

## ENVIRONMENTAL IMPACT ASSESSMENTS

For the following two proposed projects

- **ESKOM BRAAMHOEK TRANSMISSION POWER LINE & SUB-STATION INTEGRATION**
- **CONSTRUCTION & UPGRADE OF ACCESS ROADS**

For the Eskom Braamhoek Pumped Storage Scheme

### PURPOSE OF THIS DOCUMENT

The purpose of this Background Information Document (BID) is to obtain initial comments from Interested and Affected Parties (I&APs) regarding the Braamhoek Transmission Power Line and Sub-station Integration Environmental Impact Assessments (EIAs: 12/12/20/672, 12/12/20/673 & 12/12/20/674) as well as the Construction and Upgrade of Access Roads EIA (EIA: A24/16/3/110) for the Braamhoek Pumped Storage Scheme (PSS) currently under investigation by Eskom. Separate EIAs will be carried out to evaluate the potential environmental and social impacts for both developments, and to address issues of concern raised by I&APs, the Authorities and specialists.

All I&APs will be given opportunities to contribute issues, to verify that their issues have been evaluated, and to comment on various documents. The findings of the EIAs will be considered by the National Department of Environmental Affairs and Tourism (DEAT) with recommendations from the KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZN DAEA) and the Free State Department of Tourism, Environmental and Economic Affairs (FS DTEEA).

This BID is the first step to inform I&APs of the process and to gather public input on the proposed projects. The EIA studies must address concerns and issues that the wider community of the study area might have. Should you wish to participate in this process, please complete the enclosed comment sheet, write a letter, call or email the Public Participation Office and/or attend the Public Open Days. Your comments will ensure that all relevant issues are evaluated and taken up in the EIA processes.

### BACKGROUND

The site for the Braamhoek PSS is situated 23 km northeast of Van Reenen on the farms Braamhoek, Zaaifontein and Bedford. The study area forms part of the uThukela Regional District and is situated on the boundary of KwaZulu-Natal and the Free State, within the Drakensberg escarpment. The EIA for the Braamhoek PSS was completed in June 1999 and National DEAT awarded Eskom environmental authorization for the construction of the Braamhoek PSS in December 2002.

Once constructed, the Braamhoek PSS will utilise surplus electricity generation capacity on the Eskom system during off-peak hours by pumping water from a lower, to an upper reservoir and then releasing this water during peak load hours to generate electricity. A PSS relieves the need for other peaking plants, such as the more expensive gas fired turbines, to meet peak loads, as well as relieving the need for the de-loading of coal fired generation during periods of low power system load. In addition, there will be a reduction in net pollutants and waste generated during periods of peak load demand. Braamhoek PSS will consist of 4 x 333MW pump-turbine machines, two reservoirs that will be interconnected by an enclosed tunnel system (the upper reservoir on the head water tributary of the Wilge River which flows into the Vaal River System, and the lower reservoir in the headwater of the Klip River which flows south-eastwards into the Thukela River). The four pump-turbine units will have a total potential generation capacity of approximately 1332 MW. It is expected that the first unit will be commissioned in 2011. The next three units will be commissioned at three month intervals, with the last unit being commissioned in 2012.



**BACKGROUND INFORMATION DOCUMENT - NOVEMBER 2004**



## MOTIVATION FOR THE PROPOSED PROJECTS

Electricity cannot be stored. It is necessary to generate and deliver power over long distances at the instant it is required. In South Africa, thousands of kilometres of high voltage lines transmit power from power stations to major substations where the voltage is reduced for distribution. To support expected loads, additional generation capacity is required by 2012. In order to meet this date, the design of the Braamhoek PSS must commence in 2004 and construction must begin in 2007.

To implement and operate the Braamhoek PSS, road access is required to the upper and lower dam sites. Prior to the construction of the Braamhoek PSS, it will be necessary that access roads are constructed and/or existing roads upgraded for site access and that provision is made for internal access between the dams. Various alternatives have been identified for further investigation.

The integration of the Braamhoek PSS into the National Grid requires the construction of a sub-station, turn-ins and transmission lines connecting the power station to the grid. Generated power can then be transmitted from the power station to the grid for transmission to wherever it is required.

## BRAAMHOEK TRANSMISSION POWER LINE & SUB-STATION INTEGRATION EIAs

(EIAs: 12/12/20/672 & 12/12/20/673 & 12/12/20/674)  
PROJECT DETAILS



The project team is currently investigating site and route options (Figure 1) for transmission integration into the National Grid. The proposed infrastructure, investigated under three separate EIA processes, includes:

- Braamhoek sub-station
- Braamhoek turn-ins
- Braamhoek-Venus 400 kV transmission line

### BRAAMHOEK SUB-STATION (EIA: 12/12/20/672):

A new substation will be required to receive electricity generated by the power station and will be situated on the farm Braamhoek. New equipment, designed to Eskom's specifications, will be installed for operation up to 400 kV capacity. The substation will be located close to the tunnel entrances for the power station, and will be connected to the Majuba-Venus #2 transmission line and directly linked to the Venus substation.

### BRAAMHOEK TURN-INS (EIA: 12/12/20/674):

The new sub-station will initially be connected to the National Grid via a 'turn-in' from the existing Majuba-Venus 400 kV transmission line. The turn-ins will link into the Majuba-Venus #2 transmission line approximately 9 km to the west of the sub-station. Two transmission lines will be required to complete the turn-in, each with a 55 m wide servitude. Pylon construction will be cross-rope suspension design and strain towers may be required on difficult terrain and bends.

### BRAAMHOEK-VENUS 400 kV TRANSMISSION LINE (EIA: 12/12/20/673):

To ensure reliability of supply, a second connection to the National Grid will be provided by a direct connection to the Venus sub-station. The Venus sub-station is north-east of Estcourt and the direct distance between Braamhoek and Venus is 79 km. Pylon construction will be cross-rope suspension design (Figure 2) and strain towers (Figure 3) may be required on difficult terrain and bends. There is a vacant servitude on the Majuba-Venus #2 line that follows the N3 for most of the route through the Braamhoek-Venus area, and this is Eskom's preferred route. The Venus sub-station has the necessary bay for the new line and no extension of the sub-station yard is required.

### EIA REQUIREMENTS:

The construction of transmission lines is a listed activity in terms of environmental legislation, and requires environmental authorisation from the DEAT, with recommendations from the KZN DAEA and FS DTEEA. The EIA for the transmission lines will be undertaken by Margen Industrial Services, PBA International (SA) and Independent Environmental Consultants. ACER (Africa) Environmental Management Consultants have been appointed as the associated Public Participation Consultant.



Figure 1 Site layout map indicating location of transmission power line and sub-station integration infrastructure

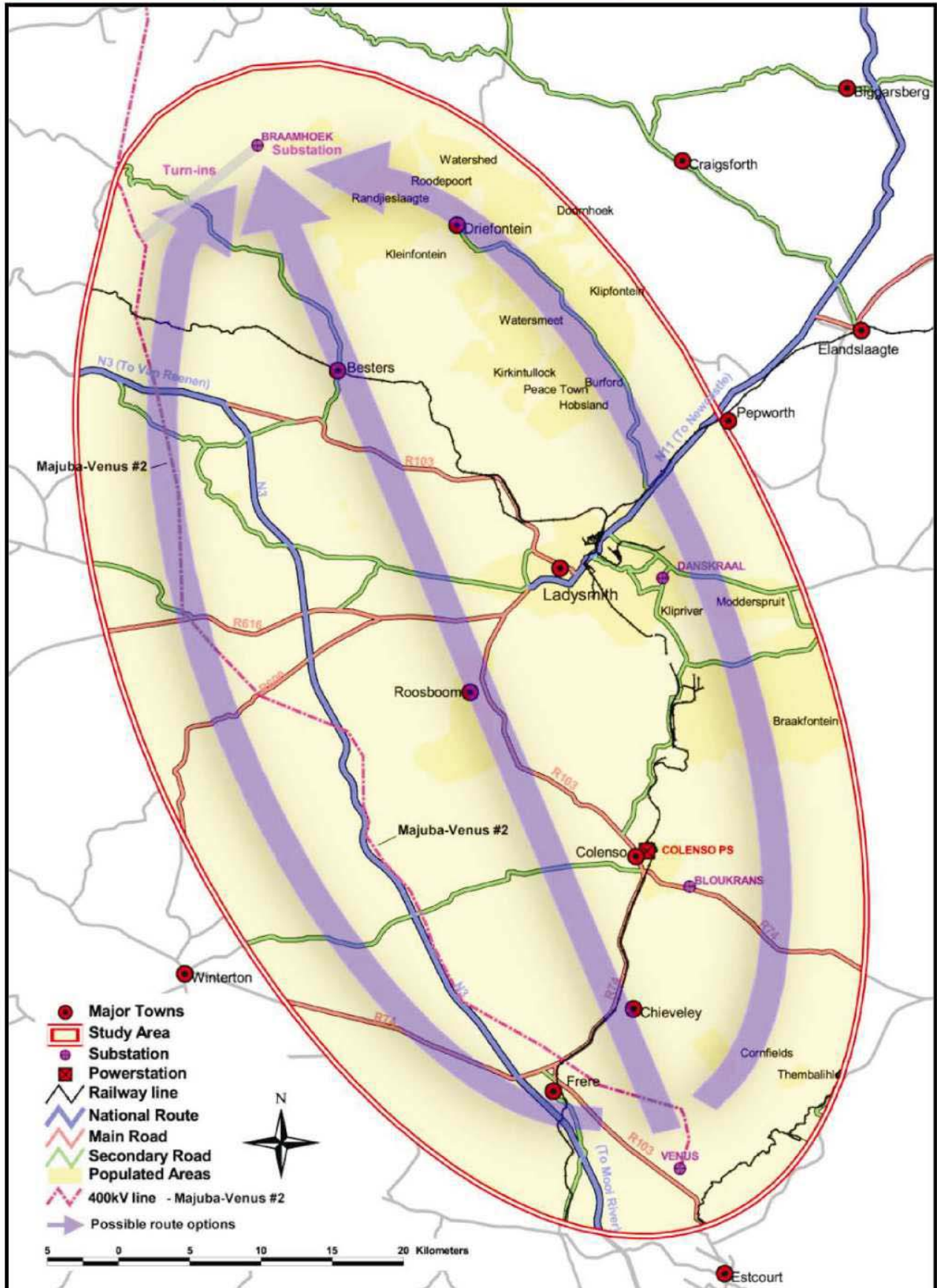


Figure 2 Typical form of a cross-rop suspension tower

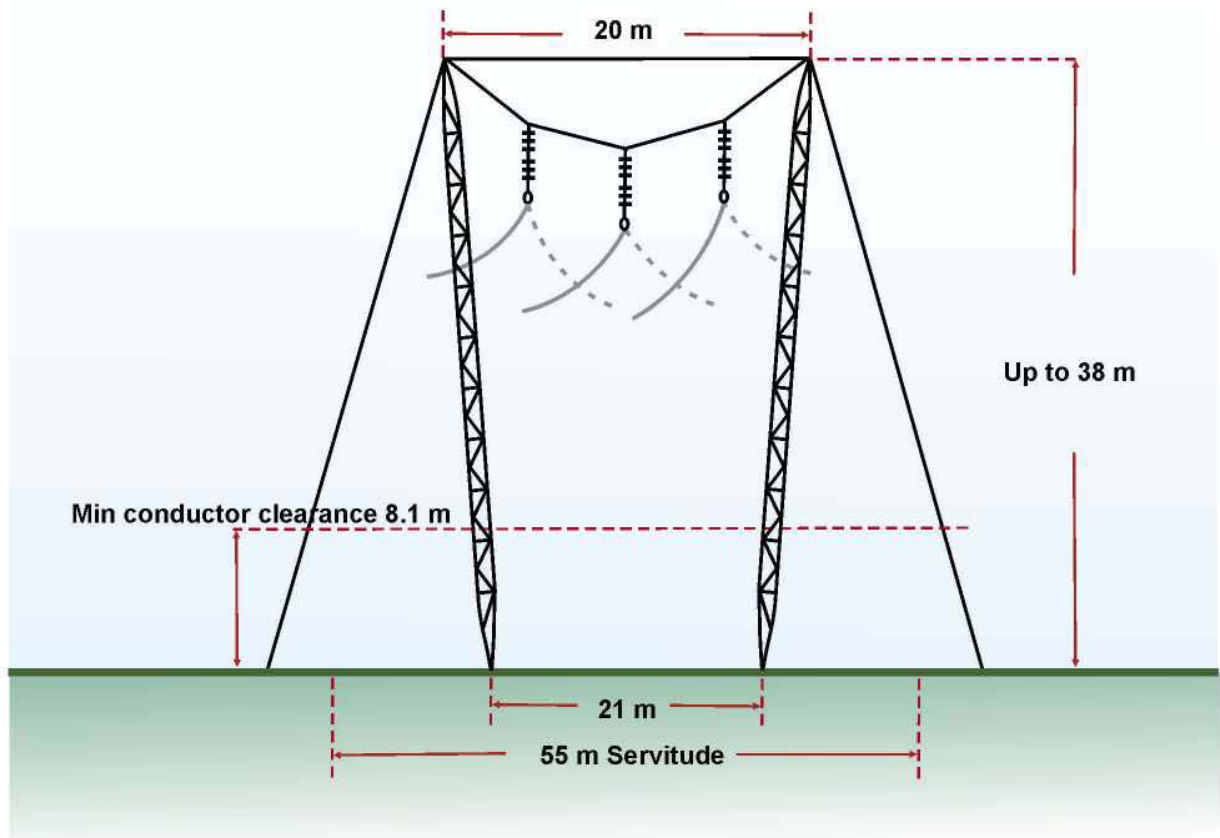
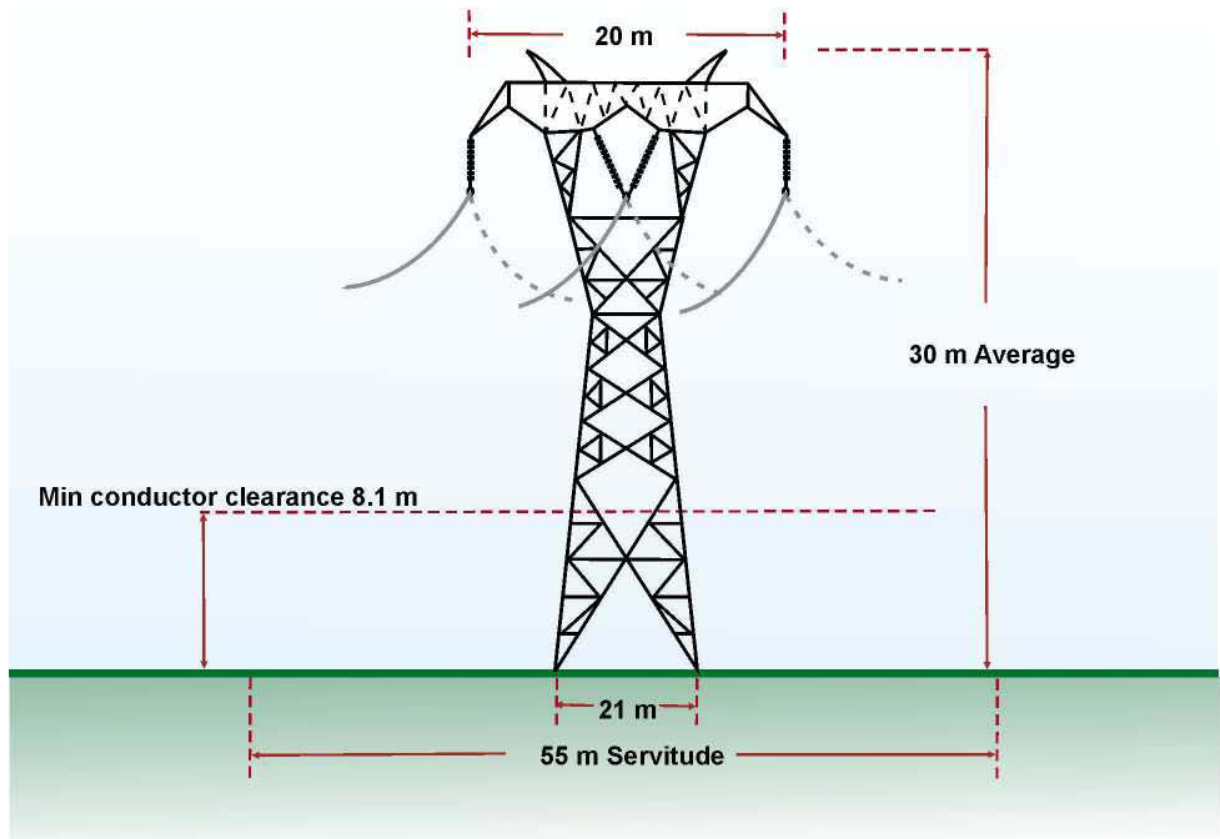


Figure 3 Typical form of a strain tower





# THE ENVIRONMENTAL IMPACT ASSESSMENT

## WHAT IS AN EIA?

An EIA is an efficient planning and decision-making tool. The environmental consequences of a proposed project are identified up front. The EIA helps to ensure that over its life cycle the project will be environmentally acceptable and sustainably integrated into the surrounding environment. The EIA is done in terms of the EIA Regulations under Section 21 of the Environment Conservation Act.

- The National Environmental Management Act (NEMA) (Act 107 of 1998). This Act forms the overarching framework for environmental management in South Africa.
- The Environment Conservation Act, 1989. Sections 21, 22 and 26 of this Act were promulgated in 1997, and make EIAs a statutory requirement for new developments.
- The National Water Act (Act 36 of 1998). Which makes provision for the protection of water resources.

Stakeholders can obtain more information on the above-mentioned Acts from the Public Participation Office.

## POTENTIAL ISSUES FOR INVESTIGATION (Both projects)

A few potential issues of concern are summarised here to stimulate stakeholders to raise further issues.

- Environmental factors: Fauna and flora, wetlands, birds, geotechnical and groundwater issues, cut and fill, borrow pits, pollution of watercourses, construction camps, etc.
- Effects of operation: Stormwater runoff, weed control, pesticides, oil spillages, fire management, etc.
- Socio-economic issues: Potential socio-economic benefits. An influx of job seekers to the area may put pressure on existing services and accommodation facilities, etc.
- Aesthetics: For example, visual impacts from the establishment of new infrastructure.
- Cultural heritage impacts.
- Effects of construction and operation activities.
- Issues identified by I&APs.

## PHASES OF AN EIA

An EIA is done in phases, as outlined below:

### SCOPING PHASE

To identify the issues and concerns that need to be evaluated by specialist investigations (specialist investigations may also form part of scoping). Issues are raised by I&APs, the Authorities, the EIA technical specialists as well as the proponent, and captured in a Draft Scoping Report. This report can only be handed to the Authorities once I&APs have had the opportunity to verify that their issues have been captured. EIA processes may be authorised based on Scoping alone (thereby omitting steps 2 and 3).



### IMPACT ASSESSMENT PHASE

Specialist Studies are undertaken to investigate any issues of concern identified during the Scoping Phase by assessing the potential positive and negative impacts and recommending ways to maximise benefits and minimise negative impacts



### INTEGRATION PHASE/COMPILE REPORT

To integrate the findings of all the Specialist Studies into an Environmental Impact Report (EIR) on which public comment is obtained before being finalised and handed to the Authorities for decision-making



### DECISION-MAKING PHASE

The EIA cannot in itself provide a decision. The decision is in the hands of the 'lead agent', which is the National DEAT, who will coordinate with the other Authorities to ensure that a consensus decision is reached. The EIA regulations make provision for 'conditional' decision-making, which implies that authorisation for the proposed development may be given subject to a variety of conditions.

The EIA needs to be followed through by means of an Environmental Management Programme (EMP) that transfers the findings of the EIA into practical measures.



# CONSTRUCTION & UPGRADE OF ACCESS ROADS EIA

(EIA: A24/16/3/110)

## PROJECT DETAILS



*Knight Piésold*  
CONSULTING



Various options for the access routes have been identified. The project team is currently investigating these options to ascertain the preferred option for the proposed construction of access roads to the Braamhoek PSS. It is expected that most of the access roads will follow existing roads which will be upgraded. The combined length of the access roads is approximately 90 km, of which only about 20 km of this may be new road.

To implement and operate the Braamhoek PSS, three levels of road will be required as follows:

- External access roads: Providing access to the scheme from the existing regional roads.
- Internal access roads: Linking the upper and lower reservoir sites.
- Internal site roads: Providing access within the upper and lower sites, as well as within the campsites.

## EXTERNAL ACCESS ROADS

To provide external access to the dam sites, existing roads can be utilised from the N3 National Highway (N3) at Swinburne to the north and from R103 Regional Road via Besters to the south. Investigations of all these external access roads will be conducted to ensure that design standards are suitable for the vehicles and, where necessary, recommendations will be made for improvements. As existing roads are to be utilised for external access, environmental impacts are expected to be minimal. All upgraded existing roads will be designed to mitigate against environmental impact.

A further alternative, which could be considered for external access, is to provide direct access from the N3 at Van Reenen.

## INTERNAL ACCESS ROADS

For internal access between the upper dam site (on the farm Bedford) and the lower dam (on the farm Braamhoek), there are four alternatives:

- **Alternative 1:** (Figure 4a) Braamhoek (24 kms of new road): The construction of a new route up the Drakensberg Escarpment following the existing track at Braamhoek Pass, 22 km NE of Van Reenen. The new road links to the existing road network south of the Braamhoek Dam, where the D48 and P275 will be upgraded to link to the R103 near Besters.
- **Alternative 2:** (Figure 4b) De Beers Escarpment (32 km, including 15 kms of new road): The upgrading of the existing D48, 16 km NE of Van Reenen. A new link road along the escarpment to provide a link to the Upper Dam. The D48 and P275 will be upgraded to link to the R103 near Besters.

- **Alternative 3:** (Figure 4c) De Beers - Skeurklip (58 km upgrades): This alternative utilises the full length of the S61 (Free State) and D48 (KZN). The S922 provides the link to the upper dam. The D48 and P275 will be upgraded to link to the R103 near Besters.
- **Alternative 4:** (Figure 4d) Kiesbeen (132 km): This alternative uses the existing N3 through Van Reenen's Pass for access through the Drakensberg Escarpment. The S790 and S922 will provide a link from the N3 to the upper dam site. The D48 and P275 will provide the link from the N3 to the lower dam site.

## INTERNAL SITE ROADS

Internal roads will be required to provide access to the various components of the scheme and main access roads. These roads will be constructed and privately owned by Eskom, including:

- Approx. 18 km of road at the lower reservoir site.
- Approx. 7 km of road at the upper reservoir site.

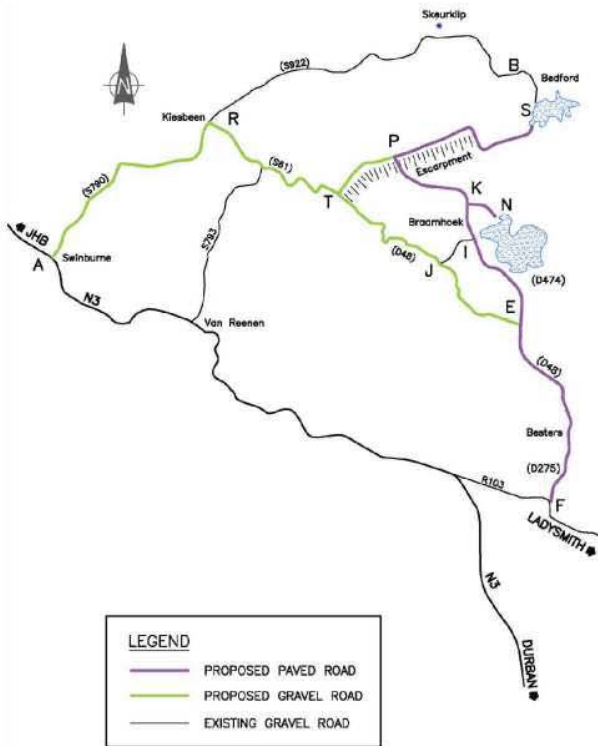
## EIA REQUIREMENTS

The Scoping phase of the EIA will investigate a number of alternatives and the results of this will determine which alternative(s) are to be taken forward to the Impact Assessment phase. Servitude acquisition will then be made on the basis of that preferred alternative.

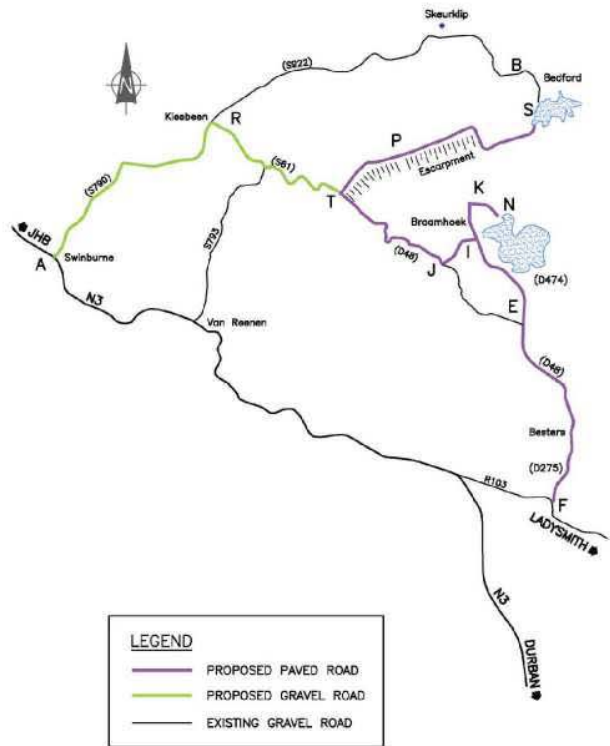
In terms of the environmental legislation the construction of roads is a listed activity, and requires environmental authorisation from DEAT, with recommendations from the KZN DAEA and FS DTEEA. The EIA for the access roads will be conducted by the Braamhoek Consultants Joint Venture. ACER (Africa) Environmental Management Consultants have been appointed as the associated Public Participation Consultant.



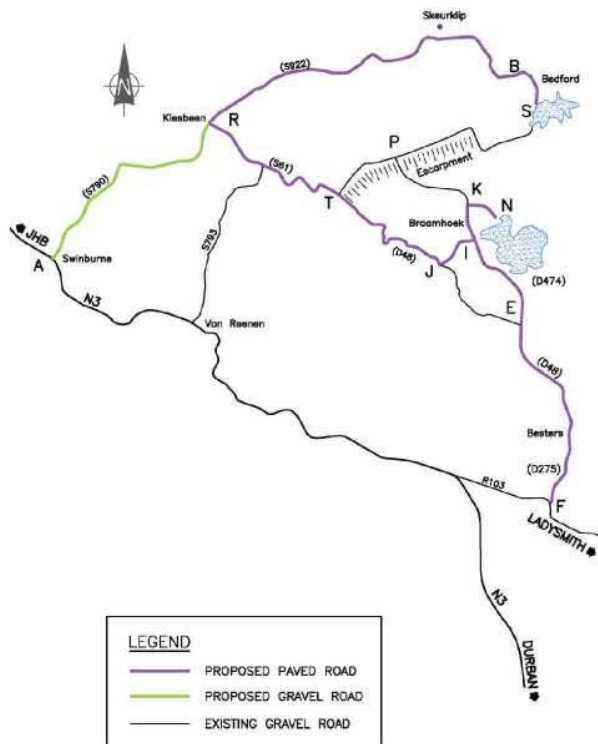
**Figure 4a Alternative 1 - Braamhoek**



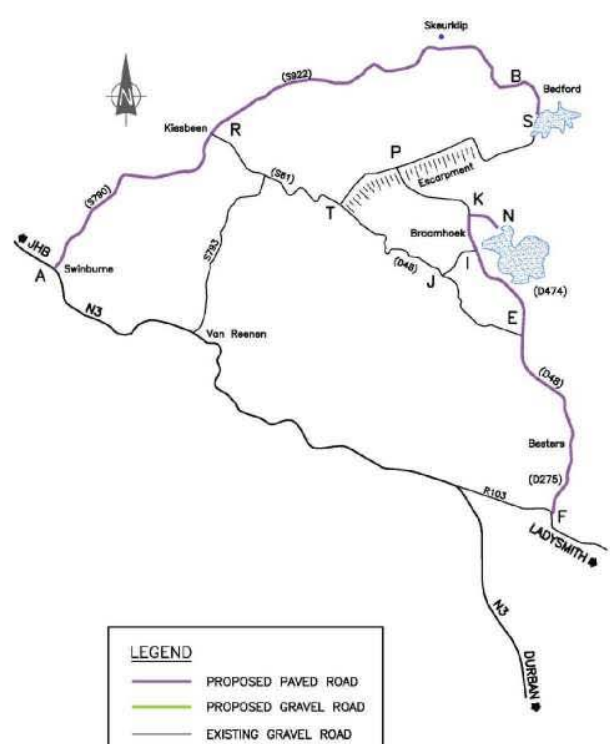
**Figure 4b Alternative 2 - De Beers Escarpment**



**Figure 4c Alternative 3 - De Beers - Skeurklip**



**Figure 4d Alternative 4 - Kiesbeen**



## PUBLIC PARTICIPATION

Public Participation is an essential component of any environmental assessment. Principles of Public Participation include the provision for sufficient and transparent information, on an ongoing basis to I&APs, to enable them to comment on the proposed project. The key objective of Public Participation during a scoping study is to assist I&APs to identify issues of concern and to make suggestions for enhanced benefits.

Issues are raised by the I&APs, the Authorities, EIA technical specialists and the project proponent, and captured in a Draft Scoping Report. This report will be finalised once I&APs have had the opportunity to verify that their issues have been accurately recorded and understood.

## YOUR PARTICIPATION IS IMPORTANT

Your comment on any aspects of the proposed projects, including the EIAs and public participation processes, and issues that need to be investigated, will help us to focus the technical studies, and will assist the Authorities in their decision-making.

## PUBLIC PARTICIPATION OFFICE: ACER (Africa)

### Transmission Power Line and Sub-station Integration EIAs:

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Visit Eskom's EIA web site: [www.eskom.co.za/eia](http://www.eskom.co.za/eia)

## PUBLIC OPEN DAYS!!!

We would welcome your presence at one of the following Public Open Days:

**Date:** Monday, 29 November 2004  
**Time:** 13h00 - 18h00 (presentations at 15h00)  
**Venue:** Estcourt, Umtshezi Municipal Public Library

**Date:** Tuesday, 30 November 2004  
**Time:** 13h00 - 18h00 (presentations at 15h00)  
**Venue:** Ladysmith Royal Hotel, Sir Reays

**Date:** Wednesday, 1 December 2004  
**Time:** 10h00 - 12h00  
**Venue:** Harrismith, Hamilberg School,

Wednesday, 1 December 2004  
14h00 - 17h00  
Harrismith, Hlomisa School



Short presentations on the project and the EIA processes will be given. The project team will be available for the entire day and detailed maps will be on display for those interested.