

# **ENVIRONMENTAL MANAGEMENT PLAN**

**FOR**

**THE CONSTRUCTION AND OPERATION OF THE PROPOSED**

**J.N VAN DYK T/A PUMA PARADISE SERVICE STATION ON**

**ERF 1296 RUNDU EXTENSION 4 INDUSTRIAL AREA**

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## **1.1 INTRODUCTION**

This Environmental Management Plan (EMP) has been developed to address potential environmental impacts associated with activities of the proposed renovation (construction) and operation of J.N Van Dyk T/A PUMA Paradise Service Station which will be located on serviced ERF 1296, in Rundu Extension 4 area. The EMP has been developed in terms of the Environmental Management Act (EMA), 2007, the EIA Regulations – 2012, the EIA policy of 1995 and international environmental treaties and conventions Namibia is a signatory of. This proposed project development is foreseen to be a standard service station which will support the erection of a fuel retail facility which includes forecourt, steel canopy and underground fuel storage tanks as well as a Convenience shop for service station users.

According to the Environmental Management Act (2007) and its Regulations (2012), development of a service station is one of the listed activities under the hazardous substance treatment, handling and storage, which require an Environmental Clearance Certificate as specified as follows:

*“The storage and handling of dangerous goods including petrol, diesel, liquid petroleum, gas or paraffin, in containers with a combined capacity of more than 30 cubic meters at any one location. The construction of filling stations or any other fuel facility underground or above ground storage of dangerous goods including petrol, diesel, liquid, petroleum, gas and paraffin.*

## **1.2 PROJECT ACTIVITIES**

The project will undergo three phases which are pre planning, construction and operation phases. The EMP will not cover the decommissioning phase of the project. The pre-planning, construction and operation phases will involve the following activities:

**Table 1: Project phases and activities.**

<b>Pre-planning phase</b>	<b>Renovation/Construction phase</b>	<b>Operational phase</b>
Screening relevant legislation	Site preparation, barricading site, placing construction site warning signs	Fuel distribution
Obtaining compliance/mandatory certificates	Excavation for reticulations(pipelines); old storage fuel tanks, removal of interlock pavers	Off-loading of fuel
Appointing Contractors	Renovating existing buildings with steel works, concrete/masonry work and carpentry works	Convenient shop services
	Transportation of construction material	Dispensing of fuel into vehicles
	Installation of new underground fuel tanks,	Corrective Maintenance
	Installing an oil/water separator	Tyre services
	Construction of the entire service station	Car washing services
	Electricity and water installation	
	Site clearance	
	Compliance Inspections	

## CONSTRUCTION PHASE

### 1.2.1 Health and Safety

Health and Safety processes play a vital role in minimizing the high number of accidents and risks on a construction site and the consequences this has for workers, as such, they should be implemented from the start. Thus, it has become a very important Aspect that should be included in the EMP. All the workers on the construction site must work together and adhere to all the necessary precautions to prevent injury and death. Table 2 below shows the impacts of poor Safety and Health patterns as well as their remedial measures and responsible authority.

**Table 2: Effects of poor Occupational Safety and Health practices management plan.**

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
Occupational Safety and Health	<ul style="list-style-type: none"> <li>Occupational Safety and Health risks can cause injuries, health risks to construction workers and the nearby residents.</li> <li>Solid waste pickers, electricians, brick layers, painters, welders, drivers and other general workers during construction phase are subjected to potential health and safety risks.</li> </ul>	<ul style="list-style-type: none"> <li>Electrical shock</li> <li>Heights when doing masonry, welding or painting works.</li> <li>Static postures, long working hours, prolonged exposure to hazardous working conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Provide workers with protective clothing.</li> <li>Promote Safety, Health education and create awareness to all the workers.</li> <li>Appoint a site Safety and Health practitioner.</li> <li>Construction warning signs, barricading unsafe places.</li> </ul>	<ul style="list-style-type: none"> <li>Appointed Safety Officer/SHE representative</li> <li>Project Manager</li> <li>Contractor</li> </ul>

### 1.2.2 Waste generation and disposal

The environmental impacts of construction waste include soil contamination, water contamination, and deterioration of landscape. Also, construction waste has a negative economic impact by contributing additional cost to construction due to the need to replace wasted materials. According to Fadiya, Georgakis, & Chinyio, (2014) the construction industry generates about 35% of industrial waste in the world. Identifying potential waste early in the design process decreases waste generated during construction as well as negative economic impact, thus included in the EMP. Table 3 below shows the impacts of waste generation arrays as well as their remedial measures.

**Table 3: Effects of waste generation and disposal management plan.**

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
<b>Waste generation</b>	<ul style="list-style-type: none"> <li>• Pollution of the environment</li> <li>• An increase in trips for waste removal due to an increase in construction waste.</li> <li>• Illegal dumping of construction waste, attracts vagrants</li> </ul>	<ul style="list-style-type: none"> <li>• lack of proper waste management practices,</li> <li>• Packaging</li> <li>• products of demolition</li> </ul>	<ul style="list-style-type: none"> <li>• All construction workers should be made aware of their responsibility in waste management and of the correct means of disposing of waste.</li> <li>• Waste bins with lids should be provided at strategic locations on site for all general waste.</li> <li>• All general waste shall be disposed of at a suitably registered landfill site as agreed with the town council.</li> <li>• Explore management options, which include reduction, recycling, and disposal of wastes.</li> </ul>	<ul style="list-style-type: none"> <li>• Appointed Safety Officer/ SHE representative</li> <li>• Project Manager</li> <li>• Contractor/ Subcontractor</li> <li>• All Employees</li> <li>• All visitors</li> </ul>

### 1.2.3. Noise Pollution

Construction sites produce a lot of noise, mainly from vehicles, heavy equipment and machinery, but also from workers shouting. Excessive noise is not only annoying and distracting, but can lead to hearing loss, high blood pressure, sleep disturbance and extreme stress. Table 4 below shows the impacts of Noise pollution patterns as well as their remedial measures.

**Table 4: Noise pollution management plan.**

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsible
Noise pollution	<ul style="list-style-type: none"> <li>• Increase in ambient noise levels causing annoyance to people living in close proximity of the development.</li> <li>• Disturbance of surrounding residents.</li> <li>• Resulting in health issues.</li> </ul>	<ul style="list-style-type: none"> <li>• Equipment and machinery</li> <li>• vehicles</li> <li>• Workers shouting</li> <li>• General construction noises</li> </ul>	<ul style="list-style-type: none"> <li>• Construction work should be limited to working hours between 07:00 am to 17:00 pm on Weekdays and,</li> <li>• If work takes place over weekends noisy work should be limited to Saturday mornings between 08:00 am and 12:00pm.</li> <li>• If any noisy work is to be scheduled outside of the permitted times prior permission should be obtained from the town council and notices should be placed prominently to notify neighbours.</li> </ul>	<ul style="list-style-type: none"> <li>• Appointed Safety Officer/ SHE representative</li> <li>• Project Manager</li> <li>• Contractor/ Subcontractor</li> </ul>



### 1.2.4 Dust generation

Dust is categorized by any particulate matter that is smaller than 10 microns in diameter. All construction sites generate high levels of dust (from concrete, cement, wood, stone, silica) and this can be carried over a long distance. Construction dust is classified as PM10 - particulate matter less than 10 microns in diameter, invisible to the naked eye. Table 5 below shows the impacts of Dust generation patterns as well as their remedial measures.

**Table 5: Dust pollution management plan.**

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
Dust generation	<ul style="list-style-type: none"> <li>Suspended dust can potentially cause irritation to the workers on site as well as the neighbors.</li> </ul>	<ul style="list-style-type: none"> <li>From construction activities and rubble removal.</li> </ul>	<ul style="list-style-type: none"> <li>Dampening soil and excavations during work to reduce the likelihood of dust becoming suspended.</li> <li>Providing all operators of cutting and grinding equipment with the necessary personal protective equipment.</li> <li>Limiting dust generating activities to times when winds are strong.</li> <li>Spraying trucks down with water to prevent dust particulates from being suspended while being transported</li> </ul>	<ul style="list-style-type: none"> <li>Appointed Safety Officer/ SHE representative</li> <li>Project Manager</li> <li>Contractor/ Subcontractor</li> </ul>

### 1.2.5 Traffic congestion

Construction is likely to cause temporary traffic delays and temporarily make it more difficult to access development adjacent to the Preferred Alternative corridor. Temporary obstructions in the roadway and the influence on adjacent developments must be considered. Table 6 below shows the impacts of Traffic congestion patterns as well as their remedial measures.

**Table 6: Effects of Traffic congestion management plan.**

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
Traffic congestion	<ul style="list-style-type: none"> <li>• Disruption of current traffic flows.</li> <li>• During this phase possible traffic congestion or increase in congestion, temporary obstructions in the roadway and the influence on adjacent developments must be considered.</li> </ul>	<ul style="list-style-type: none"> <li>• Movement of construction vehicles and abnormal vehicles or freight.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction personnel should make use of main roads in as far as is reasonably possible and construction vehicles should be as few as reasonably possible.</li> <li>• The detail design of the proposed filling station should adhere to the prescribed specifications (and subsequent approval) of the applicable road authorities;</li> <li>• Care should be taken relating to the placing of signage in the proximity of access points to the proposed service station;</li> </ul>	<ul style="list-style-type: none"> <li>• Appointed Safety Officer/ SHE representative</li> <li>• Project Manager</li> <li>• Contractor/ Subcontractor</li> </ul>

### 1.2.6 Visual pollution

Temporary visual impacts will include the presence of equipment and workers, temporary changes in the views of travelers when rerouting is necessary and the addition of traffic or increased time during which traffic remains in a particular area due to increased congestion. Table 7 below shows the impacts of Visual pollution as well as their remedial measures.

**Table 7: Visual effects management plan.**

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
Visual pollution	<ul style="list-style-type: none"> <li>Construction will cause temporary loss of visual quality.</li> </ul>	<ul style="list-style-type: none"> <li>Construction activities.</li> </ul>	<ul style="list-style-type: none"> <li>The construction site should be kept very neat and organized to reduce visual pollution.</li> </ul>	<ul style="list-style-type: none"> <li>Appointed Safety Officer/ SHE representative</li> <li>Project Manager</li> <li>Contractor/ Subcontractor</li> </ul>

**OPERATIONAL PHASE**

**1.3.1 Service station Operation**

The primary function of gas stations is to provide gasoline and diesel fuel to customers, who refill vehicle tanks and canisters. Operating a gas station requires receiving and storing a sufficient amount of fuel in storage tanks and then dispensing the fuel to customers. The operation of a service station comes with associated disadvantages. Table 8 below shows the impacts of a Service station operation and their remedial measures.

**Table 8: Effects of a Service station operation and its proposed Mitigation measures.**

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
Operation of service station	<ul style="list-style-type: none"> <li>• Increase in traffic volumes during fuel scarcity periods.</li> <li>• Contamination of ground and surface water, and transportation of contaminants downstream.</li> <li>• Creating soil erosion in vulnerable areas.</li> <li>• Service station operation results in disturbance of surrounding residents through 24hr service station.</li> <li>• Permanent sight illumination from onsite lighting causing light pollution.</li> <li>• Temporary illumination from accessing vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased hardened surfaces and runoff thereby</li> <li>• Day to day operational activities</li> </ul>	<ul style="list-style-type: none"> <li>• An inclusive noise control policy should be compiled and implemented.</li> <li>• Storm water catchment and oil separators should be installed onsite to capture runoff and separate hydrocarbons.</li> <li>• Lights should be projected inward and downwards thereby reducing the potential negative impact of light pollution for the surroundings.</li> <li>• Maintaining storm drains seasonally</li> <li>• Traffic signs</li> </ul>	<ul style="list-style-type: none"> <li>• Puma Paradise/ project proponent</li> <li>• Supervisor on duty</li> </ul>

### 1.3.8 Hazardous substances spillage and surface runoff

Liquid spillage is commonly associated with soil, storm water and groundwater contamination. At gas stations, fuel is stored and transferred between tanker trucks, storage tanks, and vehicle tanks. During both storage and transfer, a small fraction of unburned fuel is typically released to the environment unless pollution prevention technology is used. Even if the fraction may be small, the cumulative release can be extensive because of the large quantities of fuel sold. The cumulative release of unburned fuel is a public health concern because gas stations are widely distributed in residential areas and because fuel contains toxic and carcinogenic chemicals (Hilpert et al., 2015). Table 9 below shows the impacts of storage and transfer of oil as well as their remedial measures.

**Table 9: Hazardous substances spillage management plan.**

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
Hazardous substances spillage and runoff.	<ul style="list-style-type: none"> <li>Results in the polluting of the surrounding soil and the storm water.</li> </ul>	<ul style="list-style-type: none"> <li>The spillage and runoff of fuel and oil</li> </ul>	<ul style="list-style-type: none"> <li>All areas that generate potentially contaminated storm water should discharge via the oil/water separator.</li> <li>Sealing of the forecourt areas where fuel products will be handled to prevent infiltration of petroleum products into the soil underlying the site;</li> <li>Storm water draining from the surfaces areas should be collected in a sealed sump to be treated; Preventative measures should be installed to prevent the storm water or other liquids draining into the soil;</li> <li>Subsurface fuel tanks must be placed in concrete encasements with a sump system to prevent spilled fuel from draining into the soil.</li> <li>Fuel lines and dispensers should be rendered leak-proof and are recommended to be placed in encasements.</li> </ul>	<ul style="list-style-type: none"> <li>Puma Paradise</li> <li>Site supervisor</li> </ul>

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
Storage and transfer of oil.	<ul style="list-style-type: none"> <li>• Spillage.</li> <li>• The storage and transfer of fuel can result in on-site fires and explosions.</li> <li>• Contamination of surface runoff.</li> <li>• People exposed to spilled / leaked fuel.</li> <li>• Result in the contamination of soil and sub-sequent</li> <li>• Catastrophic surface spillage leading to safety hazard</li> </ul>	<ul style="list-style-type: none"> <li>• Storage and transfer of fuel by either delivery vehicles to Underground Storage Tanks (UST) or by attendants to customers' vehicles</li> <li>• Storage of fuel in Underground Storage Tanks (UST)</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure the safe transportation of fuel to and from site.</li> <li>• The service station should be operated in strict accordance to requirements as set out by head SANS standards;</li> <li>• The petrol station is designed to release petrol vapour into the air, soil and water using pipes connected from (USTs).</li> <li>• Ensure all fire-fighting equipment is readily available, accessible and functioning.</li> <li>• Ensure that relevant signage e.g. no smoking, is displayed in potentially dangerous areas and is abided by everyone;</li> <li>• All employees and sub-contractors onsite must be aware of the relevant HSE policy and implementation thereof, in addition to an Emergency Plan and the EMP and;</li> </ul>	<ul style="list-style-type: none"> <li>• Puma Paradise</li> <li>• Site supervisor</li> </ul>

### 1.3.10 Fuel Vapor Emissions

At gas stations, fuel can be released in both liquid and vapor phases during delivery, storage, and dispensing. Direct vapor release is usually associated with atmospheric pollution, while liquid spillage is commonly associated with soil and groundwater contamination. However, spilled liquid fuel also evaporates into the atmosphere. Almost saturated gasoline vapors can be released to the atmosphere when tanks are refueled, unless a suitable vapor recovery system is in place. This can present danger to the surrounding residential dwellings, businesses, and other buildings such as schools. Table 10 below shows the impacts of Fuel Vapor Emissions as well as their remedial measures.

**Table 10: Fuel Vapor Emission management plan**

Aspect	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
Fuel Vapor Emissions	<ul style="list-style-type: none"> <li>Release of vapors into the surrounding environment during the refilling of the vehicles replenishing, fuel spillage and motor vehicle exhausts.</li> </ul>	<ul style="list-style-type: none"> <li>Evaporation of spillage</li> </ul>	<ul style="list-style-type: none"> <li>The petrol station should be designed to release petrol vapour into the air, soil and water using pipes connected from (USTs).</li> <li>Ensure safe transportation of fuel to and from site and avoid spillage.</li> </ul>	<ul style="list-style-type: none"> <li>Puma Paradise</li> <li>Site supervisor</li> </ul>

### 1.3.11 Soil Erosion

Rapidly moving water can cause soil erosion, resulting from soil above or around the UST system being carried away by wind and storm waters. Table 12 below shows the impacts of Soil erosion and its remedial measures.

**Table 11: Soil erosion management plan**

Environmental components	Potential impacts	Potential source of impact	Mitigation measures	Responsibility
Soil erosion	<ul style="list-style-type: none"> <li>• Could lead to erosion</li> </ul>	<ul style="list-style-type: none"> <li>• Increase in storm water run-off due to an increase in hard surfaces</li> </ul>	<ul style="list-style-type: none"> <li>• Proper measures should be in place to ensure that surface runoff drains into the natural system without resulting in erosion of the soil</li> </ul>	<ul style="list-style-type: none"> <li>• Puma Paradise</li> <li>• Site supervisor</li> </ul>

## 1.4 EMERGENCY PREPAREDNESS AND RESPONSE PLAN (EPRP)

### 1.4.1 Fire

The proponent will develop specific fire boiler explosion and fighting procedures and trained special fire and explosion employees to deal with fires at the project site. Fire warning systems (detection systems and alarms) and firefighting equipment (fire extinguishers) will be installed onsite.

**The following steps will be taken:**

- Appropriate Fire signage around the site.



- Small fires that can be safely extinguished should be put out using the appropriate extinguisher.
- If a fire grows too big to manage by portable extinguishers, emergency procedures will be initiated which include calling the city fire brigade
- At all times, in the event of a fire the employees should be advised to remain calm;
- All personnel will be evacuated in the event of a fire outbreak or explosion.
- A responsible person will be appointed to lead the fire and explosion response team onsite, and also will be responsible for holding a roll call in the event of an evacuation.
- All staff will be trained on fire and explosion response procedures, and drills will be held regularly and the procedures reviewed for improvement.
- All firefighting equipment will be inspected for effectiveness and project premises will be inspected for degree of safety.

#### **1.4.2 Medical treatment and emergencies**

The proponent will employ the services of full time medical personnel with OSH appropriate level of training to handle all medical issues (injuries/accidents, illnesses) throughout the construction phase of the project. The medical treatment and emergency procedures will be developed by this staff in consultation with the Project Manager. All emergency procedures will comply with the Labour Act, safety and health regulations or requirements. The proponent will provide basic medical treatment equipment (ambulance) during construction phase.

#### **1.4.3 Health and Safety Emergency prevention**

- A Safety Health and Environmental Officer shall be employed at the site during construction phase of the project. All people to be employed at the proposed project site will be subjected to a medical assessment to evaluate their fitness for work. All

contractors and subcontractors engaged Puma Paradise, shall be required to employ a Safety Health and Environmental Officer to assist in the identification of hazards and emergency situations

- Employees who are considered emotionally, physically and medically incapable of carrying out their job will not be allowed to operate or drive equipment/vehicles.
- The proponent will not permit any of its employees to operate, drive or operate any vehicles or equipment whilst under the influence of alcohol, drugs or any mind altering medication/drugs.
- All employees working at the project site t should be able to read and understand the signs.
- All risks or hazards should be reviewed frequently, operating procedures updated as per need and communicated to all staff.
- All equipment and vehicles should be inspected and serviced to ensure there are in good working order.
- The proponent will develop safety, health and environment procedures which will be updated and communicated to all employees.

#### **1.4.4 Emergency prevention**

- Employees who are considered emotionally, physically and medically incapable of carrying out their job will not be allowed to operate or drive equipment/vehicles.
- The proponent will not permit any of its employees to operate, drive or operate any vehicles or equipment whilst under the influence of alcohol, drugs or any mind altering medication/drugs during the construction phase of the project.
- All employees working at the site should be able to read and understand the signs.
- All risks or hazards should be reviewed frequently, operating procedures updated as per need and communicated to all staff.
- All storage facilities, equipment and vehicles should be inspected and serviced to ensure there are in good working order.

## **CONCLUSION AND RECOMMENDATIONS**

This Environmental Management Plan provided all the negative impacts and their adequate mitigation measures temporary. Therefore, it should be properly followed and implemented, to help minimize the negative impacts on the environment. To ensure the effectiveness of this document during the life-cycle of the project, it needs to be reviewed throughout all phases particularly when there is a change in mitigation measures. The Environmental Management Plan should be used as an on-site reference document during all project phases and auditing should take place in order to determine compliance with the EMP for the proposed project.

## REFERENCES

Environmental Management Act (2007)

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