

ESKOM

ENVIRONMENTAL IMPACT ASSESSMENT

Proposed Gamma Substation

Social and Socio-economic Impact Assessment

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Report prepared for:

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June 2007

EXECUTIVE SUMMARY

Introduction

BACKGROUND

Eskom's transmission network which supplies electricity to the greater Eastern and Western Cape areas is running short of capacity to supply the natural load growth, which will present a reliability constraint by 2009 (or immediately if power supply problems are encountered, as has recently been experienced country wide). To counter this situation and to meet projected future electricity demand, Eskom is planning to strengthen its transmission network by constructing a 765 kV transmission line backbone through the centre of the country, linking its main generating facilities in Mpumalanga with demand centres in the Western and Eastern Cape. This involves constructing new 765 kV transmission lines from Standerton, in Mpumalanga, to Cape Town, in the Western Cape, with branch lines to Port Elizabeth, in the Eastern Cape. The approximate length of the total line is 1,300 km. In order to transmit electricity over long distances, Eskom requires sub-stations, and Eskom is proposing the construction of the Gamma Sub-station at an approximate equal distance between two existing substations, i.e. the Perseus (close to Dealesville) and Omega (at Koeberg) Sub-stations. The proposed site is approximately 42 km southeast of Victoria West, Northern Cape.

Previously, environmental authorisation was issued in 2005 for the proposed Gamma Sub-station to be located on the farm Uitvlugfontein 265/0. However, recent planning has indicated that the proposed Gamma Sub-station would be more ideally located about 10 km to the east of the original site. It will now lie mainly on the farm Uitvlugfontein 265/1, as well as on a small part of the farm Schietkuil 3/0.

Eskom Transmission has appointed ACER (Africa) Environmental Management Consultants (ACER) as the Independent Environmental Consultant to undertake new the Environmental Impact Assessment (EIA) for the proposed Gamma Sub-station. Subsequently, ACER appointed Mr J van der Walt of Ntshebe Socio-environmental and Development consultants to conduct a Social and Socio-economic Impact Assessment as part of the EIA.

SCOPE OF WORK

According to the document 'Environmental Assessment Terms of Reference: Social and Socio-economic Specialist Study', ACER requires the following specialist input:

"The Social and Socio-Economic Assessment will cover the following key aspects:

- Description of the current social and socio-economic environments within the study area, outlining important characteristics and components thereof, which may be influenced by the proposed infrastructure or which may influence the proposed infrastructure during construction and operation.
- The identification of potential impacts (positive and negative, local and regional, including cumulative impacts if relevant) of the proposed development on the social and socio-economic environments during construction and operation. This aspect of the study must consider

potential impacts on existing infrastructure, nuisance impacts, the transmission of diseases, in particular HIV/AIDS, and health and safety impacts.

- ❑ The identification of mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction, and operation of the proposed transmission lines).
- ❑ The formulation of a simple system to monitor impacts, and their management, based on key indicators.

In addition to the above, the Specialist is required to identify any other aspects related to the socio-economic situation in the study area that should be incorporated within this EIA. Should this require additional time and budget, this will be agreed upon at the appropriate time.”

Description of the project

PROJECT SITE AND SIZE

As indicated, the project site is located approximately 42 km from Victoria West on the farms Uitvlugfontein 265/1 and Schietkuil 3/0. The climate is warm all year round and rainfall is low, between 200 and 250 mm per annum. The soil cover is thin and very susceptible to erosion by wind and water.

Eskom intends to acquire approximately 172 ha for the substation, and a servitude of a further 80 ha to accommodate the new transmission lines. The whole of the substation site is to be fenced with security fencing.

MAIN SUB-STATION SWITCHGEAR

Power is brought to the sub-station on 765 kV transmission lines that end on a large steel structure called a terminal tower. Power is then transferred into the main electrical switchgear inside the sub-station perimeter. These include:

- ❑ Transformers.
- ❑ Reactors.
- ❑ Busbars.

After passing through the switchgear, power out of the sub-station is fed into the 765 kV outgoing transmission lines that start from large steel terminal towers about 43 m outside the perimeter fence.

CONSTRUCTION AND MAINTENANCE OF ACCESS ROADS

The Gamma Sub-station will be served by a tarred access road to the R63, and internal gravelled traffic areas for access to the sub-station equipment. The flow of traffic to the site during the construction period will be relatively light, and during operations there will be virtually no traffic.

TEMPORARY STORAGE OF HAZARDOUS SUBSTANCES

Certain hazardous substances will be stored and dispensed during the construction period. This includes substances such as fuels, oils, and lubricants, which will be stored and dispensed at the construction camp. Storage will be take place according to strict specifications.

TELECOMMUNICATION MASTS

A 30m to 50m lattice microwave telecommunication mast will be constructed, as this forms an integral part of the sub-station.

USE OF SERVICES AND RESOURCES DURING CONSTRUCTION

Certain services and resources will be required during construction. These include:

- ❑ Water – to be sourced from a borehole on site.
- ❑ Sewerage – On-site treatment of the very small volume of sewerage flow will take place through the use of chemical toilets and septic tanks.
- ❑ Roads – Where possible, existing roads will be used. During construction, traffic would be fairly light, and there would be virtually no traffic during the operation of the sub-station.
- ❑ Storm water – Due to the sensitivity of the soil on site to erosion, storm water will need to be diverted into the surrounding areas with very low energy levels.
- ❑ Solid waste disposal – Solid waste will be stored temporarily on site for removal to an appropriate landfill site.
- ❑ Electricity – There is no accessible electricity on site, and diesel generators will be used for electricity generation.

ECONOMICS AND JOB CREATION

The construction cost of the proposed Gamma Sub-station would be approximately R 500 million. At the busiest time of the construction work, there will not be more than 80 people present on the site at any one time. Special emphasis would be placed on the use of Small and Medium Enterprises and Affirmative Business Enterprises.

OPERATIONS AND MAINTENANCE

Maintenance activities are specialised, and are carried out by Eskom employees who would need to access the site. During the operation of the sub-station no one will be permanently reside on the site.

DECOMMISSIONING

Separate environmental authorisation would be required at the time of decommissioning.

PROJECT TIMEFRAMES

In order to meet the expected electricity demand, the proposed Gamma Sub-station must be operational by 2009¹. Therefore, construction must commence in the latter half of 2007.

Description of the social and socio-economic environments

INTRODUCTION

It is important to gain an understanding of the receiving social and socio-economic environment in relation to the proposed development, in order to identify the potential social and socio-economic impacts that the proposed project may have.

REGIONAL AND LOCAL CONTEXT

The area affected by the project falls into two provinces, and is divided into a number of District and Local Municipalities, including:

- ❑ Northern Cape: the Pixley KaSeme District Municipality (DC 07) (PSDM), and the Ubuntu Local Municipality (NC 071) (ULM).
- ❑ Western Cape: the Central Karoo District Municipality (DC 05) (CKDM), and the WCDMA 05.

The main towns situated within the study area are Victoria West and Murraysburg. Population figures are low, and the population density in none of the municipalities in the study area is more than two people per km².

LAND-USE

The study area comprises large expanses of open land with concentrated small settlements. Major land-uses in the study area include:

- ❑ Commercial agriculture.
- ❑ Live stock farming (dairy, beef, sheep, ostriches, etc.).
- ❑ Game farming.
- ❑ Peri-urban development (including homesteads, shops, and limited subsistence agriculture).
- ❑ Rural homesteads.
- ❑ Eco-tourism and conservation. Many local landowners practise conservation and maintain conservancies.
- ❑ Transportation.

There are no settlements on the project site itself. The homestead on Schietkuil 3/0 is located about 3 km away on the opposite side of the N1, and there is no homestead on Uitvlugfontein 265/1. The next closest inhabited homestead is on Kleinfontein, approximately 6 km from the site, and is occupied by the owner of Uitvlugfontein 265/1. Both Schietkuil 3 and Kleinfontein have eight permanent labourers who reside with their families on the properties in close proximity to the respective farm homesteads.

The site is located on two grazing camps of the two farms where sheep, springbuck, and limited cattle are grazed.

¹ This is to meet the current and immediate future demand. Additional construction (in phases) may occur over the next 10-15 years, as indicated by growth in demand for electricity.

TOURISM

The project site is located in an area with fairly limited existing tourism, although the N1 serves a main access route between Gauteng, the Free State Province and the Cape.

On Schietkuil 3/0 the old hunting lodge has recently been revamped into a more upmarket Bed & Breakfast, catering for both hunters and overnight tourists. The lodge caters for both local, so-called 'biltong hunters', and international trophy hunters. International hunters predominantly originate from European countries such as Belgium and Germany, and the United States of America. There are no tourist facilities on Uitvlugfontein 265/1, and hunting seldom takes place.

Description, assessment and mitigation of potential effects of the proposed development

Project-specific socio-economic effects were identified and formulated as six questions. In answering these questions, potential effects are described and assessed, based on the methodology prescribed by ACER. The questions and effects are as follows:

- What are the potential opportunities for employment and local contractors during the construction and operation of the proposed sub-station?
 - Employment creation.
 - Opportunities for local contractors, SMEs and ABEs.

- What are the potential effects related to the construction camp during the construction phase of the proposed sub-station?
 - Potential markets for informal trading.
 - Increased pressure on existing infrastructure.
 - Increase in the spread of diseases (including sexually transmitted diseases and HIV/AIDS).
 - Potential in-migration of people.
 - Potential increase in poaching.
 - Effects on safety and security.
 - Nuisance effects.

- What are the potential effects on farming activities and farm infrastructure?
 - Loss of, or loss of access to, farm infrastructure.
 - Disruption of farming and hunting activities.
 - Loss of grazing land.

- What are the potential operation-specific effects of the proposed sub-station on the social and socio-economic environment?
 - Electromagnetic fields.

- Emergency situations.
- What are the cumulative effects associated with the proposed development?
- What are the potential effects of the proposed sub-station on the social and socio-economic environment which are specifically dealt with by other specialist studies?
 - Effects on cultural heritage resources.
 - Visual impacts.

Monitoring indicators

There are two broad issues, which are combinations of others, which overarch the majority of impacts outlined above, i.e. employment opportunities and use of local contractors, and health and safety. For both of these issues a number of simple monitoring indicators are outlined.

Concluding remarks

Ntshebe believes that this report accurately reflects the impacts that the construction and operation of the proposed Gamma Sub-station may have on the social and socio-economic environment. The assessment of key issues shows that there are no negative impacts which can be classified as fatal, or which are of high significance thereby blocking the project, provided that the suggested mitigation measures are undertaken. It is, however, important that these suggestions are implemented in order for the project to be environmentally acceptable.

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ACRONYMS

ABE	Affirmative Business Enterprise
ACER	ACER (Africa) Environmental Management Consultants
AIDS	Acquired Immune Deficiency Syndrome
DEAT	Department of Environmental Affairs and Tourism
EIA	Environmental Impact Assessment
HIV	Human Immune Deficiency Virus
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
SIA	Social Impact Assessment
SME	Small and Medium Enterprise
kV	Kilovolt
EHV	Extra High Voltage
PCD	Polychlorinated Biphenyl
ULM	Ubuntu Local Municipality
PSDM	Pixley ke Seme District Municipality
CKDM	Central Karoo District Municipality

1. INTRODUCTION

1.1 Background

Eskom's transmission network which supplies electricity to the greater Eastern and Western Cape areas is running short of capacity to supply the natural load growth, which will present a reliability constraint by 2009 (or immediately if power supply problems are encountered, as has recently been experienced country wide). To counter this situation and to meet projected future electricity demand, Eskom is planning to strengthen its transmission network by constructing a 765 kV transmission line backbone through the centre of the country, linking its main generating facilities in Mpumalanga with demand centres in the Western and Eastern Cape. This involves constructing new 765 kV transmission lines from Standerton, in Mpumalanga, to Cape Town, in the Western Cape, with branch lines to Port Elizabeth, in the Eastern Cape. The approximate length of the total line is 1,300 km. In order to transmit electricity over long distances, Eskom requires sub-stations, and Eskom is proposing the construction of the Gamma Sub-station at an approximate equal distance between two existing substations, i.e. the Perseus (close to Dealesville) and Omega (at Koeberg) Sub-stations (ACER: 2007). The proposed site is approximately 42 km southeast of Victoria West, Northern Cape. Figure 1 indicates the approximate position of the substation on a locality map.

Previously, environmental authorisation was issued in 2005 for the proposed Gamma Sub-station to be located on the farm Uitvugfontein 265/0. However, recent planning has indicated that the proposed Gamma Sub-station would be more ideally located about 10 km to the east of the original site. It will now lie mainly on the farm Uitvugfontein 265/1 as well as on a small part of the farm Schietkuil 3/0.

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1.2 Scope of work

According to the document 'Environmental Assessment Terms of Reference: Social and Socio-economic Specialist Study', ACER requires the following specialist input:

"The Social and Socio-Economic Assessment will cover the following key aspects:

- Description of the current social and socio-economic environments within the study area, outlining important characteristics and components thereof, which may be influenced by the proposed infrastructure or which may influence the proposed infrastructure during construction and operation.
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- ❑ The identification of mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction, and operation of the proposed transmission lines).
- ❑ The formulation of a simple system to monitor impacts, and their management, based on key indicators.

In addition to the above, the Specialist is required to identify any other aspects related to the socio-economic situation in the study area that should be incorporated within this EIA. Should this require additional time and budget, this will be agreed at the appropriate time.”

1.3 Methodology

In order to fulfil the scope of work, a range of methodologies was used. Qualitative, secondary and primary research was undertaken.

Secondary research included:

- ❑ Desktop analysis and literature review.
- ❑ Continuous exchange of information with other specialist study personnel.

Primary research involved the collection of both qualitative and quantitative information on-site or telephonically, and constituted:

- ❑ Site visit to gain an understanding of the receiving environment.
- ❑ Key informant interviews (both structured and unstructured) to gain an in-depth understanding of the issues associated with the proposed project.

Potential effects of the proposed substation were identified and assessed based on a set of conventions provided in the Specialist TOR. These are outlined in detail in Appendix 1.

1.4 Structure of this report

The material is presented in sections as outlined below.

Section 1 is an introduction to the study. **Section 2** outlines key elements of the proposed development, which have relevance to this study. **Section 3** provides a description of the receiving social and socio-economic environments. Against the background of the preceding sections, **Section 4** identifies, describes, and assesses potential socio-economic effects of the proposed development. It also recommends mitigation and management actions to minimise the negative and enhance the positive effects of the development. **Section 5** concludes the report, and **Section 6** provides a reference of information sources utilised during the study.

Figure 1 Locality map of the arrow indicating the study area.



2. DESCRIPTION OF THE PROJECT

2.1 Introduction

A sub-station is an important element of an electricity generation, transmission, and distribution system. Its function is normally to transform voltages from high to low, or the reverse, using transformers and other heavy-duty electrical switchgear. In the case of the Gamma Sub-station it has two important additional functions. The sub-station will house the equipment that will be used to correct or neutralise inductive reactance, or voltage rise induced in the power lines from capacitance effects. It will also enable Eskom to safely tap off power from the 765 kV backbone and distribute it to other geographical areas, for example, the Eastern Cape.

The proposed Gamma Sub-station will eventually accommodate five incoming and five outgoing lines, together with the associated switching, protection, and control equipment. Additional power lines will come in from the Perseus Sub-station near Dealesville, and new lines will go out to the Omega (Koeberg) and Grassridge (Port Elizabeth) Sub-stations.

2.2 The project site

The Gamma site lies mainly on the farm Uitvlugfontein 265/1 but also overlaps slightly onto Schietkuil No. 3/0. An area of land approximately 1.54 km x 1.136 km (172 ha) has been demarcated for the sub-station (Figure 2). Originally, Eskom purchased the farm Uitvlugfontein 265/0, which is located on the opposite side of the R 63, but it was later decided, from a cost perspective, to move the site to the current position.

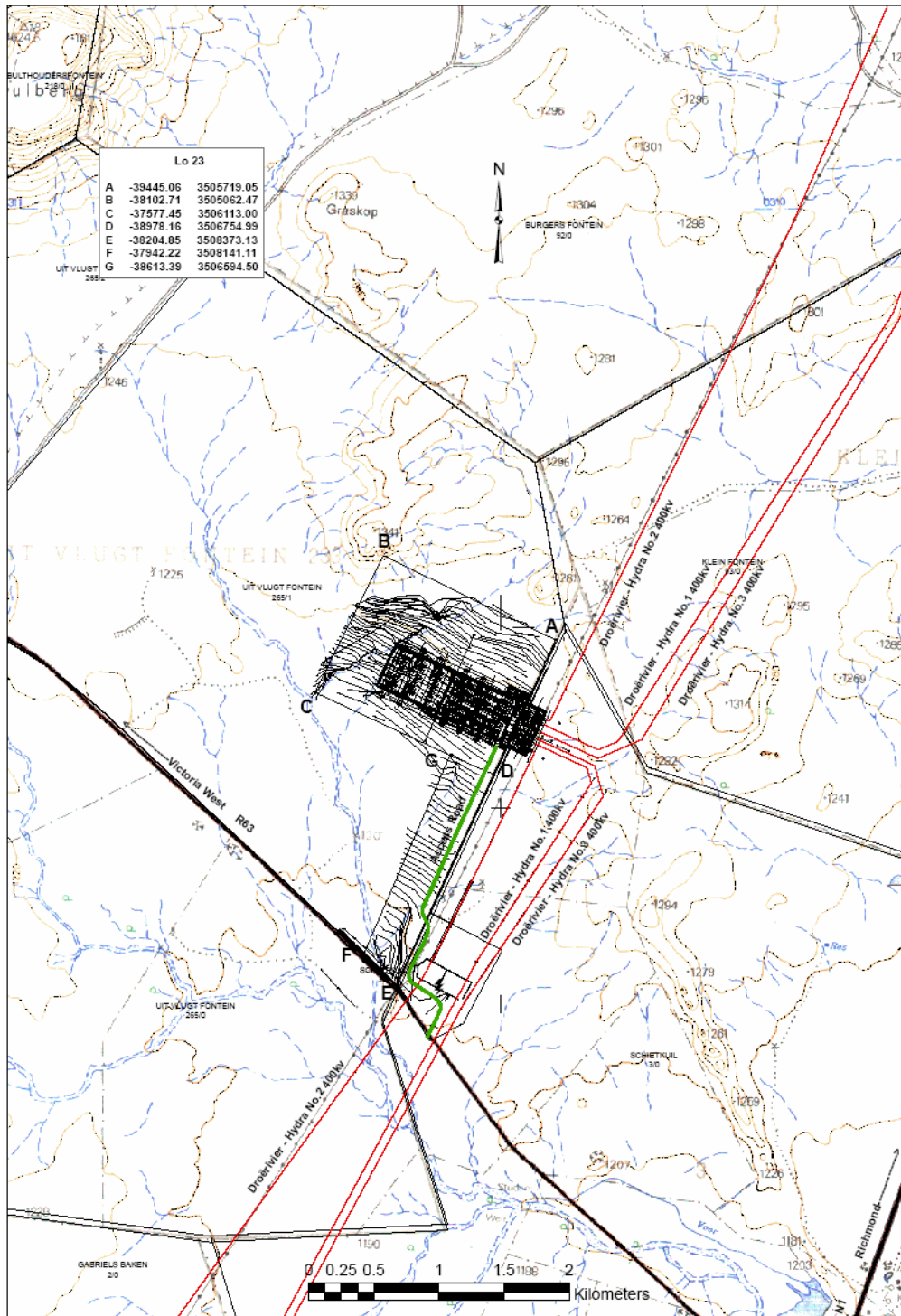
Soil cover is thin and the soils are sensitive to water and wind erosion. The site is typical of what is classified as Central Upper Karoo (Acocks Veld Type 27) (Acocks: 1953) or Upper Nama Karoo (Veld Type 50) (Low and Rebelo: 1996). The vegetation on the stony plains of such areas is made up commonly of Kapokbush *Eriocephalus ericoides*, Silverkaroo *Plinthus karoicus*, and Perdekaroo *Rosenia humilis*, amongst others. After good rains, grasses such as Tassel Bristlegrass *Aristida congesta* and Lehmann's Lovegrass *Eragrostis lehmanniana*, may dominate.

The site lies at an altitude of about 1,200 m. The climate in the region is warm all year round, with hot summers and winters that frequently have frost. The annual rainfall is low, and varies between 200-250 mm per annum. Rainfall is mostly in summer with a greater proportion occurring mainly late in the season.

2.3 Site size

The proposed Gamma Sub-station will cover a relatively large area. Eskom is planning to purchase an area that is approximately 1,136 m by 1,540 m (approximately 172 ha) on which the facility will be built. In addition, a small corridor (approximately 400 m x 2,000 m, an area of 80 ha) will be used for an access road to the R63. When finally completed, the sub-station itself will cover about 1,290 m x 465 m (approximately 60 ha) (when measured in terms of the outer perimeter lines of the terraces and security fence). There will also be turn-in lines from the existing 400 kV lines to the sub-station. These turn-in lines will require their own servitudes.

Figure 2 Map showing the location of the proposed Gamma Sub-station, with turn-in lines.



2.4 Main sub-station switchgear

Power is brought to the sub-station on 765 kV transmission lines that end on a large steel structure called a terminal tower. The centre line of the tower is 43 m from the security fence surrounding the sub-station. Power is then transferred into the main electrical switchgear inside the sub-station perimeter.

2.4.1 Transformers

Eskom is planning to install two EHV transformers at the Gamma Sub-station. Their main purpose will be to boost the electrical power feed in the existing 400 kV lines that run past the site. The voltage will be stepped down from 765 kV to 400 kV, and this additional power can then be fed into the 400 kV lines for onward transmission.

Formerly, polychlorinated biphenyl (PCB) was used around transformer windings as it was not a fire hazard in indoor power transformers, and it is highly stable. However, PCB by-products are unstable and toxic, and also accumulate in the environment. These products are, therefore, no longer permitted and will not be used at the proposed Gamma Sub-station. Instead, transformer oil, a highly refined mineral oil that is stable at high temperatures will be used.

2.4.2 Reactors

Each transmission line coming into and going out of Gamma Sub-station will be provided with a dedicated reactor. These items of equipment are essential for the efficient operation of long, EHV power transmission lines. Eventually, the Gamma Sub-station will have a total of 10 reactor units; five on the incoming and five on the outgoing transmission lines.

2.4.3 Busbars

Once past the switching components, the lines of a given voltage in the sub-station all tie in to a common bus. This consists of a number of heavy metal busbars, usually made of aluminium. The busbars are supported high above the ground and then safely carry and distribute the 765 kV voltages to the different lines. In order to reduce the gross weight of supporting steelwork and the weight of the busbars themselves, the intention is to use hollow tubular sections for the busbar components. This will help reduce the overall height of the steelwork and electrical switchgear, which will be approximately 25 m.

2.4.4 Power out

Power out of the sub-station is fed into the 765 kV outgoing transmission lines that start from large steel terminal towers about 43 m outside the perimeter fence. There will initially be two feeds going out, which will be increased to a total of five as the capacity of the sub-station is increased to cater for the increasing demand for power from the areas being supplied.

The Gamma Sub-station makes provision for six 400 kV feeder lines going out that can feed into the existing 400 kV power grid. Three of these feeds will be commissioned during the initial construction phase of the work. Three will be added later as the demand for power increases and the feed to the 400 kV grid has to be increased proportionately.

2.4.5 Buildings

When operational, the sub-station is not manned on a 24-hour basis. Extensive buildings and service facilities are, therefore, not needed. The main facilities to be provided include a small office, workshop areas and storage space, external storage areas, and a control room to house the high voltage monitoring and control instrumentation and equipment. The sub-station will also be equipped with Eskom's own internal micro-wave telecommunications facilities.

2.5 Construction and maintenance of access roads

The Gamma Sub-station will be served by a tarred access road to the R63 and internal gravelled traffic areas for access to the EHV equipment. The flow of traffic to the site during the construction period will be relatively light and, during operations, there will be virtually no traffic. The access road comprise the following:

- Construction of 6 m wide, tarred access roads (totalling a length of approximately 1.8 km).
- Drainage is to be provided in the form of meadow drains (flat terrain) and "v" drains (steeper terrain). Some new culverts may be required.
- Fencing will be erected where required.
- Gravel will be obtained from the nearest existing borrow pit of suitable material.

Particular attention will be paid to storm water and the management thereof, with erosion protection measures being put in place where indicated by the terrain (geology, soils, and topography) and climate (in particular, rainfall and high rainfall events in short periods of time). Furthermore, any access roads will be aligned and constructed within the provisions and specifications of the private landowners. This is considered important for three primary reasons:

- The access road should fulfil multiple functions, serving the needs of Eskom and the landowners.
- Landowners are acutely aware of sensitivities on their land and should be in an excellent position to inform Eskom of optimum alignment.
- During and post construction, Eskom will be responsible for the maintenance of the access road.

2.6 Temporary storage of hazardous substances

The hazardous substances referred to comprise fuels, oils, and lubricants that will be stored and dispensed at the construction camp. Specifications for the storage and dispensing of fuels, oils, and lubricants include the following:

- Specifically designated areas.
- All storage of fuels, oils, and lubricants shall be stored above ground and under cover.
- All designated areas will be bunded.
- Each designated area will be equipped with adequate fire protection equipment appropriate for the nature of the fuels, oils, and lubricants that are stored and dispensed.
- All areas shall be properly signed in all applicable languages.
- All employees must be properly trained in the storage and dispensing of specific fuels, oils, and lubricants.
- A specific procedure for emergency situations, including accidental spills, must be formulated and must be available on site at all times.

2.7 Telecommunication masts

A telecommunication mast will be required at the Gamma Sub-station. The mast will be a microwave lattice mast between 30 and 50 m high, and will form an integral part of the sub-station.

2.8 Use of services and resources during construction

2.8.1 Water

Water will be required for potable use and in the construction of the foundations for the sub-station. The water will be sourced from a borehole on site.

2.8.2 Sewerage

Negligible sewerage flow is anticipated for the duration of the construction period. On-site treatment will be undertaken through the use of chemical toilets and septic tank facilities. The supplier will service the toilets periodically.

2.8.3 Roads

Existing roads will be utilised as far as possible during the construction and operational periods. The sub-station will be served by a tarred access road to the R63, and internal gravelled traffic areas for access to the EHV equipment. The flow of traffic to the site during the construction period will be relatively light, and during operations there will be virtually no traffic.

2.8.4 Storm water

Soil on site is clayey and sandy (derived from sandstone and shale parent rock in the Karoo geological system), and sensitive to water and wind erosion. Although the mean annual rainfall is relatively low, the area does experience short, sharp, or intensive thunderstorm-type precipitation. Storm water will have to be diverted into the veld at low energy levels to make sure that significant erosion problems are avoided in and around the site.

2.8.5 Solid waste disposal

All solid waste will be collected at a central location at the construction site and will be stored temporarily until removal to an appropriately permitted landfill site.

2.8.6 Electricity

Diesel generators will be utilised for the provision of electricity.

2.9 Economics and job creation

The proposed Gamma Sub-station will cost approximately R 500 million to construct.

At the busiest time of the construction work, which is when the civil works are being carried out (foundations, storm water drainage, buildings, etc), there should not be more than 80 people present on the site at any one time. Depending on the level and nature of construction activity taking place, there will be varying numbers of people housed on-site in temporary construction camp accommodation. Employment will be effected either directly with the main contractor, or through sub-contractors, which will include Small and Medium Enterprises (SMEs) and Affirmative Business Enterprises (ABEs).

It is important to note that the construction of a sub-station is a specialised undertaking requiring skilled people. It is probable that the appointed contractors will bring in skilled staff from other areas. By implication, job opportunities for local people will be limited to unskilled jobs, on-site and in construction camps. Apart from direct employment, local people and businesses will benefit through the supply of goods and services to the appointed contractors.

2.10 Operations and maintenance

During operations, Eskom requires access to the sub-station for maintenance activities. This will require traversing private property. Maintenance activities are specialised and are, therefore, carried out by Eskom employees. During the operational life of the sub-station, there will be no people housed on site on a permanent basis.

2.11 Decommissioning

The following are assumed:

- ❑ The physical removal of the sub-station infrastructure would entail the reversal of the construction process.
- ❑ A rehabilitation programme would need to be agreed upon with the landowners before being implemented.
- ❑ The disposal of materials from the decommissioned sub-station would be at an approved waste disposal facility. Alternatively, recycling opportunities could be investigated and implemented.

All of the afore-mentioned would be subject to a separate EIA and environmental authorisation at the appropriate time.

2.12 Project timeframes

In order to meet the expected electricity demand, the proposed Gamma Sub-station must be operational by 2009². Therefore, construction must commence in the latter half of 2007.

² This is to meet the current and immediate future demand. Additional construction (in phases) may occur over the next 10-15 years, as indicated by growth in demand for electricity.

3. DESCRIPTION OF THE SOCIAL AND SOCIO-ECONOMIC ENVIRONMENTS

3.1 Introduction

It is important to gain an understanding of the receiving social and socio-economic environment in relation to the proposed development, in order to identify the potential social and socio-economic impacts that the proposed project may have.

3.2 Regional and local context

The area affected by the project falls into two provinces, and is divided into a number of District and Local Municipalities, including:

- ❑ Northern Cape: the Pixley KaSeme District Municipality (DC 07) (PSDM) and the Ubuntu Local Municipality (NC 071) (ULM).
- ❑ Western Cape: the Central Karoo District Municipality (DC 05) (CKDM) and the WCDMA 05.

The main towns situated within the study area are Victoria West and Murraysburg.

The preferred site for the Gamma Sub-station is on the farms Uitvlugfontein 265/1 and Schietkuil 3/0 in the Pixley ka Seme and Central Karoo District Municipalities. The former is in the Northern Cape Province, and the latter in the Western Cape Province.

3.2.1 Northern Cape: Pixley ke Seme District Municipality

The PSDM is located in the south-eastern portion of the Northern Cape Province and consists of eight local municipalities. The total geographical area of the province is 102,765 km². The district has a population of 164,529 people, which translates to a population density of 1.6 people per km². For comparison, the average population density of the Northern Cape is two people per km² and that of South African is 36 people per km². The majority of people live in scattered towns and settlements. The area mainly consists of game (springbok and wildebeest), sheep, and cattle farms (PSDM Integrated Development Plan: 2002).

3.2.2.1 Ubuntu Local Municipality

The ULM covers an area of 20,389 km² and has a population of approximately 16,368 people. The population density is slightly higher than in the district with an average of 0.8 people per km². However, if it is considered that the town of Victoria West, as the main settlement in the ULM, has an estimated population of around 11,000 (approximately 67% of the ULM population), the population density in the remainder of the ULM is actually substantially less (Statistics South Africa: 2001).

3.2.2 Western Cape: Central Karoo District Municipality

The CKDM is situated in the northern part of the Western Cape Province, and covers the municipal areas of Beaufort West, Laingsburg, and Prince Albert as well as District Management Area WCDMA 05. The geographical area of the province is 38,853 km².

The general area is sparsely populated with a population of approximately 37,000 residents and a population density of 0.95 people per km², which is very low compared to the average Western Cape Province population density of 35 people per km². Much of the area is semi-desert. Approximately half of the population lives in the Beaufort West area, which points to an even lower population density in the non-urban areas (CKDM: 2002). Poverty levels are high, and because of this the CKDM has been declared as a Presidential Node by President Mbeki during 2001 and, therefore, has been incorporated in the Integrated Sustainable Rural Development Programme (Department of Local Government and Housing: 2006).

The towns of Victoria West and Murraysburg are the closest formal settlements to the project site, both being around 42 km from the site, although in almost opposite directions. Murraysburg has a population of approximately 5,900 people. Unemployment is high and many local people are forced to migrate to larger centres to find work. The main sources of employment are farm labourers, domestic servants, contractors, or municipality workers (Clark, A & Qizilbash, M.: 2005).

3.3 Land-use

The study area comprises large expanses of open land with concentrated small settlements. As illustrated, the population density is low. Major land-uses in the study area include:

- Commercial agriculture.
- Live stock farming (dairy, beef, sheep, ostriches, etc.).
- Game farming.
- Peri-urban development (including homesteads, shops, and limited subsistence agriculture).
- Rural homesteads.
- Eco-tourism and conservation. Many local landowners practise conservation and maintain conservancies.
- Transportation.

Historical, racially-based land-ownership patterns persist in the study area, and the rural areas are characterised by privately, mainly white-owned, commercial family farms. Many areas are facing a shortage of vacant, planned or developed residential land, and there is the need for land for communal grazing, small-scale farming, and non-residential use.

3.3.1 Land use on the proposed project site

As indicated earlier, the project site is located on two farms, i.e. Schietkuil 3/0 and Uitvlugfontein 265/1, both privately owned. There are no settlements on the project site itself. The homestead on Uitvlugfontein 265/0 (which was purchased by Eskom previously) is abandoned, and the Schietkuil 3/0 homestead is located on the opposite (southern) side of the N1, approximately 3 km from the proposed site. The next closest homestead is on Kleinfontein, approximately 6 km from the site, and is occupied by the owner of Uitvlugfontein 265/1. Both Schietkuil 3 and Kleinfontein have eight permanent labourers who reside with their families on the properties in close proximity to the respective farm homesteads.

Farmers in the project area practice rotation grazing and farms are, therefore, divided into grazing camps, the number of which is determined by the carrying capacity of the land and the overall size of the farm. The affected grazing camp on Schietkuil 3/0 is approximately 450 ha in size and the grazing camp on Uitvlugfontein 265/1, approximately 1,500 ha.

The land is used as grazing for sheep and springbuck on Schietkuil 3/0, and sheep, springbuck, and limited cattle on Uitvlugfontein 265/1. There are approximately 250 sheep and 70 white springbuck on Schietkuil 3/0, with approximately 300 sheep, 700 common springbuck, and 20 head of cattle on Uitvlugfontein 265/1.

Uitvlugfontein 265/0, the farms which belongs to Eskom, is being rented as grazing by the owner of Uitvlugfontein 265/1.

3.5 Tourism

The area lacks significant features and is located in a part of the country that is fairly inaccessible because of its distance from the main centres of attraction. Nevertheless, it is serviced by a good national road. Surveys show that the area attracts the least number of foreign tourists that visit South Africa (Urban-Econ, 2006).

Nevertheless, tourism in and around Victoria West is developing, although at a slow pace. Several bed-and-breakfast establishments, guesthouses, and hunting lodges have been established in and around the town. The Apollo Film Festival, which is an annual event, is now becoming well known and does draw numbers of tourists to Victoria West every year.

On Schietkuil 3/0 the old hunting lodge has recently been revamped into a more upmarket type Bed & Breakfast, catering for both hunters and overnight tourists. The lodge caters for both local, so-called 'biltong hunters', and international trophy hunters. International hunters predominantly originate from Europe, countries such as Belgium and Germany, and the United States of America. There are no tourist facilities on Uitvlugfontein 265/1, and hunting seldom takes place.

4 DESCRIPTION, ASSESSMENT AND MITIGATION OF POTENTIAL EFFECTS OF THE PROPOSED DEVELOPMENT

Through the course of the specialist study, a number of project-specific socio-economic effects were identified. These issues were formulated into six questions. In answering these questions, this section provides a description and assessment of the potential effects, based on the methodology prescribed by ACER in its TOR (Appendix 1). This section also outlines practical mitigation/management actions to enhance positive and reduce negative effects. Towards the end of this section, Table 1 provides a summary assessment of the effects.

- ❑ What are the potential opportunities for employment and local contractors during the construction and operation of the proposed sub-station?
- ❑ What are the potential effects related to the construction camp during the construction phase of the proposed sub-station?
- ❑ What are the potential effects on farming activities and farm infrastructure?
- ❑ What are the potential operation-specific effects of the proposed sub-station on the social and socio-economic environment?
- ❑ What are the cumulative effects associated with the proposed development?
- ❑ What are the potential effects of the proposed sub-station on the social and socio-economic environment which are specifically dealt with by other specialist studies?

4.1 What are the potential opportunities for employment and local contractors during the construction and operation of the proposed sub-station?

4.1.1 *Employment creation*

As indicated earlier, no more than 80 people would be employed on the construction site at any given time. The construction of a sub-station is a specialised task which requires fairly specialised construction personnel. Therefore, a significant number of these 80 people would be coming from elsewhere, and job opportunities for local people will thus be limited to unskilled jobs, on-site and in the construction camp. Apart from direct employment, local people and businesses could benefit through the supply of goods and services to the appointed contractors.

The operation of a substation does not require any on-going human activity and therefore, there would be no permanent workforce based at the substation. Regular maintenance and emergency repairs would be conducted by specialised teams of permanent Eskom personnel. It is, therefore, not anticipated that any new jobs would be required during operation. The effect is positive with short term **duration**, as it would only occur during the construction phase. The **intensity** is low as it is a fairly small number of new positions which would be available, and the **frequency** is once off. The **significance** of the effect is medium, with a high **probability** of

occurrence. After the implementation of benefit enhancement, the significance will remain medium due to the small number of employees.

4.1.1.1 Recommendations for benefit enhancement

- ❑ As far as possible, employ local staff during construction, where applicable.
- ❑ Ensure recruitment measures are aimed particularly at construction workers classified as designated employees in terms of the Employment Equity Act (black people, as defined in the Act, women, and disabled people).
- ❑ As far as possible, trade locally during operation, where applicable.

4.1.2 Opportunities for local contractors, SMEs and ABEs

As indicated above, opportunities for local people would be limited to unskilled jobs. However, as indicated, Eskom places an emphasis on SMEs and ABEs. Thus, if there are local contractors with the required skills and experience to conduct activities such as the construction of access roads and the erection of fences, opportunities could exist for these contractors to get involved in the construction process.

The **duration** of this positive effect is short term, as it would only occur during the construction phase. The **intensity** is low as there are a fairly small number of positions available for SMEs and ABEs. The **frequency** is once off. The **significance** of the effect is medium, with a high **probability** of occurrence. After the implementation of benefit enhancement, the significance will remain medium due to the limited number of opportunities.

4.1.2.1 Recommendations for benefit enhancement

- ❑ Prioritise sub-contracting to local SMEs and ABEs.
- ❑ The overall environmental management approach must include provision for the use of local contractors as far as possible.

4.2 What are the potential effects related to the construction camp during the construction phase of the proposed substation?

4.2.1 Potential markets for informal trading

The construction camp will be located in close proximity to the construction site itself, which means that it would be in the order of 42 km from either Victoria West or Murraysburg. Construction workers would, therefore, find it difficult to make quick trips into town during lunch time or after hours in order to purchase basic items. Thus, the construction camp could provide informal vendors with an outlet for their wares, which in turn, may have positive economic effects in the immediate local economy. For instance, the wife of the landowner of Schietkuil indicated that she would be interested in establishing a small vending outlet, for example in the form of a converted container, at the construction camp in order to supply a range of basic items to the construction workers.

However, the presence of informal vending and trading stalls in close proximity to construction camps could, if not managed carefully, cause littering and uncontrolled dumping of refuse, creating unhygienic conditions, which can also lead to the spread of diseases.

By and large, the effect would be positive with a fairly local **extent**. The duration would be for the construction phase only and, therefore, short term. The **intensity** would be low since at any given time there would only be a maximum of 80 potential customers for vendors. The **probability** of occurrence is probable, and the **significance** is low. After the implementation of benefit enhancement, the probability could become highly probable and the significance could become medium.

4.2.1.1 Recommendations for benefit enhancement

- ❑ Provide a designated area for informal vendors with appropriate services such as refuse facilities, water, and sanitation.
- ❑ Institute a system whereby vendors can apply to the camp manager for permission to sell their wares in the designated area.
- ❑ Give preference to local vendors when granting permission.
- ❑ Allow only vendors with permission to trade, in the designated area.
- ❑ Allow trading to only take place in the designated area, and nowhere else. Since the site will be owned by Eskom and the surrounding land is privately owned, this should not be difficult to enforce.

4.2.2 Increased pressure on existing infrastructure

Due to the distance from towns such as Victoria West and Murraysburg, the effect on infrastructure in these towns would be less than, for instance, if the camp was located on the outskirts of one of the towns. However, this implies that the construction camp would potentially require its own access road, access to a water source, sanitation facilities, and appropriate waste management systems. Inappropriate construction camp management may result in the erection of informal dwellings in the area which lacks infrastructure, with a lack of adequate water and sanitation facilities. Without management, litter may quickly reach problematic proportions. Inadequate access to resources such as firewood may result in unsustainable harvesting of vegetation from surrounding areas. As indicated earlier, the vegetation is very sensitive, and damage done by such practices would take a long time to recover.

The effect would be negative but with a short term duration, as it would only occur during the construction phase. The **intensity** is low as the number of construction workers is small and limited in-migration is expected. The **frequency** would be once off. The **significance** of the effect is medium, with the **probability** of occurrence being probable. After the implementation of recommended mitigation/management actions it would still be probable for the effect to occur and the significance could become low.

4.2.2.1 Recommended mitigation/management actions

- ❑ Investigate the possibility of locating the construction camp at the old and currently vacant Uitvlugfontein 265/0 homestead, since a basic level of infrastructure and services are already in place.
- ❑ Provide adequate entertainment facilities in the construction camp in order to prevent boredom among workers and limit the need to go into town. These could include:
 - A well equipped games room with games such as pinball, checkers, cards, table tennis, billiards etc.
 - A television/video room where television and movies are shown.

- A small bar selling soft drinks, wine, and beer.
- ❑ Supply firewood to construction workers. Regardless of the level of service provided in the construction camp, people like to make a fire during cold weather.
- ❑ Provide a quality canteen at the construction camp with a sufficiently appetising menu.

4.2.3 Increase in the spread of diseases (including sexually transmitted diseases and HIV/AIDS)

Any construction or development activity which causes migration of people has the potential to increase the spread of diseases. In this case, one of the most serious of these is HIV/AIDS. Induced migration, as well as the movement of contractor construction workers from elsewhere in the country, can potentially increase the spread of HIV/AIDS.

Activities such as prostitution and varying levels of promiscuity are often associated with groupings of construction workers. This could lead to scenarios where an infected construction worker coming into the area spreads the disease through unprotected intercourse with sex trade workers or local individuals, who, in turn, will spread it locally. Although the nearest formal settlements are more than 40 km away, there are farm homesteads and farm labourer accommodation within 3 km from the site. Alternatively, an uninfected construction worker could become infected through unprotected intercourse and, on return to his/her place of origin, spread the disease there.

By implication, the potential increase in the transmission of sexually transmitted diseases (STDs) and HIV/AIDS becomes an issue of great concern, as it is especially problematic in a country where infection rates are already high.

If the construction camp is not managed efficiently, a lack of adequate water, sanitation, and waste facilities may lead to unhygienic living conditions and the easy spread of water borne diseases. Such events will not only affect construction workers and thereby the progress on the construction of the substation, but may also spread to local communities.

The effect would be negative and the **duration** short term, although the duration of the subsequent spread of a disease like HIV/AIDS would be a lot more long term. The **intensity** is low as a fairly small number of construction workers will be on site at any given time. The **frequency** would be continuous since once a disease has begun to spread it could potentially continue to do so. The **significance** of the effect is high, with a high **probability** of occurrence. After the implementation of mitigation/management actions, the significance could reduce to medium.

4.2.3.1 Recommended mitigation/management actions

- ❑ Include an HIV/AIDS awareness component in the induction programme of all construction workers coming onto site.
- ❑ Ensure adequate access to HIV/AIDS-related information and condoms, for all construction employees.
- ❑ Ensure sufficient water and sanitation is provided at the construction camp.
- ❑ Ensure that refuse management and removal is done properly.

4.2.4 Potential in-migration of people

According to the World Bank, the induced population increase associated with a development initiative is estimated to equal the number of people employed on the project (World Bank Technical Paper No. 139 of 1991). However, in applying this statement, caution must be exercised to take into account the geographical, social, and socio-economic context within which the development is taking place, as well as the type of development, as these are factors that may increase or decrease the multiplier. On a project of this nature, which is localised, away from towns or settlements, with a limited number of employment opportunities, and relatively specialised skills requirements, in-migration to the study area, *per se*, is not seen as a significant impact.

If in-migration does occur, it would be in the form of job seekers, informal vendors, and criminal opportunists in the vicinity of the construction camp. Criminal elements may also target construction workers as well as landowners and farm labourers, which can lead to an increase in general theft, stock theft, house breakings, and threats to personal safety (Section 4.2.5 and 4.2.6).

The **duration** of this negative effect would be short-term with a low **intensity**, as a fairly small number of construction workers would be employed and the project site is a substantial distance from any major centre. The **frequency** would be once off. The **significance** of the effect would be medium, with a probable **probability** of occurrence. After the implementation of mitigation/management actions, the significance could reduce to low.

4.2.4.1 Recommended mitigation/management actions

- Actively downplay the number of potential jobs available.
- Recruit locals through the Department of Labour offices in Victoria West.

4.2.5 Potential increase in poaching

An influx of migrants, although potentially limited, as well as the presence of a number of construction workers in the construction camp, may lead to an increase in poaching on farms neighbouring the proposed substation site. In good condition and at the right age, a sheep can fetch around R 750.00 and thus, even the poaching of a small number of animals could lead to substantial losses to surrounding landowners.

The status of this effect is negative with a short-term **duration**. Again, the **intensity** would be low as a fairly small number of construction workers would be on site at any given time. The **frequency** would be once off. The **significance** of the effect would be medium, with a probable **probability** of occurrence. After the implementation of mitigation/management actions, the significance could reduce to low.

4.2.5.1 Recommended mitigation/management actions

- During site induction programme, emphasise the prohibition on the poaching of animals, as well as the serious level at which culprits would be dealt with.
- Institute adequately strict disciplinary procedure for individuals caught poaching.
- Provide a quality canteen at the construction camp with a sufficiently appetising menu.
- Maintain a complaints register where stock owners can register complaints.

- ❑ Investigate complaints registered.
- ❑ Compensate stockowners for any proven stock losses incurred due to poaching.

4.2.6 Effects on safety and security

The influx of especially criminal opportunists could potentially affect the safety and security of farmers, farm labourers, and construction workers. The two farm homesteads which are respectively approximately three and six kilometres from the proposed construction site would be particularly vulnerable. The crime rate in the area is very low, and although the homesteads are in fairly close proximity to the N1, they do not have very sophisticated safety and security systems.

The increased number of construction vehicles could also potentially pose safety risks to pedestrians and animals. Current pedestrian traffic around or across the site is infrequent, but there are a number of sheep and white springbuck in the camp surrounding the construction site, which could be at risk.

The **duration** of this negative effect would be short-term with a low **intensity** as a fairly small number of construction workers would be employed and limited in-migration is expected. The **frequency** would be once off. The **significance** of the effect would be medium, with a probable **probability** of occurrence. After the implementation of mitigation/management actions, the significance could reduce to low.

4.2.6.1 Recommended mitigation/management actions

- ❑ During site induction programme, emphasise the prohibition on access onto surrounding properties.
- ❑ Institute adequately strict disciplinary procedure for individuals caught on surrounding properties without a specific official purpose.
- ❑ Institute mitigation actions outlined earlier in order to limit construction worker movement onto surrounding properties after hours.
- ❑ Implement and enforce speed limits for all construction-related vehicles on and en route to the construction site.
- ❑ Institute a complaints register where neighbouring landowners and communities can registers complaints such as construction workers trespassing on private property.

4.2.7 Nuisance effects

Since there is no settlement in close proximity to the site, noise impacts during construction would be minimal. Air pollution concerns relate mainly to dust. Dust may be a problem, but only during the construction period. However, with appropriate dust suppression measures, it can be controlled.

The status of this effect would be negative and the **duration** short-term. The **intensity** would be low. The **frequency** would be once off. The **significance** of the effect would be medium, with a probable **probability** of occurrence. After the implementation of mitigation/management actions, the significance could reduce to low.

4.2.2.1 *Recommended mitigation/management actions*

- ❑ Apply suitable dust suppression measures.

4.3 **What are the potential effects on farming activities and farm infrastructure?**

4.3.1 **Loss of, or loss of access to, farm infrastructure**

The grazing camp on Schietkuil which would be affected by the substation construction is approximately 450 ha in size. Eskom has obtained a servitude for an area of 200 ha on this farm for the purposes of the transmission lines and substation. The main watering point in the camp is located in very close proximity to the proposed construction site. The watering point consists of a borehole equipped with a windmill, a small reservoir, and drinking troughs. Eskom indicated that it aims to obtain water for construction purposes from a borehole on site (Section 2), which implies that it would, in all likelihood, be using this borehole serving the watering point. At present, there are around 250 sheep and 70 white springbuck being kept in the affected camp. The farmer practices rotation grazing according to a grazing plan and, therefore, there is not always the same number of sheep in the camp. However, the number of springbuck only fluctuates through birth increase, natural deaths, and kills through hunting. These animals would effectively lose their access to water with the advent of construction. According to landowners the cost for the drilling and fitting of new boreholes elsewhere in the affected camp would be in the order of R 25,000.00 per borehole.

The affected grazing camp on Uitvlugfontein 265/1 is approximately 1,500 ha in size. According to the landowner, Eskom would be acquiring around 100 ha for the purposes of the substation. The transmission lines do not turn in across Uitvlugfontein 265/1. There are a number of watering points in the affected camp. One of the windmills is in very close proximity to the construction site but not directly in it. According to the landowner, temporary loss of access to this watering point would not pose a problem to his livestock, since they could easily water at other points in the camp.

The **duration** of this negative effect could be long term, with a medium **intensity**. The **frequency** would be once off. The **significance** of the effect would be medium, with a high **probability** of occurrence. After the implementation of mitigation/management actions, the significance could reduce to low.

4.3.1.1 *Recommended mitigation/management actions*

- ❑ Negotiate with the affected landowners regarding compensation or the provision of new boreholes and watering points elsewhere in the grazing camps, further away from the construction activities.
- ❑ Negotiate with landowners and provide compensation for the capture and moving of game from the affected camps to elsewhere on the respective farms.

4.3.2 **Disruption of farming and hunting activities**

During construction, the owners of Schietkuil 3/0 and Uitvlugfontein 265/1 would need to move their livestock away from the construction site area. This not only applies to the actual construction site, but also to the area surrounding the site, as construction activities may pose risks to animals in terms of potential poaching (Section 4.2.5), as well as safety due to the

increased movement of heavy and other construction vehicles (Section 4.2.6). The owner of Schietkuil regularly hosts South African and international hunters on the farm. The going rate for international hunters to hunt a white springbuck is between R 3,00.00.00 and R 4,000.00. During the two year construction period, it would not be possible to hunt in the affected camp. This is partly due to safety considerations for construction personnel, but also because very few hunters would be interested in hunting in close proximity to a fairly large construction site. The landowner could, therefore, potentially suffer a loss of income for the duration of the construction period. No hunting takes place on Uitvlugfontein 265/1.

The owner of Schietkuil indicated that because of the abovementioned reasons, together with the loss of access to the watering point (Section 4.3.1), he will have to remove all livestock from the remaining 250 ha of the grazing camp for the period of construction. The removal of sheep is fairly easy as they can either be herded into adjacent camps, or herded and loaded onto trucks for removal to other camps on the farm³. However, game cannot be herded in the same manner and has to be captured by professionals. The rate per head for the capture of white springbuck is approximately R 1,000. Thus, it would cost the land owner approximately R 70,000.00 to capture and move the 70 white springbuck from the affected camp.

The **duration** of this negative effect could be short term, with a high **intensity**. The **frequency** would be once off. The **significance** of the effect would be medium, with a high **probability** of occurrence. After the implementation of mitigation/management actions, the significance could reduce to low.

4.3.2.1 Recommended mitigation/management actions

- ❑ Negotiate with the affected landowners regarding compensation or the provision of new boreholes and watering points elsewhere in the grazing camps, further away from the construction activities.
- ❑ Negotiate with landowners and provide compensation for the capture and moving of game from the affected camps to elsewhere on the respective farms.

4.3.3 Loss of grazing land

As indicated earlier, the affected camps on Schietkuil 3/0 and Uitvlugfontein 265/1 are 450 ha and 1,500 ha respectively. Eskom has secured servitudes on the two farm of in the order of 350 ha. The construction of the 60 ha substation would only require around 170 ha, but the turning in of transmission lines to the substation would effectively take up the remainder. After completion of construction, approximately 60 ha of grazing would be permanently lost. However, both affected landowners appear satisfied with the compensation they received for the servitudes.

As indicated earlier, the vegetation surrounding the proposed site is very sensitive and when it is damaged, e.g. trampled through construction activities, it takes in the order of five years to re-establish itself. Should construction activities damage vegetation on the areas surrounding the construction site, the landowners would temporarily (for a few years) not be able to use such areas for grazing after the completion of construction.

The **duration** of this negative effect could be medium term, as it could potentially take damaged grazing land up to five years to recover. The **intensity** would be medium and the

³ This is done regularly as part of the management of rotation grazing.

frequency once off. The **significance** of the effect would be medium, with a high **probability** of occurrence. After the implementation of mitigation/management actions, the significance could reduce to low.

4.3.3.1 Recommended mitigation/management actions

- ❑ Restrict the movement of construction vehicles and equipment to as small an area as practically possible.
- ❑ Negotiate with the affected landowners regarding compensation or the provision of new boreholes and watering points elsewhere in the grazing camps, further away from the construction activities. This will put them in a position to be able to utilise grazing not damaged through construction.
- ❑ Negotiate with landowners regarding compensation for grazing areas outside of land purchased by Eskom which have been damaged by construction activities.

4.4 What are the potential operation specific effects of the proposed sub-station on the social and socio-economic environment?

4.4.1 Electromagnetic fields

Electromagnetic Fields (EMFs) are produced from EHV electrical equipment. Extremely Low Frequency (ELF) fields are the type of EMFs that are likely to be generated from the equipment in the proposed sub-station.

An EMF is the electric field generated around conductors through which alternating electric current is flowing. The field is at its maximum closest to the conductor, and the intensity drops away from the conductor. Apart from the magnitude of the voltage and current applied to a conductor, the intensity of the EMF depends on the height of the conductors above ground, and the spacing between the conductors.

Eskom is guided by exposure guidelines for electric and magnetic fields as given by the International Commission on Non-Ionising Radiation Protection. Furthermore, sub-stations are designed in accordance with standards of the International Radioactive Protection Agency. Added to this, Eskom adopts the precautionary principle in the control and restriction of activities taking place within the sub-station servitude.

Some concerns exist regarding the impact of exposure of humans and animals to EMFs from electrical equipment. In this regard, EMFs are perceived as threats to farm workers and livestock. A number of studies have been undertaken internationally on the biological impact of ELF fields. To date, no conclusive evidence of any health-related impacts has been advanced.

After more than 20 years of research undertaken by Eskom, it has not been conclusively demonstrated that detrimental human and animal health effects exist with the exposure to EMFs. Studies on the effects of EMFs on farm animals have also concluded that they have no influence on the reproduction, meat, milk and egg production or the development of offspring. This has been verified recently by an independent research study, commissioned by Eskom and internationally peer -reviewed. Therefore, it is very unlikely that EMFs would be a potential issue as far the Gamma Sub-station is concerned.

4.4.4.1 *Recommended mitigation/management actions*

- No mitigation or management actions recommended.

4.4.3 **Emergency situations**

Although the chances are small, it is possible that emergencies with the electrical equipment may occur at the sub-station, for example, transformers can become overloaded and blow up and switchgear equipment can explode. Each of these kinds of incidents can have knock on effects and can place humans, animals, and the natural environment at risk.

The **duration** of this negative effect could be short term, with a low **intensity**. The **frequency** would be once off. The **significance** of the effect would be medium, with a low **probability** of occurrence. After the implementation of mitigation/management actions, the significance could reduce to low.

4.4.3.1 *Recommended mitigation/management actions*

- Eskom to provide and implement detailed emergency procedures applicable to substations.

4.5 **What are the cumulative effects associated with the proposed development?**

Sectional upgrades are currently taking place on the N1 between Beaufort West and Bloemfontein. In order to make the upgrade of such a long stretch of road more manageable, the work has been divided in shorter sections. Surveys and soil sampling are currently being done for a 35 km section, which starts approximately 10 km south of the N1/R63 crossroads and end around 25 km to the north. It is estimated that construction would start towards the end of 2008 and have a duration of around two years.

A construction camp for equipment and personnel is planned to be established on approximately 2 ha of the farm Mordant, close to the southern extreme of the 35 km section. The owner of Schietkuil 3/0 indicated that he has been approached for the possible location of a second construction camp on his property later in the construction programme, when the works have moved further to the north of the 35 km section.

It is, therefore, possible that there would be an overlap in construction periods between the sub-station and the N1 upgrade of approximately one year. Delays on either of the projects could potentially increase or decrease this overlap period.

Potential effects which may result from the overlap are:

- Disruption of traffic flow and logistical difficulties in getting heavy transformers and other equipment to the sub-station site due to limited lane availability on the N1.
- Exacerbation of negative effects such as induced migration, effects on safety and security, increased poaching, increase in the spread of HIV/AIDS, and increased pressure on existing infrastructure.
- Competition for construction material from existing quarries and borrow pits.

It is important that close liaison and cooperation between Eskom and the South African National Roads Agency Limited be established before the advent of either of the construction processes in order to minimise potential negative effects.

4.6 What are the potential effects of the proposed sub-station on the social and socio-economic environment which are specifically dealt with by other specialist studies?

4.6.1 *Effects on cultural heritage resources*

Potential impacts on cultural heritage resources relate to isolated scatters of stone tools and the possible presence of rock paintings, freshwater shell middens containing pottery, bone, and ostrich eggshell fragments, and the remains of more recent human habitation. A separate Cultural Heritage specialist study has been commissioned by ACER to investigate potential effects on cultural heritage resources. Therefore, these are not described or discussed further as part of the SIA.

4.6.2 *Visual impacts*

Visual and aesthetic impacts are highly subjective and usually considered most significant when the development is dissimilar to other developments or the general surroundings in which it is sited. There is little that can be done to avoid the visual intrusiveness of large elements of electrical infrastructure. However, mitigation measures to lessen impacts are available and should be applied. A separate Visual Assessment specialist study has been commissioned by ACER to investigate potential effects on cultural heritage resources. Therefore, it is not described or discussed further as part of the SIA.

Table 1 Summary assessment table of potential effects of the proposed development on the socio-economic environment

Nature of impact	Phase ⁴	Extent	Duration	Intensity	Frequency	Probability	Significance (no mitigation)	Significance (with mitigation)
Employment creation (+)	C	Regional	Short term	Low	Once	High	Medium	Medium
Opportunities for local contractors, SMEs and ABEs (+)	C	Local	Short term	Low	Once	High	Medium	Medium
Potential markets for informal trading (+)	C	Regional	Short term	Low	Once	Probable	Low	Medium
Increased pressure on existing infrastructure (-)	C	Regional	Short term	Low	Once	Probable	Medium	Low
Increase in the spread of diseases (including sexually transmitted diseases and HIV/AIDS) (-)	C	National	Long term	Low	Continuous	High	High	Medium
Potential in-migration of people (-)	C	Local	Short term	Low	Once	Probable	Medium	Low
Potential increase in poaching (-)	C	Local	Short term	Low	Once	Probable	Medium	Low
Effects on safety and security (-)	C	Local	Short term	Low	Once	Probable	Medium	Low
Nuisance effects (-)	C	Local	Short term	Low	Once	Probable	Medium	Low
Loss of, or loss of access to, farm infrastructure (-)	C	Local	Long term	Medium	Once	High	Medium	Low
Disruption of farming and hunting activities (-)	C	Local	Short term	Medium	Once	High	Medium	Low
Loss of grazing land (-)	C	Local	Short term	Medium	Once	High	Medium	Low
Electromagnetic fields (-)	No mitigation/management actions recommended							
Emergency situations (-)	O	Local	Long term	Low	Once	Probable	Low	Low

⁴ C = Construction. O = Operation.

5. MONITORING INDICATORS

There are two broad issues, all of which are a combination of others, which overarch the majority of impacts outlined above. The following outlines simple monitoring indicators for these issues.

EMPLOYMENT OPPORTUNITIES AND USE OF LOCAL CONTRACTORS

- ❑ Number of people employed per employment category.
- ❑ Number of local people employed per employment category.
- ❑ Number of local contractors, SMEs and ABEs employed.
- ❑ Rand value per employment category and per local employee.
- ❑ Rand value of local, SME and ABE contracts.

HEALTH AND SAFETY

- ❑ HIV/AIDS awareness as part of all contractor induction.
- ❑ Availability of HIV/AIDS awareness materials and condoms on site.
- ❑ Inclusion of road safety campaigns as part of contractor induction.
- ❑ Number of construction vehicles involved in accidents documented in the accident log.
- ❑ Number of private vehicles involved in accidents documented in the accident log.
- ❑ Number of complaints documented in the complaints register.
- ❑ Nature of complaints documented in the complaints register.
- ❑ Actions taken to address these complaints.
- ❑ Feedback from aggrieved parties regarding the efficacy of resolving complaints.

6. CONCLUDING REMARKS

Ntshebe believes that this report accurately reflects the impacts that the construction and operation of the proposed Gamma Sub-station may have on the social and socio-economic environment. The assessment of key issues shows that there are no negative impacts which can be classified as fatal, or which are of high significance thereby blocking the project, provided that the suggested mitigation measures are undertaken. It is, however, important that these suggestions are implemented in order for the project to be environmentally acceptable.

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APPENDIX 1

Conventions used for the assessment of effects

CONVENTIONS USED IN THE SIA FOR THE ASSESSMENT OF EFFECTS

- Nature
Description of the impact.

- Extent.
A description of whether or not the impact would occur on a spatial scale that:
 - Is limited to the immediate area(s) where construction is to take place.
 - Is confined to a small area with a radius of less than two kilometres around the project site.
 - Extends over a larger area that would include a major portion of an area or province.
 - Covers an even wider area that would have national or international implications.

- Duration.
A prediction of whether the duration of the impact would be:
 - Short-term (0 to 3 years) – or confined to the construction period.
 - Medium-term (3 to 10 years).
 - Long-term (> 10 years).
 - Should be considered as permanent (beyond the anticipated lifetime of the project).

- Intensity.
A description of whether or not the intensity (magnitude/size/frequency) of the impact would be high, medium, low or negligible (no impact).

- Frequency of occurrence.
A description of any repetitive, continuous or time-linked characteristics of the impact(s) as:
 - Continuous (i.e. without interruption).
 - Intermittent (occurring from time to time, without specific periodicity).
 - Periodic (occurring at more or less regular intervals).
 - Time-linked (i.e. occurring only or mostly at specific times of the day or week – e.g. impact only occurs at night, or during normal working hours).

- Probability of occurrence.
A description of the probability of the impact actually occurring as:
 - Improbable (very low to low likelihood).
 - Probable (distinct possibility).
 - Highly probable (most likely).
 - Definite (the impact would occur regardless of prevention or mitigation measures).

Based on a synthesis of the information contained in the above, an assessment is provided in terms of the following criteria:

- Significance.
The significance of impacts of the proposed project is assessed both with and without mitigation action. The significance of the identified impacts on components of the affected environment (and where relevant, with respect to potential legal infringement) is described as:
 - Low: Where the impact will not have a significant influence on the environment, and, thus, will not be required to be significantly accommodated in the project design.
 - Medium: Where it could have an adverse influence on the environment, which would require modification of the project design or alternative mitigation actions.
 - High: Where it could (or should) block the project regardless of any possible mitigation.

- Status of the impact.
A statement of whether the impact is positive (a benefit), negative (a cost), or neutral. Indicate in each case who is likely to benefit and who is likely to bear the costs of each impact.

- Degree of confidence in predictions.
A statement of the degree of confidence in the predictions, based on the availability of information, and the specialist's knowledge and expertise.