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# ENVIRONMENTAL MANAGEMENT PLAN

PROPOSED SUBDIVISION & LAYOUT APPROVAL ON PORTION A OF THE REMAINDER OF PORTION 4 OF THE FARM USAKOS-OST NO.64 ERONGO REGION, NAMIBIA

**PREPARED**

**BY**

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# 1. INTRODUCTION

## 1.1 BACKGROUND INFORMATION/ EXECUTIVE SUMMARY

An EMP is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation (Landcom, 2014).

A site-specific EMP must be prepared for the development on portion A of the reminder of the portion 4 of farm Usakos-Ost no 64. Usakos, Erongo Region in Namibia.. It provides the answers to the following important questions:

- What are the likely environmental issues for the site?
- What likely harm these issues can cause to the surrounding environment?
- How will you manage these issues to minimize harm to the environment?

Extra Time CC was appointed as independent environmental assessment practitioners to undertake an Environmental Impact Assessment process and to complete the Environmental Management Plan (EMP) for the project on undeveloped land.

This document represents the Environmental Management Plan or Statement (EMP / EMS) for the proposed Development - portion A of the reminder of the portion 4 of farm Usakos-Ost no 64. Usakos, Erongo Region in Namibia.. The contents of the EMP will be binding on all parties who have a role to play in the design, construction, and operation and decommissioning of the facilities, as relevant to the roles played.

## 1.2 THE ORIGIN AND CONTEXT OF THE ENVIRONMENTAL MANAGEMENT PLAN

Digists Investment cc is proposing development on portion A of the reminder of the portion 4 of farm Usakos-Ost no 64. Usakos, Erongo Region in Namibia. This EMP requires the developer to compel each contractor/s to comply with this Environmental Management Plan and is compiled to manage the establishment of the aforementioned township. This EMP has been compiled by Extra Times Environmental Consultants CC, and is subject to changes to cope with new circumstances, requirements of the Developer/Contractors, Community or other authorities as they arise. The contents of the EMP was prepared in accordance with the requirements set out in Namibian Procedure and Guidelines for EIA and EMP published in the Government Gazette No.1 of April 2008.

## 1.3 THE PURPOSE OF THIS ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Act no.7 of 2007 requires each development project in Namibia to conduct an Environmental Impact Assessment after which an Environmental Management Plan is to be prepared.

The principles envisaged by the Namibian Environmental Management Act 7 of 2007 stipulate that:

a) Environmental assessments must be conducted for developments that affect the environment;
b) The public must be involved in decisions affecting their environment;
c) Precaution must be taken to prevent environmental damage, and if it cannot be prevented it must be reduced, limited or controlled.
d) Renewable resources must be used on a sustainable basis for the benefit of current and future generations of Namibians;
e) Reduction, re-use and recycling of waste must be promoted;

The principles above apply to all activities that have an impact on the natural environment, and these principles must be mandatorily adhered to by both Government and individuals and institutions.

The tool of Environmental Assessment (EA) has been used effectively for over twenty years, and it's a process of identifying, predicting and evaluating the socio-economic and biophysical impacts of a development on the environment prior to the development being implemented.

Mitigation measures are then sought for each significant impact. These mitigation measures are described in an Environmental Management Plan (EMP), which stipulates in practical terms how they will be implemented, who will do them, and how their effectiveness will be monitored.

In terms of the Namibian Environmental Impact Assessment (EIA) Regulations (Government Notice (GN) 28, 29, and 30 promulgated on 6 February 2012) enacted in terms of the Namibian Environmental Management Act (Act no. 7 of 2007) (EMA), the proposed project triggers Activities 1(a; b), 5.1 (c), 8.1, 8.8, 8.9 and 10.1 in terms of Regulation GN 29. As the proposed project triggers activities listed in terms of the Regulations, it is necessary to apply to the Ministry of Environment and Tourism: Directorate of Environmental Affairs (MET: DEA) for authorization by way of an Environmental Clearance Certificate (ECC).

The EIA process comprised a full Scoping process that included an assessment of all potential environmental impacts as identified through the process. Section 8 (j) of

the EIA Regulations require that a EMP is submitted as part of the Scoping Report so that these documents can be considered simultaneously.

The 2012 EIA Regulations define a **'Management Plan'** as: "…a plan that describes how activities that may have significant environments effects on the environment are to be mitigated, controlled and monitored." The EMP has been included in the part of EIA Report to provide a link between the impacts identified in the EIA Process and the required environmental management on the ground during project implementation and operation. The purpose of this document is to guide environmental management throughout the proposed project development.

The scope of an EMP will vary depending on the scale and type of the development project. The consultant, Extra TimesConsultants CC, considered the proposed site in its local and regional context in the of this EMP.

An EMP is developed in stages. These stages are:


## 1.4 THE SCOPE OF AN EMP:

The proponent is committed to protecting the environment from its activities and requires the same commitment from its service suppliers through development and implementation of an EMP.

It is the civil contractor's responsibility to prepare a site-specific EMP and submit it to the project manager for approval.
This Environmental Management Plan was prepared in line with the following generic steps:

**Commitment:**

**Step 1:** Statement of Commitment:

Objectives are to:

- Fully comply with applicable environment protection legislation,
- Comply with Namibia's environmental guidelines and requirements,
- Minimise damage to the environment caused by construction activities.

**Planning:**

**Step 2:** Listing environmental issues related to construction / establishment site activities and identifying their likely impact on the surrounding environment. There is every need to be aware of sensitive natural features surrounding the site that can potentially be affected by proposed activities onsite.

**Step 3:** Spelling out the legal requirements, regulations, conditions as stated in Background Information Document (BID).

These issue are then Related to issues listed in Step 2. These requirements are included in training programme.

**Step 4:** Writing a series of simple work instructions to ensure compliance with the legal requirements as well as minimising damage to the environment. Provision of training for staff appropriate to their level of knowledge.

**Step 5:** Preparing an Emergency Plan for the site:

- Identification of the likely emergency situations that can arise on the site.
- The list prepared in Step 2 is helpful for this step
- Determining the actions required to manage each of the emergency situations.
- Identifying relevant authorities and person(s) to be contacted in each emergency situation.
- Preparing a List of Emergency Contacts with up-to-date contact details.
- Preparing a site map and a locality map.

**Implementation:**

**Step 6:** Assigning responsibility for implementing the Work Instructions.

**Step 7**
- Providing adequate training to the personnel responsible for implementation of the EMP components.
- Making sure all site personnel are aware of the Work Instructions applicable to their tasks.

**Monitoring & Reporting**

**Step 8: Preparing monitoring report card:**

- Identification of what should be measured for compliance purposes as specified by the legislative requirements (for example, dust emissions, water quality

discharged from sedimentation basins). These measuring requirements should be evident from the EMP.

- Including Namibia's monitoring requirements
- Determining how often we will measure.
- Measuring what has been identified.
- Submitting report card to relevant authorities.
- Establishing an in-house audit process.

## 2. CHECKLISTS FOR THE PROPOSED TOWNSHIP ESTABLISHMENT

### 2.1 DETAILED DESCRIPTION OF THE DEVELOPMENT:

Development on portion A of the reminder of the portion 4 of farm Usakos-Ost no 64. Usakos, Erongo Region in Namibia.

### 2.2 BRIEF DESCRIPTION OF THE SURROUNDING AREA:

The proposed site is situated along B2 road aproximetly 2 km from the town center; this proposal takes up the other portion of the area that is available for development purposes as established in the Usakos town Planning Sheme

### 2.3 IS THE PROJECT SIGNIFICANTLY DIFFERENT FROM THE SURROUNDING LAND USE?

No, it is located in the vicinity of existing commercial and residential developments in the town of Usakos on portion A of the reminder of the portion 4 of farm Usakos-Ost no 64. Usakos, Erongo Region in Namibia.

### 2.4 ARE ANY OF THE FOLLOWING LOCATED ON THE SITE CHOSEN FOR THE DEVELOPMENT?

- River, stream, dam, wetland – there no existing River to the northern part of the project
- Open space area – there are nine erven reserved as open space
- Residential (formal or informal settlement)- yes in 2 km west of the proposed development
- Area of cultural importance, e.g. graveyards, old houses, museum, etc. – no
- Cadastral – yes, there is an existing cadastral

### 2.5 ARE THERE ANY PROTECTED AREAS CLOSE TO THE PROPOSED SITE?

No.

### 2.6 WILL THE PROJECT BE CONSIDERED A NOISY INTRUSION TO THE NEIGHBOURS?

No, the increased noise levels will be during construction and thereafter, it will be general noise levels of a residential area or setting

### 2.7 WOULD IT BE NECESSARY TO CONSTRUCT ROADS TO ACCESS THE PROPOSED SITE?

No, the existing access road will be used, with access roads created within the vicinity / erven.

# 3. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

## 3.1 INTRODUCTION

The EMP has been divided into four different phases associated with the proposed development namely the 1) pre-construction planning phase, 2) the construction phase and 3) operational phase. This EMP will be considered a Final EMP if approved.

It should be read in conjunction with the contract documentation to ensure the contractor works in an environmentally sensitive manner, thus ensuring the impacts on the environment and neighbouring community are kept to a minimum or sustainably. Should there be any conflict between the EMP and project specifications, then terms herein shall be secondary.

## 3.2 OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PLAN

The aim of the EMP is to ensure that the negative impact on the environment due to the proposed development is limited or maintained sustainably. To achieve this, the EMP has the following clear objectives:

- To identify possible negative impacts of the proposed activity on the environment and mitigation thereof.
- To provide information on construction activities associated with the identified environmental issues.
- To provide guidelines for the management of the identified environmental issues.
- To provide guidelines to the responsible person to follow appropriate Contingency Plans or Measures in the case of various possible impacts.

## 3.3 RESPONSIBLE PERSONS (S)

The implementation of this EMP requires the involvement of various stakeholders, each with specific responsibilities to ensure that the development is completed in an environmentally sensitive manner.

**The Developer**: Digits Investment cc

**Responsibility:** To implement the final EMP after approval before commencement of the construction phase and ensure the proposed development comply with the environmental requirements of the Republic of Namibia.

**The Project Consultants**: Extra Times Consulting CC

**Responsibility:**

- To undertake the detailed design for the proposed development and to ensure that necessary permit has been obtained.
- To ensure the contractor sign the EMP before commencement of construction work.

**The Environmental Control Officer:**

Responsibility:

- To ensure that the contractor implement the EMP for the duration of the project from pre-construction to post-construction (decommissioning).
- To review the method statements with the resident engineer.
- To maintain direct open line between the project consultant, contractor.
- To audit the implementation of the EMP and compliance to the environmental authorisation once a month until project completion.

**The Contractor:**

Responsibility:

- To implement the EMP and keep a copy of the EMP on-site for the duration of the construction phase because obligations imposed by the EMP are legally binding to environmental legislation.
- To comply with the environmental regulations and undertake his construction activities in an environmentally sensitive manner and rehabilitation of the site.
- To undertake good housekeeping practices during duration of the project.
- To ensure that adequate environmental awareness training takes place in the language of the employees.

**Designated Environmental Officer:**

Responsibility:

- To implement the Environmental Management Plan.
- To maintain records of environmental queries for duration of the construction.
- To resolve environmental issues during the construction phase of the project.

**The Project Steering Committee**:

The Project Steering Committee (PSC) comprises of representatives of the Project Consultants, Engineers, Councillors, Ward Committee, Local Community and Contractor

**Responsibility:**

- To monitor the implementation of the EMP.
- To assist in sourcing general workers from the local community.
- To ensure participation of local contractors during construction.
- To assist in resolving social or environmental issues that may arise during construction.

### 3.4 METHOD STATEMENT

A Method Statement, sometimes called a "safe system of work", is defined as a document detailing how a particular task or activity will be carried out. It should detail the possible dangers / risks associated with a particular part of the project and the 'methods" of control to be established, to show how the work will be managed safely (BSH Conferences, 2015; HS Direct, 2015). The contractor should give a written statement to the Resident Engineer at least two weeks before the activity so that any irregularities can be handled before construction commences and also communicated to the employees. The format of the method statement should clearly indicate the following:

1. Construction and Operational Procedures

2. Materials and Equipment used

3. How and where materials will be stored

4. Plan of Action (When actions will be undertaken)

Based on the EMP specifications, the following Method Statements are required as a minimum:

- Site clearing
- Site layout and establishment
- Storage of hazardous substances and accidental spillages of hazardous substances
- Cement mixing
- Waste management procedures
- Wastewater management procedures
- Traffic accommodation
- Erosion remediation
- Fire control and emergency procedures

### 3.5 SITE ENVIRONMENTAL AWARENESS TRAINING (SEAT)

The interactive trainings should be developed for site supervisors, managers and the general workers with the aim of providing with an introduction to environmental issues on construction site.

SEAT is designed to meet the basic environmental knowledge that the subcontract chain are required to prove to major contractors, and covers the environmental aspects of the Environmental Management policies and regulations. SEAT is designed to bring the construction workers environmental and sustainability knowledge up to date by giving a thorough overview of the subject, relevant legislation and the industry best practice.

It will enable them to identify, control and minimise the environmental impacts of their work and where possible identify environmental improvements opportunities.

The briefings and trainings should be done by the Environmental Control Officer prior to construction in the form of an on-site talk (toolbox talks).

The basic rules of conduct, which should be considered for the duration of the project, are tabulated below.

**Table 1: Basic Conduct Rules during Construction Phase**

| Do | Do Not |
|---|---|
| • Use of proper ablution facilities provided | Make open fires for cooking, dedicated areas should be provided during construction |
| • Clearing of the work areas of litter , rubbish | Allow any cement bags or litter to be blown around the place |
| • Timeous report all leakages and/or spillages | • Access the neighbouring properties without the owners' consent |
| • Confine work and storage of equipment and comply with all safety procedures | • Collect fire wood in neighbouring areas |
| • Provide fire extinguisher in good working condition and easily accessible | • Dispose of cigarettes and burning matches randomly |
| • Use areas designated for food preparation | • Do not leave food lying around |
| • Only emergency repairs of construction vehicles is allowed on the construction site | • Enter any fenced off neighbouring areas |
| • Use all safety equipment and comply with all safety procedures | • Dump any waste substance into the donga |
| • Prevent excessive dust and noise | • Electrical services and equipment should not be interfered and/or tempered with |

### 3.6 RECORD KEEPING

There should be an up-to-date filing system at the Site Office for the duration of the project whereby Method Statements, Environmental Incidents Report, Training Records, Audit Reports and Public Complaints Register are kept. It is advised that photographs of the site should be taken pre-, during and post-construction as a visual reference. These records should be kept for a minimum of 2 years after completion of the project.

### 3.7 PENALTIES

In cases of transgressions and non-compliance to the EMP by the contractor, s/he should be liable to a penalty fine. Transgressions should be recorded in a dedicated register, and be kept at the site office for the duration of the project. The Resident Engineer will issue the penalties in terms of the severity on the environment; however, *Table 2* below may be used as a guideline.

**Table 2: Penalties for Transgressions**

| Transgression | Penalty |
|---|---|
| | |
| **Concrete mixing on the ground** | **N$4,000.00** |
| **Spillages** | **N$4,000.00** |
| **Soil erosion** | **N$2,500.00** |
| **Veld fires** | **N$3,000.00** |

The Environmental Management Plan is outlined in *Table 3* below. Adherence to this plan during construction will ensure that the environmental impacts associated with the proposed development will be mitigated to a greater extent thus promoting sustainable development. The commitment and co-operation of the identified responsible person (s) will ensure effective implementation of the EMP pre-construction and post-construction; therefore it is imperative that there is file dedicated for Environmental Documentation.

## 4. LEGAL FRAMEWORK

Construction must be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the EMP are legally binding in terms of environmental statutory legislation and in terms of the additional

conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

**List of the relevant legislation**

- **Constitution of the Republic of Namibia (1990)**
- **Environmental Management Act, No. 7 of 2007**
- **Environmental Assessment Policy (1994)**
- **Waste Management Policy**
- **Regulations relating to the Health and Safety of Employees at Work (promulgated interims of Section 101 of the Labor Act, No. 6 of 1992 (GN156, GG 1617 of 1 August 1997)**
- **Affirmative Action (Employment) Act, No. 29 of 1998**
- **Labor Act, No. 11 of 2007**
- **Water Act (Act 54 of 1956)**

## TABLE 3: ENVIRONMENTAL MANAGEMENT PLAN

| ASPECT | POSSIBLE IMPACT | MITIGATION PLAN | RESPONSIBLE PERSON (S) |
|---|---|---|---|
| **1. PRE-CONSTRUCTION PHASE** | | | |
| **Project Contract and Programme** | Adherence to the EMP | • The EMP must be included in the tender documentation and a copy of the EMP should be available on-site for the duration of the project.<br>• The environmental responsibilities should be formalized and environmental awareness should be introduced to the labourers in their language as Toolbox Talks. | **CONTRACTOR & ENGINEERS** |
| **Location of Camp and Depot** | Environmental damage | • The camp depot should be located in an area where adjacent landowners, land users and NamPower servitudes are not disturbed or obstructed.<br>• The contractor should provide the project consultant/ engineer with the Layout Plan of the camp depot for approval before commencement with the construction phase. The plan should include site offices, temporary fencing boundary, sanitation facilities, waste and petroleum products storage facilities, stockpiling areas, etc.<br>• The parking of vehicles, storage of equipment and materials must strictly be confined to designated areas.<br>• If located on the "virgin" ground, area to be rehabilitated once the project is completed. | **CONTRACTOR & ENGINEERS** |
| **Water . Supply** | Source of water during the construction phase | • Potable water must be available at the camp depot, office site and construction site. It should be obtained from the local municipality.<br>• No boreholes can be established without municipal approval. | **CONTRACTOR, ENGINEERS & USAKOS TOWN COUNCIL** |
| **Access Control** | Hazards to animals, and stealing of construction materials | • Fence or suitably secure main site office and material storage area.<br>• Unauthorized entry should be prohibited. | **CONTRACTOR, ENGINEERS & USAKOS TOWN COUNCIL** |

| ASPECT | POSSIBLE IMPACT | MITIGATION PLAN | RESPONSIBLE PERSON (S) |
|---|---|---|---|
| **Access Route** | Erosion and dilapidation of the access route | • Upgrade the access road used during construction to an acceptable condition.<br>• Proper maintenance should be done to ensure the quality of the access road. | **CONTRACTOR & ENGINEERS** |
| **Power Supply** | Safety Impacts | • Limit the power supply cables & ensure the safety of the workers and neighbouring residents.<br>• All health and safety laws and regulations should | **CONTRACTOR & ENGINEERS** |
| **Solid Waste** | Littering/ Pollution of environment with waste materials | • Refuse receptacles with lids should be placed at the camp depot and on the construction sites.<br>• They should be easily accessible.<br>• System for regular waste removal must be set up.<br>• Refuse bins should be clearly marked to avoid mixing of hazardous and general waste<br>• Letter or agreement between contractor and pollution control officers or companies dealing with hazardous waste should be on site. | **CONTRACTOR & ENGINEERS** |
| **Sewage** | Pollution of environment with waste materials | • Adequate sanitation facilities e.g. chemical toilets must be provided at the camp depot and construction site.<br>• Letter of consent from a registered waste facility to allow contractor to empty the toilet facility at their sewer system should be in the environmental document. | **CONTRACTOR & ENGINEERS** |
| **Social & Socio-Economic Aspects** | Dissatisfaction | • A Project Steering Committee (PSC), which comprises of the Usakos Town Council, Engineers, contractors and Community Representatives must be convened and details of the project discussed.<br>• The PSC must meet regularly to address any concerns/ issues from the neighbouring land users and employing local labourers. | **CONTRACTOR & ENGINEERS** |
| **Health & Safety** | Danger | • The site should be clearly demarcated for safety reasons and non-employees, neighbouring community and passer-by shouldn't be allowed on the construction site as a | **CONTRACTOR & ENGINEERS** |

| ASPECT | POSSIBLE IMPACT | MITIGATION PLAN | RESPONSIBLE PERSON (S) |
|---|---|---|---|
| | | precautionary measure.<br>• The contractor should provide employees with suitable equipment to protect them from hazards being presented and that will allow them to work without risk to the health in a hazardous environment, e.g. hard hats, gloves, boots, etc.<br>• Safety signs complying with Safety standards should be placed on-site in a manner clearly visible to the public.<br>• Construction methods should adhere to the SHE Regulations<br>• A safety officer and/or rep should be appointed prior to commencement of construction | |
| **ASPECT** | **POSSIBLE IMPACT** | **MITIGATION PLAN** | **RESPONSIBLE PERSON (S)** |
| **2. CONSTRUCTION PHASE** | | | |
| **Flora** | Loss of vegetation | • Removal of vegetation in the construction area is inevitable; however the topsoil must be reserved and used as a top layer on disturbed areas to enable plant succession.<br>• Vegetation clearance should be confined to the development footprint and set out to avoid substantial vegetation disturbance.<br>• Rehabilitate denuded areas with appropriate species as per specifications.<br>• All excavations to be filled and rehabilitated before construction moves off sites. | **Contractor, Engineer, DEO and ECO** |
| **Fauna** | Disturbance to fauna in the area | • No hunting, snaring, shooting, nest raiding or egg collection by the construction staff should be allowed. | **Contractor, Engineer, DEO and ECO** |
| **Topsoil** | Loss of Topsoil | • Exposure of bare ground will be minimized. Topsoil stripping should be limited and it should be stored separately from subsoil, i.e. no mixing of soils.<br>• In situ material should be removed to an average depth of 1000mm.<br>• Cleared and grubbed topsoil must be stockpiled as a top layer of at least 150mm thickness on the backfilled trenches for rehabilitation purposes.<br>• Soil conservation measures such as berms, gabions and mats should be used on-site to help reduce erosion.<br>• Topsoil stockpile should be litter and weed free. | **Contractor, Engineer, DEO and ECO** |

| ASPECT | POSSIBLE IMPACT | MITIGATION PLAN | RESPONSIBLE PERSON (S) |
|---|---|---|---|
| | | • Litter should be removed from the stockpiled topsoil. | |
| **Geotechnical** | Disturbances of structural faults and possibility of trenches collapse and cracking of settlements | • A contour map be utilised to determine the best possible design in terms of drainage.<br>• The transported material found in the first 500mm should be saturated with water and compacted with an impact roller or rammer to ensure a collapse prior to the construction of any structures.<br>• Heaving clays must be considered during the design phase. | **Contractor, Engineer, DEO and ECO** |
| **Land Capability** | Degradation of land capability | • Areas on construction sites that were compacted by construction activities should be ripped to allow re-establishment of natural vegetation. The disturbed area must be rehabilitated as to adhere to municipal standards & requirements, where necessary. | **Contractor, Engineer, DEO and ECO** |
| **Topography** | Disturbing the natural topography | • Trenches, soil dumps and other working areas should be rounded-off to ensure the disturbed area(s) blend in with the natural environment and the possibility of erosion is minimized.<br>• All the excavations should be backfilled to avoid being used as illegal dumping sites.<br>• Rehabilitation by covering the disturbed areas should hasten the succession process and minimize potential erosion. | **Contractor, Engineer, DEO and ECO** |
| **Access . Roads** | Disturbance of the natural environment | • Routes used during construction that aren't required should be completely rehabilitated once the construction phase is completed. | **Contractor, Engineer, DEO and ECO** |
| **Land Use** | Impact on current land use | • The land use will be changed from agricultural to residential use. However, the development will be compatible with the surrounding land use on completion of the construction phase. | **Contractor, Engineer, DEO and ECO** |
| **Air Quality** | Nuisance and reduction in visibility | • Occasional wetting of the access routes / haul roads and construction site must be done by means of a water tanker pipe to keep the dust down and vehicles should drive at 40km/h speed. | **Contractor, Engineer, DEO and ECO** |
| **Noise** | Nuisance | • Construction should be limited to normal working days and office hours from 08h00 to 17h00.<br>• Ensure that employees and staff conduct themselves in an | **Contractor, Engineer, DEO and ECO** |

| ASPECT | POSSIBLE IMPACT | MITIGATION PLAN | RESPONSIBLE PERSON (S) |
|---|---|---|---|
| | | acceptable manner while on site, both during work hours and after hours.<br>• Limit working hours of noisy equipment to daylight hours,<br>• Fit silencers to construction equipment and vehicles. | |
| **Solid Waste** | Littering/ Pollution | • All waste should be appropriately separated, contained and disposed be removed from the site to the Frankfort solid waste site during the construction period.<br>• Reduction, reuse and recycling of waste should be introduced.<br>• Illegal dumping should be forbidden. | **Contractor, Engineer, DEO and ECO** |
| **Sewerage** | Pollution of the receiving environment. | • Adequate sanitation facilities i.e. 15 employees per facility should be provided.<br>• The toilets should be located at least 50m from the construction site.<br>• They should be kept clean and hygienic regularly to ensure that they are usable.<br>• Effluent must not be discharged into natural environment and bush-toileting is prohibited. | **Contractor, Engineer, DEO and ECO** |
| **Cement mixing** | Pollution of soils, surface and groundwater | • Mixing of cement should be done at specifically selected areas on mortar boards or similar structures to contain surface run-off.<br>• Cleaning of cement mixing equipment should be done on proper cleaning trays.<br>• No cement or cement containers should be left lying | **Contractor, Engineer, DEO and ECO** |
| **Water Supply** | Source of water during the construction phase. | • Potable water must be available at the camp site and construction site in clearly marked containers. It must be obtained from the local municipality | **Contractor, Engineer, DEO and ECO** |
| **Power Supply** | Safety Impacts | • Limit the power supply cables & ensure the safety of the workers and neighbouring residents.<br>• All health and safety laws and regulations should be adhered. | **Contractor, Engineer, DEO and ECO** |
| **Energy Efficiency** | Saving of fossil fuels | • Manual (local) labour should be used as much as possible rather than machinery to conserve fossil fuels. | **Contractor, Engineer, DEO and ECO** |
| **Stormwater** | Contamination of stormwater | • Stormwater must be diverted from the construction works.<br>• Stormwater control works must be constructed, operated and maintained in a sustainable manner throughout the project. | **Contractor, Engineer, DEO and ECO** |

| ASPECT | POSSIBLE IMPACT | MITIGATION PLAN | RESPONSIBLE PERSON (S) |
|---|---|---|---|
| | | • Construct and operate the necessary collection facilities and storm water management systems such as diversion berms, ditches, drains, oil separation sumps, gross water ways etc. to prevent contamination of any water.<br>• Stormwater leaving the construction site must in no way be contaminated by any substance produced, stored, dumped or spilled on site.<br>• Washing areas should be designated and contaminated water channelled through an existing system.<br>• No contaminated water should be allowed to run freely in and through any drainage system. | |
| **Soil erosion** | Erosion | • Ensure correct drainage of areas.<br>• All the areas disturbed during construction work needs to be landscaped to a standard similar or better than before on completion of the works before replacement of topsoil.<br>• The layout of the area should be optimized to limit the erosion potential.<br>• Make use of geotextiles within disturbed areas of steeper topography to avoid erosion through surface water runoff.<br>• Avoid steep-cut banks of watercourses or drainage lines<br>• Correct site reinstatement and landscaping following any disturbances will abate channel and gulley formation | **Contractor, Engineer, DEO and ECO** |
| **Traffic Impact** | Safety/ Traffic Impacts | • The vehicle construction should limit speed to 40km/h and also be considerate of the surrounding land users.<br>• Only drivers with valid licenses should be allowed to drive the construction vehicles. | **Contractor, Engineer, DEO, ECO and Traffic Officer** |
| **Fire Hazard** | Risk of veld fires<br>. | • No open fires are permitted in the construction site.<br>• The contractors and labourers should be informed and advised on the associated risks, dangers and damage of property caused by accidental fires and how to prevent them.<br>• Fire extinguishers should be made available at the construction site, and the labourers should be informed of their location and shown how to use them.<br>• Restrict smoking activities to demarcated smoking activities | **Contractor, Engineer, DEO and ECO** |
| Vehicle Servicing | Pollution | • Vehicle servicing should be done at the identified camp depot | **Contractor, Engineer, DEO** |

| ASPECT | POSSIBLE IMPACT | MITIGATION PLAN | RESPONSIBLE PERSON (S) |
|---|---|---|---|
| Areas | | on impermeable surfaces to minimize the likelihood of petrochemical spills on soil. In the case of accidents polluted soil should b appropriately treated or taken away to an appropriate site.<br>• Used spares must be collected and disposed of in the correct manner. Oils must be drained into a suitable container, transferred to a larger storage container, and then supplied to oil recycling companies or the local business people. Oil may under no circumstances be disposed off into the sewer lines, storm water system, stream, or the ground.<br>• All construction equipment and vehicles will be cleaned before entering the site to reduce chances of spreading weeds and non-native species. | **and ECO** |
| **Areas of Cultural and/or Historical Importance** | Disturbance of important scientific findings | • If fossil material is later discovered it must be appropriately protected and the discovery reported to relevant government authorities<br>• A monitoring report should be submitted after completion of the earth-moving activity.<br>• Should any human skeletal remains be found during excavations, work must stop in the area. The findings should be reported immediately to the Archaeology Authorities through the Local Authorities / Nkurenkuru<br>• Therefore, the recommended planning of the residential development may proceed. | **Contractor, Engineer, DEO and ECO** |
| **ASPECT** | **POSSIBLE IMPACT** | **MITIGATION PLAN** | **RESPONSIBLE PERSON (S)** |
| • **3. POST CONSTRUCTION PHASE** | | | |
| **Surface water and /or existing storm water systems** | Management of storm water systems | • Management of all storm water systems to keep them in working condition,<br>• Storm water handling to be done according to prevent erosion. | **Contractor, Engineer, DEO and ECO** |
| **Soil erosion** | Erosion | • Ensure correct drainage of area<br>• The layout of the area should be optimized to limit the erosion potential,<br>• Rehabilitate denuded areas especially slopes with appropriate species. | **Contractor, Engineer, DEO and ECO** |

| ASPECT | POSSIBLE IMPACT | MITIGATION PLAN | RESPONSIBLE PERSON (S) |
|---|---|---|---|
| | | • Erosion control measures should be implemented to stop further erosion and to reduce the safety hazards created by the dangerous slopes of the dongas. | |
| **Aesthetic View of the area**<br><br>. | Aesthetic pollution | • The site must be clear of litter and all waste and builders' rubble must be removed and disposed to Frankfort landfill site.<br>• All stockpiles must be removed to spoil or handled as directed by the engineers.<br>• Spoil heaps should be flattened to the similar adjacent ground, to prevent soil erosion, thus encouraging natural revegetation.<br>• All excavations should be backfilled, levelled and compacted.<br>• All surfaces hardened due to construction must be ripped and material imported thereon be removed.<br>• The original site topography should be restored where as much as possible.<br>• All disturbed areas should be revegetated with indigenous grass to ensure progressive plant succession. Topsoil should be applied at cleared area and where material was stockpiled for this purposed.<br>• A final audit must be completed before the contractor may leave the site to ensure that all requirements were adhered to.<br>• A meeting must be held between the stakeholders to ensure that the site has been restored to a satisfactory condition.<br>• The contractor should rehabilitate the site when construction is completed, thus a detailed rehabilitation plan should be provided by the contractor | **Contractor, Engineer, DEO and ECO** |
| **ASPECT** | **POSSIBLE IMPACT** | **MITIGATION PLAN** | **RESPONSIBLE PERSON (S)** |
| **4. OPERATION PHASE** | | | |
| **Power Supply** | Service delivery and Safety impacts | • The existing electrical network should be extended to the proposed development.<br>• Energy efficiency measures should be adopted to reduce consumption of electricity.<br>• The electrical work should comply with wiring code of practice | **NKURENKURU MUNICIPALITY** |

| ASPECT | POSSIBLE IMPACT | MITIGATION PLAN | RESPONSIBLE PERSON (S) |
|---|---|---|---|
| | | for premises as set out in the Occupational Health and Safety Act.<br>• A registered electrical engineer acknowledged by the municipality should undertake all the electrical work. | |
| **Waste management** | Littering | • All domestic waste should be removed from the site to the solid waste site.<br>• Illegal dumping should be prohibited. | **USAKOS TOWN COUNCIL** |
| **Water Supply** | Water scarcity as a result of the development | • The municipality have sufficient bulk water supply to cater for the development. | **USAKOS TOWN COUNCIL** |
| **Sewerage** | Pollution due to overflowing of the existing system due to inability to accommodate the extra effluent from development | • The development will connect to the existing system, proposals will be accommodated.<br>• Regular monitoring and maintenance of the sewer network should be in place. | **USAKOS TOWN COUNCIL** |
| **Aesthetics** | Aesthetics and soil erosion | • Public open space and park space should be revegetated to minimize soil exposure thus reducing possibility of erosion. | **USAKOS TOWN COUNCIL** |

# 5. ENVIRONMENTAL MONITORING & AUDITING (EM&A)

## 5.1 INTRODUCTION

The Environmental Monitoring and Auditing aims to ensure that the organization has factored in all aspects of environmental management in its business functions either as a Developer and/ or Operator of schemes (Operations and Maintenance) with an impacting function on the environment or as a Regulator, with a management function, to control activities that may have an impact on the environment (DWAF, 2013).

## 5.2 PURPOSE OF THE EM&A:

The purpose of environmental monitoring and auditing is to verify that all relevant laws and policies are adhered to, that environmental management tools are used effectively, and to identify and correct environmental issues.

The resident engineer (project manager) should monitor overall aspects of the project, e.g. labour issues and complaints raised by the community, so they can be addressed thoroughly involving the Project Steering Committee. The ECO should monitor construction activities at least once a month. Environmental audit must carried out and monthly reports should be compiled and presented to the PSC for discussion if need be. It is highlighted that regular meetings between the resident engineer, site manager and ECO should be held to ensure that anticipated environmental impacts are within predicted levels, e.g. noise generation and the implementation of the EMP is effective.