

JULY 2007

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

CONSTRUCTION OF A PROPOSED

**WIND ENERGY FACILITY**

IN THE WESTERN CAPE PROVINCE

AN Eskom INITIATIVE

BACKGROUND INFORMATION DOCUMENT



SUSTAINABLE  
FUTURES ZA



Eskom Holdings Limited is proposing to establish a commercial wind energy facility on a site in the Western Cape Province. Through a regional site identification process, a broader area which falls within the Matzikama Local Municipality on the West Coast has been identified by Eskom for consideration within an Environmental Impact Assessment (EIA). It is proposed for a cluster of up to 100 wind turbines (described as a wind energy facility or a wind farm) to be constructed over an area of approximately 25km<sup>2</sup> in extent. The nature and extent of this facility is explored in more detail in this document.

### Aim of this background information document

This document aims to provide you, as an interested and/or affected party (I&AP), with:

- an overview of the Wind Energy Facility project proposed by Eskom.
- an overview of the Environmental Impact Assessment (EIA) process and studies being undertaken to assess the project.
- details of how you can become involved in the EIA process, receive information, or raise issues, which may concern and/or interest you.

### Policy planning, renewable energy and Eskom

Eskom is responsible for the provision of reliable power to South Africa. The decision to expand Eskom's electricity generation capacity is based on national policy and informed by on-going strategic planning undertaken by the Department of Minerals and Energy (DME), the National Energy Regulator of South Africa (NERSA) and Eskom (the hierarchy of policy and planning documentation is illustrated below). Through this planning process, the long-term view of electricity demand and supply in South Africa is forecasted and assessed, and the framework for Eskom and South Africa to investigate a wide range of supply and demand-side technologies and options is provided.

National Energy Policy, NEMA, Energy Efficiency Strategy and Renewable Policy

DME:  
National Integrated Energy Plan

NERSA:  
National Integrated Resource Plan

Eskom:  
ISEP

EIA



Internationally there is increasing pressure on countries to increase their share of renewable energy generation due to concerns such as climate change and exploitation of resources. The South African Government has set a 10-year target for renewable energy of 10 000 GWh renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. This amounts to approximately 4% (1667 MW) of the total estimated electricity demand (41 539 MW) by 2013.

In responding to the growing electricity demand within South Africa, as well as the country's targets for renewable energy, Eskom has a drive to establish renewable forms of energy generation capacity. Eskom embarked upon a research programme through its Resources and Strategy Division to investigate South Africa's sources of renewable energy, and identify appropriate alternative solutions to meet the energy needs of the country. Through this research, the viability of a wind energy facility was investigated and the potential to establish a wind energy facility at a site along the West Coast within the Western Cape identified.

### Why Wind Energy?

Wind energy is firmly established as a mature technology for electricity generation, with a reported 65 000 MW installed base worldwide. It is one of the fastest growing electricity generating technologies with installed capacity increasing by ~10 000 MW annually, and features in energy plans across all five continents. Use of wind for electricity generation is essentially a non-consumptive use of a natural resource, and produces zero greenhouse gas emissions. A wind energy facility also qualifies as a Clean Development Mechanism (CDM) project as it meets all international requirements.

### Investigations into Wind Energy for South Africa

Eskom commissioned the Klipheuvel Wind Energy Demonstration Facility (north of Durbanville) in February 2003. Research at this facility has focused on how the technology interacts with the South African environment and has highlighted unique factors that can impact performance.

Detailed and reliable information about the strength, direction, and frequency of the wind resource is vital when considering the installation of a wind energy facility, as the wind resource is a critical factor to the success of the installation. With a doubling of average wind speed, the power in the wind increases by a factor of 8, so even small changes in wind speed can produce large changes in the economic performance of a wind farm (for example, an increase of average wind speed of 6m/s to 10m/s increases the amount of energy produced by over 130%).

As a part of Eskom's wind research programme a national wind atlas for South Africa was compiled (in conjunction with the DME and the CSIR). Areas of high potential for future commercial wind farm development were identified, and high-accuracy meteorological measurement stations erected at these sites for on-going monitoring.

Based on the Klipheuvel pilot demonstration facility and measured wind data, a full-scale commercial wind energy facility is now being proposed on the West Coast. Eskom embarked on a regional site identification and selection process for a study area on the West Coast to the north of the Olifants River mouth close to the town of Koekenaap. This process was undertaken as a precursor to the EIA process, and was based on a regional assessment methodology developed and implemented by Western Cape DEA&DP.

### Wind Energy Facility Development on the West Coast

A challenge is to ensure that wind energy projects can meet economic, social and environmental sustainability criteria. The regional site identification process to determine and delineate areas suitable for wind energy development included the consideration of sites/areas of special environmental importance and planning criteria, as well as issues relating to landscape character, value, sensitivity and capacity. These aspects were then balanced with technical



constraining factors affecting the siting of a wind farm, including the wind resource (wind potential diminishing with distance from the coastline), land availability, accessibility and existing grid infrastructure.

Through this siting study, an area which falls within the Matzikama Local Municipality is now considered as potentially suitable for the wind energy development (as indicated on the map on page 8). This area (> 35km<sup>2</sup> in extent) comprises the farms:

- Portion 5 of the farm Gravewaterkop 158
- Portion 620 of the farm Olifants Rivier Nedersetting
- Portion 617 of the farm Olifants Rivier Nedersetting

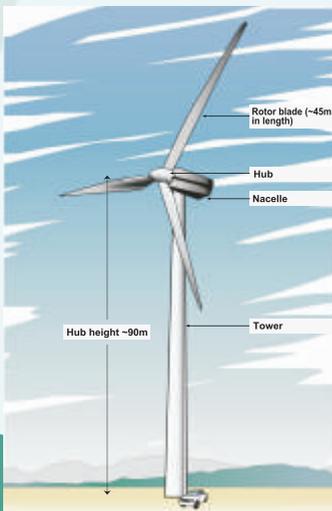
The wind farm is proposed to accommodate up to 100 turbines. The performance of the turbines is also determined by disturbances to the wind resource, which requires that they are appropriately spaced, and turbines would, therefore, be positioned over an area of approximately 25km<sup>2</sup>. As local level issues were not assessed in sufficient detail at the regional level, these issues are now being considered within site-specific studies and assessments through the EIA in order to delineate areas of sensitivity within the broader area. Once constraining factors have been determined, the layout of the wind turbines and infrastructure can be planned. The overall aim is to maximise electricity production through exposure to the wind resource, while minimising infrastructure, operation and maintenance costs, and social and environmental impacts. Specialist software is available to assist developers in selecting the optimum position for each turbine before the project is constructed.

Other infrastructure associated with the wind energy facility will include:

- foundations to support the turbine towers
- underground cables between turbines
- a substation
- overhead powerlines (132 kV distribution lines) feeding into the electricity distribution network/grid at Koekenaap or Vredendal
- an access road to the site from the main road/s within the area
- internal access road to each wind turbine

### What is a Wind Turbine and how does it work?

The kinetic energy of wind is used to turn a wind turbine to generate electricity. A wind turbine consists of three rotor blades and a nacelle mounted at the tip of a tapered tower. The mechanical power generated by the rotation of the blades is transmitted to the generator housed within the nacelle, via a gearbox and drive train.



Turbines are able to operate at varying speeds. The amount of energy a turbine can harness depends on both the wind velocity and the length of the rotor blades. It is anticipated that the turbines utilised for the proposed wind energy facility on the West Coast will have a hub height of ~80m, and a rotor diameter of ~90m (i.e. each blade ~40m - 45m in length). Wind turbines can start generating at wind speeds of between 10 to 15 km/hour, with nominal wind speeds required for full power operation varying between ~45 and 60 km/hour.

A turbine is designed to operate continuously, unattended and with low maintenance for more than 20 years or >120 000 hours of operation. Once operating, a wind farm can be monitored and controlled remotely, with a mobile team for maintenance, when required.



The operation of the proposed facility will only require 6 permanent personnel located close to the facility. Complete turbine erection and commissioning is typically one tower per week. A facility consisting of up to 100 turbines will therefore take approximately 2 years to construct and commission, and requires the expertise of skilled staff.

**ENVIRONMENTAL IMPACT ASSESSMENT PROCESS**

In terms of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998), Eskom requires authorisation from the National Department of Environmental Affairs and Tourism (DEAT) (in consultation with the Western Cape DEA&DP) for the undertaking of the proposed project. In order to obtain authorisation for this project, comprehensive, independent environmental studies must be undertaken in accordance with the EIA Regulations. This project has been registered with National DEAT under Application Reference number 12/12/20/913.

An EIA is an effective planning and decision-making tool. It allows the environmental consequences resulting from a technical facility during its establishment and its operation to be identified and appropriately managed. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issue(s) reported on in the EIA report as well as dialogue with affected parties.

Eskom has appointed Savannah Environmental, as independent consultants, to undertake a Scoping and Environmental Impact Assessment to identify and assess all potential environmental impacts associated with the proposed project for the area as identified, and propose appropriate mitigation measures in an Environmental Management Plan (EMP). As part of these environmental studies, I&APs will be actively involved through the public involvement process being undertaken by Sustainable Futures ZA.

**The phases of an EIA are:**



**What are the potential environmental impacts associated with the proposed project?**

Potential environmental (social and biophysical) impacts associated with the project will be assessed through a number of specialist studies:

<b>Biophysical Studies</b>	<b>Social Studies</b>
Impacts on ecology & flora	Impacts on visual quality & aesthetics
Impacts on terrestrial fauna	Impacts on heritage sites
Impacts on avifauna	Impacts on ambient noise levels
Impacts on soils & agricultural potential	Impacts on landuse & social environment
Impacts on topography & water resources	Impacts on tourism potential
	Impacts on traffic & transportation



The specialist studies will assess potentially significant impacts and recommend practical and achievable mitigation measures in order to minimise the significance of the impacts. These recommendations will be included within a project-specific EMP.

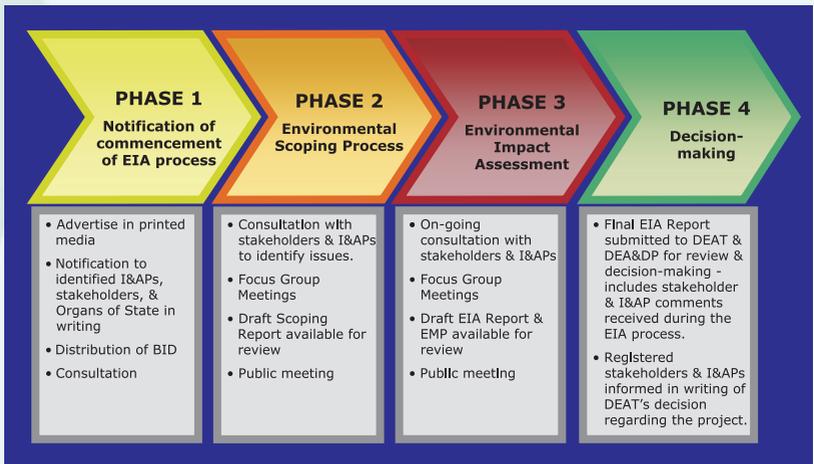
### Public Involvement Process

The sharing of information forms the basis of the public involvement process and offers you the opportunity to become actively involved in the EIA from the outset. Comments and inputs from I&APs during the EIA process are encouraged in order to ensure that potential impacts are considered within the ambit of the study.

The public involvement process aims to ensure that:

- Information containing all relevant facts in respect of the application is made available to I&APs for review.
- Participation by potential I&APs is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the application.
- Adequate review periods are provided for I&APs to comment on the findings of the draft Scoping and EIA reports.

In order to ensure effective participation, the public involvement process includes the following steps:



At each phase you will receive written correspondence regarding documentation for review as well as the relevant comment period.

### Your responsibilities as an I&AP

In terms of the EIA Regulations, your attention is drawn to your responsibilities as an I&AP:

- In order to participate in this EIA process, you must register yourself on the project database.
- You must ensure that any comments regarding the proposed project are submitted within the stipulated timeframes.

- You are required to disclose any direct business, financial, personal or other interest which that you may have in the approval or refusal of the application for the proposed Wind Energy Facility.

### How to become involved

1. By responding (by phone, fax or e-mail) to our invitation for your involvement which has been advertised in local and national newspapers.
2. By returning the attached Reply Form to the relevant contact person.
3. By attending the meetings to be held during the course of the project. As a registered I&AP you will automatically be invited to attend these meetings. Dates for public meetings will also be advertised in local and regional newspapers.
4. By contacting the consultants with queries or comments.
5. By reviewing and commenting on the draft Scoping and EIA Reports within the stipulated 30-day review periods.

If you consider yourself an I&AP for this proposed project, we urge you to make use of the opportunities created by the public involvement process to provide comment, or raise those issues and concerns which affect and/or interest you, and about which you would like more information. Your input into this process forms a key element of the EIA process.

By completing and submitting the accompanying Reply Form, you automatically register yourself as an I&AP for this project, and are ensured that your comments, concerns or queries raised regarding the project will be noted.

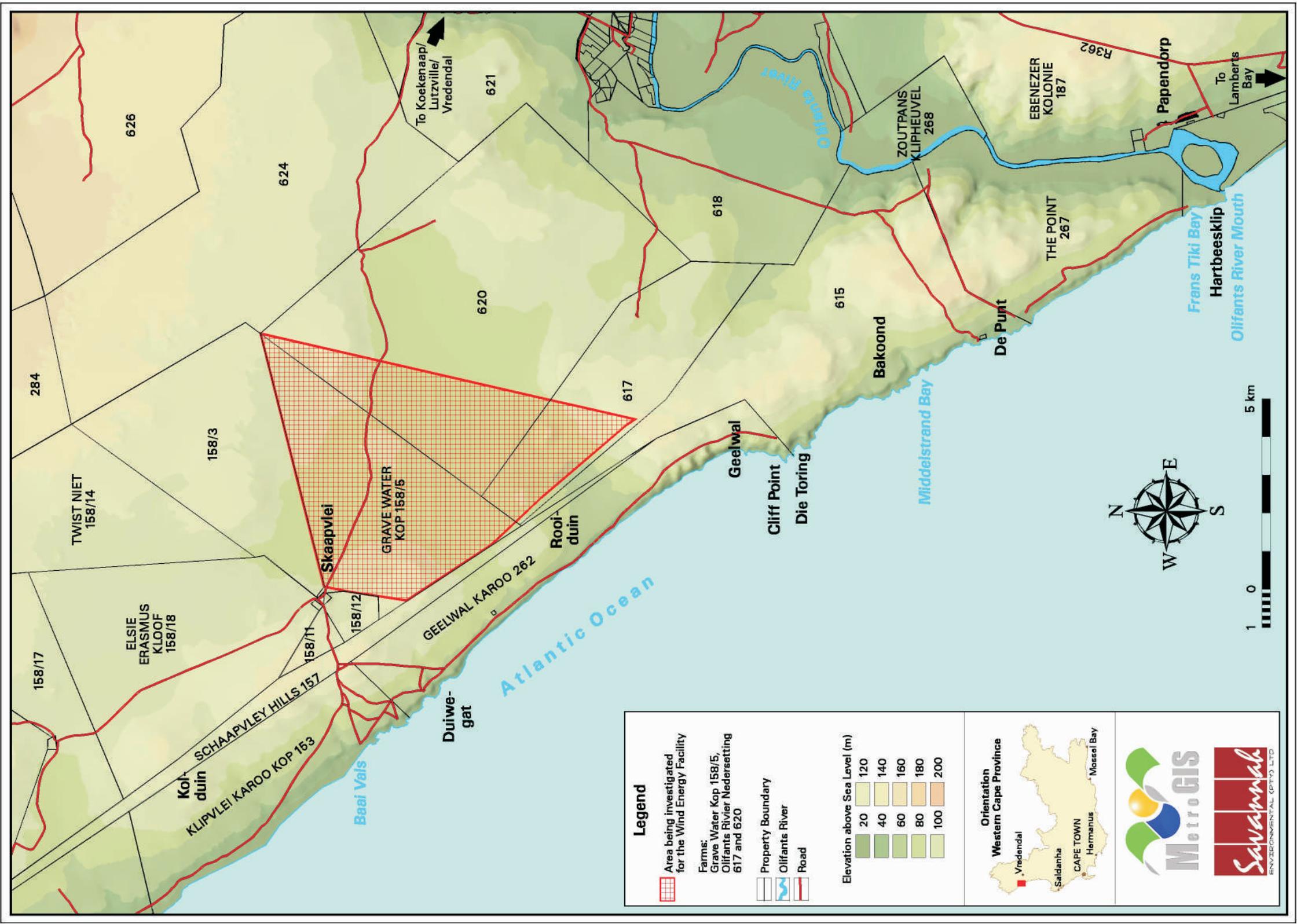
### Comments and queries

Direct all comments, queries or responses to:

Shawn Johnston of Sustainable Futures ZA  
PO Box 749, Rondebosch, CAPE TOWN, 7701  
Phone: 083 325 9965  
Fax: 086 510 2537  
E-mail: [windfarms@mweb.co.za](mailto:windfarms@mweb.co.za)

To view project documentation, visit: [www.savannahsa.com](http://www.savannahsa.com)





**Legend**

-  Area being investigated for the Wind Energy Facility
-  Property Boundary
-  Olifants River
-  Road

Farms:  
 Grave Water Kop 158/5,  
 Olifants Rivier Nedersetting  
 617 and 620

Elevation above Sea Level (m)

	20
	40
	60
	80
	100
	120
	140
	160
	180
	200

**Orientation**  
 Western Cape Province

