

KUDU INTEGRATION PROJECT FOR TRANSMISSION LINES AND SUBSTATIONS

PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

DATE: 26 May 2006
SEF Ref No. 6041

SUBMITTED TO:

Department of Environmental Affairs and Tourism
Private Bag X447
Pretoria 0001



DEPARTMENT OF ENVIRONMENTAL
AFFAIRS AND TOURISM

PREPARED FOR:

ESKOM TRANSMISSION

PO Box 1091
Johannesburg
2157

Tel: (011) 800 2465
Fax: (011) 800 3917

E-mail: john.geeringh@eskom.co.za

COMPILED BY:

Strategic Environmental Focus (Pty) Ltd

PO Box 74785
Lynnwood Ridge 0040
Pretoria

Tel: (012) 349 - 1307
Fax: (012) 349 - 1229
E-mail: sef@sefsa.co.za



Copyright Warning

With very few exceptions the copyright of all text and presented information is the exclusive property of Strategic Environmental Focus. It is a criminal offence to reproduce and/or use, without written consent, any information, technical procedure and/or technique contained in this document. Criminal and civil proceedings will be taken as a matter of strict routine against any person and/or institution infringing the copyright of Strategic Environmental Focus (Pty) Ltd

ESKOM KUDU INTEGRATION PROJECT FOR TRANSMISSION LINES AND SUBSTATIONS

PLAN OF STUDY FOR EIA

TABLE OF CONTENTS

Section 1: Introduction	1
1.1 Scope of the EIA	1
1.2 Purpose of the Plan of Study for EIA.....	1
Section 2: Environmental Issues Identified During Scoping	4
2.1 The physical and biological environment.....	4
2.1.1 Wind erosion	4
2.1.2 Soil compaction.....	5
2.1.3 Water erosion.....	5
2.1.4 Loss of high potential arable land	5
2.1.5 Visual intrusion.....	5
2.1.6 Habitat destruction and disturbance	6
2.1.7 Floral impacts	6
2.1.8 Faunal impacts	6
2.2 The social environment.....	7
2.2.1 Destruction of heritage/historical sites.....	7
2.2.2 Impact on tourism.....	8
2.2.3 Health, safety and security.....	8
2.2.4 Social issues	10
2.2.4.1 Local benefits	10
2.3 Public Participation.....	10
2.3.1 Newspaper Advertisement.....	10
2.3.2 Direct Notification of registered I&AP's.....	10
2.3.3 Key Stakeholder Meetings	11
2.3.4 Information Sessions / Public Meetings.....	11
2.3.5 Draft EIA Report for review	11
2.3.6 Submission of EIA Report.....	11
2.3.7 Record of Decision.....	11
Section 3: Description of Feasible Alternatives	12
3.1 Alternative SOURCES OF POWER GENERATION.....	12
3.1.1 Alternative routes	12
Section 4: Additional Information Required	13
Section 5: Guidelines for the Impact Assessment Phase	14
5.1 Issues and concerns raised by I&APs	14
5.2 Mitigation and enhancement.....	14
Section 6: Method of Identifying Impacts.....	15
Section 7: Method of Assessing the Significance of Impacts.....	16
7.1 Approach to the study	16
7.1.1 Description of the affected environment.....	16
7.1.2 Identification of possible risk sources	17
7.1.3 Impact identification and assessment.....	17
7.1.4 Assessment procedure	17
7.1.4.1 Nature of the impact.....	17
7.1.4.2 Extent of the impact	17

7.1.4.3	Duration of the impact	18
7.1.4.4	Intensity	18
7.1.4.5	Probability of occurrence	18
7.1.4.6	Legal requirements	18
7.1.4.7	Status of the impact	18
7.1.4.8	Degree of confidence in predictions	18
7.1.5	Mitigation measures	20
7.1.5.1	Mitigation objectives: what level of mitigation must be aimed at?	20
7.1.5.2	Recommended mitigation measures	20
7.1.5.3	Effectiveness of mitigation measures	20
7.1.5.4	Recommended monitoring and evaluation programme	20
7.2	Project Phasing	21
Section 8: Study Team.....		22

SECTION 1: INTRODUCTION

PD Naidoo & Associates (PDNA) in association with Strategic Environmental Focus (SEF), as independent consultants, were appointed by Eskom to undertake the appropriate environmental process for the proposed development of a 400 kV transmission line from the Namibian border to Juno substation in the Western Cape. This transmission line will supply power to the Western Cape from the Kudu combined-cycle gas turbine (CCGT) power-station in Namibia. The process that was followed complies with Sections 21 and 26 of the Environment Conservation Act (Act 73 of 1989). This is the second stage of the process, which involves an Environmental Impact Assessment (EIA) aimed at evaluating the most likely environmental impacts of the proposed development. The Scoping phase of the environmental process recommended **Routes C and E** as the preferred alignments for the transmission line. As a follow-up to the Scoping phase, a comprehensive Environmental Impact Assessment is now required.

In accordance with the application procedure, a number of environmental issues were identified during the Scoping phase. This Plan of Study for EIA outlines the procedure to be followed and methods to be employed in investigating and assessing all the issues identified in the Scoping phase. SEF has compiled this Plan of Study for EIA, which outlines the sequence of actions to be taken in order to complete the EIA process and, ultimately, to obtain a Record of Decision for the Client (Eskom Transmission) regarding the proposed Kudu Integration Project.

The Plan of Study for EIA is based on the findings and recommendations of the Scoping Report (see Figure 1).

1.1 SCOPE OF THE EIA

The scope of the EIA includes the immediate surroundings of Oranjemund, Gromis and Juno substations and the 400 km corridor connecting these substations (see Figure 2). Five alternative routes for the line were examined during the Scoping phase. The preferred route was determined considering the input from key stakeholders and interested and affected parties, the preliminary recommendations of various specialists as well as technological and socio-economic cost-benefit analyses. The available routes are limited by the location of both the Kudu CCGT power-station in Namibia as well as the load centre in the Western Cape. An area approximately 5 km wide within this route constitutes the study area for the detailed EIA to be undertaken in accordance with the Environment Conservation Act, 1989 (Act No 73 of 1989).

1.2 PURPOSE OF THE PLAN OF STUDY FOR EIA

Issues and concerns raised by the I&APs and key stakeholders during the Public Participation Programme were collected, processed and addressed in the Draft Comments and Response document, which forms a vital part of the Scoping Report.

The next step of the EIA process is the development of guidelines for execution of the impact assessment and the compilation of an Environmental Impact Report (EIR). The Plan of Study for the EIR outlines these guidelines.

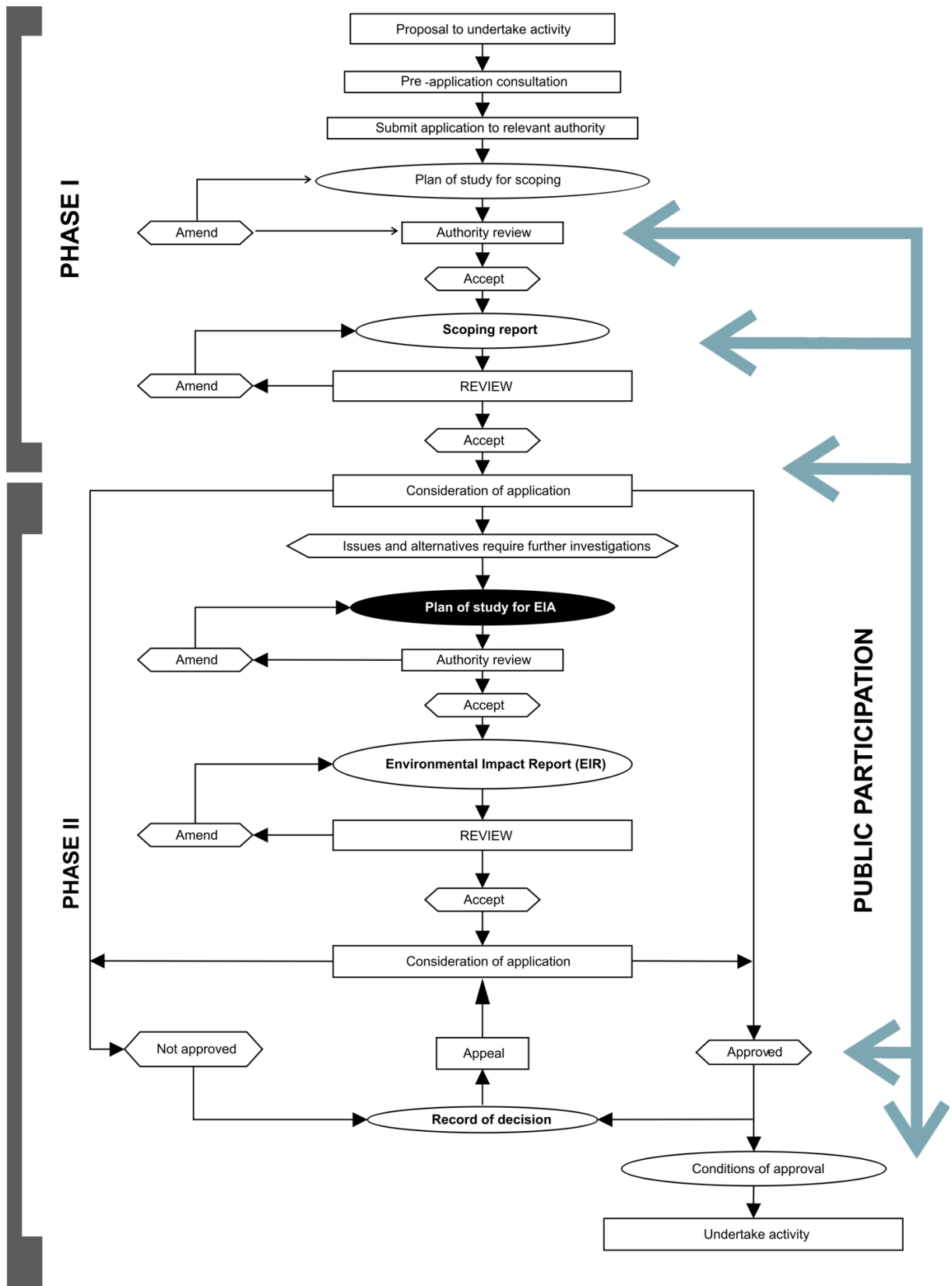


Figure 1: Application Procedure as prescribed by the Department of Environmental Affairs and Tourism, showing the progress of the project so far.

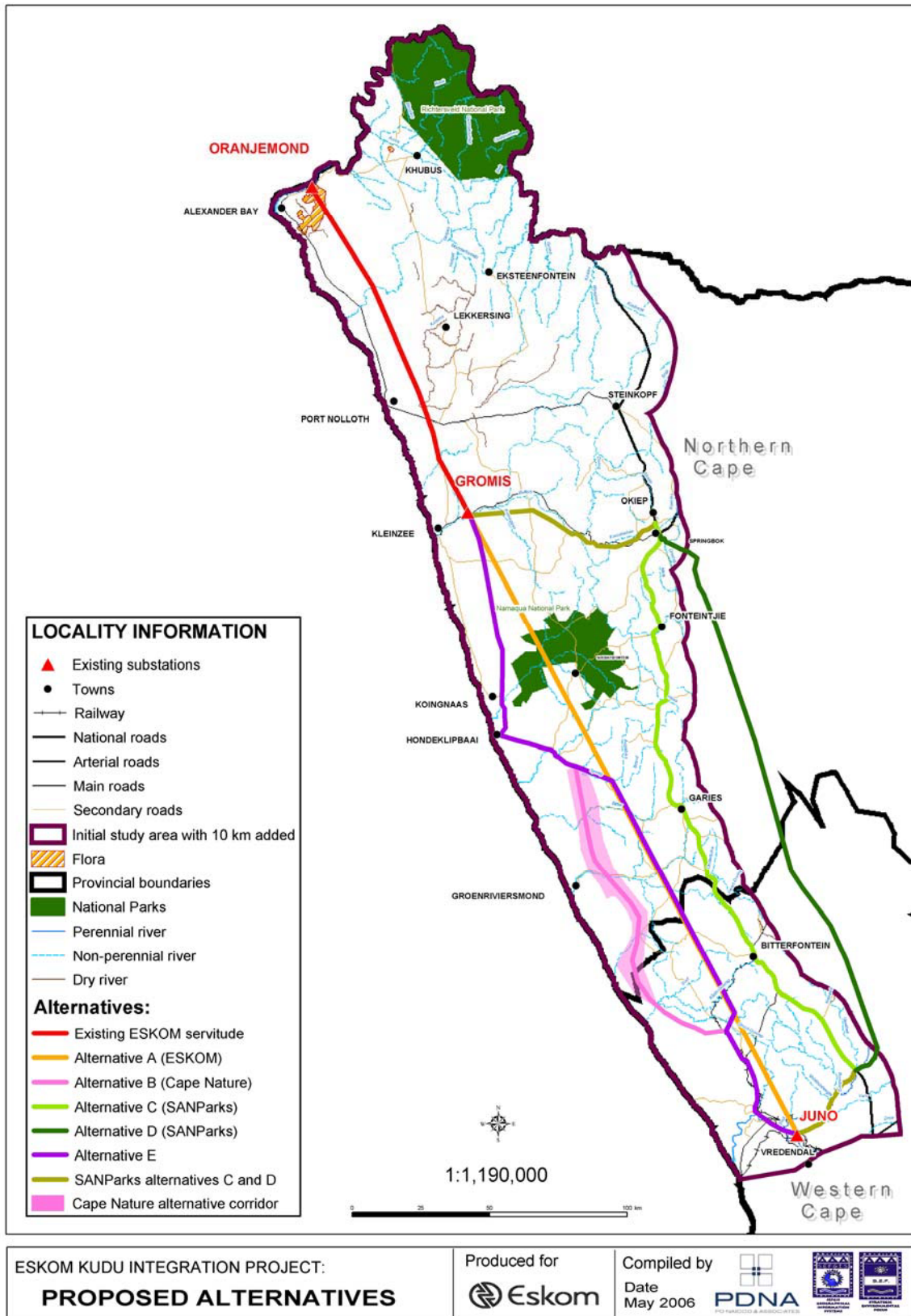


Figure 2: Locality map and alternatives

SECTION 2: ENVIRONMENTAL ISSUES IDENTIFIED DURING SCOPING

The key environmental issues identified by the Scoping phase were determined through a review of issues encountered in EIA processes for similar linear developments, an assessment of potential environmental impacts, and a public participation process. A team of specialists identified potential risk sources/impacts during a site visit to appraise the environment and assess the potential impacts of the development. The specialists were also asked to compile preliminary reports of the alternative routes as proposed by the key stakeholders. The preliminary specialist reports identified alternative routes C and E as the most suited alternatives for the construction of the transmission line, which was a very significant outcome of the scoping exercise. The public participation process also outlined, evaluated and highlighted the most significant issues that require further investigation during the EIA. The EIA team will thus focus on discipline-specific problems, seeking to examine each significant issue in further detail through the relevant specialist studies.

Other issues that were identified by consultation with I&APs and key stakeholders during the Scoping phase were incorporated with input of the specialists consulted. This enabled SEF to decide which issues require further investigation during the EIA phase.

Issues relevant to the environmental investigation were included in the list of key environmental issues and documented in the Draft Comments and Response Document in the Scoping Report. The EIR will examine each issue and, based on the findings of the specialist studies, assess these likely impacts of the development. Suitable mitigation measures for all identified impacts must be provided by all specialist studies.

The issues were grouped into two broad categories as follows:

- a) Key issue 1: The physical and biological environment; and
- b) Key issue 2: The social environment.

2.1 THE PHYSICAL AND BIOLOGICAL ENVIRONMENT

2.1.1 Wind erosion

All fine sandy soils (<15% clay) are prone to wind erosion when dry and devoid of vegetation during windy periods. Soil erosion caused by dispersive soils in association with disturbances of the vegetation/topsoil cover and poor ground management practices are some of the risks identified for moderately sloping areas. These risks will affect both the construction and operation phases. The extent of these risk sources along Route B will need to be assessed and further quantified as part of a detailed geotechnical investigation along this route.

2.1.2 Soil compaction

Sandy soils are easily compacted by vehicle movement, at all soil moisture levels, especially when wet. Soil compaction will mainly be evident during the operational (maintenance) phase of the project, with similar results for the construction phase.

2.1.3 Water erosion

Intensity of rainfall increases as aridity increases. As such, the entire study area is at risk of flash floods. Effective measures to curb water erosion will be investigated.

2.1.4 Loss of high potential arable land

There is a likelihood that some sections of the proposed transmission line could traverse high potential arable land, some of which is currently cultivated. The EIA will need to study how cost-effective pylon structures, that cause the least impact on farming practises, can be used on cultivated farmland. This issue is localised in the Olifants River valley, the only region in the study area that is intensively cultivated.

Other issues that should be addressed include the destruction of farm fences, destruction of farming infrastructure, and damage to crops, game or farm animals. The timing of construction activities and the likely negative impacts on adjacent cultivated land should also be addressed.

2.1.5 Visual intrusion

The visual impact of the line on the surrounding environment has been identified as a potentially highly significant issue that will need to be further quantified in terms of specific impacts that would occur if the line were built. The significance of these visual impacts without mitigation may be high due to the relative scale of the structures, the high visibility within the (mostly flat) study area and the high tourism potential of Namaqualand.

The Visual Impact Assessment should recommend mitigation measures that take into account the surrounding environment, existing impacts such as roads, railway lines, and other infrastructure to ensure that all visual impacts are minimised and manageable. The assessment should indicate what sensitive receptors occur within the view shed and viewing distance.

The visual intrusion could be significant especially where the line traverses tourist attractions such as nature reserves etc. Any proposed alignment must take into account the existing tourism infrastructure.

2.1.6 Habitat destruction and disturbance

The initial ecological assessment identified five major plant communities, which show varying degrees of degradation due to anthropogenic impacts such as overgrazing, trampling, road construction, etc. (see Chapter 4 of the Scoping Report).

Although few negative environmental impacts are expected along the recommended routes, any impacts on sensitive environments would depend largely on the type of equipment used for erecting pylons and transmission lines. The specialist ecological report will therefore need to suggest specific mitigation to avoid destruction and/or undue disturbance of the habitat where access roads, construction camps and pylons will be located.

Management measures to control alien infestation resulting from imported soils and the clearing of vegetation for the servitude should also be included among these mitigation measures.

The ecological study should suggest which habitat types along the recommended routes are sensitive, and thus to be avoided in the final alignment of the transmission line.

2.1.7 Floral impacts

The Succulent Karoo, which is traversed by the proposed route, has an extraordinarily high level of endemism and high diversity, especially of leaf succulents and miniatures. The feature most commonly associated with Namaqualand is the colourful floral display that begins in autumn and peaks in early spring.

Along the coast in the north of the study area there are large areas that have been disturbed by mining practices. Further inland, however, the vegetation is largely undisturbed, especially within the Namaqua National Park and Skilpad Flower Reserve. Despite these initiatives, much of Namaqualand's biodiversity remains unconserved. It has been estimated that some two thirds of the region is needed to protect at least one population of each of Namaqualand's 456 Red Data Book plant species. As such, the ecological study should suggest which habitat types along the recommended routes are sensitive, and thus to be avoided in the final alignment of the transmission line.

2.1.8 Faunal impacts

The predictable rainfall appears to have selected for resident forms of invertebrates and small vertebrates, thus resulting in isolation and speciation. As such, there is a high proportion of endemic reptiles and a number of endemic mammals with 24 arid-adapted bird species (also occurring in adjacent arid biomes) and one endemic (the recently described Barlow's lark

Certhilauda barlowi).

The most significant impact of the 400 kV transmission line on fauna will be in the form of high risks of bird impacts such as electrocutions, collisions, habitat destruction and disturbance.

The Ornithologist (bird specialist) will be required not only to quantify all the significant bird impacts, but also to propose route-specific mitigation measures, that can effectively alleviate these impacts. Also, the efficacy of these measures should be assessed and included in the final report on bird-impacts.

Due to the nature of bird-powerline interactions, a study on bird impacts will be required during the EIA. This study must determine what line sections will need specific mitigation devices, such as bird diverters, bird flappers, etc.

2.2 THE SOCIAL ENVIRONMENT

It must be ensured that the environment surrounding the development is safe and secure, and acceptable to the affected communities within the study area. In this regard the social issues flagged during the site visit (including the tourism issues) as well as the concerns raised in the public consultation process must be taken into account. These issues have been grouped as follows:

- Destruction of heritage/historical sites;
- Impact on tourism; and
- Health, safety and security.

Most of the significant issues were raised by I&APs at the Public Open Days, during discussions with local authorities and by key stakeholders at the Key Stakeholder Workshops. These issues were forwarded to the relevant specialists and documented in the Draft Comments and Response Document (see Scoping Report). A summary of these issues is provided below.

2.2.1 Destruction of heritage/historical sites

Since the proposed route covers a variety of landscapes between the Orange River (Oranjemund substation) and Vredendal (Juno substation), the specialist team was shown the area from the air. The findings of this study are therefore extrapolated from aerial observations, prior experience, work of colleagues and others. While the coastal areas and to some extent the Kamiesberg Mountains are relatively well understood in terms of heritage, no work has taken place on the coastal plains.

While no specific preferences are given in terms of the corridor, it is suggested that rocky outcrops, low hills and ridges be avoided as this is where the predominant heritage of the area (archaeological sites) are likely to occur. It will also be necessary (where appropriate) to consult with Nama communities where the route passes close to their grazing lands. It is also suggested that the route be kept away from the N7 so as not to impact its visual amenity value.

Impacts to heritage are likely to low due to the sparse nature of human settlement away from the coast. It is recommended that the route be ground-proofed (and mitigation applied through minor adjustment or recording and sampling) once other environmental and economic considerations allow for design of a proposed route.

2.2.2 Impact on tourism

For the EIA, a detailed list of all tourism facilities such as National parks, conservation areas, hotels, curio shops, game farms etc. will be required. If tourism infrastructure is to be avoided in positioning the line, the accurate location of any tourist attraction must be determined.

The Tourism report must therefore provide best estimates of the number and location of game farms, lodging facilities, Nature Reserves and heritage/tourist sites. Statistics of tourist visitors should be provided, where possible, as these are often important in determining the importance of these sites.

2.2.3 Health, safety and security

Some health concerns such as contract workers exacerbating the spread of the HIV/AIDS in local communities have been raised by I&APs. Importantly, stakeholders have noted that high unemployment in certain areas is the primary cause for the increase in HIV/AIDS. Anecdotal evidence indicates that women become involved in prostitution to support their families.

Details regarding the disposal of sewerage during the construction phase of the development will be provided in the environmental management plan.

The Social impact report must report on the status of and risks related to safety and security during construction. The following issues should be discussed in detail:

- Precautionary measures to ensure the safety of workers during construction.
- Theft of livestock and an increase in other criminal activities often associated with construction camps.
- Precautionary measures for construction workers when working on game farms; especially during the hunting (winter) season.

- Safety and security during operation and maintenance: Trespassing by Eskom Transmission employees maintaining the servitude. There is a concern that landowners could feel a security risk in terms of personal safety and a potential increase in theft of equipment and livestock.
- Loss of residence – Transmission lines and pylons could negatively impact on homesteads, labour tenant’s homes and outbuildings.
- Compensation policy – Eskom Transmission's compensation policy and negotiation process regarding loss of residence and agricultural land must be clearly spelled out to affected landowners.

- Servitude negotiation and management:
 - Eskom Transmission's policy regarding the negotiation process and the registration of the servitude should be clearly explained to affected landowners.
 - The management of the servitude needs to be clearly explained and documented.

- Access roads:
 - Existing infrastructure should be used as far as possible when identifying new access routes to avoid additional impacts to crops and surrounding veld.
 - Neighbouring landowners affected by access roads should also be consulted as part of the negotiating process.

2.2.4 Social issues

A detailed study on social impacts will be undertaken to review the feasibility, need and acceptability of the proposed 400 kV transmission line, with cognisance of the Integrated Development Plans for the area.

In terms of national socio-economic needs, I&APs understand that the proposed 400 kV transmission line will contribute to the overall strengthening of Eskom's Western Grid with the emphasis on solving the problems encountered as of late in the Western Cape, with the resultant increase in the potential for economic growth. However, questions about alternative routes were voiced at some workshops (see Section 3).

2.2.4.1 Local benefits

Both the Northern and Western Cape show a strong inclination towards developing the eco-tourism industry. Numerous nature reserves form part of the development of this industry. The major concern pertains to the negative visual impact that the proposed line may have on these developments. The social impact study should address these concerns fully and assess what impacts, if any, the development could have on eco-tourism.

There is an opinion that Eskom Transmission should, as far as possible, take cognisance of the Preferential Procurement Act (1999) when issuing its tenders. Only in this manner can the local economy benefit during the construction phase, if local contractors receive preference when awarding tenders. However, it is understood that construction of the pylons and stringing of Transmission lines is a specialised activity, and that according to Eskom Transmission, this construction is carried out predominantly by specialised and experienced contractors.

Job creation and training is considered important, since high unemployment prevails within the entire study area and, although stakeholders understand that the construction of transmission lines is highly specialised, unskilled work such as bush clearing and fencing could be carried out by local residents.

2.3 PUBLIC PARTICIPATION

2.3.1 Newspaper Advertisement

An advertisement, notifying the public of the EIA process, will be placed in local and regional newspapers.

2.3.2 Direct Notification of registered I&AP's

Stakeholders who registered during the scoping phase will be directly informed by e-mail, post and fax of the approval of the Plan of Study for EIA,

as well as the availability and dates of draft reports for public review, as well as the dates for submission of the final report.

2.3.3 Key Stakeholder Meetings

The main key stakeholders involved in the public consultation process of the scoping phase include *SANParks* and *CapeNature*. Key stakeholder meetings were held in Port Nolloth, Garies, Kamieskroon and Vanrhynsdorp during February and March 2006. The next round of meetings will be arranged with all key stakeholders to present the findings of the Environmental Impact Report.

2.3.4 Information Sessions / Public Meetings

Interested and affected parties who registered during the scoping phase will be informed about the Information Sessions / Public Meetings scheduled for the EIA phase. The purpose of these meetings will be to present and discuss the findings of the Environmental Impact Report.

2.3.5 Draft EIA Report for review

On 19 July 2006 the draft EIA Report will be made available for public review. It will be placed at easily accessible venues in the project area, as well as on SEF's website. The Report will be available for a 30-day period and all registered I&APs will be directly informed of the availability of the draft Report.

2.3.6 Submission of EIA Report

Once amended and submitted, registered I&APs will be informed of the submission. A copy of the final document will be made available for the public's information.

2.3.7 Record of Decision

Once a Record of Decision has been issued, all registered I&APs will be informed of the outcome of the RoD.

SECTION 3: DESCRIPTION OF FEASIBLE ALTERNATIVES

After careful consideration of various alternatives to provide reliable electricity supply to the Greater Cape region from the Namibian Kudu CCGT power-station (see Section 5 of the Scoping Report), a new 400 kV Transmission line (from the Namibian border via Gromis substation to Juno substation in the Western Cape Province) proved to be the most feasible alternative. There is no existing servitude between the Gromis and Juno substations. Therefore, the objective of this study is to identify the most suitable alignment for the transmission line. The final position of the line within the preferred corridor will be based on an analysis of the environmental impacts as well as a socio-economic cost-benefit analysis.

3.1 ALTERNATIVE SOURCES OF POWER GENERATION

The EIA will report on the process that was used to select the preferred route, with a summary of the alternatives that were considered during the scoping exercise by answering the following questions:

- What other sources of power generation can be considered other than the construction of new transmission lines?

3.1.1 Alternative routes

After studying four alternative routes, the Scoping Report recommended Routes C or E as the preferred corridors. Where possible, the line will be routed along existing infrastructure based on the preferences indicated by the key stakeholders.

The EIA will focus on confirming whether the route alternative that has been indicated by I&APs as being the preferred route is the most suited for construction of the transmission line. This is the most feasible option based on the specialists' findings and recommendations as well as input derived from I&APs and key stakeholders during the Public Participation Programme. The procedure by which these issues are to be addressed is discussed in Sections 6 and 7.

SECTION 4: ADDITIONAL INFORMATION REQUIRED

Based on the initial assessment of the proposed route alternatives, the experience of the Independent Environmental Consultant with similar linear projects and the findings of the Public Participation Programme, the need arises for the execution of the following specialist studies (as detailed previously in Section 2):

- Visual Impact Assessment (VIA);
- Ecological Assessment;
- Avifauna Assessment;
- Social and Tourism Impact Assessment; this study will also include a discussion on the feasibility and acceptability of the project in view of approved Integrated Development Plans for the area;
- Cultural Heritage Study, i.e. archaeological and historical resources. Eskom Transmission adheres to a very comprehensive policy with guidelines for archaeological, historical, palaeontological and cultural preservation (a route-specific Environmental Management Plan will be implemented);
- Soil and Agriculture Assessment; and
- Engineering Geological Assessment (Geotechnical study).

All these studies will be carried out in a more detailed manner along the recommended routes (Routes C and E). The terms of reference will indicate that these studies must thoroughly assess and quantify all the impacts identified along Route C and E. The results and findings of these investigations will be reflected in the Environmental Impact Report (EIR).

SECTION 5: GUIDELINES FOR THE IMPACT ASSESSMENT PHASE

General aspects that require attention in the Impact Assessment phase of the project as well as in the preparation of a detailed Environmental Management Plan (EMP) are addressed below. It should be noted that these aspects are not necessarily the only ones that need to be addressed in the Environmental Impact Report (EIR) and EMP, other aspects relating to, practical and technical considerations during construction and maintenance will also need to be covered.

5.1 ISSUES AND CONCERNS RAISED BY I&APS

Environmental issues identified during the scoping exercise and detailed in the Scoping Report, should be addressed in the EIR and EMP. These will be done by the corresponding specialists in conjunction with the lead consultants (SEF).

In some instances, for example issues pertaining to archaeological and palaeontological sites, social impacts, ecosystems, geotechnical constraints etc., may need more detailed investigation prior to construction when the detailed alignment is determined. The EIR must indicate which of these issues will need detailed investigation when the positions of the pylons are determined.

5.2 MITIGATION AND ENHANCEMENT

Emphasis will be placed on quantifying impacts along Route B and providing suitable mitigation for each impact. Mitigation measures suggested by the I&APs, key stakeholders and the specialists should be taken into consideration to avoid or reduce potential negative impacts. In addition, ways and means of enhancing any positive impacts will also be addressed in the EIR and EMP.

SECTION 6: METHOD OF IDENTIFYING IMPACTS

The methods used to identify the most likely impacts of the transmission line on the surrounding environment include:

- SEF's professional knowledge base and past experience;
- Specialist studies, covering various technical aspects of the construction of the transmission line;
- A Public Participation Programme, involving various forms of public consultation (see Section 4 of Scoping Report);
- GIS Mapping and Overlays were used to identify and map the alternative routes of the transmission line; and
- The Deeds Office was consulted to obtain contact details of landowners affected by the transmission line.

These methods were combined with a comprehensive literature review of the relevant issues and impacts pertaining to the development.

SECTION 7: METHOD OF ASSESSING THE SIGNIFICANCE OF IMPACTS

Previous experience has shown that it is often not feasible or practical to only identify and address possible impacts. The rating and ranking of impacts is often a controversial aspect because of the subjectivity involved in attaching values to impacts.

Therefore, the assessment will concentrate on addressing key issues. The methodology employed in the EIA will involve a circular route, which will allow for the evaluation of the efficiency of the process itself. The project will be divided into four phases in order to assess impacts related to the Pre-construction, Construction, Operational and Decommissioning phases. The assessment of actions in each phase will be conducted in the following order:

- a) Identification of key issues;
- b) Analysis of the activities relating to the proposed development;
- c) Assessment of the potential impacts arising from the activities, without mitigation; and
- d) Investigation of the relevant mitigation measures, as well as an assessment of their effectiveness in alleviating impacts.

Mitigation measures are to be proposed by all the specialists involved in the project. The specialist studies will be based on the assessment procedure outlined below.

7.1 APPROACH TO THE STUDY

The specialist is to provide an outline of the approach used in the study. Assumptions and sources of information must also be clearly identified. The knowledge of local people should be incorporated in the study.

The description of the study approach shall include a short discussion of the suitability of the methods used in the specialist study in terms of local and international trends and specific practice.

7.1.1 Description of the affected environment

A description of the affected environment must be provided. The focus of this description must be relevant to the specialist's field of expertise.

The specialist must provide an indication of the sensitivity of the affected environment. Sensitivity, in this context, refers to the "ability" of an affected environment to tolerate disturbance, for example, if disturbance of the natural habitat results in the permanent loss of its biodiversity. The affected environment could be categorised as having a "low tolerance" to disturbance and is, therefore, termed a highly sensitive habitat. If, on the other hand, a

habitat is able to withstand significant disturbance without a marked impact on its biodiversity, the affected environment could be categorised as having a high tolerance to disturbance (i. e. “low sensitivity” habitat).

7.1.2 Identification of possible risk sources

The specialist must identify the potential sources of risk to the environment posed by the construction, operation and maintenance of the proposed Kudu 400 kV Transmission line. Risks are to be identified for the construction and operational phases of the project.

7.1.3 Impact identification and assessment

The specialist must make a clear statement, identifying the environmental impacts of the construction, operation and maintenance of the proposed 400 kV transmission line. As far as possible, the specialist must quantify the suite of potential environmental impacts identified in the study and assess the significance of the impacts according to the criteria set out below. Each impact will be assessed and rated.

For the purposes of this study, the term “assessment” refers to “the process of collecting, organising, analysing, interpreting and communicating data relevant to some decisions” (Stauth *et al.*, 1993). The assessment of the data must, where possible, be based on accepted scientific techniques, failing which the specialist is to make judgements based on his/her professional expertise and experience.

7.1.4 Assessment procedure

The terms of reference for the specialist study include criteria for the description and assessment of environmental impacts. These criteria are drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act (73 of 1989). These criteria include:

7.1.4.1 Nature of the impact

This is an appraisal of the type of effect the construction, operation and maintenance of the proposed Kudu 400 kV transmission line would have on the affected environment. This description should include what is to be affected and how.

7.1.4.2 Extent of the impact

The specialist must describe whether the impact will be: local - extending only as far as the line servitude; or limited to the site and its immediate

surroundings; or will have an impact on the region; or will have an impact on a national scale.

7.1.4.3 Duration of the impact

The specialist must indicate whether the lifespan of the impact would be short-term (0-5 years), medium-term (6-10 years), long-term (>10 years) or permanent.

7.1.4.4 Intensity

The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.

7.1.4.5 Probability of occurrence

The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

7.1.4.6 Legal requirements

The specialist should identify and list the relevant South African legislation and permit requirements pertaining to the development proposals. He/she should provide reference to the procedures required to obtain permits and describe whether the development proposals contravene the applicable legislation.

7.1.4.7 Status of the impact

The specialist should determine whether the impacts are negative, positive or neutral ("cost – benefit" analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, a positive impact of the proposed Kudu 400 kV transmission line may be negative for the environment. It is important that this distinction is made in the analysis.

7.1.4.8 Degree of confidence in predictions

The specialist should state what degree of confidence (low, medium or high) there is in the predictions, based on the available information and level of knowledge and expertise.

Based on a synthesis of the information contained in the foregoing

procedure, the specialist is required to assess the potential impacts in terms of the following significance criteria:

- No significance – the impact does not influence the proposed Kudu 400 kV transmission line and/or environment in any way;
- Low significance – the impacts will have a minor influence on the proposed Kudu 400 kV Transmission line and/or the environment. These impacts do not require modification of the project design or alternatives modification.
- Moderate significance – the impacts will have a moderate influence on the proposed Kudu 400 kV transmission line and/or the environment. The impacts can be ameliorated by modification in the project design or implementation of effective mitigation measures.
- High significance – the impacts will have a major influence on the proposed Kudu 400 kV transmission line and/or the environment. These impacts could have the “No-go” implication on portions of the proposed development regardless of any mitigation measures that could be implemented.

In order to assess impacts that relate to more than one element of the environment (e.g. visual quality and land use), certain specialists may require information obtained from other specialists. A study team workshop has been held to ensure that all specialists and the client have a common understanding of the receiving environment and issues related to the project are addressed in a synergistic manner.

For each of the two main project phases (construction and operation), the existing and potential future impacts and benefits (associated only with the proposed development) should be described using the criteria listed above – for example: extent (spatial scale), duration, intensity, etc. The impacts must then be assessed in terms of their significance (low, medium, or high) etc., and the degree of assessment confidence stated.

In order to maintain consistency in the impact assessment it is suggested that all potential impacts to the environment (or component of the environment under review) should be listed in a table similar to the example (Table 2) shown below (more than one table will be required if impacts require assessment at more than one spatial scale). The assessment parameters used in the table should be applied to all of the impacts and a brief descriptive review of the impacts and their significance can then be provided in the text of the specialist reports and consequently in the EIR.

Note: the impact assessment in this section should highlight the potential development consequences if no measures are applied to mitigate the

impacts.

7.1.5 Mitigation measures

Mitigation measures should be recommended in order to enhance benefits and minimise negative impacts and they should address the following:

7.1.5.1 Mitigation objectives: what level of mitigation must be aimed at?

For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in a measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make an “educated guess” based on his/her professional experience.

7.1.5.2 Recommended mitigation measures

For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided.

7.1.5.3 Effectiveness of mitigation measures

The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions.

7.1.5.4 Recommended monitoring and evaluation programme

The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives.

Each environmental impact is to be assessed before and after mitigation measures have been implemented.

The management objectives, design standards etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits must, wherever possible, be expressed as measurable targets. National standards or criteria are examples, which can be stated as mitigation objectives.

Once the above objectives have been stated, feasible management actions, which can be applied as mitigation, must be provided.

A duplicate column on the impact assessment tables described above should indicate how the application of the proposed mitigation or management actions has reduced the impact. If the proposed mitigation is to be of any

consequence, it should result in a measurable reduction in impacts (or, where relevant, a measurable benefit).

Table 1: Impacts on STUDY SUBJECT without management / mitigation actions

Nature		Status	-
Impact source(s)			
Affected stakeholders			
Magnitude	<i>Extent</i>		
	<i>Intensity</i>		
	<i>Duration</i>		
	<i>Reversibility</i>		
	<i>Probability</i>		
Significance	<i>Without mitigation</i>		
	<i>With mitigation</i>		
Confidence			

7.2 PROJECT PHASING

The impact assessment will provide an evaluation of the significance of each key impact in terms of the nature, probability, duration, extent and intensity. This will be done for each of the four phases of the project: pre-construction, construction, operational and decommissioning phases.

SECTION 8: STUDY TEAM

The table below contains contact details of professionals who will be responsible for the Environmental Investigation for the proposed Kudu 400 kV transmission line.

Table 4: Study team

Team member	Company / Contact details	Responsibility
Reuben Heydenrych	Strategic Environmental Focus (Pty) Ltd PO Box 74785 Lynwood Ridge 0040 Tel: (012) 349-1307 Fax: (012) 349-1229 Cell: 083-420-0628 E-mail: reuben@sefsa.co.za	Project Manager - Environmental Investigation
Guillaume Nel	Strategic Environmental Focus (Pty) Ltd PO Box 74785 Lynwood Ridge 0040 Tel: (012) 349-1307 Fax: (012) 349-1229 Cell: 083-442-5417 E-mail: guillaume@sefsa.co.za	Public Participation Programme (Public Liaison Officer)
Ilse Aucamp	Strategic Environmental Focus (Pty) Ltd PO Box 74785 Lynwood Ridge 0040 Tel: (012) 349-1307 Fax: (012) 349-1229 Cell: 082-828-0668 E-mail: ilseb@sefsa.co.za	Social and Tourism Study
Tim Hart	Natural Cultural History Museum P O Box 28088 Sunnyside 0132 Tel: (012) 324-6082 Fax: (012) 328-5173 Cell: 082-560-6979 E-mail: johnny@nfi.org.za	Heritage study
Heidi van Deventer	Strategic Environmental Focus (Pty) Ltd PO Box 74785 Lynwood Ridge 0040 Tel: (012) 349-1307 Fax: (012) 349-1229 Cell: 083-4029967 E-mail: heidi@sefsa.co.za	Geographic Information Systems (GIS)
Mader van den Berg	Strategic Environmental Focus (Pty) Ltd PO Box 74785 Lynwood Ridge 0040 Tel: (012) 349-1307 Fax: (012) 349-1229 Cell: 076-169-1435 E-mail: mader@sefsa.co.za	Visual Impact Assessment
Nick Helme	Nick Helme Botanical Surveys PO Box 22652 Scarborough	Ecological study (floral and faunal impact)

	7975 Tel: 021 780 1420 Fax: 021 780 1868 cell: 082 82 38350 E-mail: botaneek@iafrica.com	
John Smallie	Endangered Wildlife Trust Private Bag X11 Parkview 2122 Tel: (011) 486 1102 Fax: (011) 486 1506 Cell: 082-454-9570 E-mail: chrisv@ewt.org.za	Avi-fauna (Ornithologist)
Demos Dracoulides	DDA Environmental Engineers PO Box 60034, Table View 7439 Fax: (021) 557 1078	Air pollution assessment
Mark Richter	MSJ Consulting Tel: (031) 267-7227 Fax: (031) 266-5322 Cell: 083-461-6194 E-mail:	Geo-Technical
Johan Lambrechts	University of Stellenbosch Fax: (021) 808 4791	Soil and Agriculture Impact Assessment