

**ENVIRONMENTAL  
MANAGEMENT  
PROGRAMME (EMPr)**



**Establishment of the Proposed Renewable Energy  
(Solar Park) Generation Project on Portion 173 of  
the Farm Wildebeestlaagte 411-KQ, Thabazimbi  
Local Municipality, Waterberg District  
Municipality, Limpopo Province**

Prepared for:

**Vulpecula Energy (Pty) Ltd**

A SYSTEMS APPROACH  
APPLIED TO YOUR REQUIREMENTS

**Details of the Environmental Assessment Practitioner (EAP) who prepared the Environmental Management Programme (EMPRr)**

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## **Environmental Programme Report**

This EMPr is applicable to the Solar panel park and associated infrastructure.

Separate generic EMPs will be compiled for the powerline and for the substation.

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## GLOSSARY

<b>Alien vegetation</b>	Means all undesirable vegetation, defined as but not limited to, all declared category 1 and category 2 plants in terms of the Conservation of Agricultural Resources Act (43 of 1983) (CARA) amended regulations 15 and 16 as promulgated in March 2001.
<b>Client</b>	Vulpecula Energy (Pty) Ltd
<b>Construction activity</b>	Refers to any action taken by the Contractor, his subcontractors, suppliers or personnel in undertaking the construction work.
<b>Contaminated water</b>	Means water contaminated by the client's activities, e.g. polluted water from building rubble, waste spillage etc
<b>Environment</b>	The 'environment' is defined in terms of the National Environmental Management Act (Act 107 of 1998) as the surroundings within which humans exist and that are made up of- <ul style="list-style-type: none"> <li>(i) the land, water and atmosphere of the earth;</li> <li>(ii) micro-organisms, plant and animal life;</li> <li>(iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and</li> <li>(iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing</li> </ul>
<b>Environmental Impact</b>	The change to the environment resulting from an environmental aspect (an activity) on the environment, whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.
<b>Fence</b>	A physical barrier in the form of posts and barbed wire or any other concrete construction ('palisade'- type fencing included) constructed with the purpose of keeping humans and animals within or out of defined boundaries.
<b>General Waste</b>	Domestic, commercial and non-hazardous waste.
<b>Non-compliance</b>	Failure to comply with the requirements of the EMP.
<b>Pollution</b>	Any change in the environment caused by substances, radioactive or otherwise, or noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
<b>Hazardous waste</b>	Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.
<b>Pollution Incident</b>	Any incident that may cause or has caused damage to or the contamination of the natural environment
<b>Potentially hazardous substance</b>	Is a substance, which can have a deleterious effect on the environment. Hazardous chemical substances are defined in the Regulations for Hazardous Chemical Substances published in terms of the Occupational Health and Safety Act (Act No. 85 of 1993).
<b>Solid waste</b>	All solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
<b>Storm water</b>	Rainfall run-off from the site.
<b>Vegetation rehabilitation</b>	Refers to the re-establishment of locally indigenous vegetation with a similar species composition to that which naturally occurs in the area.
<b>Waste water</b>	Water containing cement washings, oil, fuel or other contaminants.

## ABBREVIATIONS AND ACRONYMS

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BAR	Basic Assessment Report
BID	Background Information Document
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act
CBD	Central Business District
CMA	Catchment Management Agencies
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ESMP	Environmental and Services Management Plan
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DESTEA	Free State Department of Economic, Small Business Development, Tourism & Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
DoT	Department of Transport
DRDLR	Department of Rural Development and Land Reform
DWA	Department of Water Affairs
DWS/DHSWS	Department of Water and Sanitation / Department of Human Settlement and Water and Sanitation
EIS	Ecological Importance and Sensitivity
GG	Government Gazette
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IAIASA	International Association of Impact Assessments South Africa
IDP	Integrated Development Plan
IWWMP	Integrated Water and Waste Management Plan
MSMD	Materials Safety Data Sheet
NDA	National Department of Agriculture
NDP	National Development Plan
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEMAQA	National Environmental Management: Air Quality Act
NEMWA	National Environmental Management: Waste Act
NFA	National Forest Act
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act
NSSD	National Strategy for Sustainable Development
NWA	National Water Act
OHSA	Occupational Health and Safety Act
PES	Present Ecological State
PIA	Paleontological Impact Assessment
PPP	Public Participation Process
PVPP	Photovoltaic Power Plant
SANBI	South African National Biological Institute
TOPS	Threatened or Protected Species – NEMBA
WISA	Water Institute of South Africa
WMA	Water Management Area

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<b>Enterprise name:</b>	Vulpecula Energy (Pty) Ltd.
<b>Business registration number:</b>	2021/534272/07

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<b>Project information</b>	
<b>Project title:</b>	
<b>DFFE ref nr:</b>	14/12/16/3/3/2/2159
<b>Local Municipality:</b>	Thabazimbi Local Municipality
<b>District Municipality</b>	Waterberg District Municipality
<b>Province:</b>	Limpopo
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## 1. PROJECT BACKGROUND

Exigent Engineering Consultants CC (hereafter referred to as Exigent) has been appointed by Vulpecula Energy (Pty) Ltd. (hereafter referred to as Vulpecula) to conduct the Environmental Impact Assessment (EIA) process for the proposed the development of renewable solar energy in key locations to the ESKOM grid and in terms of high levels of solar irradiation. The proposed site is located within the Thabazimbi Local Municipality, Waterberg District Municipality in Limpopo Province on a site approximately 316 hectares in extent, Portion 173 of the Farm Wildebeestlaagte 411 KQ.

The competent authority (CA) responsible for considering of this proposal is the National Department of Forestry, Fisheries and Environment (DFFE). The application is undertaken in terms of EIA Regulations published in terms of Government Notice No. R. 362 of 7 April 2017 under Section 24(5), and 44 of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), as amended, the intent to carry out the Environmental Impact Assessment Process (in terms of Listing Notice 1 – GN R324, Listing Notice 2 – GN R325 and Listing Notice 3 – GN R327) for various listed activities.

## 2. PROJECT LOCALITY

The proposed development is located with the within the Thabazimbi Local Municipality, Waterberg District Municipality in Limpopo Province. The proposed development is located within the quaternary degree grid cell 2427 CC (Figure 2-1) in the quaternary catchment A24E, within the Crocodile West and Groot Marico catchment, which lies within the Limpopo River Water Management Area (WMA):

**Table 2-1. Beginning and end point coordinates of the proposed development.**

Portion	Latitude	Longitude
Portion 173 of the farm Wildebeestlaagte 411 KQ	24°57'31.56"S	27°14'15.89"E

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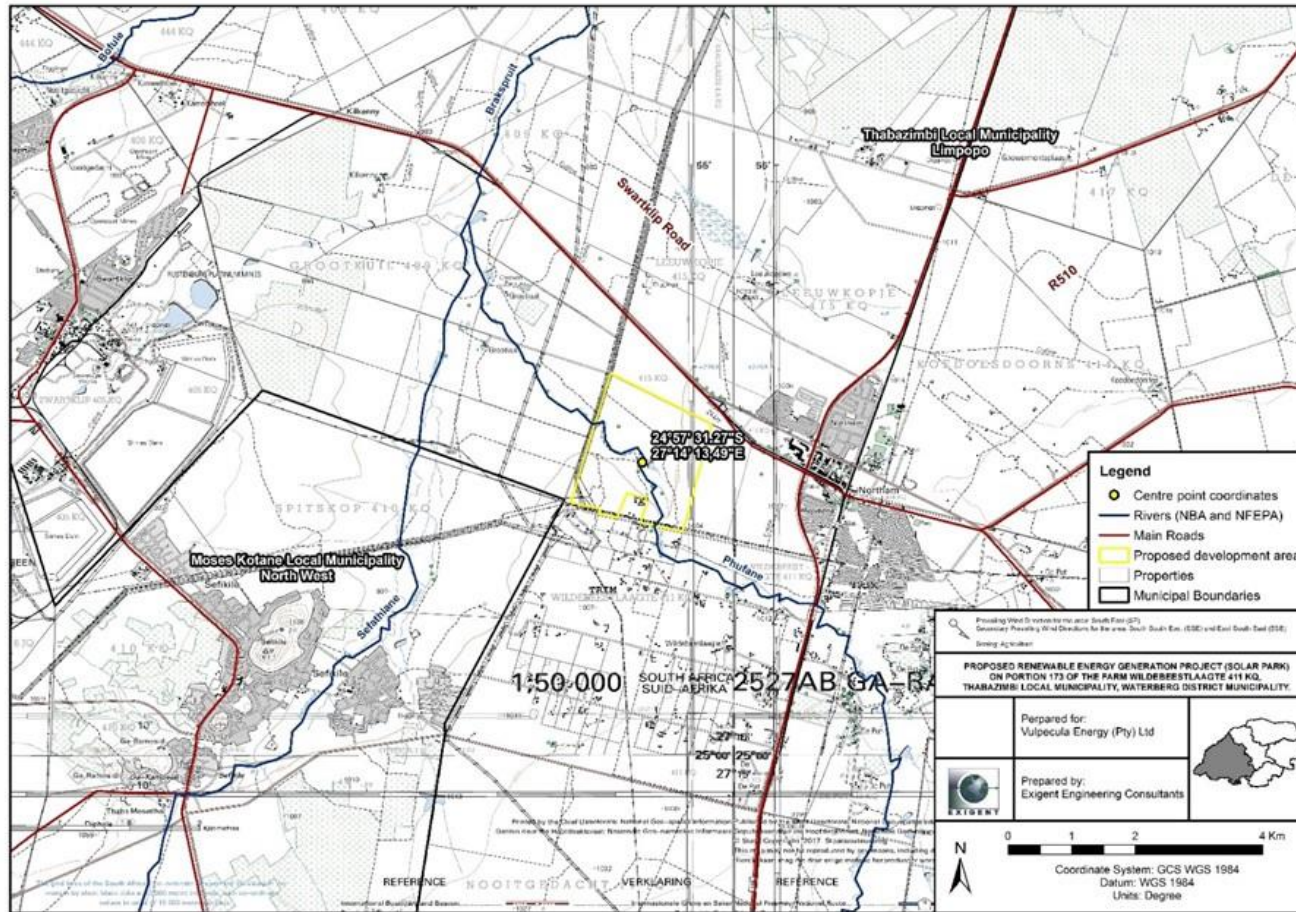


Figure 2-1. 1:50 000 Topographic map of the study area

Table 2-2. 21-digit Surveyor General code for the properties affected by the proposed properties.

T 0 K Q 0 0 0 0 0 0 0 0 0 4 1 1 0 0 1 7 3

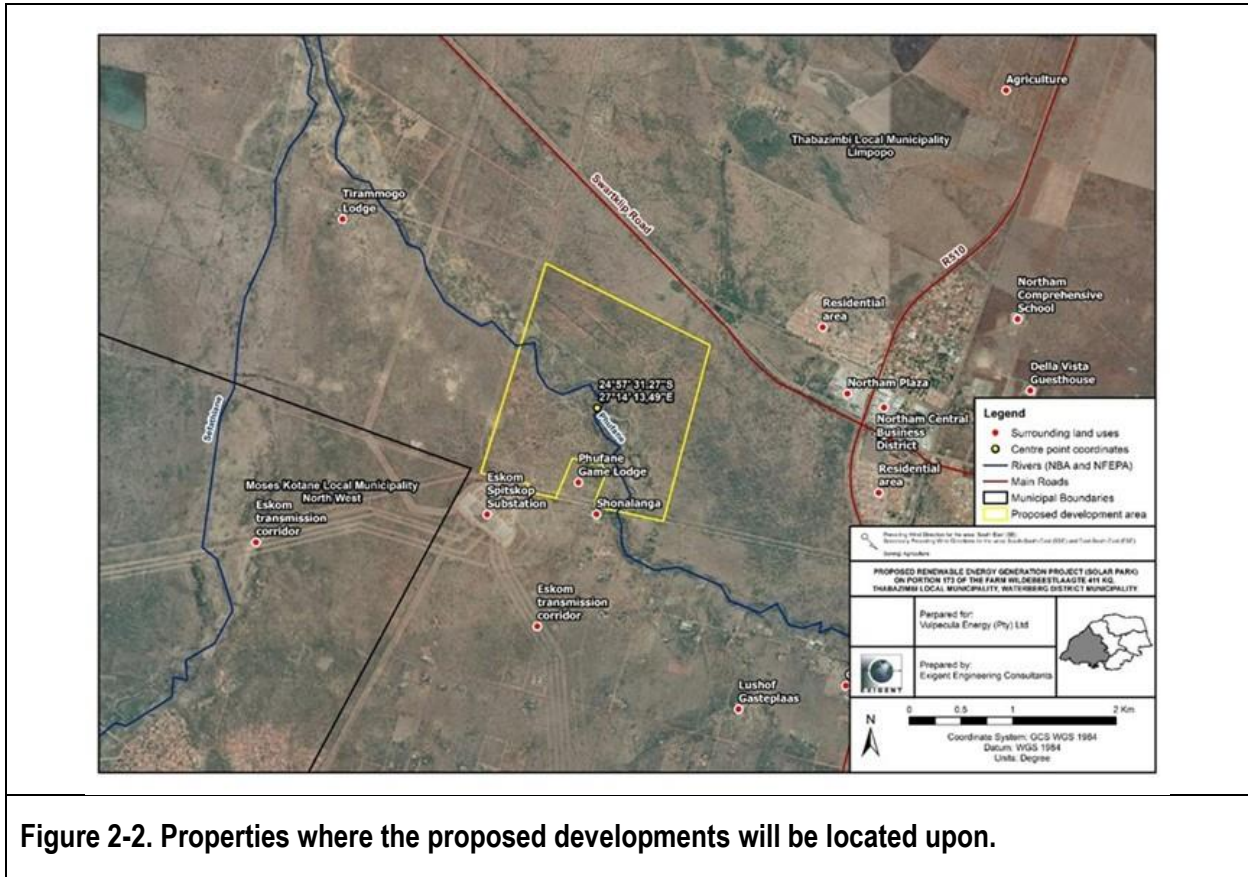


Figure 2-2. Properties where the proposed developments will be located upon.

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### 3. DESIGN INFORMATION

#### 3.1 Project Description

Table 3-1 below contains the description of the proposed developments:

**Table 3-1. Project details**

Component	Descriptions/dimensions
Output capacity of the PVPP	100 MW
Height of PV panels	4.5 m
Area of the PV Array	Total area of the PV Array: 139.21 ha
Number of inverters required	<p>Each Medium voltage station will be equipped with DC/AC inverters that converts Direct Current (DC) into Alternate Currents (AC) at a low voltage of 270V. There will be 75 medium voltage stations throughout the proposed development.</p> <p>PV technology is in constant and rapid evolution, this means that the final choice of the type (e.g. central inverters or string inverters) and model of inverter can be taken at the time of the commission date, on the basis of the availability of inverters of the worldwide market and of the cost-efficiency curve. In any case, the total installed capacity of the inverters (AC side) will be up to 125 MWac.</p>
Area occupied by inverter/transformer stations/substations	There will be 75 medium voltage stations throughout the proposed development. Each will have an area of approximately 31.3 m <sup>2</sup> . Therefore, the combined area of the medium voltage stations will be 2 347.5 m <sup>2</sup> .
Control rooms	The substation will be equipped with 1 control room. The control rooms will have a length of 30 m and a width of 11 m. Therefore, each of the control room will have an area of 330 m <sup>2</sup> .
Workshops/Warehouses	Two warehouses / workshops will be constructed within close proximity to the On-site 132kV switching station. The warehouses will have an area of approximately 600 m <sup>2</sup> .
Capacity of on-site substations	The on-site 100MW substation will host a 120 MVA transformer 22kV/88kV (or 22kV/132 kV), plus one as spare
Area occupied by both permanent and construction laydown areas	<p>Project footprint / fenced area is up to approximately 165 ha. Surface area (within the project footprint) will be covered by PV modules, internal roads, MV stations and a HV substation.</p> <p>The construction camp (temporary) will be up to 10 ha in extent.</p>
Areas occupied by buildings	<p>Medium-voltage stations occupy a footprint up to 930 m<sup>2</sup>.</p> <p>On-site substation and switching station occupy a footprint of approx. 2 920 m<sup>2</sup>. This area includes the control buildings.</p> <p>Workshop &amp; Warehouse occupy a footprint of approx. 300 m<sup>2</sup> each. In total, 2 warehouses are foreseen.</p> <p>Therefore, the total area occupied by buildings (MV stations, HV substation, Workshop &amp; Warehouse) amounts to approx. 5 867m<sup>2</sup> (1.3 ha).</p> <p>The Battery Energy Storage Systems (BESS) will be located in the area where the camp site will be for the purpose of the construction phase. This area will be approximately 10 ha in size.</p>
Length of internal roads	Approximately 18 356 m
Width of internal roads	8 m

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Component	Descriptions/dimensions
Access roads	The project footprint / development area will have direct access from the P16/2 road leading from the R510 providing the site with access from the southern boundary, whereas access from to the northern portion will be gained via the road D869.
Proximity to the grid connections	712 m (via the proposed infrastructure route). One 88kV (or 132 kV) overhead power line or underground line, connecting the on-site HV switching station to the Eskom Spitskop HV Main Transmission Substation (MTS).
Height of fencing	3.0 m
Type of fencing	Wire mesh fencing with video-surveillance system.
Height of overhead powerlines	88 kv (or 132kV): up to 25 m above the ground level
Length and width of servitude of 132kV powerline	The servitude will be 36 m in width and the 132kV corridor from the on-site substation to the Eskom Spitskop MTS will be 712 m long.
132kV Substation dimensions	11 001 m <sup>2</sup>
Switching station dimensions	22 560 m <sup>2</sup> ; The on-site substation will host a 120 MVA transformer 22kV/88kV (or 22kV/132 kV), plus one as spare
Battery Energy Storage Facility	With a Maximum Export Capacity up to 100 MW and a 6-hour storage capacity up to 600 MWh, with a footprint up to 10 ha within the proposed PV plant footprint / fenced area.

During the construction phase, the sites may be provided with additional:

- Water access point, water supply pipelines, water treatment facilities;
- Prefabricated buildings; and
- Workshops & warehouses; which will all be removed at the end of construction.

The connection may also entail interventions on the Eskom grid, according to Eskom's connection requirements/solution.

## 3.2 Project Phases Description

### 3.2.1 PRE-CONSTRUCTION PHASE

The pre-construction phase of the proposed project includes the planning of the project, by considering the best strategic approach for construction and implementation of the proposed development. This is done in order to minimize the risks during the construction phase on the environment.

Based on the environmental impacts, e.g. natural vegetation, potential graves and natural water resources, as well as engineering design considerations and existing servitudes, various alternative layout options were considered.

### 3.2.2 CONSTRUCTION PHASE

The project will be located within close proximity to Northam, with the grid connection powerline leading from the proposed PVPP to the existing Eskom Spitskop substation located towards the south of the proposed PVPP project.

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The construction phase for the proposed development will be separated into two phases, namely the 1) site preparation phase, and the 2) construction and installation phase.

The construction phase of the proposed development is expected to take 15 months. It is estimated that between 100 and 150 laborers will be employed.

A detailed description of the infrastructure to be installed has been included as part of Appendix C of this report.

### **3.2.2.1 SITE PREPARATION PHASE**

The proposed development site is accessible via a secondary (P16/2) road (East to West) leading from the R510 as well as from the road D869. The following preparations will take place:

- PV modules and all steel structures will be transported to the proposed development site.
- The main transformers, graders, drill rigs, 10 m<sup>3</sup> tipper truck, tractors, trailers, water tanker truck, track-loader backhoes (TLBs) and trenching machines will be delivered to site.
- Vegetation clearance will take place.
- The area will be graded and levelled according to the required specifications, using the 20-ton roller.
- Throughout the entirety of the construction phase, water spray (using the water tanker truck) will be used to control excessive dust blow off.
- Internal access roads, as indicated on the layout plans, will be established on site. These access roads will allow for easy vehicular access to each panel system within the proposed development. All roads will be gravel roads with a width of up to 8 m. (Once the proposed PVPPs are operational, the roads will mainly be used for maintenance and inspections.)
- For the purpose of the construction phase of the proposed development, water access point, water supply pipelines, water treatment facilities, pre-fabricated building, workshops and warehouses will be installed during the site preparation phase.

### **3.2.2.2 CONSTRUCTION AND INSTALLATION PHASE**

- As part of the construction and installation phase, concrete transformer pads for each row of solar panels and a switch panel for connection to the power grid and control sheds will be constructed on site.
- Electrical systems development will take place in conjunction with the installation of the rest of structures on site (such as the sewer wastewater treatment works (WWTW) and all supporting infrastructure). The electrical systems installations will include electrical cabling and trenching (field trenching in and around the site where the units will be installed). These structures connect the solar units, collect the energy from them and then route the energy to a point within the utility infrastructure system.
- A sewer reticulation system will also be installed on site. This will be done to service the offices of the control building and will be done in accordance with the specifications of the SABS. The systems will consist of an underground conservancy tank and a patented digester. These systems require electricity to power the pumps and fans used as part of the aeration process.

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- During the construction phase, solid waste will mainly consist of vegetation material from the clearance of vegetation which will be recycled to be re-used as organic fertilizer. Other type of solid waste will include, amongst others, wood from packaging, boxboards, expanded polystyrene and household waste, which will be recycled as much as possible. Non-recyclable waste will be delivered to the closest permitted landfill site.
- Water needs for the construction and operational phases will be obtained from the local municipality.

### 3.2.3 OPERATIONAL PHASE

The proposed solar park aims to supplement the national energy supply through providing Eskom with a collective additional 100 MW additional energy supply. The proposed development aims to provide a sustainable, self-sustaining plant with all resources managed and maintained through internal processes.

## 4. ENVIRONMENTAL LEGISLATION

All legislation applicable to the development must be strictly enforced. The Applicant and all contractors must be acquainted with the relevant environmental legislation, including provincial and local government regulations, which are in place to ensure the protection of the environment.

This EMPr has been compiled in accordance with the provisions of the Constitution of South Africa and the principles of Integrated Environmental Management. It is the responsibility of the Applicant to ensure that all operations related to the PVPP developments and associated infrastructure are in line with environmental legislation during construction and operation.

## 5. PURPOSE OF THE EMPR

The EMPr is a management tool that outlines environmental management strategies to ensure the Project's environmental commitments and objectives are met. The EMPr will be used during the proposed construction period for the services.

The EMPr outlines:

- Key environmental issues associated with construction and operation of the development;
- Management measures to minimise construction and operational impacts;
- Monitoring to be undertaken during construction and the operational phase;
- Environmental accountabilities; and
- Legislative requirements which must be met by the Company.

The applicant must take into consideration that this EMPr will be amended during the environmental authorisation process and must be amended as required over the duration of the construction or in line with changes in legislation. All operational license requirements must be added to this EMP in terms of monitoring requirements.

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The objective of this EMPr is to measure, record and demonstrate ongoing compliance with relevant legislation through implementation of the specified mitigation measures.

## 6. SCOPE OF THE EMPR

The EMPr provides environmental management objectives that aim to mitigate the impact of the construction phase on the biophysical environment, whilst taking into consideration the potential social and economic impacts of the proposed upgrade. The main components of the management are the following:

- Dust management during construction;
- Erosion and sedimentation;
- Hazardous and non-hazardous waste management on site;
- Stormwater control and management;
- Ambient noise levels;
- Litter and waste pollution;
- Site operations and facilities;
- Watercourse protection;
- Environmental sensitive zones and protection thereof;
- Sourcing, excavating and dumping of soil material;
- Noise and vibration control;
- Sewer spillages mitigation; and
- Environmental awareness training.

## 7. AIM OF THIS DOCUMENT

The purpose of this EMPr is to ensure that the impacts of all the phases of the project on the environment are kept to a minimum, to ensure continued monitoring of the construction phase and to ensure the involvement of interested and affected parties (I&APs) in a meaningful way.

## 8. ENVIRONMENTAL AWARENESS TRAINING

The Contractor must ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EMPr.

The presentation must be conducted, as far as possible, in the employees' language of choice.

As a minimum, training must include:

- Explanation of the importance of complying with the EMPr.
- Identification of sensitive environmental systems.
- Discussion of the potential environmental impacts of construction activities.

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- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their duties.
- Explanation of the specifics of this EMPr.
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.

The contractor must keep records of all environmental training sessions, including names, dates and the information presented.

## 9. ENVIRONMENTAL ACCOUNTABILITIES

### 9.1 Responsibility Matrix and Reporting Structure

During operation, all instructions and official communications regarding environmental matters must follow the organisational structure shown in Figure 9-1. The organisational structure identifies and defines the authorities' structure, and the communication structure for the various parties involved in the construction and operation of the proposed PVPP developments.

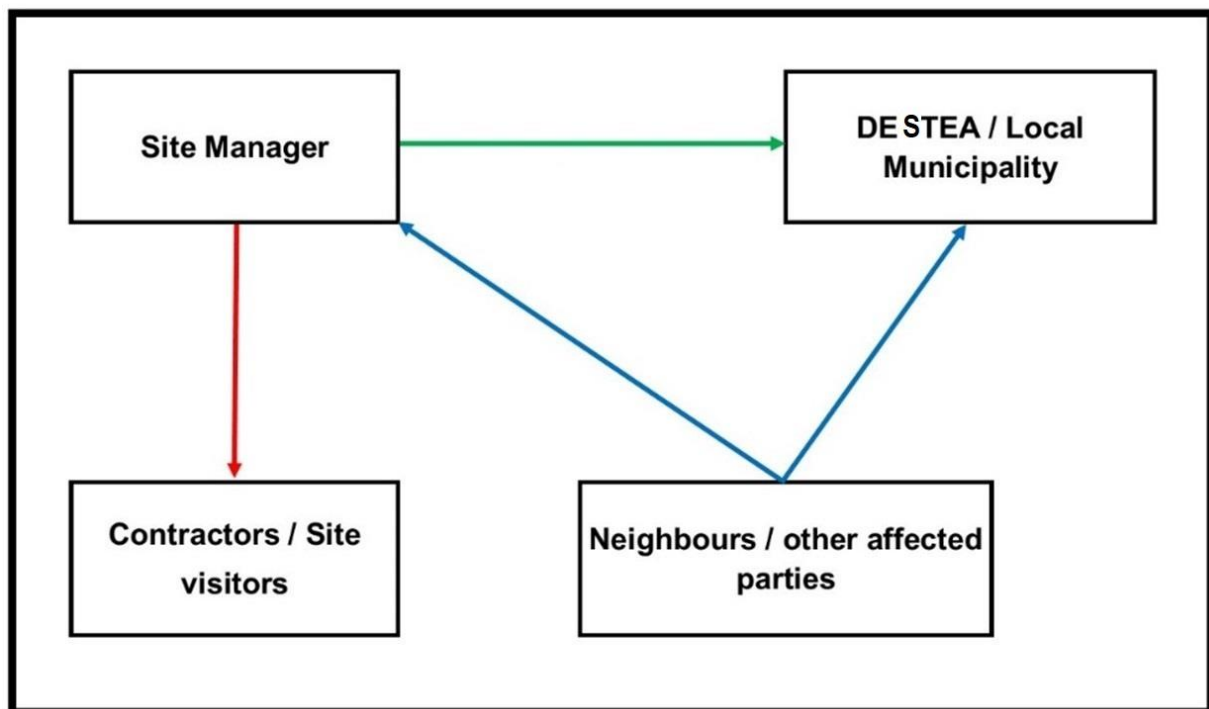


Figure 9-1. Organisational/reporting structure for implementation of the EMPr

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## 10. ENVIRONMENTAL ROLES

Environmental accountabilities for this construction EMP are as follows:

**Table 10-1: Environmental Accountabilities**

ROLE	ACCOUNTABILITY
<b>Applicant</b>	<ul style="list-style-type: none"> <li>• Ensure that the conditions within the EMPr are met.</li> <li>• Implementation of the EMPr.</li> <li>• Submission of any substantial changes, updates or amendments to the EMPr to DFFE for approval.</li> <li>• Ensuring that the provisions of the EMPr are binding on all Contractors operating on the site during the life of the project.</li> <li>• Including a performance-based requirement in all Contract Documents.</li> <li>• Ensuring that environmental site inspections and monthly audit reports are compiled during construction to establish how well the Contractor is complying with the EMPr. The monthly environmental audit reports must be submitted to DFFE and DESTEA.</li> <li>• Ensuring that compliance/non-compliance records are kept in good order and made available on request by the authorities.</li> <li>• Complying with all applicable environmental legislation, regulations and guidelines, and ensuring that Contractors undertake responsibility to do the same.</li> <li>• Being committed to the principles contained within NEMA, including the prevention of pollution and sustainable development.</li> </ul>
<b>Project Engineer and Resident Engineer (RE)</b>	<ul style="list-style-type: none"> <li>• Ensuring that the provisions of the EMPr are binding on all Contractors operating on the site during the construction of the project and that a performance-based requirement is included in all contracts.</li> <li>• Including the approved EMPr as part of the contract documents.</li> <li>• Ensuring that the Contractor(s) and Sub-contractor(s) are conversant with the requirements of the EMPr and that all members of staff on site have attended an environmental awareness-training course presented by the ECO.</li> <li>• Compiling preliminary construction site layout plans prior to construction commencing.</li> <li>• Approving final construction site layout plans in conjunction with the Environmental Manager.</li> <li>• Ensuring that the Contractor(s) complies with the EMPr and, if not, ensure that the Contractor(s) bears the costs of damages/compensation resulting from non-compliance with the EMPr.</li> <li>• If necessary, on the recommendation of the Environmental Manager or Environmental Compliance Officer (ECO), instructing the Contractor(s) to suspend any or all works on site, if the Contractor(s) or his/her Sub-contractors/suppliers fail to comply with the EMPr.</li> <li>• Ensuring that the Contractor(s) conducts all activities in a manner that minimises disturbance to the project area, local communities and road users and that complaints and queries by members of the public at the site office, are forwarded to the RE.</li> <li>• Liaison with stakeholders including landowners and land users, utility providers<sup>1</sup>, neighbours, and relevant authorities. This must be done in association with the Contractor (and the ECO where necessary).</li> <li>• Ensuring that a register of complaints and queries by members of the public is maintained at the site office and the actions taken in response to these complaints are recorded.</li> <li>• Liaising directly with the Environmental Manager in terms of environmental issues and maintaining close channels of communication with the Environmental Manager regarding foreseeable activities that may require environmental input.</li> </ul>

<sup>1</sup> The Project Engineer is to ensure liaison with utility operators regarding safety requirements for work within utility servitudes or crossing utilities.

ROLE	ACCOUNTABILITY
	<ul style="list-style-type: none"> <li>• On behalf of the Employer, reviewing any substantial changes, updates or amendments to the EMPr prior to its submission to the DFFE for approval.</li> <li>• On behalf of the Employer, ensuring that the Environmental Manager keeps the compliance/non-compliance records in good order and makes them available on request to the authorities.</li> <li>• Ensuring that all EMPr-related instructions from the RE to the Contractor are recorded in the site diary.</li> <li>• Having available a copy of the EMPr at the construction site at all times and ensuring that all staff, Contractors and Sub-contractors are familiar with or made aware of the contents of the EMPr.</li> <li>• Complying with all applicable environmental legislation, regulations and guidelines, and ensuring that Contractors undertake responsibility to do the same.</li> <li>• Ensuring that an environmental close out report is obtained from the Environmental Manager prior to awarding the Certificate of Completion to the Contractor(s).</li> </ul>
<b>Site Manager</b>	<ul style="list-style-type: none"> <li>• Be familiar with the recommendations and mitigation measures of this EMPr and implement these measures.</li> <li>• Ensure that all employees and contractors adhere to the EMPr.</li> <li>• Advise on environmental management issues.</li> <li>• Monitor site activities on a daily basis for compliance.</li> <li>• Rectify transgressions through the implementation of corrective action.</li> <li>• Ensure that environmental inspections/audits are conducted as per the requirements of the EA.</li> <li>• Inform and educate all employees about the environmental risks associated with the various activities undertaken and highlight those activities which must be avoided in order to minimise significant impacts to the environment.</li> <li>• Maintain an environmental register which keeps a record of all incidents which occur on the site. These incidents include: <ul style="list-style-type: none"> <li>• Public involvement/complaints.</li> <li>• Health and safety incidents.</li> <li>• Hazardous materials stored on site.</li> <li>• Non-compliance incidents.</li> </ul> </li> </ul>
<b>Contractor/ Site visitors</b>	<ul style="list-style-type: none"> <li>• Ensure implementation of the EMPr.</li> <li>• Inform and educate all employees/contractors/site visitors about the environmental risks associated with the various activities undertaken at the site and highlight those activities which must be avoided in order to minimise significant impacts to the environment.</li> <li>• Should employees/contractors/site visitors require clarity on any aspect of the EMPr, they must contact the Site Manager for advice.</li> </ul>
<b>Environmental Control Officer (ECO)</b>	<ul style="list-style-type: none"> <li>• Demarcate all sensitive areas which will be impacted upon by the development footprint.</li> <li>• Demarcate the pipeline infrastructure along the environmentally approved layout to limit deviation of the infrastructure.</li> <li>• Conduct a monthly site visit to monitor the construction activities in terms of the approved EMP and ensure authorisation conditions are adhered to.</li> <li>• Compile a monthly audit report in which all finding will be recorded, non-compliance highlighted, mitigation measures suggested, and recommendations included.</li> <li>• The monthly audit report must be submitted to DFFE and DESTEA.</li> </ul>
<b>Authorities / DESTEA</b>	<ul style="list-style-type: none"> <li>• Review reports submitted as and when required.</li> <li>• Conduct site visit and/or investigation after incident.</li> </ul>
<b>Neighbours/I&amp;APS</b>	<ul style="list-style-type: none"> <li>• Report incidents.</li> <li>• Report nuisance activities during construction phase.</li> </ul>

## 11. PROPOSED CONSTRUCTION TIMEFRAMES

The construction phase of the proposed developments is expected to be approximately 15 months, respectively. The preliminary proposed construction timeframes are indicated in Table 11-1.

**Table 11-1. Proposed timeframe of activities during the construction phase.**

ACTIVITY	PROPOSED TIMEFRAME	LOCATION	SPECIFIC ACTIVITIES
Site preparation	To be confirmed	On-site	To be confirmed
Construction of all infrastructure	To be confirmed	On-site	To be confirmed
Final construction activities and rehabilitation	To be confirmed	On-site	To be confirmed

## 12. EXPECTED ENVIRONMENTAL IMPACTS

As part of the environmental processes of the proposed development, the expected impact associated with the proposed development have been determined.

The DEA Screening tool was consulted as part of the planning phase of the proposed development. During this consultation, numerous specialist studies were identified. The studies that were undertaken included:

- A Heritage Impact Assessment;
- An Agricultural Impact Assessment;
- A Wetland Delineation and Functionality Assessment;
- An Ecological Impact Assessment;
- An Avifaunal Impact Assessment; and
- A Visual Impact Assessment
- Socio-Economic Impact Assessment
- Geotechnical Investigation

The clearance activities associated with the proposed solar development will potentially have an impact on the wetland areas and water levels, whether it is through direct or indirect impacts. Clearance work will also carry a risk of soil and water pollution, with large construction vehicles contributing substantially due to oil and fuel spillages. The clearance almost certainly carries by far the greatest risk of alien invasive species being imported to the site, and the high levels of habitat disturbance also provide the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance. The use of heavy machinery during the construction process of the development will result in the compaction of soil, resulting in decreased infiltration of rainwater and increased surface run-off volumes and velocities leading to a greater erosion risk.

The positive impacts of the proposed development relate to the provision of short to medium term employment opportunities of the construction and operational phases of the proposed developments. Approximately 30 permanent employment opportunities will be created during the construction phase of the proposed development. Based on the demand, up to 100 employment opportunities can be created during this phase at any one time. Furthermore, the positive impacts are seen in the additional energy supply to the existing Eskom electricity grid.

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The impact ratings for the construction and operational phases of the proposed developments have been included in Table 12-1 and Table 12-2

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**Table 12-1. Summary of the possible impacts of the construction phase.**

Impact	Status	Extent	Duration	Severity	Frequency	Probability of occurrence	Significance without mitigation	Significance with mitigation	
Ecological Assessment (excluding avifaunal and wetland): Habitat destruction & Fragmentation	Negative	1	5	3	2	5	63	MEDIUM	LOW
Ecological Assessment Soil erosion and sedimentation	Negative	3	5	3	3	5	88	MEDIUM	LOW
Ecological Assessment (excluding wetland): Dust pollution	Negative	2	3	3	4	5	72	MEDIUM	LOW
Ecological Assessment Spillages of harmful substances	Negative	3	4	3	4	2	60	MEDIUM	LOW
Ecological Assessment (excluding wetland): Spreading of alien invasive species	Negative	2	3	3	4	4	64	MEDIUM	LOW
Ecological Assessment (excluding wetland): Negative effect of human activities on fauna and flora	Negative	1	3	5	2	4	54	MEDIUM	LOW
Ecological Assessment: Road mortalities of fauna	Negative	2	3	2	2	4	42	LOW	LOW
Agricultural Assessment: Loss of high agricultural potential ground	Negative	1	3	4	3	5	64	MEDIUM	MEDIUM
Heritage Assessment: Archaeology	Negative	2	2	3	1	5	42	LOW	LOW
Heritage Assessment: Built Environment	Negative	2	2	3	1	5	42	LOW	LOW
Heritage Assessment: Cultural Landscape	Negative	2	2	3	1	5	42	LOW	LOW
Heritage Assessment: Human Burial Sites	Negative	2	2	3	1	5	42	LOW	LOW
Wetland Assessment: Dust contamination	Negative	2	2	2	3	5	48	LOW	LOW
Wetland Assessment: Import and spread of alien invasive vegetation	Negative	1	2	3	3	5	48	LOW	LOW
Wetland Assessment: Soil and Water pollution	Negative	1	2	2	3	5	40	LOW	LOW
Wetland Assessment: Soil Erosion	Negative	1	1	2	2	5	28	LOW	LOW
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Impact	Status	Extent	Duration	Severity	Frequency	Probability of occurrence	Significance without mitigation	Significance with mitigation
Wetland Assessment: Habitat destruction	Negative	2	2	2	2	5	42	LOW
Visual impact	Negative	2	5	1	5	5	80	MEDIUM
Avifaunal Assessment: Direct habitat destruction	Negative	1	5	5	2	5	77	MEDIUM
Avifaunal Assessment: Habitat fragmentation (birds)	Negative	2	5	5	2	5	84	MEDIUM
Avifaunal Assessment: Collisions	Negative	1	4	5	1	4	50	MEDIUM
Avifaunal Assessment: Disturbances through human activities, noise and fires	Negative	2	4	5	2	5	77	MEDIUM
General: Pollution due of surface and groundwater due to chemical, oil and fuel spills	Negative	1	2	3	3	3	36	LOW
General: Traffic Control Impacts	Negative	2	2	3	2	5	49	LOW
General: Dust, noise and waste generated during construction	Negative	2	3	2	3	5	56	MEDIUM
Socio-economic Assessment - Promotion of the Solar Energy Value Chain	Positive	3	5	4	5	4	108	HIGH
Socio-economic Assessment - Job Creation and Skills Development	Positive	2	5	4	5	5	110	HIGH
Socio-economic Assessment - Crime and Social Disruption	Negative	2	5	3	4	3	70	MEDIUM

**Table 12-2. Summary of the possible impacts of the operational phase.**

Impact	Status	Extent	Duration	Severity	Frequency	Probability of occurrence	Significance without mitigation	Significance with mitigation	
Ecological Assessment: Construction of infrastructure, access roads etc.	Negative	2	2	2	3	4	42	LOW	LOW
Ecological Assessment: Road mortalities of fauna	Negative	1	3	3	3	3	42	LOW	LOW
Ecological Assessment: Spreading of alien invasive species	Negative	2	3	2	3	4	49	LOW	LOW
Heritage Assessment: Archaeology	Negative	2	2	3	1	5	42	LOW	LOW
Heritage Assessment: Built Environment	Negative	2	2	3	1	5	42	LOW	LOW
Heritage Assessment: Cultural Landscape	Negative	2	2	3	1	5	42	LOW	LOW
Heritage Assessment: Human Burial Sites	Negative	2	2	3	1	5	42	LOW	LOW
Agricultural Assessment: Loss of high agricultural potential ground	Negative	1	5	4	1	5	60	MEDIUM	LOW
Wetland Assessment: Rehabilitation of cleared land	Positive	2	5	4	4	4	88	MEDIUM	HIGH
Wetland Assessment: Soil Erosion and Sedimentation	Negative	2	3	2	1	5	42	LOW	LOW
Wetland Assessment: Soil and Water pollution	Negative	2	1	2	2	5	35	LOW	LOW
Wetland Assessment: Dust contamination	Negative	2	1	2	2	5	35	LOW	LOW
Wetland Assessment: Import and spread of alien invasive vegetation	Negative	1	3	1	1	5	30	LOW	LOW
Visual impact	Negative	2	5	1	5	5	80	MEDIUM	MEDIUM
General: Traffic Control Impacts	Negative	1	5	2	1	3	32	LOW	LOW
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Impact	Status	Extent	Duration	Severity	Frequency	Probability of occurrence	Significance without mitigation	Significance with mitigation	
Socio-economic Assessment - Contribution to the Constrained National Electricity Grid	Positive	3	5	4	5	5	120	HIGH	HIGH
Socio-economic Assessment - Capital Formation and Investment Attraction	Positive	3	5	4	5	5	120	HIGH	HIGH
Socio-economic Assessment - Reduction in CO2 Emissions per Unit of Electricity Generated	Positive	3	4	3	5	5	100	HIGH	HIGH
Socio-economic Assessment - Lower Tariffs per Unit will Reduce Inflationary Pressure	Positive	3	3	3	3	4	63	MEDIUM	MEDIUM
Socio-economic Assessment - Promotion of the Solar Energy Value Chain	Positive	5	5	4	4	4	112	HIGH	HIGH
Socio-economic Assessment - Job Creation and Skills Development	Positive	2	5	1	5	5	80	MEDIUM	MEDIUM
Socio-economic Assessment - Community Development	Positive	3	3	3	3	4	63	MEDIUM	MEDIUM
Socio-economic Assessment - Risk of Vandalism	Negative	2	5	1	3	3	48	LOW	LOW

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**Table 12-3. Cumulative impacts of the possible impacts of the operational phase**

Impact	Nature	Extent	Duration	Severity	Frequency	Probability of occurrence	Significance without mitigation	Significance with mitigation
<b>• Cumulative impacts include all proposed and existing renewable energy projects within a 30 km radius around the study areas.</b>								
Platinum Solar Park (30 MW)	Positive	3	4	4	5	5	110	HIGH
Allied Farms Solar Park (10 MW)	Positive	3	4	4	5	5	110	HIGH
Ecological Assessment: Impacts on habitat resulting in loss, degradation and / or fragmentation.	Negative	3	4	2	3	3	54	MEDIUM
Ecological Assessment: habitat is destroyed or altered by the development.	Negative	3	4	3	3	2	50	MEDIUM
Ecological Assessment: Impact on natural environmental processes and ecosystem functioning.	Negative	3	4	4	3	2	55	MEDIUM

Impact	Nature	Extent	Duration	Severity	Frequency	Probability of occurrence		Significance without mitigation	Significance with mitigation
Avian Assessment: Disturbance through human activities	Negative	3	3	3	5	5	90	MEDIUM	LOW
Visual Assessment: Landscape transformation	Negative	1	5	2	2	2	32	LOW	LOW
Visual Assessment: visual effects	Negative	1	5	2	1	1	16	LOW	LOW

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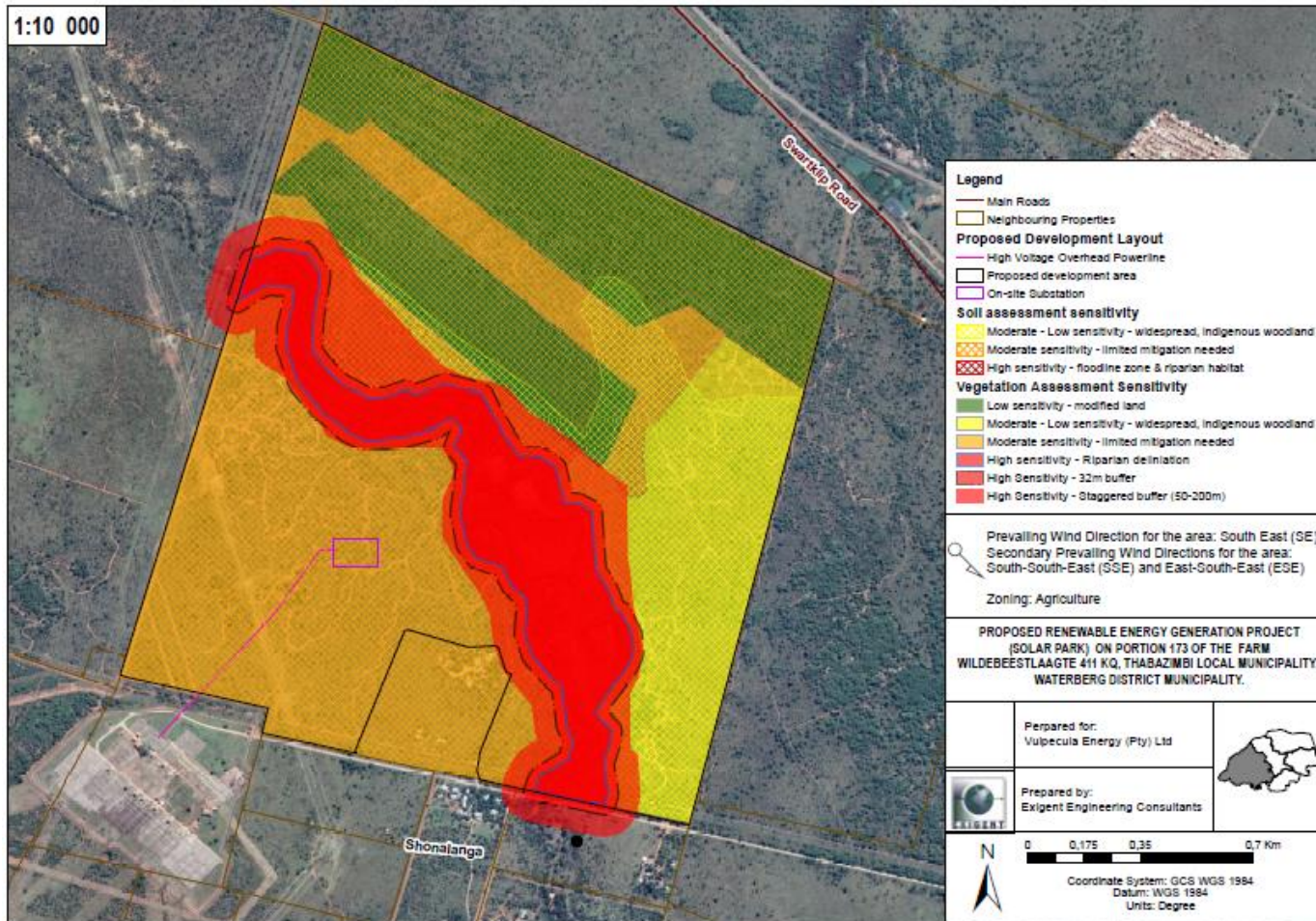


Figure 12-1. Sensitivity map

## 13. REPORTING

A filing system must be established and must be maintained throughout the lifespan of the activities. The Site Manager is solely responsible for the upkeep and management of the EMPr file. A hardcopy of all documentation must be filed, while electronic copies must be maintained in a dedicated electronic folder with regular back-ups being made. The maintenance and filling of, electronic and hard copies must be the responsibility of the Site Manager and must remain current and up to date. The filing system must be updated, and relevant documents added as required. The EMPr file must be made available at all times on request by DFFE, LEDET and other relevant authorities.

A monitoring programme must be implemented for the duration of the construction and operational phase.

This programme must include:

- Daily incident logs are to be compiled by the Site Manager.
- All significant incidents must be reported to the District Municipality within 24 hours of occurrence and kept in the EMPr file controlled by the Site Manager. The daily incident logs must contain the following:
  - The date and time of the incident.
  - Description of the incident.
  - The name of the person responsible.
  - The incident must be listed as significant or minor.
  - Remedial or corrective action taken to mitigate the incident.
  - Record of repeat minor offences by the same employee/contractor.
- The Site Manager must keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reasons for the damage must be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage must be directed to the Site Manager for appraisal.

The Site Manager must be held liable for all unnecessary damage to the environment. A register must be kept of all complaints from the surrounding community/businesses. All complaints/claims must be handled immediately to ensure timeous rectification by the responsible party.

The Site Manager must cover relevant details with regard to:

- Construction procedures and location of the construction site.
- Start date and duration of the procedure.
- Materials, equipment and labour to be used.
- How materials, equipment and labour would be moved to and from the site as well as on site during construction.
- Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure.
- Emergency procedures in case of any reasonably potential accident/incident which would occur during the procedure.

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- Compliance/non-compliance with the EMPr specification and motivation if non-compliant.

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## 14. ENVIRONMENTAL MANAGEMENT PROGRAMME

Table 14-1. Environmental aspects and related actions for the pre-construction phase of the proposed development.

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
<b>1. Pre-construction phase</b>									
<b>1.1. Aspect: Site Preparation, Site Offices, Storage of Materials and Health and Safety</b>									
<b>1.1.1. Alignment with the environmental documentation</b>									
Best practice Construction site management in order to limit environmental impacts									
	The developer must ensure this EMPr forms part of the contractual agreements with the Contractor(s) and sub-contractors for the execution of the proposed development.	Raise environmental awareness		To be inspected	Once-off	Developer; Project Manager (PM); Environmental Officer (EO)	✓		
	Where possible, local labor and contractors must be used.	Promote socio-economic environment		To be inspected	Once-off	Contractor; PM	✓	✓	✓
	An independent ECO must be appointed.			To be inspected	Once-off	Contractor	✓		
<b>1.1.2. Construction site management</b>									
Optimum Construction site management in order to limit environmental impacts									
	A suitable area for site offices and areas for the storage of equipment, materials and batching, etc. must be confirmed with the ECO.	Minimum impacts on sensitive habitats		On-site	Once-off	Project Manager; EC; Contractor	✓		
	Posters presenting photographs of potential floral species of concern, must be erected on site.	Minimum impacts on sensitive habitats		On-site	Once-off	Project Manager; EC; Contractor	✓		

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Environmental awareness training must be conducted for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil, pollution of water resources (both surface and groundwater), air pollution and litter control.	Raise environmental awareness	On-site	Continuous, as required	Project Manager; EC; Contractor	✓	✓		
	Instruct employees, contractors, and site visitors to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship, nesting) seasons. In addition, control pets to avoid harassment and disturbance of wildlife.	Raise environmental awareness	On-site	Continuous, as required	Project Manager; EC; Contractor	✓	✓		
	Continuous awareness and training programmes shall be implemented and updated.	Raise environmental awareness	On-site	Continuous, as required	Project Manager; EC; Contractor	✓	✓	✓	
	Staff must be educated on the need to refrain from indiscriminate waste disposal and pollution of local soil and water resources.	Raise environmental awareness	On-site	Once-off	Project Manager; EC; Contractor	✓	✓		
	No staff should be accommodated on the site.	Raise environmental awareness	On-site	Once-off	Project Manager; EC; Contractor	✓	✓	✓	
	Staff must be trained on reporting of environmental incidents.	Raise environmental awareness	On-site	Once-off	Project Manager; EC; Contractor	✓	✓	✓	
	A detailed contingency document must be provided by the appointed contractor prior to the construction phase of the proposed development.	Raise environmental awareness	On-site	Once-off	Contractor	✓			
	The plan must show the positions and extent of the known permanent and temporary site structures and infrastructure such as office buildings, wash bays, storage areas, materials stockpiling areas, topsoil stockpiling areas, concrete batching areas etc. This plan	Ensuring all construction camp activities are outside of sensitive areas.	Site to be inspected. Plan to be provided to the ECO, Engineer and be kept in Site file	Once-off	Contractor	✓			



Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	must take all environmentally sensitive areas into consideration.								
	The principal contractor is to provide a detailed security plan aimed towards ensuring the safety of the adjacent estates.	Ensuring all construction camp activities are outside of sensitive areas.	Site to be inspected. Plan to be provided to the ECO, Engineer and be kept in Site file	Once-off	Contractor	✓			
	No construction workers are to be permitted to wander past the boundaries of the demarcated/cordoned-off construction footprint.	Ensuring all construction camp activities are outside of sensitive areas.	Site to be inspected.	Continuous	Contractor	✓	✓	✓	
	A Registered Professional Landscape Architect should be appointed to ensure that the proposed mitigation measures are implemented in the most optimal and environmentally enhancing way.	Minimum impacts on sensitive habitats	Site to be inspected.	Once-off	Contractor	✓			
<b>1.1.3. Protection of the natural vegetation</b>									
Protection of protected (Provincially and Nationally) species occurring on site and ensure sensitive ecosystems and habitats are protected during construction									
	The removal of vegetation should only occur on the footprint area of the development and not over the larger area. The clearing and damage of plant growth in these areas should be restricted to the footprint way leave area.	The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓		
	The removal of indigenous trees and shrubs should be kept to a minimum necessary. Trim, rather than fell of woody species along the edges of the development site where possible.	The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓		
	Sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, to reduce potential impacts.	The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓		

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Clearing of vegetation should be scheduled for the drier winter months and limited to areas immediately needed for construction..		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	A 32-meter buffer should be implemented around the riparian zones of the drainage channels and wetlands on site.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	A Water Use Licence application should be submitted to the Department of Water and Sanitation for the development of the solar plants within 500 meter of the wetland zones or the floodline zones of non-perennial drainage channels.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	Vegetation stripping should occur in parallel with the progress of construction to minimise erosion and/or run-off.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO, Contractor		✓	
	The few taller than 3m indigenous trees along the proposed site provide resting/perching sites for larger birds like vultures, birds of prey, arboreal reptiles and mammals that might occur/pass through the area and must be preserved.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	A pre-construction site visit must be undertaken by a specialist where all protected trees (such as the <i>Olea eurpaeae subsp. Africana</i> which is provincially protected) and Red Data species which will be affected, be counted and permits applied for.		Protection of natural resources	Site inspection	Once-off	Developer; ECO; EO; Specialist	✓		
	All sensitive areas likely to be intersected by the project must be identified, demarcated, photographed and clearly marked prior to any construction works.		Protection of natural resources	Site inspection	Once-off	Developer; ECO; EO; Specialist	✓		
<b>1.1.4. Management of on-site waste (excess materials and recyclables)</b>									
Adequate management of waste throughout all phases of the proposed development.									
	An agreement must be reached between the Developer, the Surrounding Farmers and the Thabazimbi Local		Clean site policy	Agreement to be forwarded to ECO	Once-off	Developer	✓		
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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Municipality regarding the distribution of excess materials that will not be used on site.								

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**Table 14-2. Environmental aspects and related actions for the construction phase of the proposed Renewable PPP Energy Project.**

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/ rehabilitation
<b>2. Construction phase</b>									
<b>2.1. Aspect: Site Preparation, site offices and Storage of Materials</b>									
<b>2.1.1. Site preparation activities</b>									
	Site clearing must take in a phased manner.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	Areas which are not to be constructed within two months must not be cleared so as to reduce risk of erosion.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	Progress of vegetation establishment must be monitored regularly by ECO, with slow recovery requiring intervention to ensure site recovery and integrity, as well as physical stability.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	Topsoil obtained as part of the site preparation activities will be stored until it can be used for rehabilitation.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. These include watercourses where applicable.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
<b>2.1.2. Establishment of site offices and storage areas</b>									
	The construction camp is to be erected in accordance with the site plan compiled in the pre-construction phase.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO	✓	✓	
	The site plan must be submitted to the Department with the initial monitoring report.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO	✓	✓	
	The site offices are not to be placed within the 1:100 year flood line or within proximity to any water resources or sensitive areas.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	The size of the site offices should be minimized.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	A comprehensive fire management plan should be implemented so as to prevent any fire outbreaks.		The preservation of the vegetation on-site.	Site to be inspected.	Once-of	ECO	✓	✓	

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
<b>2.1.3. Establishment of site offices and storage areas of hazardous materials</b>									
Proper storage facilities for the storage of oils, paints, grease, fuel, chemicals and any hazardous materials to be used must be provided to prevent migration of spillages into the surface and groundwater regime.									
	The location of storage areas must take prevailing wind direction, water resources, site topography and erosion potential into account.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	Storage of these materials are to be done on or within impervious surfaces.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	Storage must be designated, demarcated, fenced and clearly marked as such.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	Fire prevention equipment must available at all storage facilities at all times.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	Any water that collects in the bund must not be allowed to stand and must be removed and disposed of as liquidous waste immediately.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	All fuel storage tanks (temporary or permanent) and associated facilities must be designed and installed in accordance with the relevant oil industry standards, National codes, Local Authority, and other relevant requirements.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	The capacity and content of the tank must be clearly displayed and identified.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	All waste fuel and chemical soiled rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	All storage facilities (including any tanks) must be on an impermeable surface in order to ensure that accidental spillage does not pollute local soil or water resources. The facilities must also be protected from the ingress of stormwater from surrounding area.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	on site. Where possible, the available MSDSs should additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes.								
	A suitable Waste Disposal Contractor must be employed to remove waste oil. These wastes should only be disposed of at a licensed landfill site designed to handle hazardous wastes.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site at a licensed hazardous waste site.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	Any spillage, which may occur, shall be investigated and immediate action must be taken. This must also be reported to the ECO and depending on the severity reported to the DEFF as stipulated in the conditions of the Environmental Authorisation.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	Keep written records detailing: the type of spill; the corrective and remedial measures implemented in the stopping or reduction of the spill; and the clean-up of the spill. Such progress reporting is important for monitoring and auditing purposes and the written reports may afterwards be used for training purposes in an effort to prevent similar future occurrences		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
<b>2.1.4. Access control and vehicular movement</b>									
Access onto the site will be provided through a gravel road leading into and through the proposed developments. Additionally, numerous internal gravel roads will be constructed.									
	Strict site access control procedures must be implemented.		Ensure safety for all individuals on-site	Site to be inspected.	Continuous	Contractor		✓	
	A record must be kept of all persons who enters and exits the facility.		Ensure safety for all individuals on-site	Site to be inspected.	Continuous	Contractor		✓	
	Ensure only legitimate entry into the development area takes place.		Ensure safety for all individuals on-site	Site to be inspected.	Continuous	Contractor		✓	
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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Any Departmental unit (DFFE, DWS etc.) governing environmental precaution, must be granted access to the development site at all times.		Compliance with monitoring requirements	Site to be inspected.	Continuous	Contractor		✓	
	Existing infrastructure and haul roads must be used as far as possible.		Limiting construction impacts	Site to be inspected.	Continuous	Contractor		✓	
	Vehicle movement to be restricted to designated dirt roads and may not occur near sensitive habitats.		Limiting construction impacts	Site to be inspected.	Continuous	Contractor		✓	
	Limit vehicle movement on unpaved areas and vehicle speeds should be restricted on site (speed limit of 40km/h)		Limiting construction impacts	Site to be inspected.	Continuous	Contractor		✓	
	Travelling at night should be avoided or limited as much as possible.		Limiting construction impacts	Site to be inspected.	Continuous	Contractor		✓	
	Vehicle movement should be restricted to an absolute minimum that is required for the construction. Unnecessary movement of vehicles will increase the degradation of paths and dirt roads leading to an increased erosion risk.		Limiting construction impacts	Site to be inspected.	Continuous	Contractor		✓	
<b>2.2. Aspect: Ecological Sensitivity of the development area</b>									
Ensure sensitive ecosystems and habitats are protected during construction									
	All rubble, litter and any other type of waste must be removed from the watercourse areas within proximity to the construction areas and regular monitoring of this is required on site.		Improve habitat quality	Site to be inspected.	Continuous	Contractor		✓	
	All construction-related waste/material should be appropriately disposed of after the construction has ceased.		Improve habitat quality	Site to be inspected.	Continuous	Contractor		✓	
	Where holes for poles pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and getting trapped and/or injured.		Improve habitat quality	Site to be inspected.	Continuous	Contractor		✓	
	Fauna that are trapped in trenches, must be relocated on site and located as far as possible within the sensitive habitats.		Improve habitat quality	Site to be inspected.	Continuous	Contractor		✓	
	No protected fauna or flora may be harmed or removed without the necessary permits.		Improve habitat quality	Site to be inspected.	Continuous	Contractor		✓	

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Monitoring should be implemented during the pre- and post-construction phase of the Solar Plant and powerlines to ensure that minimal impact is caused to the avifauna of the area. The monitoring should be conducted by a suitable avifauna specialist listed in Appendix D.		Improve habitat quality	Site to be inspected.	Continuous	Contractor	✓	✓	
	Hunting, capturing and trapping of fauna must be prohibited.		Improve habitat quality	Site to be inspected.	Continuous	Contractor		✓	
	All infrastructure must be erected within the site boundaries.		Limiting construction footprint	Site to be inspected.	Continuous	Contractor		✓	
	All infrastructure must be located outside of the very high to highly sensitive areas (and associated buffers) as determined by the ecological, heritage, avifaunal, wetland specialist assessments.		Limiting construction footprint	Site to be inspected.	Continuous	Contractor		✓	
	All above-mentioned areas must be demarcated and cordoned off prior to the commencement of site clearance.		Limiting construction footprint	Site to be inspected.	Continuous	Contractor		✓	
	No indigenous vegetation is to be collected or utilized for firewood.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	Contractor	✓	✓	✓
	Where possible, development must be located within the disturbed grassland.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	Should the ECO confirm that clearing of indigenous vegetation is unavoidable, plant material must be transplanted where practical and possible.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	Care must be given to not unnecessarily clear or destroy indigenous vegetation.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	All indigenous plant material removed from the cleared areas must be stockpiled for mulching. All remaining vegetation must be removed and disposed of at a registered landfill site.		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	Contractor		✓	



Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/ rehabilitation
	Notice boards must be erected informing construction workers on floral and faunal species of particular conservation concern. A relevant specialist should be notified when any of these species are observed during the construction phase		The preservation of the vegetation on-site.	Site to be inspected.	Continuous	ECO		✓	
	Appropriate measures, like bird flappers, to be implemented to prevent collisions with structures and possible burning of tubes.		Protection of avifaunal species	Site to be inspected.	Continuous	Contractor		✓	✓
	Flight paths of migratory birds and waterbirds must be determined and assessed during regime 2 monitoring.		Protection of avifaunal species	Site to be inspected.	Continuous	ECO		✓	
	Preconstruction Monitoring needed to determine the presence of Threatened, Rare, Endemic or Range Restricted bird species. Please refer to section on previous results from avifauna studies in the area as reference, as well as the avifauna monitoring programme		Protection of avifaunal species	Site to be inspected.	Continuous	Contractor	✓		
	Land management practices should not attract raptors or other species vulnerable to collision. Structures should be designed to reduce the availability of perching sites.		Protection of avifaunal species	Site to be inspected.	Continuous	Contractor	✓		
	Ensure that sites are close to existing power lines, so that few new lines are required.		Protection of avifaunal species	Site to be inspected.	Continuous	Contractor	✓	✓	
	The impact of collision of birds is partially mitigated for by placing new infrastructure close to existing lines because the more overhead power lines and other associated infrastructure there are together, the more visible they would be to the birds in the area		Protection of avifaunal species	Site to be inspected.	Continuous	Contractor		✓	
	The high-risk sections of line should be marked with suitable anti-collision marking devices on the earth wire as per the Eskom guidelines.		Protection of avifaunal species	Site to be inspected.	Continuous	Contractor		✓	
	Should any of the mentioned threatened or near threatened species be abundant within the study area, further in dept assessments might be required to determine the impact the proposed development will have on these species.		Protection of avifaunal species	Site to be inspected.	Continuous	ECO		✓	

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Use existing facilities (e.g., access roads) to the extent possible to minimize the amount of new disturbance.		The preservation of the vegetation on-site and habitat	Site to be inspected.	Continuous	ECO		✓	
	Ensure protection of important resources by establishing protective buffers to exclude unintentional disturbance. All possible efforts must be made to ensure as little disturbance as possible to sensitive bird habitats during construction.		The preservation of the vegetation on-site and habitat	Site to be inspected.	Continuous	ECO		✓	
	During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place.		The preservation of the vegetation on-site and habitat	Site to be inspected.	Continuous	ECO		✓	
	Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas.		The preservation of the vegetation on-site and habitat	Site to be inspected.	Continuous	ECO		✓	
<b>2.3. Control of alien and invasive plant species</b>									
Ensure sensitive ecosystems and habitats are protected during construction									
	All alien invasive plants must be removed. The ECO must do regular follow-ups to ensure no alien invasive plants are located within the development footprint.		Improvement of the quality of the natural resources	Site to be inspected.	Continuous	ECO Contractor		✓	
	Bare surfaces must be grassed as soon as possible after construction to minimise time of exposure. Locally occurring, indigenous grasses must be used. Alien invasive grasses such as <i>Pennisetum clandestinum</i> (Kikuyu) are not to be used.		Improvement of the quality of the natural resources	Site to be inspected.	Continuous	ECO Contractor		✓	
	A Rehabilitation and monitoring programme must be compiled for the project and must be strictly applied to all construction areas and servitudes. This rehabilitation plans must be implement best practice principles. Monitoring and rehabilitation must continue for the life of the project.		Improvement of the quality of the natural resources	Site to be inspected. MSDS for controls must be	Continuous	ECO Contractor		✓	✓
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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
				available in the site file.					
	Institute an eradication/control programme for early intervention if invasive species are detected. The use of indigenous plants must be encouraged		Improvement of the quality of the natural resources	Site to be inspected.	Continuous	ECO Contractor		✓	✓
	All alien invasive plants control work should only be undertaken by a competent contractor;		Improvement of the quality of the natural resources	Site to be inspected.	Continuous	ECO Contractor		✓	✓
<b>2.4. Herbicide and pesticide limitation</b>									
Ensure sensitive ecosystems and habitats are protected during construction									
	No herbicides are allowed to be used on indigenous vegetation, particularly within proximity to watercourses and wetlands..		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	
	Registered herbicides must strictly be applied to alien invasive vegetation only.		Conservation of natural resources on site	MSDS in site file.	Continuous	ECO Contractor		✓	
	Pesticides are not to be used during the construction or operational phase of the development.		Conservation of natural resources on site	Site to be inspected.	Continuous	ECO Contractor Developer		✓	✓
	General spraying of herbicides and pesticides must be prohibited.		Conservation of natural resources on site	Site to be inspected.	Continuous	ECO Contractor		✓	
<b>2.5. Protection of the watercourses</b>									
Ensure sensitive ecosystems and habitats are protected during construction									
	As far as possible, indigenous plants or natural features must not be disturbed, destroyed or removed.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	
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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	No material storage or laydown areas are permitted under trees.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	
	No physical damage may be caused to any aspect of a watercourse, other than that necessary to complete the works as specified and in accordance with the accepted method statement and the approved site layout plans.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	
	The extent and duration of the hydrological disruption must be minimized where possible.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	
	The pan and buffer zone should also be regarded as no-go areas and no construction or operational activities including stockpiling, clearing, laydown areas, vehicle movement or any other associated activities should occur in or near this pan system.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	
	A stormwater management system which would ensure that surface runoff patterns are retained as is, especially pertaining to the drainage areas, must be developed, should the drainage areas and interspersed small depressions may be included within the development footprint without resulting in large impacts.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	
	The storm water management system must include design of erosion prevention structures such as soak ways, attenuation areas and dissipation structures.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	
	All structures and mitigation measures must be maintained throughout the lifetime of the development.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	✓
	It will be important to implement a monitoring programme so that any changes to the pan system on the site can be identified quickly before it leads to irreversible changes. This monitoring programme should include at least during the construction phase, a bi-annual bi-monitoring of the pan system. This should be conducted by a suitable qualified wetland specialist.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	The drainage area occurring in the south eastern corner of the site contains better defined wetland conditions and provides a higher level of ecological function. The development should therefore consider excluding this drainage area from development. Where the development is unable to exclude this drainage area in the south eastern corner of the site, it will also have to implement the necessary storm water structures and erosion measures to ensure that runoff generated by the development does not lead to impacts in the downslope areas.		Conservation of natural resources on site	Site to be inspected.	Continuous	Contractor		✓	
<b>2.6. Aspect: Erosion and sedimentation control</b>									
Ensure sensitive ecosystems and habitats are protected during construction									
	Both temporary and permanent soil erosion control measures must be used during the construction and operation phases.		Conservation of sensitive areas	Site to be inspected.	Continuous	Contractor		✓	
	Any 'sods' of vegetation removed during clearing activities should be replanted.		Conservation of sensitive areas	Site to be inspected.	Continuous	Contractor		✓	
	Where necessary, an approved local indigenous grass seed mixture should be applied in conjunction with the sods.		Conservation of sensitive areas	Site to be inspected.	Continuous	Contractor		✓	
	Checks must be carried out at regular intervals to identify areas where erosion is occurring and remedial action must be taken.		Conservation of sensitive areas	Site to be inspected.	Continuous	Contractor		✓	
	Grass should be watered on a regular basis (naturally and artificially) until the vegetation has established and adequate cover is achieved.		Conservation of sensitive areas	Site to be inspected.	Continuous	Contractor		✓	
	Reprofiling of the banks of disturbed drainage areas to a maximum gradient of 1:3 to ensure bank stability.		Conservation of sensitive areas	Site to be inspected.	Continuous	Contractor		✓	

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Incorporate adequate erosion management measures to limit erosion and associated sedimentation of the water resource; management measures may include berms, silt fences, hessian curtains and stormwater diversion away from areas susceptible to erosion.		Conservation of sensitive areas	Site to be inspected.	Continuous	Contractor		✓	
	Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas.		Conservation of sensitive areas Limit erosion	Site to be inspected	Continuous	Contractor		✓	
	Excavated material and large sediment loads must be prevented from entering water resources and other sensitive areas.		Limited erosion Limited dust Limited sedimentation	Site to be inspected.	Continuous	Contractor		✓	
	The pre-construction profile of the river must be returned to one similar to before construction.		Limited erosion Limited dust Limited sedimentation	Site to be inspected.	Continuous	Contractor		✓	
	Protect sloping areas and drainage channel banks that are susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas.		Limited erosion Limited dust Limited sedimentation	Site to be inspected.	Continuous	Contractor		✓	
	Excavated soils must be placed on the upslope side, minimizing the risk of erosion and excess sediment entering the freshwater ecosystems.		Limited erosion Limited dust Limited sedimentation	Site to be inspected.	Continuous	Contractor		✓	
	If compaction occurs, rectification can be done by application and mixing of manure, vegetation mulch or any other organic material into the area. Use of well cured manure is preferable as it will not be associated with the nitrogen negative period associated with organic material that is not composted.		Limited erosion Limited dust Limited sedimentation	Site to be inspected.	Continuous	Contractor		✓	
	A stormwater plan must be developed with the aid of an engineer to ensure that water runoff is diverted off the site without pooling and stagnation or erosion. Financial provision		Limited erosion Limited dust Limited sedimentation	Site to be inspected.	Continuous	Contractor		✓	

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	for closure will include the estimated costs for erosion control post-clearance.								
	Rehabilitation is to take place immediately after construction on any particular section of the pipeline infrastructure by using topsoil that was removed and stockpiled for use in rehabilitation.		Limited erosion Limited dust Limited sedimentation	Site to be inspected.	Continuous	Contractor		✓	
<b>2.4. Aspect: Site Support Facilities</b>									
<b>2.4.1. General Management Measures</b>									
Ensure a work environment that is safe and fair for all workers									
	Respect workers right to refuse to work in unsafe and unhealthy environment.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	All work must be carried out under strict supervision and according to best practice.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Management must identify training requirements for the various work areas and undertake training of employees and contract workers in the respective areas.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Staff that will stay on site should be accommodated in one location of the site to ensure that the impact will be minimal on the larger area.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Construction activities must be restricted to working hours Monday to Saturday, unless otherwise approved by the appropriate competent person in consultation with the affected residents.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Local labour must be used to ensure the affected community get the most benefit from the job opportunities.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Training must be provided to local labourers in order to perform more specialised jobs.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
<b>2.4.2. Ablution facilities</b>									
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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/ rehabilitation
Ensure a work environment that is safe and fair for all workers									
	Workers must be provided with suitable ablution facilities.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Ablution facilities must be serviced regularly and service slips must be kept in the site file.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	The Contractor is responsible for the erection and maintenance of adequate ablution facilities and for enforcing the use of these facilities.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	The Contractor must be responsible for ensuring that all ablution facilities are maintained in a clean and sanitary condition to the satisfaction of the Applicant.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Separate toilet facilities must be provided for males and females on site.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	All ablutions are to be located as far away from the watercourses and wetlands as possible.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
<b>2.4.3. Fire prevention and control</b>									
Ensure a work environment that is safe and fair for all workers									
	Fire prevention talks must be held.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Ensure adequate firefighting equipment on site.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Cleared vegetation must not be burned on the site.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Ensure that all workers on site know the proper procedure in the incidence of a fire on site.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Smoking must not be permitted in those areas considered a fire hazard.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	



Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Campfires at construction sites must be strictly controlled to ensure that no veld fires are caused.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	No vegetation to be used for firewood.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	The grass cover along the boundary fences of the adjacent properties should be kept short (30 cm) to minimise the fire hazards.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
	Designated smoking areas must be provided within the site camp.		No complaints from workers	Site to be inspected.	Continuous	Contractor		✓	
<b>2.4.4. Operation of the construction site</b>									
To ensure that the site cause least disturbance to environment and any I&APs									
	Lighting and noise disturbance or any other form of disturbance on the person living lawfully in the vicinity must be kept to a minimum.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
<b>2.4.5. Stockpiling</b>									
To ensure minimum visual impairment. As well as to manage dust and sedimentation									
	Soil stockpiling areas must follow environmentally sensitive practices.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Excavated topsoil should be kept clean of exotic vegetation;		Protection of the natural environment	Site to be inspected.	Continuous	Contractor		✓	
	Stockpiled topsoil should be free of deleterious matter such as large roots, stones, refuse, stiff or heavy clay and noxious weeds, which would adversely affect its suitability for planting.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.		No incidents/complaints from I&APs	Site to be inspected.	Continuous	Contractor		✓	

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
			Limited erosion Limited dust						
	Stockpiling must remain within the construction boundaries.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Where stockpiling has occurred outside of the site boundaries, immediate action must be taken for the effective relocation of the stockpiles into the site boundaries.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	The careful positioning of soil piles, and runoff control, and planting of some vegetative cover after completion (indigenous groundcover, grasses etc.) must limit the extent of erosion occurring on the site.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	No construction materials are to be stockpiled or dumped in watercourse and wetland (riparian) areas.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Material stockpiles or stacks must be stable and well secured to prevent collapse of the stockpile and possible injury to workers or local residents.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Stripped topsoil must be stockpiled in areas agreed with by the Site Manager for later use in re-vegetation and must be adequately protected. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. The depth of the soil may vary and due to this reason the top 300 mm of soil must be removed and preserved as topsoil.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	

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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Stockpile material should be stored 30m or more away from drainage lines and identified riparian zone habitat.		Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	During earthworks, the top 50 cm of the topsoil must be removed and stockpiled during the construction period. This soil is to be replaced once activities have been completed. This is to maintain the existing seed bed and soil profiles as best as possible.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Vegetation (grass and small shrubs) should not be cleared from the site prior to construction except if vegetation requires relocation as determined through an ecology assessment). This material is to be stripped together with topsoil as it will supplement the organic and possibly seed content of the topsoil stockpile depending on the time of soil stripping (whether plants are in seed or not);		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Stockpiles must be convex and no more than 2 m high. Stockpiles must be shaped so that no surface water ponding can take place.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Topsoil stockpiles must not be subject to compaction greater than 1 500 kg/m <sup>2</sup> and must not be pushed by a bulldozer for more than 50m.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Soil should be handled when dry during removal and placement to reduce the risk of compaction.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	

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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Topsoil stockpiles must be monitored regularly to identify any alien plants. If any occurs, they must be removed before they germinate to prevent contamination of the indigenous seed bank.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Any potential large sediment loads (i.e. stockpiles) must be contained by covering them.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
<b>2.4.6. Stormwater management</b>									
To minimize the impact of stormwater runoff on the receiving environment									
	Temporary stormwater management plan must be in place and structures must be accordingly used during construction.		Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Any areas damaged as a result of stormwater runoff from the construction site must be rehabilitated immediately.		Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Multiple discharge points that are reasonably spread out across the working areas adjoining the various watercourse habitats to allow a diffuse spread of surface runoff, maximising the amount of infiltration.		Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Concentrated flows through buffer zones should be avoided through diffuse flow discharges, and runoff entering the buffer zone should not exceed 1.5m/sec to enhance the pollutant removal performance of buffers		Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Suitably designed baffle structures (e.g. gabion/Reno mattresses) for large discharge points should be used to dissipate and control energy of temporary stormwater runoff before entering watercourses.		Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
<b>2.4.7. Dust suppression measures</b>									
To ensure minimum visual impairment and dust related health risks.									

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Dust suppression measures must be implemented such as regular watering.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
<b>2.4.8. Vehicles</b>									
Limit pollution due to vehicle movement									
	All mechanical equipment must be in good working order and adhere to relevant noise requirements of the Road Traffic Act.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	Safety measures that generate noise, including reverse gear alarms, must be adjusted to minimise noise.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	sensitive soils with high risk of compaction (e.g., clayey soils) must be avoided by construction vehicles and equipment, wherever possible, to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
	The vehicles must be in good working order and all leaks such as oil leaks must be repaired immediately.		No incidents/complaints from I&APs Limited erosion Limited dust	Site to be inspected.	Continuous	Contractor		✓	
<b>2.5. Aspect: Waste management measures</b>									
<b>2.5.1. Sewage spillages</b>									
To prevent or minimize the incidents and impact of potential sewage spillages that would be associated with the on-site sewer treatment facility.									

Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Should a sewage spillage occur, it must be reported to the relevant departments immediately.		No incidents/complaints from I&Aps Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	✓
	Where contamination of the soil occurs, soil must be immediately removed to prevent further contamination.		No incidents/complaints from I&Aps Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	✓
	Should faulty infrastructure be identified, it must be replaced immediately after discovery. This must form part of a maintenance plan set forth by the Municipality.		No incidents/complaints from I&Aps Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	✓
	Records of all sewage spillages must be kept.		No incidents/complaints from I&Aps Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	✓
	An emergency preparedness plan must be in place for instances where spills occur that can be harmful to people or the receiving environment.		No incidents/complaints from I&Aps Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	✓
	No sewage waste is to be buried or left as is.		No incidents Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	✓
	Preventative measures must be undertaken during the construction of the infrastructure, securing all joints for minimum spillage occurrences.		No incidents/complaints from I&Aps Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	✓
<b>2.5.2. Hazardous substances</b>									
To ensure no waste poses health threats or causes pollution									
	All spills must be immediately cleaned up and treated accordingly as per the predefined hazardous spill protocol.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Hazardous waste (oils, effluent from corrosion protection activities) must be disposed of at registered landfill site.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	Extra care must be taken to prevent any potentially hazardous substances from entering the watercourses and resources during rainfall events.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
	In the event of the spilling of chemicals and potentially hazardous substances, this must be addressed immediately and reported to the ECO and the relevant authority.		Protection of surface and groundwater	Site to be inspected.	Continuous	Contractor		✓	
<b>2.5.3. General Waste</b>									
Limit pollution due construction works									
	Construction waste must be taken to the closest general waste landfill site.		Protection of natural resources	Site to be inspected.	Continuous	Contractor		✓	
	All rubble, litter and any other type of waste must be removed from the development footprint and areas directly adjacent to the construction areas and regular monitoring of core ecological areas must be undertaken.		Protection of natural resources	Site to be inspected.	Continuous	Contractor		✓	
	All waste and materials used during the construction phase must be removed; no waste is to be buried or burned or left in the conservation area.		Protection of natural resources	Site to be inspected.	Continuous	Contractor		✓	
<b>2.5.4. Groundwater contamination</b>									
Limit groundwater pollution due construction works and associated activities									
	If construction machinery or equipment is used during the construction works, they are not to be re-fuelled or washed on site.		Protection of natural resources	Site to be inspected.	Continuous	Contractor		✓	
	Precautions must be taken to prevent refuse from spreading from or on the site by placing dustbins strategically at the site.		Protection of natural resources	Site to be inspected.	Continuous	Contractor		✓	
	Drip trays must be used to collect used oil, lubricants, etc. during maintenance. Drip trays must be provided for all stationary plant.		Protection of natural resources	Site to be inspected.	Continuous	Contractor		✓	
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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Washing of equipment must be restricted to urgent maintenance requirements only and must not occur near a watercourse.		Protection of natural resources	Site to be inspected.	Continuous	Contractor		✓	
	No dumping in the riparian zone		Protection of natural resources	Site to be inspected	Continuous	Contractor		✓	
	Chemicals to be stored on an impervious surface protected from rainfall and storm water run-off.		Protection of natural resources	Site to be inspected	Continuous	Contractor		✓	
	Drip trays must be placed under stationary construction vehicles.		Protection of natural resources	Site to be inspected.	Continuous	Contractor		✓	
	All construction vehicles should be inspected for oil and fuel leaks regularly and frequently. Vehicle maintenance will not be done on site except in emergency situations in which case mobile drip trays will be used to capture any spills. Drip trays should be emptied into a holding tank and returned to the supplier		Protection of natural resources	Site to be inspected	Continuous	Contractor		✓	
<b>2.5.5. Cement and concrete batching</b>									
Limit groundwater and river pollution due construction works and associated activities									
	Concrete mixing directly on the ground must not be allowed and must take place on impermeable surfaces in dedicated areas to the satisfaction of the Site Manager and ECO.		No spillages /incidents or complaint	Site to be inspected.	Continuous	ECO Contractor		✓	
	The concrete batching activities must be located in an area of low environmental sensitivity to be identified by the Site Manager and ECO.		No spillages /incidents or complaint	Site to be inspected.	Continuous	ECO Contractor		✓	
	All runoff from batching areas must be strictly controlled and cement-contaminated water must be collected, stored and disposed of at a registered landfill site authorised to deal with these substances.		No spillages /incidents or complaint	Site to be inspected.	Continuous	Contractor		✓	



Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	Contaminated water storage facilities must not be allowed to overflow and appropriate protection from rain and flooding must be implemented. The storage facilities must be completely closed systems such as JoJo tanks, with adequate capacities.		No spillages /incidents or complaint	Site to be inspected.	Continuous	Contractor		✓	
	Unused cement bags must be stored out of the rain where runoff won't affect them. Used / empty cement bags must be collected and stored in weatherproof containers to prevent wind-blown cement dust and water contamination.		No spillages /incidents or complaint	Site to be inspected.	Continuous	Contractor		✓	
	Used cement bags must not be used for any other purpose and must be disposed of on a regular basis at a registered landfill site.		No spillages /incidents or complaint	Site to be inspected.	Continuous	Contractor		✓	
	All excess concrete must be removed from site on completion of concrete works and disposed of at a registered landfill site. Washing of the excess concrete into the ground must not be allowed.		No spillages /incidents or complaint	Site to be inspected.	Continuous	Contractor		✓	
	All excess aggregate must be removed.		No spillages /incidents or complaint	Site to be inspected.	Continuous	Contractor		✓	
<b>2.6. Avifauna</b>									
Limiting the impact on birds									
	No birds may be poached during the construction of the solar plant development. Many birds are protected by law and poaching, or other interference could result in a fine or jail term.		Protection of rare species	Site to be inspected.	Continuous	Contractor		✓	
	Where trenches pose a risk to bird safety, they should be adequately cordoned off to prevent ground-living birds falling in and getting trapped and/or injured.		Protection of rare species	Site to be inspected.	Continuous	Contractor		✓	
<b>2.7. Light</b>									
Light pollution									
	Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the		Protection of landscape	Site to be inspected	Continuous	Contractor		✓	
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Nr.	Objectives	Mitigation Measures	Target/Standard	Indicator	Frequency	Responsibility	Phase applicable		
							Prior to construction	Construction	Operational/rehabilitation
	components of the proposed intervention – this is especially relevant where there are open views from the nearby farmsteads and game lodges towards the proposed intervention.								
	Minimise the amount of luminaires to the minimum and connecting these lights to motion sensors can also be considered in reducing light pollution.		Protection of landscape	Site to be inspected	Continuous	Contractor		✓	

**Table 14-3. Environmental aspects and related actions for the post-construction and rehabilitation phase of the proposed project.**

3. post-construction and rehabilitation							
3.1. Aspect: Finishing of site after construction							
3.1.1. Restoration of the surrounding land							
Ensure successful rehabilitation and operation of the infrastructure installation							
All temporary facilities and waste materials must be removed.	Clean site policy	Site to be inspected.	Continuous	ECO Contractor		✓	
Rehabilitation of the natural vegetation of the excavated areas must be done immediately after the upgrade of the infrastructure at any point in order to prevent dust generated by the excavation activities from dispersing. The rehabilitation and construction must run simultaneously.	Limited erosion Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor			✓
For landscaping, soils must be reinstated in reverse order to ensure correct drainage and rehabilitation, if there is not enough topsoil present at the site it must be imported.	Limited erosion Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor			✓
indigenous plant material from the construction footprint area could be collected and bagged to be used in re-vegetation or as mulch during rehabilitation.	Limited erosion Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor		✓	✓
Search and Rescue activities must be initiated as part of the rehabilitation process.	Limited erosion Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor			✓

3. post-construction and rehabilitation							
All temporary stockpile areas, litter and dumped material and rubble must be removed on completion of construction.	Limited erosion Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor			✓
All riverbeds impacted during construction must be restored as close to its original profile prior to construction with the use of a rehabilitation plan.	Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor			✓
Locally occurring indigenous grasses must be used during rehabilitation.	Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor			✓
Alien invasive grasses such as <i>Pennisetum clandestinum</i> (Kikuyu) must not be used.	Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor			✓
Landscaped areas around the proposed development must be planted with indigenous (preferably using endemic or local species from the area) grasses, forbs, shrubs and trees, which are water wise and require minimal horticultural practices.	Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor			✓
Natural vegetation should be retained wherever possible	Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor	✓	✓	✓
The areas around the proposed intervention should be extensively landscaped to create a visual buffer of a minimum of 20m wide. Vegetation could be used to screen views toward the proposed intervention.	Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor	✓	✓	

3. post-construction and rehabilitation							
An ecological approach to rehabilitation and vegetative screening measures, as opposed a horticultural approach to landscaping should be adopted.	Successful rehabilitation of areas disturbed during construction	Site to be inspected.	Continuous	ECO Contractor			✓
An emergency preparedness plan must be in place prior to the commissioning of the operational phase for instances where spills occur that can be harmful to people or the receiving environment.	Minimizing the impact of raw sewage on the watercourses, surface and groundwater	Site to be inspected.	Continuous	ECO Contractor			✓





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## CURRICULUM VITAE

<b>SURNAME</b>	ADAM (Weiermans)
<b>FIRST NAMES</b>	JACOLETTE
<b>IDENTITY NUMBER</b>	7407190109082
<b>ROLE</b>	Managing member of Exigent
<b>DEGREES</b>	MSc; LLM (Environmental Law)
<b>PROFESSIONAL REGISTRATION</b>	Professional Natural Scientist (400088/02) Environmental Assessment Practitioner of South Africa (EAPASA) (2019/1040)
<b>BOARDS SERVING</b>	Chairperson of the Gauteng Department of Agricultural and Rural Development (GDARD) External Appeal panel (2020-2023), Board member of Wetland Society of South Africa (2020-2022); Technology Evaluator for emerging innovations for the Water Research Commission (WRC) (2021-2024); IUCN World Commission on Environmental Law member; IAIA KZN North Coast representative; IAIA KZN Treasurer; Director of WETREST (PBO) Vice-Chairperson of the Businesswomen Association of South Africa Zululand Branch EAPASA Assessor
<b>NATIONALITY</b>	South African
<b>CONTACT NUMBER</b>	+27 82 852 6417
<b>YEARS OF EXPERIENCE</b>	21

### CAREER HISTORY:

Jacolette obtained a Master of Science in Zoology from the University of Pretoria, South Africa in 2000. Her thesis, *Roads as Ecological Edges for Rehabilitating Coastal Dune Assemblages in Norther Kwa-Zulu-Natal, South Africa* (published in *Restoration Ecology* Vol 11, Issue 1, p: 43-46) was based on field work conducted in the rehabilitating forests of Richards Bay Minerals, north of Richards Bay. In 2019 she also obtained a LLM degree in Environmental Law. For this degree, her dissertation assessed the 'Legislative challenges with wetland mitigation banking in South Africa'. This included aspects such as the available and required policy, tools and frameworks required for implementing wetland banking, specifically also addressing the finance options, such as BIOFIN and debating the business aspects of wetland banking.

Jacolette has gained 21 years of professional experience in the environmental sector and has been a certified Professional Natural Scientist with the South African Council for Natural and Scientific Professionals (SACNASP) since 2002. In 2019 she was awarded the KZN Regional Businesswomen of the Year 2019 award in the Environmental Entrepreneur category. She is registered with the Environmental Assessment Practitioners of South African (2019/1040) and is also an EAPASA Assessor for applications. She has been a Fellow member of the Water Institute of South Africa (WISA) since 2012.

Since 2002, she has led and completed numerous environmental assessments in terms of various legislated processes throughout South Africa and Africa, for a wide range of clients, including the renewable energy and gas industry, mining sector, large-scale housing developments, private lodge developments, telecommunication industry, various engineering projects including linear projects such as pipelines, road construction, road upgrades as well as site-based engineering services. She has also been responsible for various strategic projects such as Integrated Environmental Management Programmes for municipalities as well as Provincial State of the Environment Reports. Her expert skill of environmental legislative knowledge provides value to the environmental applications and review of peer reviews of environmental legal matters.

Jacolette has proven the capability to complete environmental assessments of challenging projects with various approvals required from different authorities, including Department of Environmental Affairs, Department of Agriculture, Forestry and Fisheries, Department of Water and Sanitation and Department of Mineral Resources. Her expertise is in managing these complex projects with the wide range of specialists and identifying the key risks which needs to be mitigated.

As part of her specialist expertise, she has conducted ecological and wetland assessments throughout South Africa, for various different types of projects, including the challenges of linear and large-scale infrastructure. Linked to these ecological and wetland assessments, lies her passion for successfully implementing biodiversity offsets with relevant government Departments and related authorities. She has also been responsible and part of teams to conduct ecological cost benefit analysis for projects such as the Richards Bay Port Expansion Programme.

Being the managing member of Exigent, an environmental and engineering consultancy firm, since 2002, her responsibility has included on-time delivery, finance management and client liaison of the overall project, specifically focussing on management of the Environmental Impact Assessment (EIA) process, especially the interdisciplinary team of specialists, both in-house and contracted - thereby including all specialist studies, the EIA application process, the Integrated Water Use License Application and Environmental Management Programme Reporting process, ecological and/or wetland specialist studies, Red Data Species application, water quality assessments, biodiversity offsets, other related permits e.g. heritage and archaeological, protected species removal permits and Environmental Control Officer duties, where required.

Jacolette has been responsible for conducting financial closure costing evaluations for the Richards Bay Minerals mines, TRONOX mines (Hillendale, other mining right properties and Central Processing Complex for approximately 12 years, including the TRONOX Fairbreeze mine closure costings in 2012. She has also compiled a Closure costing for the Momar mine in Mozambique. This closure costing review included the concentrator, Mineral Separation Plant, mining areas, infrastructure, fuel storage, airstrip and power supply. Furthermore, she has conducted closure costing evaluations for the Kumba Iron Ore Mine in Sishen. She has completed implementation of the new Regulations GN1147 to a quarry site outside Empangeni, as well as Richards Bay Minerals. Furthermore, as part of her project manager responsibilities', was compiling the first draft of the Mining and Biodiversity Guidelines for the Chamber of Mines in 2008.

Jacolette has been involved in compilation of various strategic Environmental Management Documents, e.g. the uMhlathuze Integrated Environmental Management Plan, Environmental Aspects of the Mbonambi Nodal Framework Plans, Interim Report on Sustainable Development for the Department of Environmental Affairs in Northern Province as well as Strategic Business Plans for Johannesburg Water.

Throughout the years, she introduced the value of an environmental feasibility studies to various clients. This also involves an initial assessment of the environmental legal and physical site constraints. Numerous of these studies were conducted to a range of clients, which assists in decision-making early in the project development phase, reducing the risk to the client.

During the 20 years, she has proven herself in a broad range of environmental expertise which includes the following: *Strategic Biodiversity Planning; Biodiversity Offset Plans; Red Data Species Evaluation, Environmental project management of large scale project; Environmental Impact Assessments (EIA); Environmental Management Programmes and Plan; State of Environment Reporting; Environmental license audits; Public Private Partnerships; Geographic Information Systems (GIS) based analysis; Applicability of Environmental Legislation; Environmental Control officers during project implementation; Specialist studies such as Wetland Assessments, Ecological Assessments, Water Quality Assessments, Wildlife Management Plans; Management Plans such as Mine Rehabilitation Plans, Ecosystem rehabilitation plans; Water Services Development Plan; Environmental management legal and implementation course compilation and training and Environmental feasibility studies.*



**EMPLOYMENT HISTORY:**

Date	Employer	Position
2002 – currently	Exigent	Managing member
2001 – 2002	Dynacon Technologies	Environmental Project Manager
2000 – 2001	VKE Engineers	Environmental Scientist
1999	University of Pretoria	Conservation Researcher

**QUALIFICATIONS OBTAINED AND COURSES ATTENDED:**

Date	Institution	Qualification Obtained
2020	UNDP Global Programme on Nature for Development. Learning for Nature.	Biodiversity Finance (certificate course, May 2020)
		Protected Area Law (certificate course, May 2020)
<b>2019</b>	<b>University of KwaZulu-Natal</b>	<b>LLM (Environmental Law)</b>
2018	Alliance for Water Stewardship	AWS accreditation as a Water Stewardship Service Provider
2017	Water Institute of South Africa, KZN Branch	Water Use Licensing Workshop
2016	Department of Water and Sanitation	General Authorisation (GA) 509 training workshop
2017	Shepstone and Wiley	Environmental Law Breakfast Seminar, 2017 EIA Regulations
2015	Terra Firma Academy	Carbon Footprint Analyst (certificate course)
2015	Shepstone and Wiley	Environmental Law Half-Day Seminar, EIA Regulations
2015	WetRest – Centre for Wetland Research and Training	Wetlands – The basics: Identification, function and delineation (certificate course)
2004	The Directorate of Professional Programmes of the Geological Society of South Africa	Groundwater in South Africa: Our most valuable future resource (Certificate Course)
2003	Working for Wetlands	Wetland Rehabilitation Certificate Course
	Shangoni Management	Environmental Auditing Certificate Course-ISO 14001
	Rhodes University	Environmental and Resource Economics (Certificate Course)
2002	University of South Africa	Certificate course on Advanced Business Communication (1 year)
	DEA	Project Developer's Forum on Cleaner Development Mechanisms
2001	AfriDev Consultants	SASS5 Biomonitoring Techniques Certificate
2000	VKE Engineers	Managing Projects in a Consulting Engineer's Practise Certificate
1999	University of Pretoria	GIS project Researcher - Madagascar raptors
<b>2000</b>	<b>University of Pretoria</b>	<b>MSc Zoology (Restoration Ecology)</b>
<b>1996</b>	<b>University of Pretoria</b>	<b>BSc (Hons) (Zoology)</b>
<b>1995</b>	<b>University of Pretoria</b>	<b>BSc (Zoology)</b>
1992	Verwoerdburg High School, Pretoria	Matriculation

**MEMBERSHIP OF OTHER PROFESSIONAL BODIES OR RELEVANT ORGANISATIONS:**

Jacolette is registered as a Professional Natural Scientist (Pr. Sci. Nat., Reg number: 400088/02) since 2002, registered Environmental Assessment Practitioner of South Africa (EAPASA 2019/1040), reviewer of EAPASA applications, and a Fellow member of the Water Institute of South Africa (WISA). She is also a member of the Environmental Law Association of South Africa (ELA) (2016/224/KZN), the Wetlands Society of South Africa and Wetland Forum in Kwa-Zulu Natal, and the North Coast Region representative of the South African Affiliate of the International Association for Impact Assessment (IAIASA).

Jacolette has been Director of a Public Beneficial Organisation (WETREST) since 2016. WETREST is involved in scientific research projects for organisations such as the Water Research Council (WRC), with specific focus on wetlands and restoration. Jacolette was appointed as the Chairperson of the GDARD External Advisory Panel on Appeals for a 3-year period (September 2020-August 2023).

**SCIENTIFIC PUBLICATIONS, CONFERENCES ATTENDED AND PRESENTATIONS:**

Date	Conference/publication/presentation
2022	Environmental Management Inspectorate – Lecture ( <i>On the other side</i> )
2021	Environmental Law Association Annual Conference (15-18 September 2021)
2021	The Conservation Symposium. Presentation: ‘ <i>Biodiversity financing – A critical aspect of post-COVID-19 recovery plans</i> ’ – 1-5 November 2021 ( <a href="https://conservationsym2021.dryfta.com/index.php">https://conservationsym2021.dryfta.com/index.php</a> )
2021	IUCN World Conservation Congress Marseille (3-11 September 2021)
2021	Judge of the 2021 SA Wetland Society Annual Wetland Awards
2020	Presented lectures as part of the 3 series WETREST course: ‘ <i>Wetland buffers and offset guidelines</i> ’ 23-25 November 2020. Course 2.
2020	Presented lectures on ‘ <i>Wetland buffers and offsets</i> ’ at the WETREST Wet-Legal virtual training course, -13-14 October 2020. Course 1
2020	Judge of the Businesswomen of the Year Annual Awards
2020	Judge of the 2020 SA Wetland Society Annual Wetland Awards
2020	Annual Environmental Law Association Conference, KZN. Presentation: ‘ <i>Biodiversity financing – A critical aspect of post-COVID-19 recovery plans</i> ’ – 3-5 September 2020
2019	IAIA SA KZN Branch Workshop on Offsets – presenter ‘ <i>Legislative challenges with wetland mitigation banking in South Africa</i> ’.
2019	Annual Environmental Law Association Conference, KZN. Presentation: ‘ <i>Legislative challenges with wetland mitigation banking in South Africa</i> ’ – 26, 27 September 2019
2019	Wetland Forum KZN, Specialist presentation: ‘ <i>Legislative challenges with wetland mitigation banking in South Africa</i> ’
2018	National Wetlands Indaba, Kimberley, Northern Cape. Presentation: ‘ <i>Legislative challenges with wetland mitigation banking in South Africa</i> ’. <u>Awarded ‘Best presentation’ at the Indaba.</u>
2015	National Wetlands Indaba, Western Cape.
2012	Conservation Biology Oceania Conference, Charles Darwin University, Darwin, Australia
2000	Weiermans, J. & R. J. van Aarde. The effects of habitat edges in rehabilitating coastal dune communities in Richards Bay, KwaZulu – Natal, South Africa. <i>Restoration Ecology</i> Vol 11, Issue 1, p: 43-46.
2000	Weiermans, J. & R. J. van Aarde. The effects of habitat edges in rehabilitating coastal dune communities in Richards Bay, KwaZulu – natal, South Africa. <i>Paper presented at the Wildlife Management Association of Southern Africa 2000 Symposium.</i>
1997	Weiermans, J., A. van Jaarsveld & S. Chown. A multiple scale analysis of South African bird body – size distributions. <i>Paper presented at the Zoological Society of Southern Africa 1997 conference.</i>



## CURRICULUM VITAE

**SURNAME** : Masikane  
**FIRST NAMES** : Amanda Michelle  
**IDENTITY NUMBER** : 9301030577087  
**NATIONALITY** : South African  
**CONTACT NUMBER** : 0767999116  
**YEARS OF EXPERIENCE** : 2

### CAREER HISTORY:

Amanda completed her Bachelor of Science majoring in Environmental Sciences and Earth Science at the University of KwaZulu-Natal in 2014 and completed her Honours in Environmental Sciences in 2015.

Since joining Exigent Amanda has gained skills in surface and groundwater monitoring, conducting work as an Environmental Control Officer and assisting with field work and drafting wetland and ecological assessments.

### EMPLOYMENT HISTORY:

<u>Date</u>	<u>Employer</u>	<u>Position</u>
July 2021 – current	Exigent	Junior Environmental Consultant
May 2019- February 2021	KZN Sharks Board	Research Intern

### Junior Environmental Consultant- Exigent

In July 2021, Amanda was appointed as an Environmental Intern at Exigent Engineering Consultants CC and is gaining knowledge and experience as an Environmental Scientist. Amanda's responsibilities include report writing, environmental impact assessments, water monitoring, GIS data analysis, collation of environmental data and environmental compliance auditing as an Environmental Control Officer. Below are the projects she is involved in:

<u>Project title</u>	<u>Province</u>	<u>Aspects involved in</u>
<b>Environmental Control Officer (only)</b>		
Aquadene Housing development – Internal Infrastructure	KwaZulu-Natal	Environmental Control Officer
RBIDZ Groundwater monitoring	KwaZulu-Natal	Environmental Control Officer
CIA link road construction	KwaZulu-Natal	Environmental Control Officer
eSikhawini Road upgrade	KwaZulu-Natal	Environmental Control Officer

### QUALIFICATIONS OBTAINED

<u>Date</u>	<u>Institution</u>	<u>Qualification Obtained</u>
2015	University of KwaZulu-Natal (Westville)	BSc Honours (Environmental Science)
2014	University of Kwazulu-Natal (Westville)	BSc (Environmental Science)
2009	Umlazi Comtech High School	Matriculation

### CONFERENCES AND WORKSHOPS ATTENDED:

<u>Date</u>	<u>Name of Event</u>
2019	Southern African Sharks and Rays Symposium
2018	SAEON Graduate Student Network Indibano
2016	Society of South African Geographers Student Conference
2016	SEAmester-South Africa's Class Afloat

**SOFTWARE SKILLS:** Microsoft: Excel, Word, PowerPoint, Outlook, Publisher, ESRI's ArcGIS, QGIS, R.

**LANGUAGE CAPABILITY:** English: excellent spoken, written. IsiZulu: excellent spoken, written



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## CURRICULUM VITAE

**SURNAME** : Knoetze  
**FIRST NAMES** : Madeleine  
**IDENTITY NUMBER** : 9205180121085  
**NATIONALITY** : South African  
**CONTACT NUMBER** : 079 028 1218  
**YEARS OF EXPERIENCE** : 7

### CAREER HISTORY:

Madeleine completed her Bachelor of Science majoring in Geology and Geography at Nelson Mandela Metropolitan University in 2014.

Since the completion of her degree, she has gained seven years of experience in the field of environmental management. She has been actively involved with numerous legislated environmental processes in South Africa working with a range of clients which includes engineering projects such as pipelines, railway and road infrastructure construction and upgrades. She has been responsible for numerous mapping projects ranging in scale across three provinces. Since her employment, Madeleine has proven to be a skilled field-based assessor, utilizing her mapping skills and knowledge obtained in-field to effectively generate data of both high quality and quantity.

Madeleine has proven the capability to complete environmental assessments of challenging projects with various approvals required from different authorities, including Department of Environmental Affairs, Department of Forestry, and Department of Water and Sanitation. She is skilled in working with complex projects, interpreting and incorporating a variety of specialists' studies and identifying key issues which require mitigation for each project.

She has proven expertise in environmental expertise which includes the following:

- *Geographic Information Systems (GIS) based analysis*
- *Environmental Impact Assessments*
- *Environmental Management Plans*
- *Environmental Screening*
- *Environmental Feasibility Studies*
- *Environmental Control and auditing*
- *Applicability of Environmental Legislation*
- *Water Use Licence Application processes*
- *Public Participation Processes*
- *Wetland assessments and delineations*
- *Wetland Rehabilitation and Alien invasive plant species eradication remediation*
- *Risk Assessments*

### EMPLOYMENT HISTORY:

<b>Date</b>	<b>Employer</b>	<b>Position</b>
2015 – current	Exigent	Environmental consultant
2012	Msobo Coal	Student program

#### **2015 – Current Environmental Scientist - Exigent**

In 2015, Madeleine was appointed as an Environmental Scientist at Exigent. Together with the Managing Member, Jacolette Adam, she conducts various Environmental Impact Assessments and environmental management projects throughout South Africa. Madeleine is responsible for liaison with specialists, clients, authorities and stakeholders. Her responsibilities include GIS data analysis (including data capturing, analysis and data manipu-

lation), map compositions and database management. She has assisted in the completion of a number of environmental assessments (Basic assessments, Scoping and Environmental Impact Assessments, Water User Licence Applications and Motivation reports dealing with exemptions, and selective ecological and wetland assessments). She has been involved in numerous large- and small-scale Geographic Information Systems (GIS) disciplined projects in and KwaZulu-Natal, Free State, Limpopo, Gauteng as well as projects of a National scale. These projects ranged between mapping for the specialists and EIA process reports to Municipal Land Use Management Systems (LUMS), and mapwork for provincial transit projects.

**The projects currently involved in and completed to date with the aspects of the project**

<b>Project Name</b>	<b>Status</b>	<b>Province</b>	<b>Aspects involved in</b>
<b>Solely NEMA related projects</b>			
<b>EIA Applications</b>			
Installation of a Diesel Generator at the Existing Mhlathuze Transfer Pump Station, Richards Bay.	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Completion of the EIA in the form of a Basic Assessment Report (BAR)
The proposed services station and associated infrastructure on Erf 3961, Empangeni,	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Completion of the EIA in the form of a BAR
The proposed Thermal Energy Power Plant and associated infrastructure development in Richards Bay.	In process	KwaZulu-Natal	All Mapping and data management for the project
			Compilation of the EIA in the form of a Scoping report and EIA
The proposed Good Hope 1 and 2 photovoltaic power plants located near Dealesville, Free State.	In process	Free State	All Mapping and data management for the project
			Compilation of the EIA in the form of a BAR
Proposed Development of a Sewer Line for the Proposed Sammy Marks Township, City of Tshwane.	Completed	Gauteng	All Mapping and data management for the project
			Completion of the EIA in the form of a BAR
Proposed external infrastructure Blue Hills housing development, City of Joburg and City of Tshwane	In process	Gauteng	All Mapping and data management for the project
			Compilation of the EIA in the form of a BAR
The Proposed Construction of The External Services for the Proposed Housing Development on a Part (Portion 1) Of Driefontein 146-Ir,	In process	Gauteng	All Mapping and data management for the project
			Compilation of the EIA in the form of a Scoping report and EIA
Construction of the Proposed Residential Development on Erf 192 of Erand Agricultural Holdings, City Of Johannesburg	In process	Gauteng	All Mapping and data management for the project
			Compilation of the EIA in the form of a BAR
Construction of the Proposed Residential Development on Holding 194 of Erand Agricultural Holdings and Portion 1687 (A Portion of Portion 9) of the Farm Randjesfontein No.405-Jr, City of Johannesburg.	In process	Gauteng	All Mapping and data management for the project
			Compilation of the EIA in the form of a BAR
The proposed Filling Station on Erf 425 and Erf 426 in Pienaarsriver, Bela-Bela Local Municipality.	In process	Limpopo	All Mapping and data management for the project
			Compilation of the EIA in the form of a BAR
The proposed Spitskop photovoltaic power plant located near Northam.	In process	Limpopo	All Mapping and data management for the project
			Assistance with the EIA process in the form of Scoping and EIA

<b>Project Name</b>	<b>Status</b>	<b>Province</b>	<b>Aspects involved in</b>
<b>Amendment Applications</b>			
Part 2 Amendment: The proposed Blue Hills housing development located in the City of Johannesburg.	Completed	Gauteng	Compilation of application documents and mapping
Part 1 Amendment: The proposed Northgate Mixed Use Development in North Riding, City of Johannesburg.	Completed	Gauteng	Compilation of application documents and mapping
Part 2 Amendment: The proposed Northgate Mixed Use Development in North Riding, City of Johannesburg.	Completed	Gauteng	Compilation of application documents and mapping
Part 2 Amendment: The proposed Sammy Marks Mixed Use Development, City of Tshwane.	In process	Gauteng	Compilation of application documents and mapping
Part 1 Amendment: The proposed Nellmapius housing development, City of Tshwane.	Completed	Gauteng	Compilation of application documents and mapping
<b>Other Applications in terms of the NEMA</b>			
GEMF: Proposed Township Establishment on Portion 0 of Holding 247 of the Farm the Willows 340, Willowglen Agricultural Holdings, City of Tshwane.	Completed	Gauteng	Compilation of application documents and mapping
GEMF: The Proposed New Residential Development to be Situated on Portion 2 of Holding 49 of Willowglen AH and Portion 708 of the Farm the Willows 340-JR, City of Tshwane.	Completed	Gauteng	Compilation of application documents and mapping
GEMF: Proposed application for township establishment on portion 381 of the farm Wonderboom 302, Wonderboom agricultural holdings, Pretoria, Gauteng Province.	In process	Gauteng	Compilation of application documents and mapping
<b>Solely NWA related projects</b>			
Proposed rural roads upgrade in Mandlazini – Phase 1, Richards Bay.	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Motivation for exemption of WULA in terms of wetlands within 500 m of development
Proposed upgrade of rural roads for the City of uMhlathuze: Phase 3 – Mzingazi Village, Richards Bay,	Completed	KwaZulu-Natal	All Mapping and data management for the project
			General Authorisation Motivation in terms of the National Water Act.
Proposed upgrade of the Hammarsdale N3 Interchange	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Water Use Licence Application Technical Reporting
<b>Multi-aspect projects</b>			
The Proposed Esikhaleni Mall: Road Safety Improvements: Upgrade of Mthombothi / Mlebe Ntshona Intersection.	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Completion of the EIA in the form of a Basic Assessment Report
			General Authorisation Motivation in terms of the National Water Act
			Environmental Control Officer
Richards Bay Outfall Sewer Upgrade and Nkoninga pump station, Veld en Vlei.	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Completion of the EIA in the form of a Basic Assessment Report
			Compilation of the Water Use Licence Application Documentation
			Rehabilitation Plan compilation
Upgrade of Water Supply Infrastructure for Khoza water supply area phase 1: Empangeni.	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Completion of the EIA in the form of a Basic Assessment Report
			General Authorisation Motivation in terms of the National Water Act

<b>Project Name</b>	<b>Status</b>	<b>Province</b>	<b>Aspects involved in</b>
Proposed rural roads upgrade in Mandlazini – Phase 2, Richards Bay.	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Completion of the EIA in the form of a Basic Assessment Report
			General Authorisation Motivation in terms of the National Water Act.
Proposed upgrade of Melmoth Sanitation (Phase 3): Out-fall Sewers and Waste Water Treatment Works, Melmoth	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Completion of the EIA in the form of a Basic Assessment Report
Zamokuhle Trust Agricultural Development, Mkuze	Completed	KwaZulu-Natal	All mapping for the project
			Assisted in completing the EIA which was a complete Scoping and EIA project
			Environmental Control Officer
Proposed Ritchie Motors Double Lane Traffic Circle in Richards Bay Central.	Completed	KwaZulu-Natal	All Mapping and data management for the project
			Completion of the EIA in the form of a Basic Assessment Report
			General Authorisation Motivation in terms of the National Water Act.
			Rehabilitation Plan compilation
<b>Mapping and data management exclusive projects</b>			
Establishment of the Richards Bay Central Industrial Area.	Completed	KwaZulu-Natal	Mapping for the submitted reports
Meerensee Ext 5 Ecological Risk Assessment	Completed	KwaZulu-Natal	All Mapping and data management for the project
Mkuze Airport City Development, Mkuze	Completed	KwaZulu-Natal	All Mapping and data management for the project
Richards Bay Industrial Development Zone railway line upgrade.	Completed	KwaZulu-Natal	All Mapping and data management for the project
Richards Bay Industrial Development Zone – widening of Medway Road and associated interchanges, Richards Bay.	Completed	KwaZulu-Natal	All Mapping and data management for the project
Nkandla water pipeline wetland and vegetation assessment	Completed	KwaZulu-Natal	All Mapping and data management for the project
Mthonjaneni water pipeline wetland and vegetation assessment	Completed	KwaZulu-Natal	All Mapping and data management for the project
Mthonjaneni Local Municipality Land Use Management System, Melmoth	Completed	KwaZulu-Natal	All Mapping and data management for the project
Mondi Paper Peatland Survey: Assisted with the field surveys of the Mondli peatlands	Completed	KwaZulu-Natal	All Mapping and data management for the project
Eskom powerline and substation construction wetland and vegetation assessment	Completed	Free State	All Mapping and data management for the project
Gautrain Environmental Reviews	Completed	Gauteng	Mapping
Proposed Residential development on Portions 48, RE76, RE77 and 169 of the farm Zandfontein 317-JR in Pretoria	Completed	Gauteng	All Mapping and data management for the project
Rio Tinto prospecting permit	Completed	Western Cap	Mapping
Community Schemes Ombud Service (CSOS) Housing Facilities review	Completed	National	Mapping
<b>Environmental Control Officer (only)</b>			
Re-establishment of the rural road P537, Esikhaleni	Completed	KwaZulu-Natal	Environmental Control Officer
Aquadene Housing development – Internal Infrastructure	Completed	KwaZulu-Natal	Environmental Control Officer
Bronberg X9 & X13 Housing development	Completed	Gauteng	Environmental Control Officer
Bronberg X32 Housing development – External services	Completed	Gauteng	Environmental Control Officer
Derdepoort Erf 452 – Housing development	In process	Gauteng	Environmental Control Officer
Hoewe X321 Housing development – External services	Completed	Gauteng	Environmental Control Officer
Louwlandia X56 and X57 – External services	In process	Gauteng	Environmental Control Officer
Olievenpoort X41 and X49 – External services	Completed	Gauteng	Environmental Control Officer
Pretoriusrand Reservoir construction	In process	Gauteng	Environmental Control Officer



**2012 Msobo Coal (Student program)**

Madeleine spend a short period of time appointed in the Environmental Offices at Msobo Coal. Her responsibilities included field work such as sampling and general observations on site, and data analysis as well as gaining an understanding of the Environmental Plans which are required for mining and rehabilitation purposes.

**QUALIFICATIONS OBTAINED AND COURSES ATTENDED:**

<u>Date</u>	<u>Institution</u>	<u>Qualification Obtained</u>
2015	WetRest – Centre for Wetland Research and Training	Wetlands – The basics: Identification, function and delineation
	International Association for Impact Assessments	IAP Public Participation Mini Training Event
2014	Nelson Mandela Metropolitan University	BSc (Geology and Geography)
2012	Ermelo High School, Ermelo	Matriculation

**CONFERENCES AND WORKSHOPS ATTENDED:**

<u>Date</u>	<u>Name of Event</u>
2017	National Wetlands Indaba, KwaZulu-Natal
2017	Water Use Licensing Workshop, Water Institute of South Africa, KZN Branch
2016	General Authorisation (GA) 509 Training Workshop, Department of Water and Sanitation
2015	National Training and Development – Buffer Zone Workshop, Water Research Commission
2015	Environmental Law Half-Day Seminar, Shepstone and Wiley

**MEMBERSHIP OF OTHER PROFESSIONAL BODIES OR RELEVANT ORGANISATIONS:**

Madeleine is currently a member of the South African Affiliate of the International Association for Impact Assessment (IAIA).