

**DRAFT ENVIRONMENTAL MANAGEMENT PLAN**

**FOR**

**TOWNSHIP ESTABLISHMENT AND RELATED  
INFRASTRUCTURE ON THE REMAINDER OF FARM  
CORNELIA 857, CORNELIA, FREE STATE PROVINCE**

**PREPARED FOR  
PULA RESOURCES STRATEGIC DEVELOPMENT  
ON BEHALF OF  
MAFUBE LOCAL MUNICIPALITY**

**PREPARED BY**

**NSVT CONSULTANTS**

**AUGUST 2014**

# DRAFT ENVIRONMENTAL MANAGEMENT PLAN

FOR

## TOWNSHIP ESTABLISHMENT AND RELATED INFRASTRUCTURE ON THE REMAINDER OF FARM CORNELIA 857, CORNELIA, FREE STATE PROVINCE

### PREPARED FOR PULA STRATEGIC RESOURCES MANAGEMENT ON BEHALF OF MAFUBE LOCAL MUNICIPALITY

**Compiled by:** Lorato Tigedi *Pr. Sci. Nat*

**Expertise:** Environmental Assessment Practitioner  
BSc.– University of the Free State (UFS)  
B.Sc. Hons. (Wildlife) – UFS  
Masters in Environmental  
Management UFS (Thesis Outstanding)

**Experience:** +10 years conducting Environmental Impact Assessment, Public Participation Process, compilation of Environmental Management Plans and Environmental Compliance Monitoring for various projects within the Northern Cape, North West, Free State, and Eastern Cape Provinces, and Lesotho.

**Professional Affiliates:** SACNASP member; IAP2 Member; IAIAsa member and Chair of the FS IAIAsa branch 2010/2011

## TABLE OF CONTENTS

<b><u>1</u></b>	<b><u>INTRODUCTION.....</u></b>	<b><u>1</u></b>
<b><u>2</u></b>	<b><u>CHECKLIST FOR THE PROPOSED PROJECT .....</u></b>	<b><u>1</u></b>
<b><u>3</u></b>	<b><u>ENVIRONMENTAL MANAGEMENT PLAN .....</u></b>	<b><u>2</u></b>
<b>3.1</b>	<b>INTRODUCTION .....</b>	<b>2</b>
<b>3.2</b>	<b>OBJECTIVES OF THE EMP .....</b>	<b>2</b>
<b>3.3</b>	<b>RESPONSIBLE PERSON (S) .....</b>	<b>2</b>
<b>3.4</b>	<b>METHOD STATEMENT .....</b>	<b>4</b>
<b>3.5</b>	<b>ENVIRONMENTAL AWARENESS TRAINING.....</b>	<b>4</b>
<b>3.6</b>	<b>RECORD KEEPING .....</b>	<b>5</b>
<b>3.7</b>	<b>PENALTIES .....</b>	<b>5</b>
<b><u>4</u></b>	<b><u>AUDIT AND MONITORING .....</u></b>	<b><u>19</u></b>

## LIST OF TABLES

<i>Table 1: Basic Conduct Rules during Construction.....</i>	<i>5</i>
<i>Table 2: Penalties for Transgressions .....</i>	<i>6</i>
<i>Table 3: Draft Environmental Management Plan .....</i>	<i>7</i>

## 1 INTRODUCTION

***Pula Strategic Resources Management*** appointed *NSVT Consultants* as independent environmental assessment practitioners to undertake an Environmental Impact Assessment process and to complete the draft Environmental Management Plan (EMP) for the township establishment and related infrastructure on a Remainder of Farm Cornelia 857 at Cornelia, Free State Province as per requirements of the *Department of Economic Affairs, Tourism and Environmental Affairs*.

## 2 CHECKLIST FOR THE PROPOSED PROJECT

### 1. Give a detailed description of the development:

The proposed residential development is an extension of Ntswanatsatsi and the development comprises of 428 erven and related infrastructure on a ±46 hectares of undeveloped land.

### 2. Give a brief description of the surrounding area:

The proposed site is situated next to the existing residential development Cornelia and Ntswanatsatsi. The surrounding area is used for agricultural purposes, e.g. grazing and livestock enclosures.

### 3. Is the project significantly different from the surrounding land use?

No, it is located in the vicinity of existing residential developments.

### 4. Are any of the following located on the site chosen for the development?

- i. River, stream, dam, wetland – Yes, but not on the development footprint
- ii. Open space area – No
- iii. Residential (formal or informal settlement)- No
- iv. Area of cultural importance, e.g. graveyards, old houses, museum, etc. – No

### 5. Are there any protected areas close to the proposed site?

No

### 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

### 7. Would it be necessary to construct roads to access the proposed site?

No, the existing access road will be upgraded.

### 3 ENVIRONMENTAL MANAGEMENT PLAN

#### 3.1 INTRODUCTION

The EMP has been divided into four different phases associated with the proposed development namely the pre-construction planning phase, the construction phase and operational phase. This draft EMP will be considered a Final EMP if approved by DETEA. 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. Should there be any conflict between the EMP and project specifications, then terms herein shall be secondary.

#### 3.2 OBJECTIVES OF THE EMP

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

- To identify possible 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 in the case of various possible impacts.

#### 3.3 RESPONSIBLE PERSON (S)

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

**The Developer:** Mafube Local Municipality

Responsibility: To implement the final EMP after approval by DETEA before commencement of the construction phase and ensure the proposed development comply with the NEMA requirements and the Environmental Authorisation.

**The Project Consultants:** Pula Strategic Resources Management

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.

### **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 and PSC.
- ❑ 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 Authorisation 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 (Environmental Forum):** A committee that 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 outlines construction activities to be undertaken with mitigation measures. 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. 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 ENVIRONMENTAL AWARENESS TRAINING**

The contractor and his employees involved with the work on the construction phase are to be briefed on their obligation towards environmental protection and methodologies in terms of the EMP prior to work commencing. The briefing 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**

<b>Do</b>	<b>Do Not</b>
Use of toilet facilities provided and report	Make open fires for cooking, dedicated areas should be provided.
Clear your work areas of litter and building rubbish at the end of each day	Allow any cement bags or litter to be blown around
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	

### 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, 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**

<b>Transgression</b>	<b>Penalty</b>
Littering and bush-toileting	R1000
Concrete mixing on the ground	R2000
Spillages	R1000-R10 000 depending on the magnitude)
Soil erosion	R2000
Veld fires	R5000

The Draft 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 a file dedicated for Environmental Documentation.

**Table 3: Draft Environmental Management Plan**

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)
<b>1. PRE-CONSTRUCTION PHASE</b>			
Project Contract and Programme	Adherence to the EMP	<ul style="list-style-type: none"> <li>◇ 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. The environmental responsibilities should be formalized and environmental awareness should be introduced to the labourers in their language as toolbox talks.</li> </ul>	<b>CONTRACTOR &amp; ENGINEERS</b>
Location of Camp and Depot	Environmental damage	<ul style="list-style-type: none"> <li>◇ The camp depot should be located in an area where adjacent landowners are not disturbed or inconvenienced.</li> <li>◇ 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. The parking of vehicles, storage of equipment and materials must strictly be confined to designated areas.</li> <li>◇ If located on the “virgin” ground, area to be rehabilitated once the project is completed.</li> </ul>	<b>CONTRACTOR &amp; ENGINEERS</b>
Water Supply	Source of water during the construction phase.	<ul style="list-style-type: none"> <li>◇ Potable water must be available at the camp depot, office site and construction site. It should be obtained from the local municipality.</li> <li>◇ No boreholes can be established without DWA approval.</li> </ul>	<b>CONTRACTOR, ENGINEERS &amp; MUNICIPALITY</b>
Access Control	Hazards to animals, and stealing of construction materials	<ul style="list-style-type: none"> <li>◇ Fence or suitably secure main site office and material storage area.</li> <li>◇ Unauthorized entry should be prohibited.</li> </ul>	<b>CONTRACTOR AND ENGINEER</b>

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)
Access route	Erosion and dilapidation of the access route	<ul style="list-style-type: none"> <li>◇ Upgrade the access road used during construction to an acceptable condition.</li> <li>◇ Proper maintenance should be done to ensure the quality of the access road.</li> </ul>	<b>CONTRACTOR &amp; ENGINEERS</b>
Power Supply	Safety Impacts	<ul style="list-style-type: none"> <li>◇ Limit the power supply cables &amp; ensure the safety of the workers and neighbouring residents.</li> <li>◇ All health and safety laws and regulations should be adhered.</li> </ul>	<b>CONTRACTOR &amp; ENGINEERS</b>
Solid Waste	Littering/ Pollution of environment with waste materials	<ul style="list-style-type: none"> <li>◇ Refuse receptacles with lids should be placed at the camp depot and on the construction sites.</li> <li>◇ They should be easily accessible.</li> <li>◇ System for regular waste removal must be set up.</li> <li>◇ Refuse bins should be clearly marked to avoid mixing of hazardous and general waste</li> <li>◇ Letter or agreement between contractor and pollution control officers or companies dealing with hazardous waste should be on site.</li> </ul>	<b>CONTRACTOR &amp; ENGINEERS</b>
Sewage	Pollution of environment with waste materials	<ul style="list-style-type: none"> <li>◇ Adequate sanitation facilities e.g. chemical toilets must be provided at the camp depot and construction site.</li> <li>◇ 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.</li> </ul>	<b>CONTRACTOR &amp; ENGINEERS</b>
Social & Socio-Economic Aspects	Dissatisfaction	<ul style="list-style-type: none"> <li>◇ A project steering committee (PSC), which comprises of the municipality, Engineers, contractors and community representatives must be convened and details of the project discussed.</li> <li>◇ The PSC must meet regularly to address any concerns/ issues from the neighbouring land users and employing local labourers.</li> </ul>	<b>CONTRACTOR, ENGINEERS, &amp; MUNICIPALITY</b>

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)
Health & Safety	Danger	<ul style="list-style-type: none"> <li>◇ The site should be clearly demarcated for safety reasons and non-employees, neighbouring community and passerby shouldn't be allowed on the construction site as a precautionary measure.</li> <li>◇ 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.</li> <li>◇ Safety signs complying with SABS and SANS standards should be placed on-site in a manner clearly visible to the public.</li> <li>◇ Construction methods should adhere to the Occupational Health and Safety Act (Act 85 of 1993).</li> <li>◇ A safety officer and/or rep should be appointed prior to commencement of construction</li> </ul>	<b>CONTRACTOR &amp; ENGINEERS</b>
<b>2. CONSTRUCTION PHASE</b>			
Flora	Loss of vegetation	<ul style="list-style-type: none"> <li>◇ 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.</li> <li>◇ Vegetation clearance should be confined to the development footprint and set out to avoid substantial vegetation disturbance.</li> <li>◇ Rehabilitate denuded areas with appropriate species as per specifications.</li> <li>◇ All excavations to be filled and rehabilitated before construction moves off sites.</li> </ul>	Contractor, Engineer, DEO and ECO
Fauna	Disturbance to fauna in the area	<ul style="list-style-type: none"> <li>◇ No hunting, snaring, shooting, nest raiding or egg collection by the construction staff should be allowed.</li> </ul>	Contractor, Engineer, DEO and ECO

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)
Wetlands	Disruption on the wetland functions	<ul style="list-style-type: none"> <li>◇ No development within 32m of the protective buffer zone of the wetland.</li> <li>◇ The wetland boundary should be delineated during construction to ensure no construction activity takes place, e.g. movement of construction vehicles.</li> </ul>	Contractor, Engineer, DEO and ECO
Topsoil	Loss of Topsoil	<ul style="list-style-type: none"> <li>◇ 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.</li> <li>◇ In situ material should be removed to an average depth of 1000mm.</li> <li>◇ Cleared and grubbed topsoil must be stockpiled as a top layer of at least 150mm thickness on the backfilled trenches for rehabilitation purposes.</li> <li>◇ Soil conservation measures such as berms, gabions and mats should be used on-site to help reduce erosion.</li> <li>◇ Topsoil stockpile should be weed free, therefore weed control should be in place.</li> <li>◇ Litter should be removed from the stockpiled topsoil.</li> </ul>	Contractor, Engineer, DEO and ECO
Geotechnical	Disturbances of structural faults and possibility of trenches collapse and cracking of settlements	<ul style="list-style-type: none"> <li>◇ It is recommended that the transported material found in the first 800mm is saturated with water and compacted with impact roller or rammer to ensure a collapse prior to the construction of any structure.</li> <li>◇ All trenches and excavations must be properly backfilled and compacted to 90% of Modified AASHTO density.</li> <li>◇ No accumulation of surface water is to be permitted and the entire development must be properly drained.</li> </ul>	Contractor, Engineer, DEO and ECO

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)
Land capability	Degradation of land capability	<ul style="list-style-type: none"> <li>◇ 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 &amp; requirements, where necessary.</li> </ul>	Contractor, Engineer, DEO and ECO
Topography	Disturbing the natural topography	<ul style="list-style-type: none"> <li>◇ 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.</li> <li>◇ All the excavations should be backfilled to avoid being used as illegal dumping sites.</li> <li>◇ Rehabilitation by covering the disturbed areas should hasten the succession process and minimize potential erosion.</li> </ul>	Contractor, Engineer, DEO and ECO
Access roads	Disturbance of the natural environment.	<ul style="list-style-type: none"> <li>◇ Routes used during construction that aren't required should be completely rehabilitated once the construction phase is completed.</li> </ul>	Contractor, Engineer, DEO and ECO
Land Use	Impact on current land use	<ul style="list-style-type: none"> <li>◇ The land used 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.</li> </ul>	Contractor, Engineer, DEO and ECO
Air Quality	Nuisance and reduction in visibility	<ul style="list-style-type: none"> <li>◇ Occasional wetting of the access routes 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.</li> </ul>	Contractor, Engineer, DEO and ECO

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)
Noise	Nuisance	<ul style="list-style-type: none"> <li>◇ Construction should be limited to normal working days and office hours from 08h00 to 17h00.</li> <li>◇ Ensure that employees and staff conduct themselves in an acceptable manner while on site, both during work hours and after hours.</li> <li>◇ Limit working hours of noisy equipment to daylight hours,</li> <li>◇ Fit silencers to construction equipment.</li> </ul>	Contractor, Engineer, DEO and ECO
Solid Waste	Littering/ Pollution	<ul style="list-style-type: none"> <li>◇ All waste should be appropriately separated, contained and disposed be removed from the site to the Cornelia solid waste site during the construction period.</li> <li>◇ Reduction, reuse and recycling of waste should be introduced.</li> <li>◇ Illegal dumping should be forbidden.</li> </ul>	Contractor, Engineer, DEO and ECO
Sewerage	Pollution of the receiving environment.	<ul style="list-style-type: none"> <li>◇ Adequate sanitation facilities i.e. 15 employees per facility should be provided.</li> <li>◇ The toilets should be located at least 50m from the construction site.</li> <li>◇ They should be kept clean and hygienic regularly to ensure that they are usable.</li> <li>◇ Effluent must not be discharged into natural environment and bush-toileting is prohibited.</li> </ul>	Contractor, Engineer, DEO and ECO
Cement mixing	Pollution of soils, surface and groundwater	<ul style="list-style-type: none"> <li>◇ Mixing of cement should be done at specifically selected areas on mortar boards or similar structures to contain surface run-off.</li> <li>◇ Cleaning of cement mixing equipment should be done on proper cleaning trays.</li> <li>◇ No cement or cement containers should be left lying around.</li> </ul>	Contractor, Engineer, DEO and ECO

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)
Water Supply	Source of water during the construction phase.	<ul style="list-style-type: none"> <li>◇ Potable water must be available at the camp site and construction site in clearly marked containers. It must be obtained from the local municipality.</li> </ul>	Contractor, Engineer, DEO and ECO
Power Supply	Safety Impacts	<ul style="list-style-type: none"> <li>◇ Limit the power supply cables &amp; ensure the safety of the workers and neighbouring residents.</li> <li>◇ All health and safety laws and regulations should be adhered.</li> </ul>	Contractor, Engineer, DEO and ECO
Energy Efficiency	Saving of fossil fuels	<ul style="list-style-type: none"> <li>◇ Manual labour should be used as much as possible rather than machinery to conserve fossil fuels.</li> </ul>	Contractor, Engineer, DEO and ECO
Stormwater	Contamination of stormwater	<ul style="list-style-type: none"> <li>◇ Stormwater must be diverted from the construction works.</li> <li>◇ Stormwater control works must be constructed, operated and maintained in a sustainable manner throughout the project.</li> <li>◇ Construct and operate the necessary collection facilities and storm water management systems such as diversion berms, ditches, drains, oil separation sumps to prevent contamination of any water.</li> <li>◇ Stormwater leaving the construction site must in no way be contaminated by any substance produced, stored, dumped or spilled on site.</li> <li>◇ Washing areas should be designated and contaminated water channeled through an existing system.</li> <li>◇ No contaminated water should be allowed to run freely in and through any drainage system.</li> </ul>	Contractor, Engineer, DEO and ECO



ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON (S)
Soil erosion	Erosion	<ul style="list-style-type: none"> <li>◇ Ensure correct drainage of areas.</li> <li>◇ 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.</li> <li>◇ The layout of the area should be optimized to limit the erosion potential.</li> <li>◇ Make use of geotextiles within disturbed areas of steeper topography to avoid erosion through surface water runoff.</li> <li>◇ Avoid steep-cut banks of watercourses or drainage lines</li> <li>◇ Correct site reinstatement and landscaping following any disturbances will abate channel and gully formation.</li> </ul>	Contractor, Engineer, DEO and ECO
Traffic Impact	Safety/ Traffic Impacts	<ul style="list-style-type: none"> <li>◇ The vehicle construction should limit speed to 40km/h and also be considerate of the surrounding land users.</li> <li>◇ Only drivers with valid licenses should be allowed to drive the construction vehicles.</li> </ul>	Contractor, Engineer, DEO, ECO and Traffic Officer
Fire Hazard	Risk of veld fires	<ul style="list-style-type: none"> <li>◇ No open fires are permitted in the construction site, except under strictly controlled conditions subject to the National Veld and Forest Act, (Act No. 101 of 1998).</li> <li>◇ 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.</li> <li>◇ 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.</li> <li>◇ Restrict smoking activities to demarcated smoking activities.</li> </ul>	Contractor, Engineer, DEO and ECO

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON
Vehicle Servicing Areas	Pollution	<ul style="list-style-type: none"> <li>◇ Vehicle servicing should be done at the identified camp depot on impermeable surfaces to minimize the likelihood of petrochemical spills on soil. In the case of accidents polluted soil should be appropriately treated or taken away to an appropriate site.</li> <li>◇ 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 such as Oilkol or the Rose Foundation. Oil may under no circumstances be disposed off into the sewer lines, storm water system, stream, or the ground.</li> <li>◇ All construction equipment and vehicles will be cleaned before entering the site to reduce chances of spreading weeds and non-native species.</li> </ul>	Contractor, Engineer, DEO and ECO
Areas of Cultural and/or Historical Importance	Disturbance of important scientific findings	<ul style="list-style-type: none"> <li>◇ If fossil material is later discovered it must be appropriately protected and the discovery reported to a palaeontologist for the removal thereof as per SAHRA legislation.</li> <li>◇ Should any human skeletal remains be found during excavations, work must stop in the area. The findings should be reported immediately to the Archaeology Department at the National Museum in Bloemfontein, Free State Heritage and in SAHRA Cape Town.</li> </ul>	Contractor, Engineer, DEO and ECO
<b>3. POST CONSTRUCTION PHASE</b>			
Surface water and/or existing storm water systems	Management of storm water systems	<ul style="list-style-type: none"> <li>◇ Management of all storm water systems to keep them in working condition,</li> <li>◇ Storm water handling to be done according to prevent erosion.</li> </ul>	Contractor, Engineer, DEO and ECO

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON
Soil erosion	Erosion	<ul style="list-style-type: none"> <li>◇ Ensure correct drainage of areas,</li> <li>◇ The layout of the area should be optimized to limit the erosion potential,</li> <li>◇ Rehabilitate denuded areas especially slopes with appropriate species.</li> <li>◇ Erosion control measures should be implemented to stop further erosion and to reduce the safety hazards created by the dangerous slopes of the dongas.</li> </ul>	Contractor, Engineer, DEO and ECO
Aesthetic view of the area	Aesthetic pollution	<ul style="list-style-type: none"> <li>◇ The site must be clear of litter and all waste and builders' rubble must be removed and disposed to Cornelia landfill site.</li> <li>◇ All stockpiles must be removed to spoil or handled as directed by the engineers. Spoil heaps should be flattened to the similar adjacent ground, to prevent soil erosion, thus encouraging natural revegetation.</li> <li>◇ All excavations should be backfilled, leveled and compacted.</li> <li>◇ All surfaces hardened due to construction must be ripped and material imported thereon be removed.</li> <li>◇ 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.</li> <li>◇ A final audit must be completed before the contractor may leave the site to ensure that all requirements were adhered to.</li> <li>◇ A meeting must be held between the stakeholders to ensure that the site has been restored to a satisfactory condition.</li> <li>◇ Detailed rehabilitation plan should be provided by the contractor.</li> </ul>	Contractor, Engineer, DEO and ECO

ASPECT	POSSIBLE IMPACT	MITIGATION PLAN	RESPONSIBLE PERSON
<b>4. OPERATION PHASE</b>			
Power Supply	Service delivery and Safety impacts	<ul style="list-style-type: none"> <li>◇ The existing electrical network should be extended to the proposed development.</li> <li>◇ Energy efficiency measures should be adopted to reduce consumption of electricity.</li> <li>◇ The electrical work should comply with wiring code of practice for premises as set out in SANS 10142-1 and Occupational Health and Safety Act.</li> <li>◇ A registered electrical engineer acknowledged by the municipality should undertake all the electrical work.</li> </ul>	<b>MUNICIPALITY</b>
Waste management	Littering	<ul style="list-style-type: none"> <li>◇ All domestic waste should be removed from the site to the Cornelia solid waste site.</li> <li>◇ Illegal dumping should be prohibited.</li> </ul>	<b>MUNICIPALITY</b>
Water Supply	Water scarcity as a result of the development	<ul style="list-style-type: none"> <li>◇ The municipality have sufficient bulk water supply to cater for the development.</li> <li>◇ No trees should be planted within 5 metres of line of the water bearing services.</li> </ul>	<b>MUNICIPALITY</b>
Sewerage	Pollution due to overflowing of the existing wwtw due to inability to accommodate the extra effluent from development	<ul style="list-style-type: none"> <li>◇ The development will connect to the existing wwtw because after recommendations contained in the Bulk Services Report are adhered to/implemented then proposed developed will be accommodated.</li> <li>◇ Regular monitoring and maintenance of the sewer network should be in place.</li> </ul>	<b>MUNICIPALITY</b>
Aesthetics	Aesthetics and soil erosion	<ul style="list-style-type: none"> <li>◇ Public open space and park erven should be revegetated to minimize soil exposure thus reducing possibility of erosion.</li> </ul>	<b>MUNICIPALITY</b>

Stormwater Management	Increased surface run-off due to development	<ul style="list-style-type: none"><li>◇ The proposed development will be served by a conventional stormwater drainage system consisting of underground pipes in conjunction with roadways as well as open channels. Therefore accumulation of water within the developed area will be controlled.</li><li>◇ The compiled Stormwater Management Plan should be adhered to.</li></ul>	<b>MUNICIPALITY</b>
-----------------------	--	---	---------------------

## **4 AUDIT AND MONITORING**

Compliance monitoring provides useful information for determining environmental performance for the duration of the project. Information gained can also be used to determine how effective mitigation plans might be in achieving objectives of the EMP, the corrective actions undertaken are adequate and whether any modifications are required. 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 be carried out and monthly reports should be compiled and presented to the PSC for discussion if needed. 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.