize the effects of the abstraction on the systems flow. • Laydown area cannot be within the delineated watercourse or buffer area. • All spillways must be regularly monitored and maintained/revegetated. • The current pump house must be investigated and maintained. • A storm water management plan must be compiled; and • Siltation of the dam must be monitored to avoid decreasing the capacity of the dam; 	ECO, SHE representative, Project Manager	Construction & Operational	Monthly

WASTEWATER TREATMENT WORKS

<ul style="list-style-type: none"> • Treated effluent quality must meet target water quality limits for recreational use as described by DWAF (1996b) before used for irrigation. • An independent wastewater treatment professional should be appointed to monitor and audit the WWTW on a regular basis and ensure the quality of final effluent conforms to legal DWAF quality standards; • Sulphurous odours are normally the first indication that the WWTW is not functioning optimally. The source of odour must be investigated immediately and appropriate corrective measures taken; • During operation of the WWTW all sewerage infrastructure must be properly and regularly managed, maintained and operated throughout the life of the project; • During operation, periodic inspections of the WWTW infrastructure should be implemented to identify any system failure which could lead to contamination of the groundwater and surrounding watercourses; • Any leaks and failures of the sewerage infrastructure must be fixed immediately and areas rehabilitated as needed; • Emergency overflow infrastructure is to be constructed to convey excess flows to temporary storage pond(s) where feasible; and 	<p>Independent Wastewater Treatment Professional, SHE</p>	<p>Operational</p>	<p>Monthly</p>
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ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
<p>PREVENT THE POLLUTION OF THE SURROUNDING ENVIRONMENT AS A RESULT OF WASTE GENERATION, INCORRECT WASTE DISPOSAL AND HOUSEKEEPING.</p>	<ul style="list-style-type: none"> • Routine monitoring of discharge points should be conducted to identify areas prone to erosion and bank collapse. Problem areas should be addressed immediately. 			
	<ul style="list-style-type: none"> • Waste will be sorted at source. • Waste receptacles will be kept closed at all times when not in use. • Littering on site is forbidden and the site must be cleared of litter at the end of each working day. • Where possible, materials used or generated by construction activities must be recycled. • Waste will not be stored for a period exceeding 90 days or volumes exceeding 100 cubic metres. • Waste generated on the proposed site should be collected by authorised waste contractors and frequently disposed of at a licensed landfill site as the last resort. Recycling/reuse of waste should be enforced where feasible. 	<p>SHE Representative, Project manager</p>	<p>Construction, Operational and Decommissioning</p>	<p>Weekly</p>

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
<p>PREVENT THE IMPACT ON WATER AND SOIL RESOURCES THROUGH THE ACCIDENTAL SPILLAGE OR LEAKAGE OF WASTE OR THE INCORRECT STORAGE/HANDLING OF HAZARDOUS SUBSTANCE.</p>	<ul style="list-style-type: none"> • An inventory of all chemicals on site must be kept together with the respective SDS. • Cleaning of equipment/vehicles should be done in a designated area to prevent soil and water pollution. • Storage areas containing hazardous substances/materials are to be clearly demarcated and labelled. • Remediation of spillages must be conducted as far as practically reasonable. • All hazardous substances will be stored in a bunded area with the capacity to store 110% of the contents volume. • Should there be a specific storage area for fuel, oil and other hydrocarbon/hazardous materials. This area will be access controlled and SDSs will be available. 	<p>SHE representative</p>	<p>Construction and Decommissioning</p>	<p>On-going</p>
<p>PREVENT THE OVER ABSTRACTION OF GROUNDWATER RESOURCES.</p>	<ul style="list-style-type: none"> • Strictly adhere to the conditions of the Water Use License. 	<p>Project manager</p>	<p>Operational</p>	<p>Daily</p>

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
<p>REDUCE THE ENVIRONMENTAL AND HEALTH IMPACTS AS A RESULT OF DUST AND EMISSIONS GENERATED.</p>	<ul style="list-style-type: none"> • At times of high winds, periodic dust suppression techniques will be employed on cleared areas generating dust. • Soil stockpiles will be kept moist to prevent dust generation, or alternatives covered with sheeting to prevent off site movement of dust and erosion. • Machinery utilised on site will be maintained and kept in good working order. • Machinery emitting large quantities of Volatile Organic Compounds will be removed from site until maintenance and repair have been conducted on the machines to ensure their compliance 	<p>SHE Representative</p>	<p>Construction, Operational and Decommissioning</p>	<p>Weekly</p>
<p>REDUCE THE IMPACT OF NOISE ON SURROUNDING LAND USES AND EMPLOYEES.</p>	<ul style="list-style-type: none"> • Cleared areas will be rehabilitated as soon as these areas are not in use anymore. • Areas compacted will be scarified and ripped to encourage vegetation growth. • Construction activities should be restricted to 08:00hrs to 17:00hrs during weekdays and 08:00hrs to 13:00hrs during weekends where applicable. • Machinery will be kept in good working order to reduce noise emissions. • Should noise be problematic, silencers will be fitted to construction vehicles. • Demolish and remove all infrastructure not required post closure. 	<p>Project Manager</p>	<p>Operational</p>	<p>Following Construction</p>
<p>REDUCE THE IMPACT OF NOISE ON SURROUNDING LAND USES AND EMPLOYEES.</p>	<ul style="list-style-type: none"> • Construction activities should be restricted to 08:00hrs to 17:00hrs during weekdays and 08:00hrs to 13:00hrs during weekends where applicable. • Machinery will be kept in good working order to reduce noise emissions. • Should noise be problematic, silencers will be fitted to construction vehicles. • Demolish and remove all infrastructure not required post closure. 	<p>Contractor</p>	<p>Construction and Decommissioning</p>	<p>Daily</p>

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
<p>MINIMISE POLLUTION AS A RESULT OF UNCONTROLLED WASTE DISPOSAL AND STORAGE.</p>	<ul style="list-style-type: none"> Any noise complaints received must be recorded in the Complaints Register. 			
	<ul style="list-style-type: none"> Recyclable waste must be stored separately to waste disposed to landfill. Reuse or recycling of waste must be investigated. Waste will be stored in designated areas. Waste bins will be labelled for their designated use. All waste contaminated with hydrocarbons will be considered hazardous waste, regardless of the level of contamination. Safe disposal certificates to be kept on record. Bins for hazardous and non-hazardous waste should be clearly separated and marked. Waste should be separated according to the appropriate bin. Domestic waste will be disposed at a registered landfill site. No domestic or solid waste will be disposed of on site. All waste will be collected in drums and disposed of at a licensed landfill site. 	<p>SHE Representative</p>	<p>Construction, Operational and Decommissioning</p>	<p>Daily</p>
<p>PROTECT ARTEFACTS OF CULTURAL OR ARCHAEOLOGICAL IMPORTANCE.</p>	<ul style="list-style-type: none"> If any human remains (or any other concentrations of archaeological heritage material) are exposed during construction, all work must cease and it must be reported immediately to the nearest 	<p>SHE Representative</p>	<p>Construction and Operational</p>	<p>Weekly</p>

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
MINIMISE THE IMPACT ON BIODIVERSITY HABITATS AND DIVERSITY AND PREVENT THE PROLIFERATION OF ALIEN VEGETATION	<p>museum/archaeologist or to the SAHRA, so that a systematic and professional investigation can be undertaken</p> <ul style="list-style-type: none"> • Construction workers will be made aware of the requirement to report archaeological discoveries. 			
	<ul style="list-style-type: none"> • Quarterly vegetation rehabilitation surveys need to be conducted of the vegetation within the project footprint; and • An alien invasive plant management plan needs to be compiled and implemented prior to construction to control and prevent the spread of invasive aliens. • Should vegetation growth not establish, the area to be rehabilitated must be seeded with a seed mix of indigenous species to the local area. • Alien vegetation in and around the site will be eradicated using approved techniques and herbicides, by accredited personnel. • Proliferation of alien vegetation will be controlled. Alien vegetation will be removed should species establish in the area. 	SHE Representative	Construction and Operational	Weekly to Monthly

ASPECT AND IMPACT	MITIGATION MEASURES	RESPONSIBILITY	FREQUENCY	STAGE
<p>MINIMISE THE SAFETY RISKS DUE TO INCREASED POSSIBILITY OF CRIME AND SAFETY CONDITIONS OF EMPLOYEES.</p>	<ul style="list-style-type: none"> • Clear sign boards should be erected at the entrance to the site to indicate that a construction area is being entered and safety precautions should be followed. • Notification signs must be posted around the site warning residents and visitors about the hazards around the construction site. • Workers should be adequately trained to follow all safety procedures and wear protective equipment where required. 	<p>SHE Representative</p>	<p>Construction and Operational</p>	<p>Once-off</p>

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Table 2: Role and Responsibilities

ROLES	RESPONSIBILITY
<p>COMPETENT AUTHORITY: NORTH WEST DEPARTMENT OF ECONOMIC DEVELOPMENT, ENVIRONMENT CONSERVATION & TOURISM. (DEDECT),</p>	<ul style="list-style-type: none"> • DEDECT is responsible for the review of the draft and give comments on the EMP documents. • Liaise with Environmental Control Officer on environmental issues and non-compliance.
<p>NORTH WEST UNIVERSITY</p>	<ul style="list-style-type: none"> • Liaising directly with the relevant authorities with respect to the preparation and implementation of the EMPr and meeting the conditions documented in the environmental clearance certificate. • Appoint or act as an Environmental Manger and/or ECO to oversee implementation of the EMPr. • Bear the overall responsibility for managing the project contractors and ensure that the EMPr is effectively implemented. • Ensure the contractors are aware of the EMPr and Environmental clearance certificate obligations. • Approve all decisions regarding environmental procedures and protocols that must be followed. • Maintain open and direct lines of communication between the proponent, Contractor and Interested and Affected Parties (I&APs) with regards to environmental matters. • Attend regular site meetings and inspections where required.
<p>ECO</p>	<ul style="list-style-type: none"> • An ECO must be employed by the Project manager. This person must be available for the duration of the project and must have appropriate training and experience in the implementation of the EMPr. The responsibilities of the ECO include the following: - • Assist the Project Manager in ensuring that the necessary environmental authorisations and permits have been obtained. • Assist the Project Manager and Contractor in finding environmentally responsible solutions to challenges that may arise. • Conduct environmental monitoring as per EMPr requirements. • Monitor performance of the contractors and ensuring compliance with the EMPr and associated method statements. • Maintenance, update and review of the EMPr.

	<ul style="list-style-type: none"> • Liaison between the contractors, authorities and other key stakeholders on all environmental concerns. • Communicating all amendments of the EMPr to the relevant stakeholders. • Conducting monthly audits to ensure that the system for implementing the EMPr is effective.
CONTRACTOR	<ul style="list-style-type: none"> • Ensures that all subcontractors and services providers are well informed of the environmental requirements and responsibilities; • Adhering to instructions issued by the engineer on advice of the ECO; • Submitting Method Statement for approval by the ECO prior comments of any work; • Liaise closely with the Engineer and the ECO and ensure that work is conducted in an environmentally sound manner.

K. THE MECHANISM FOR MONITORING COMPLIANCE WITH THE IMPACT MANAGEMENT ACTIONS CONTEMPLATED IN PARAGRAPH (F);

The following management plans need to be implemented during construction, operation and decommissioning of the proposed development.

- Construction Management Plan
- Construction Control Plan
- Rehabilitation Plan; and
- Operational and Maintenance management plan

Many of the issues to be addressed in these plans are regulated in existing laws, regulations and guidelines. In addition, it is recognized that the content of several plans will be generic, in the sense that existing procedures are documented in standard code of practice, and that adaption of such generic plans will only be possible as a dynamic process during construction, operation and decommissioning.

Plans presented below, therefore contain specific actions as well as undertakings to prepare additional plans as required prior to the commencement of certain activities during the detailed design phase. **North West University** recognise the need for ongoing development and revision of all plans to ensure their continual improvement.

Construction Management Plan

The construction management plan to be implemented by the contractor shall include the following key measures:

i. Management of Fuels and other Hazardous Materials

- The contractor shall comply with all applicable laws, regulations, permits and approval conditions and requirements relevant to the storage, use and proper disposal of hazardous materials.
- The contractor shall manage all hazardous materials and wastes in a safe and responsible manner, and shall prevent contamination of soils, pollution of water and/or harm to people or animals as a result of the use of these materials.
- Should soil be contaminated by hazardous substances, soil will be removed and disposed of at a registered hazardous waste disposal facility.
- The contractor shall not construct fixed fuel storage or refuel any vehicle or equipment within 100 m from a watercourse or wetland, within a floodplain, or where there is the potential for spilled fuel to enter a watercourse or groundwater. Should it not be possible to establish such facilities outside the 100 m zone, the contractor shall ensure that the necessary precautions to prevent and clean up spillages.
- The contractor shall enclose all fixed storage.
- The contractor shall place on – site tools and equipment, such as pumps, compressors, and generators on impermeable sheeting (i.e. polyethylene or other similar materials) to prevent hydraulic fluid or fuel leaks from contaminating soils or groundwater or entering any watercourse or wetland.
- The contractor shall take all reasonable precautions to prevent fuel and lubricant spills during the course of construction. To this end, the contractor shall ensure that regular audits are performed to verify that no leakage or defective equipment is brought onto site.
- The contractor shall ensure that there is sufficient spill containment and absorbent material available on site to manage accidental spills. The contractor shall immediately clean up accidental spillages of fuel and oils, or other hazardous substances.

ii. Management of the Construction Footprint

- The contractor shall prevent littering and the random discard of solid waste on the site.
- The contractor shall manage hazardous waste.
- The contractor shall minimize the risk of fires.
- The contractor shall prevent trespassing on the site.
- The contractor shall prohibit, and actively monitor and prevent, poaching or harassment of wild animals by contract employees.
- At the start of every working day the contractor shall patrol open trenches and rescue any animals that are trapped in it, either by catching and releasing (e.g. frogs and toads) or be driven out (e.g. dangerous snakes).

- The contractor shall ensure that contract employees remain within the construction right of way or on approved roads providing access to the construction right of way.
- The contractor will ensure that travelling speeds do not exceed 30 km/h and shall ensure that this restriction is enforced. This may include, but not limited to, the monitoring of vehicle speeds and the erection of speed limit signs.

iii. Management of Dust and Noise Nuisance

- The contractor shall control dust along the construction footprint so as to ensure that no detrimental effects to the general public are caused. Control measures to be considered include the use of water browsers to wet down surfaces that have been denuded and which have the potential to generate dust.
- Wetting of denuded areas, including the topsoil stockpile, will be done in such a manner that only enough water is utilized for dust suppression, and to ensure no undue runoff is caused.
- The contractor shall comply with legal requirements for the management of noise impacts.
- The contractor's employees shall not make recreational use of all – terrain vehicles or motorcycles on site.
- An appropriate freeboard will be enforced for trucks hauling dirt, sand, soil and other loose materials. All material transported by trucks will be covered to prevent undue nuisance dust during transportation.

iv. Waste Management

- Temporary storage of construction waste will be limited to within the construction camp site, and areas designated.
- The contractor shall be responsible for the collection and removal of waste from the construction site.
- The contractor shall arrange for the removal of waste on a weekly basis to a registered landfill site. Records of this disposal shall be kept on site.
- The contractor shall conduct site clean-up on a daily basis. This will focus on the eradication of litter.
- Hazardous waste will be separated from domestic waste and stored in demarcated bins. Hazardous waste bins will be stored on a hard standing surface, covered and made water tight.
- Safe disposal certificate will be obtained from the sub-contractor appointed for the removal of hazardous waste, and will be in adherence to the NEM-WA, Waste Information Regulations.

v. Complaints Register

- The contractor shall establish and maintain a register for periodic review by the Project Management Team that logs all complaints raised by I&APs about the construction activities.

- The register shall be regularly updated and maintain records, including the name of the complainant, his/her domicile and contact details, the nature of the complaint and if any action was taken to rectify the problem.

vi. Construction Control Plan

The construction control plan to be implemented by the contractor shall include the following key measures:

CONTROL OF ACCESS TO THE CONSTRUCTION RIGHT-OF-WAY

- The utility and safety of any existing access shall not be lowered by construction activities, nor shall spillage, littering, accelerated erosion, or other environmental impacts occur. The contractor shall:
 - Ensure compliance with these requirements;
 - Exercise all relevant health, safety and environmental controls; and
 - Immediately remedy non-compliances and the effects thereof.
- In all areas where construction requires gravelling or other methods of improving vehicle access, the contractor shall completely remove these materials after construction and prior to rehabilitation of the area.
- The contractor shall restrict the number of entry and exit points for security reasons. The contractor shall ensure that his activities do not compromise the landowners or occupier's security.

STORMWATER MANAGEMENT

- The contractor shall ensure that erosion control structures are installed prior to the commencement of construction. These may be permanent or temporary structures.
- Any erosion channels that develop during the construction, operation and maintenance periods shall be backfilled and consolidated immediately. All erosion damage shall be remediated as soon as possible.
- Stormwater drains will be kept clean at all times

CONTROL OF IMPACTS OF CONSTRUCTION ACTIVITIES ON ARCHAEOLOGICAL REMAINS

- In terms of the National Heritage Resources Act (Act No. 25 of 1999) (NHRA), no graves or archaeological sites, including manmade structures more than 60 years old, may be disturbed, damaged or destroyed by any person without requisite arrangements or permits from the, South African Heritage Resource Authority (SAHRA).
- The contractor will make provision for accidental discovery of archaeological sites and graves along the construction footprint. In the event that any sites found are significant enough to warrant conservation, the contractor shall determine whether this is feasible and, if not, immediately notify the Project Management Team.

- In fulfilment of the SAHRA requirements, the contractor/ECO shall prepare the necessary documentation and obtain the permits from the SAHRA to construct through those sites which are directly affected by the construction works.

Cultural Heritage in South Africa (includes all heritage resources) is protected by the **National Heritage Resources Act (Act 25 of 1999) (NHRA)**. According to Section 3 of the Act, all Heritage resources include **“all objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens”**.

If such resources are found during the mining or development activities, they shall not be disturbed without a permit from the relevant heritage resource Authority, which means that before such sites are disturbed by development it is incumbent on the developer to ensure that a heritage impact assessment is done and the Provincial Heritage Resources Authority and SAHRA must be contacted immediately and work must stop.

If anything of Archaeological and/or paleontological significance is found during the construction and operational phase of the mine the following applies:

- NHRA 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- NHRA 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;
- NHRA 38(4)e – The following conditions apply with regards to the appointment of specialists: i) If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;

If fossil remains or trace fossils are discovered during any phase of construction, either on the surface or exposed by excavations the **Chance Find Protocol** must be implemented by the Environmental Control Officer (ECO) in charge of these developments. These discoveries ought to be protected and the ECO must report to SAHRA (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box

4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za) so that mitigation can be carry out by a paleontologist.

Chance Find Procedure

- If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.
- The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
- A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
- Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.

Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.

- The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
- In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
- Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.

REHABILITATION PLAN

- The constructor must ensure that all structures, equipment, materials and facilities used or created on site for or during construction activities are removed once the project has been completed.

- Once the grass has been established, the maintenance period shall commence. This period shall extend for a minimum period of one calendar year.
- The contractor shall prevent concentrated runoff along, or next to, the construction footprint, and shall do so by shaping the land, establishing vegetation, and taking other appropriate measures to absorb and disperse runoff.

OPERATIONAL AND MAINTENANCE MANAGEMENT PLAN

The Operational control plan to be implemented by the contractor shall include the following key measures:

- Energy management and monitoring.
- Water management and monitoring.
- Waste and pollution management.
- Stormwater management

i. Energy Management

- Electricity conservation must be encouraged.

ii. Water Management

- All additional water uses must be registered with the Department of Water and Sanitation
- Water conservation measures must be encouraged.

iii. Waste & Pollution Management

- No on-site burying of any waste is allowed.
- Domestic waste must be stored in approved containers.
- Recycling must be encouraged.
- Domestic waste must be disposed of at a licensed landfill site.

iv. Storm water management

- Any erosion channels that develop during the operation and maintenance periods shall be backfilled and consolidated immediately.
- All erosion damage shall be remediated as soon as possible.
- Stormwater canal will be kept clean at all times.

L. A PROGRAM FOR REPORTING ON COMPLIANCE, TAKING INTO ACCOUNT THE REQUIREMENTS AS PRESCRIBED BY THE REGULATIONS;

External Auditing

The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. In the event where discrepancies are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes.

An audit of the environmental management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards. Audits should be conducted during the construction phase of the facility to ensure adherence to the management measures contained in the EMPr.

The construction audit schedule will be determined by the conditions of the EA. The frequency of the construction and operational audits may vary and will be synchronised with the construction schedule.

The construction of the proposed development can be managed against detrimental impacts on the environment based on the assessment of the impacts and the mitigation measures provided. The Environmental Management Programme has been guided by the following conceptual and actual implementation requirements that broadly reflect best practice in EMPr's:

- **Continuous improvement.** North West University will be committed to review and to continually improve environmental management, with the objective of improving overall environmental performance.
- **Broad level of commitment.** A broad level of commitment is required from all levels of management as well as the workforce in order for the development and implementation of the EMPr to be successful and effective.
- **Flexible and responsive.** The implementation of the EMPr needs to be responsive to new and changing circumstances. This could be realized through rapid short-term responses to problems or incidents, as well as regular planned reviews and revision of the EMP at key stages in the project cycle. The EMPr report is a dynamic “living” document that will need to be updated regularly throughout the duration of the project life-cycle.
- **Integration across operations.** The EMPr needs to be integrated across existing line functions or operational units. This is when the full benefits of the EMPr can be realized and requires a change in mind-set from seeing environmental management as the domain of one unit (e.g. the Health, Safety and Environmental Department in a company), to being an imperative that cuts

across all line functions. This is necessary if the higher principles of sustainable development are to be realized.

M. AN ENVIRONMENTAL AWARENESS PLAN DESCRIBING THE MANNER IN WHICH-

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

Environmental awareness programme and reporting forms an integral part of an EMPr. For this reason, a procedure will be developed that will describe the means by which the Project Manager, Contractor and/or ECO will communicate with employees as well as I&APs on issues concerning the environment. The Applicant must acknowledge the importance of effective communication both internal and external, and as such will maintain communication channels, both within the company and with I&APs.

In general, the objective of this procedure will be to:

- Ensure that employees understand the Environmental policies and objectives;
- Ensure that information regarding the environment is communicated effectively and is readily accessible to the relevant parties;
- Improve feedback of operational and environmental performance to management;
- Provide for the establishment of forums to discuss environmental issues, allocate resources and ensure that adequate measures are being taken to address the environmental problems;
- Provide guidelines for communication with external organisations and I&APs;
- Ensure effective and constructive response with I&APs, and
- Ensure that records of environmental communication and interaction are documented and filed in an easily accessible storage system.

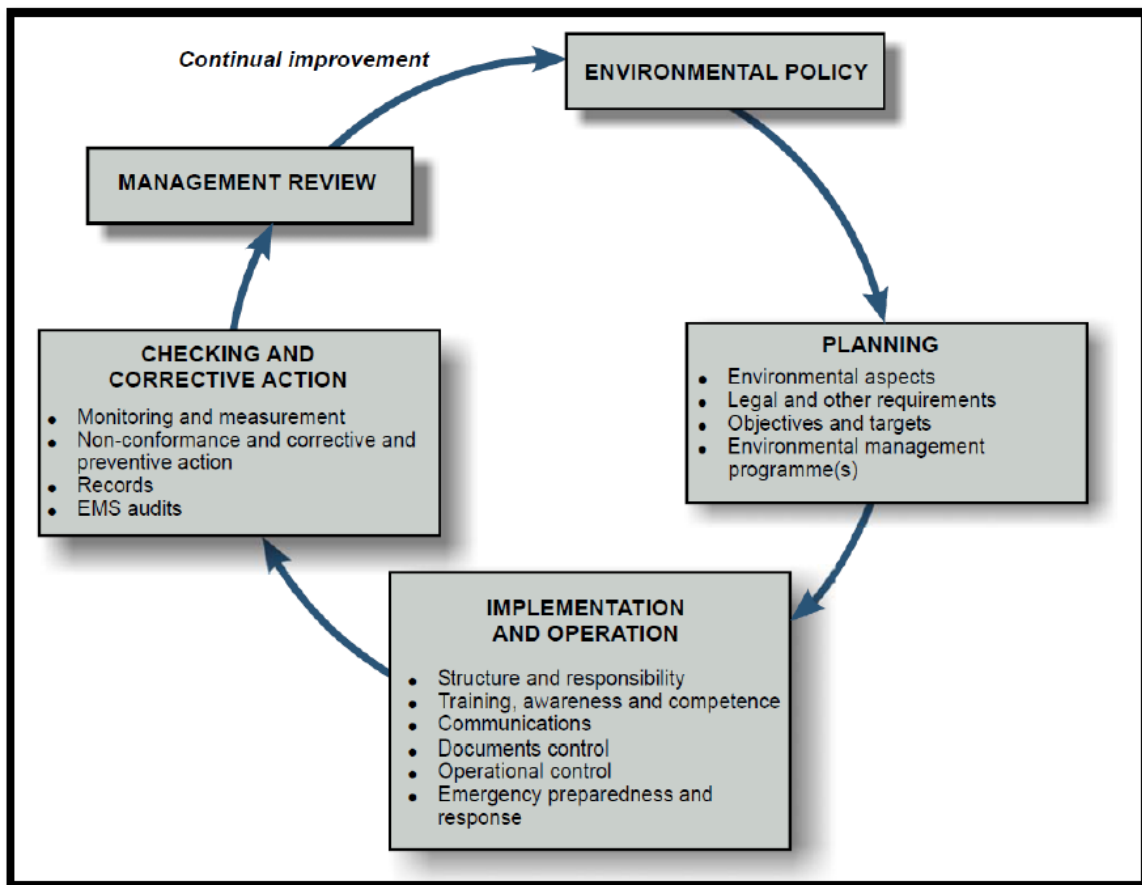


Figure 3: Environmental management circle

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

Internal communication will be conducted on a monthly basis at the project site as follows:

- Environmental induction – North West University will include environmental awareness in its induction programme for employees and contractors. A detailed environmental management and training programme must be developed. Included in this will be the environmental requirements stipulated by this EMP. Where required, specialists will be drawn in to assist with the training programme.
- Management meetings – North West University will conduct monthly meetings where relevant Environmental, Community Health, and Safety issues are discussed with the Site Manager.

External communication and awareness campaign

External communication will be conducted as follow:

- Stakeholder Register – North West University must have a comprehensive Stakeholder Register as a result of the EIA process. The register contains

a list of all stakeholders and includes the name of the stakeholder organisation and contact details of the I&APs. This register will be maintained by the ECO and updated on an annual basis.

- Stakeholder Reports – reports (i.e. Environmental, Students Health, and Safety report) will be prepared annually and distributed to all the major stakeholders.
- External Complaints Register – An external complaints register will be stationed at the site offices. If a complaint and/or concern are raised, a formal Incident Investigation will be opened, managed and investigated by the ECO.

A central complaints register will be kept by the ECO and updated and monitored on a monthly basis. Records will be kept of the external complaints, as well as the follow-up investigation and actions taken. Regular contact will be kept with the complainant until the complaint has been suitably addressed.

N. ANY SPECIFIC INFORMATION THAT MAY BE REQUIRED BY THE COMPETENT AUTHORITY.

No information yet.

*******END OF REPORT*******