

PROPOSED BRAVO INTEGRATION PROJECT

SOCIAL IMPACT ASSESSMENT

As part of the

ENVIRONMENTAL IMPACT ASSESMENT PROCESS

DRAFT SIA REPORT

BRAVO 3

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EXPERIENCE RECORD

This report was compiled by **Ms Nonka Byker** of **MasterQ Research**. Ms Byker holds a *B.Psych (Adult Mental Health)* from the University of Pretoria and is a social impact assessment specialist with approximately 3 years experience in this field. She specialises in the assessment of potential social impacts, which includes the collection and analysis of data and superimposing a proposed project on a baseline social profile to determine the potential social impacts from which mitigation measures can be developed. In total she has approximately 10 years experience in the social development field, of which 7 years were spent as a public participation consultant. Ms Byker is registered with the Health Professions Council of South Africa (HPCSA) and is a member of the International Association of Impact Assessors South Africa (IAIASA).

Some of the Social Impact Assessments that Ms Byker has conducted on behalf of MasterQ Research included the following projects:

- Social Impact Assessment for the proposed liquid fuels transportation infrastructure from the Milnerton refinery area to the Ankerlig power station in the Atlantis Industrial area (Client: Eskom Generation, Project Manager: SSI).
- Social Impact Assessment for the proposed Thyspunt Integration Project (Client: Eskom Generation/Transmission, Project Manager: SiVEST).
- Social Impact Assessment with cognisance of potential tourism impacts for the proposed Matla-Jupiter-Sebenza 400kV transmission power line (Client: Eskom Generation/Transmission, Project Manager: SSI).
- Social Impact Assessment with cognisance of potential tourism impacts for the proposed Vryburg 400kV substation in the Northwest Province (Client: Eskom Generation, Project Manager: SSI).
- Social Impact Assessment for the proposed Mokopane Integration Project (Client: Eskom Generation/Transmission, Project Manager: Savannah Environmental).
- Social Impact Assessment for the proposed Steelpoort Integration Project (Client: Eskom Generation/Transmission, Project Manager: Savannah Environmental)
- Social Impact Assessment for the proposed Mercury-Ferrum transmission power line (Client: Eskom Transmission, Project Manager: Bohlweki Environmental)
- Social Impact Assessment for the proposed Ferrum-Garona transmission power line (Client: Eskom Transmission, Project Manager: Bohlweki Environmental)
- Social Impact Assessment for the proposed Steelpoort Pumped Storage Scheme (Client: Eskom Generation, Project Manager: Bohlweki Environmental)

DECLARATION OF INDEPENDENCE

The EIA regulations (1182 and 1183, as amended) states, amongst other, that an independent consultant must be appointed to act on behalf of the client and to ensure that the public participation process is managed properly. In this regard MasterQ Research submits that it has:

- The necessary required expertise to conduct social impact assessments, including the required knowledge and understanding of any guidelines or policies that are relevant to the proposed activity;
- Undertaken all the work and associated studies in an objective manner, even if the findings of these studies are not favourable to the project proponent;
- No vested financial interest in the proposed project or the outcome thereof, apart from remuneration for the work undertaken under the auspices of the above-mentioned regulations;
- No vested interest, including any conflicts of interest, in either the proposed project or the studies conducted in respect of the proposed project, other than complying with the required regulations;
- Disclosed any material factors that may have the potential to influence the competent authority's decision and/or objectivity in terms of any reports, plans or documents related to the proposed project as required by the regulations; and

EXECUTIVE SUMMARY

The proposed Bravo Integration Project is required as a means to integrate the additional electricity supply from the new Bravo Power Station into Eskom's current electricity network. The integration of this additional electricity into the network would ensure that areas such as Secunda and Midrand would be supplied with additional electricity. The proposed Bravo Integration Project will be considered within the Environmental Impact Assessment (EIA) studies. In this regard, five separate applications have been lodged with DEAT.

This particular report only focuses on **Bravo 3 (DEAT Ref. No: 12/12/20/1097)** and details the results of the Social Impact Assessment (SIA) specialist study conducted by MasterQ Research as part of the overall EIA process that is being conducted by Cymbian Environmental Social Consulting Services.

Bravo 3 entails the construction and operation of a new 400kV transmission power line from the Bravo Power Station to the Lulumisa substation in Kayalami. This transmission power line will be approximately 90km in length.

Vanclay (2002) defined a **social impact assessment** as follows:

"... the process of analyzing (predicting, evaluating and reflecting) and managing the intended and unintended consequences on the human environment of planned interventions (policies, programmes, plans and projects) and any social change processes invoked by those interventions so as to bring about a more sustainable and equitable biophysical and human environment."

Bearing this in mind, a **change process** can therefore be defined as change that takes place within the receiving environment as a result of an intervention. A potential **social impact** follows as a result of the change process occurring. However, a change process can only result in an impact once it is experienced as such by the individual/household/community/organisation on a physical and/or cognitive level.

The change processes which were assessed included the following:

- **Demographic processes:** changes in the number and composition of people;
- **Geographical processes:** changes in land use patterns;
- **Economic processes:** changes in the way in which people make a living and the economic activities in society;
- **Institutional and empowerment processes:** changes in the role, efficiency and operation of governments and other organisations, and people's ability to get involved and influence decision making processes; and

- **Socio-cultural processes:** changes in the way in which humans behave, interact and relate to each other and their environment and the belief and value systems which guide these interactions.

This particular SIA also took into account the significance, spatial, duration, degree of probability and degree of certainty that a potential impact might have on the social environment. Impacts can either be negative, neutral or positive. The impacts are also categorised according to the various project stages, i.e. construction and decommissioning, and operation and maintenance. Mitigation measures have also been identified with the aim to reduce the potential negative impacts and to enhance the potential positive impacts.

In order to assess the alternatives in respect of its anticipated social impacts, a distinction was made between the following impacts:

- **Category 1:** Impacts that are not expected to differ between the proposed alternatives, e.g. the number of employment opportunities that might be created by the proposed project are expected to remain the same, irrespective of the chosen alternative (except in the case of the 'no go' option); and
- **Category 2:** Impacts that are expected to cause significant changes between the proposed alternatives, e.g. the need to resettle certain households increases proportionately if the development traverses densely populated areas as opposed to skirting sparsely populated areas.

For Bravo 3, three (3) possible alternative route corridors have been identified between Bravo and Lulumisa for the assessment process, of which only one (1) would be selected in the end as the preferred corridor. These corridors are as follows:

The **northern alternative** exits the Bravo power station to the west. It follows an existing transmission power line for approximately 3.5km where after it turns northwards and follows another existing transmission power line for approximately 6.2km. The corridor then turns westwards and again follows an existing transmission power line up to the Apollo converter station.

The **central alternative** also exits the Bravo power station to the west. As with the northern alternative, it follows an existing transmission power line for approximately 3.5km. It turns northwards for a distance of approximately 350m before turning westwards again. It continues in a westerly direction and traverses a greenfields area up to the Apollo converter station.

The **southern alternative** also exits the Bravo power station to the west. It then continues westwards along an existing transmission power line. Approximately 5.8km west of the R25, the corridor turns north-westwards (still following an existing transmission power line) and meets up with the northern alternative.

All of the corridor alternatives culminate in one corridor alternative at the Apollo converter station. From the Apollo converter station, the proposed transmission power line continues in a westerly direction along an existing transmission power line. It crosses the R21, the M57, the M18, the R101, the N1, and the R55. West of the R55 the corridor traverse Olievenhoutbosch within an existing servitude. It enters the Minerva substation from the east. It exits the Minerva substation to the north and continues along an existing transmission power line. It then crosses the R28, the M34 and the R511. Approximately 4.3km west of the R511 the corridor turns southwards and crosses the R28 again. It then passes west of Diepsloot and enters the Lulumisa substation from the north.

Transmission power lines are constructed and operated within a servitude that is established along its entire length (55m wide per 400kV transmission power line). The servitude gives Eskom Transmission right of way for that piece of land. Right of way should not be confused with a rental agreement. Right of way gives Eskom certain rights and controls that support the safe and effective operation of the power line.

The proposed transmission power line corridors start out in the Kungwini Local Municipality (which forms part of the Metsweding District Municipality) and the traverse the City of Tshwane Metropolitan Municipality (TSH), a very small portion of the Ekurhuleni Metropolitan Municipality (EKU) before it terminates in the City of Johannesburg Metropolitan Municipality (JHB). Most of the municipal areas are metropolitan municipalities, which are defined as municipal areas that execute all the functions of a local government for a city and which therefore does not form part of a bigger district area. All of the affected municipal areas are located within the Gauteng Province (GP).

In order to address the overall objective of this study, it was necessary to compile a detailed description of the study area. Therefore, in Section 3, every subsection provides a profile of the social processes in terms of demographic, geographical, economic, institutional and empowerment, and socio-cultural baseline conditions in the study area. Each subsection then concludes with a table summarising how the project is likely to change these baseline profiles, and the related impacts that could be expected as a result of the project.

Demographical Change Processes

Demographic processes relate to the number of people and composition of a community and include an overview of the population size and the educational profile of the affected communities.

An overview of the population demographics of the study area in relation to South Africa as a whole, the province and the district revealed that there are more females than males in the study area, which, might be ascribed to the migrant labour patterns in South Africa where the male moves to a different area in search of work. If this is the case, it can very well be assumed that these males are employed elsewhere and would therefore not be seeking

work at the proposed project. It is therefore necessary to take cognisance of the fact that a large segment of work seekers might be female.

An overview of the educational profile for the study area on local municipal level further revealed that it would appear as if the area is characterised by a semi-skilled to skilled population, which is reflected in the fact that, in 2007, only a small minority of the population has had no form of formal education.

It is expected that the construction and operation of the proposed transmission power lines will lead to a change in the number and composition of the population within the affected areas, which in turn may impact on health, safety and community cohesion (these impacts are discussed in more detail in the socio-cultural section).

The demographic change processes that can be expected during the construction and decommissioning phases of the project are as follows:

- Influx of construction workers;
- Influx of job seekers;
- Relocation of households and/or population segments.

It is not foreseen that the presence of maintenance teams would lead to the large scale influx of people to the area as maintenance teams are normally small groups. Therefore, no demographic change processes are foreseen during the operation and maintenance phases.

Geographical Change Processes

Geographical processes relate to land use patterns and infrastructure in the area. This section therefore describes the land use in the study area from a social perspective, specifically in terms of settlement patterns and land use developments.

A general assessment of the land uses in the study area indicated the following trends:

- Residential;
- Commercial cattle and crop farming;
- Mining; and
- Industries.

Geographical change processes refer changes in land use, whether it is on a temporary or permanent basis. The construction and operation of a transmission power line will lead to a change in the land use, mostly as a result of the surface infrastructure. The assessment of a land use change process from a social perspective takes into account how the proposed transmission power lines might affect the behaviour and/or lives of landowners and/or land users in the area.

The geographical change processes that can be expected during the construction and decommissioning phases of the project relate to the following land uses:

- Cultivated land; and
- Grazing land.

The geographical change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during the operation and maintenance phase of the project are as follows:

- Grazing land;
- Spatial development (future land use); and
- Presence of the transmission power line.

In addition, the following change process that would result in a Category 2 impact, which are those impacts that are expected to cause significant changes between the proposed alternatives, are as follows:

- Cultivated land (including irrigation); and
- Mining.

Economical Change Processes

Economic processes relate to the way in which people make a living and the economic activities within that society. The employment status within a community gives an indication of the economic stability of such a community and also serves as an indicator of such a community's general well-being.

Overall it would appear as if the economy of the study area is growing at a steady pace. As economic industries are growing, more employment opportunities are created thereby further reducing the unemployment rate, creating sources of income which in turn leads to the creation of other opportunities such as further education, a need for housing (which in turn creates further employment opportunities, both directly and indirectly), etc.

Economical change processes relate to the changes brought about to the employment and general economic profile of the area as a result of the introduction of any development. Employment creates a source of income, which in turn enables the employed individual to access services and a support mechanism for his/her family, thereby enhancing not only the individual's quality of life, but also that of his/her household.

The economical change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during the construction and decommissioning phases of the project are as follows:

- Compensation for servitude;
- Direct formal employment opportunities to local individuals; and
- Indirect formal and/or informal employment opportunities to local individuals.

In addition, the following economical change processes that are expected to result in Category 1 impacts during the operation and maintenance phase of the project are as follows:

- Direct formal employment opportunities to local individuals;
- Electricity supply and economic growth; and
- Property values.

Institutional & Empowerment Processes

Institutional and empowerment processes relate to the role, efficiency and operation of government sectors and other organisations within the area in terms of service delivery. It also investigates the ability of people to engage in decision-making processes to such an extent that they have an impact on the way in which decisions are made that would concern them.

The years between 2001 and 2007 saw a steady increase in the delivery of municipal services to the households within the study area.

The municipal infrastructure is mostly located within the urban areas of the municipal areas. Municipal infrastructure backlogs are mostly confined to the previously disadvantaged township areas, and, as could be expected, in informal settlement areas. The outlying rural areas rely almost exclusively on water and sanitation services that are below Reconstruction & Development Programme (RDP) standard. In terms of water services, RDP standard is defined as piped water either within a dwelling or within 200m of such a dwelling. Sanitation services on par or above RDP standard is defined as any waterborne sanitation services that are connected to a municipal sewerage system or a ventilated pit latrine (VIP) system.

In terms of baseline empowerment processes, the hierarchy of needs as set out by Maslow, offers an insightful backdrop in terms of people's potential level of involvement in the EIA process and the issues that might be pertinent to them in a development of this nature. Therefore, in order to expect people to fully participate in a process that might affect their future, people would have to function on a higher level within the hierarchy of needs (the need for self esteem, characterised by knowledge and understanding needs as well as the need for an environment that is aesthetically appealing. This means that their basic needs have to be met first.

Negotiation for land is a change process on legal and empowerment level. The same applies to the stakeholders that will be involved in the public participation process. The EIA process

is an opportunity for these stakeholders to give input into the process and project. However, stakeholders would have to offer up their time to become actively involved in the process and they should clearly understand their rights in terms of the process to enable them to use these rights.

The economical change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during this phase of the project are as follows:

- Negotiation process; and
- Additional demand on municipal services.

An increase in the availability of electricity to the local area has been identified as an institutional and empowerment change process that can be expected during the operational and maintenance phase of the project.

Socio-Cultural Processes

Socio-cultural processes relate to the way in which humans behave, interact and relate to each other and their environment, as well as the belief and value systems which guide these interactions.

Socio-cultural change processes that are associated with the construction and operation of the proposed project include changes to aspects such as health and safety and sense of place. In a social sense, it should be noted that the concept of 'health' is not only limited to physical health (i.e. the absence of ailments or illness), but also includes mental and social health. The expected changes that can occur in relation to health and safety aspects can be as a result of the presence of the proposed transmission power line and its associated infrastructure during operation, as well as the presence of construction workers and/or job seekers during construction.

The significance of the impacts of socio-cultural changes is difficult to determine on a prospective basis and are dependent on the demographic profile of, for example, construction workers and whether or not such differences affected local residents. For example, if construction workers were from a different cultural background than locals, conflict can be expected if such different cultural backgrounds are not respected. Conflict as a result of cultural differences or community disintegration as a result of the acceptance of construction workers' culture might occur – should the demographic profile of these construction workers be different, and should it matter to the communities involved.

The socio-cultural change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during the construction and decommissioning phase of the project are as follows:

- Integration with local community;
- Health;
- Safety and security; and
- Construction noise.

The geographical change processes that are expected to result in Category 1 impacts during the operation and maintenance phase of the project are as follows:

- Movement of maintenance workers;
- Physical splintering; and
- Third party tampering.

In addition, the following change process that would result in a Category 2 impact, which are those impacts that are expected to cause significant changes between the proposed alternatives, are as follows:

- Sense of place.

Expected Impacts

The significance of potential category 1 impacts is grouped per change process in Table A, while Table B reflects a summary of the potential category 2 impacts per change process.

Table A: Summary of Category 1 Impacts per Change Process

CHANGE PROCESS	ASSESSMENT AREA	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
DEMOGRAPHICAL			
Construction & De-commissioning	Influx of construction workers	Very Low -	Very low ±
	Influx of job seekers	Low -	Very low ±
Operation & Maintenance	None	n/a	n/a
GEOGRAPHICAL			
Construction & De-commissioning	Temporary loss of cultivated land	Moderate -	Low -
	Temporary loss of grazing land	Low -	Low – to ±
Operation & Maintenance	Permanent loss of grazing land	Very low – to ±	Very low ±

CHANGE PROCESS	ASSESSMENT AREA	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
	Spatial development	Low -	Very low -
	Presence of transmission power line	Moderate -	Low – to ±
ECONOMICAL			
Construction & De-commissioning	Compensation for servitude	Low +	n/a
	Direct formal employment opportunities to local individuals	Low +	Low +
	Indirect formal and/or informal employment opportunities to local individuals	Low +	Low +
Operation & Maintenance	Direct formal employment opportunities to local individuals	Low +	Low +
	Electricity supply and economic growth	Moderate +	n/a
	Property values	Moderate -	Low -
EMPOWERMENT & INSTITUTIONAL			
Construction & De-commissioning	Negotiation process	Moderate	Moderate +
	Additional demand on municipal services	Low -	Low -
Operation & Maintenance	None	n/a	n/a
SOCIO-CULTURAL			
Construction & De-commissioning	Integration with local community	Low -	Very low – to ±
	Health	Moderate -	Moderate -
	Safety and security	Low -	Very low -
	Construction noise	Low -	Very low -

CHANGE PROCESS	ASSESSMENT AREA	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
Operation & Maintenance	Movement of maintenance workers	Low -	Very low – to ±
	Physical splintering	Very low -	Very low – to ±
	Third party tampering	Low -	Very low -

Table B: Summary of Category 2 Impacts per Project Phase

Change Process	Assessment Area	Lulumisa – Minerva Section		Minerva – Apollo Section		Apollo – Bravo Section					
						Northern Alternative		Central Alternative		Southern Alternative	
DEMOGRAPHICAL											
Construction & De-commissioning	Relocation	Mod -	Mod -	High -	Mod -	Mod -	Mod -	Mod -	Low -	Mod -	Mod -
Operation Maintenance &	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
GEOGRAPHICAL											
Construction & De-commissioning	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Operation Maintenance &	Cultivated land and irrigation	Low -	Very low -	No impact	n/a	Low -	Very low -	Low -	Very low -	No impact	n/a
	Mining	Mod -	Low -	Low -	Very low -	Low -	Very low -	Low -	Very low -	No impact	n/a
ECONOMICAL											
Construction & De-commissioning	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Operation Maintenance &	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

INSTITUTIONAL AND EMPOWERMENT											
Construction & De-commissioning	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Operation & Maintenance	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SOCIO-CULTURAL											
Construction & De-commissioning	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Operation & Maintenance	Sense of place	Mod -	Low -	Mod -	Low -	Low -	Low -	Mod -	Low -	Low -	Very low -

Conclusions & Recommendations

The geographic, demographic and socio-cultural processes all have a number of negative impacts. However all of these impacts can be mitigated successfully if effectively managed. Economic impacts as a result of the project are for the most part positive in nature, which is mainly due to the economic investment and development that will take place in the community as a result of the project.

Although the expected construction impacts across all the change processes are mostly negative, these impacts are for the most part only temporary in nature and only expected to last over the construction period. In comparison, operational impacts are expected to last over the longer term and therefore would have a prolonged effect on especially the geographical environment in terms of the presence of the Transmission power lines in the area. People are more inclined to get “used” to the infrastructure in their area if servitude and line maintenance are applied effectively and with due diligence. The regular monitoring and evaluation of the Transmission power lines as a whole would also ensure that corrective measures can be taken immediately to prevent adverse effects either on the infrastructure itself, or on the local area.

To come up with a preferred corridor, a comparison among the alternative corridor alignments was conducted by assessing all of the category 2 impacts identified with a certain change process. A summary of the outcome of this brief assessment is as per the table below.

Change Process	Assessment Area	Lulumisa – Minerva Section	Minerva – Apollo Section	Apollo – Bravo Section		
				Northern Alternative	Central Alternative	Southern Alternative
Demographical	Relocation	2.96	3.7	2.96	2.22	2.96
Geographical	Permanent loss of cultivated land (including irrigation)	1.62	0	1.62	1.62	0
	Mining operations	2.7	1.62	1.62	1.62	0
Economical	No category 2 impacts	-	-	-	-	-
Institutional & Empowerment	No category 2 impacts	-	-	-	-	-
Socio-Cultural	Sense of place	2.16	2.4	1.62	2.64	1.38
TOTAL		9.44	7.72	7.82	8.1	4.34

Based on the comparison of category 2 impacts prior to mitigation, overall the **southern alternative** emerged as the preferred route corridor from a social perspective. It could further be concluded that the social environment in general pose no fatal flaws to the development of the proposed transmission power lines known as Bravo 3, under the condition that the identified mitigation measures in this document and as recommended for inclusion in the EMP, are implemented and adhered to, particularly where construction activities either takes place in close proximity to or passes through residential areas that could affect the quality of live of these households in terms of noise, dust, safety and security.

ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
CBD	Central Business District
CJMM	City of Johannesburg Metropolitan Municipality
CS	Community Survey
CTMM	City of Tshwane Metropolitan Municipality
DEAT	Department of Environmental Affairs and Tourism
EIA	Environmental Impact Assessment
EMF	Electro Magnetic Fields
EMP	Environmental Management Plan
ESTA	Extension of Security of Tenure Act
GDS	Growth and Development Strategy
GP	Gauteng Province
GPS	Global Positioning System
HIV	Human Immune-deficiency virus
I&APs	Interested and Affected Parties
ICNIRP	International Commission for Non-Ionising Radiation Protection
IDP	Integrated Development Plan
KLM	Kungwini Local Municipality
MDM	Metsweding District Municipality
NEMA	National Environmental Management Act
OHSA	Occupational Health and Safety Act
PPP	Public Participation Process
RDP	Reconstruction & Development Programme
RoD	Record of Decision
SAFCEC	South African Federation of Civil Engineering

	Contractors
SAPS	South African Police Service
SDF	Spatial Development Framework
SIA	Social Impact Assessment
STI	Sexually Transmitted Infections
WHO	World Health Organisation

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1. INTRODUCTION

During 2007 Eskom received a positive Record of Decision (RoD) from the Department of Environmental Affairs and Tourism (DEAT) on their proposed Bravo Power Station. This RoD enables Eskom to proceed with the construction and operation of the new Bravo Power Station, which is located near the town of Bronkhorstspuit in the Gauteng Province.

The current project, namely the proposed Bravo Integration Project, is therefore required as a means to integrate the additional electricity supply from the new Bravo Power Station into Eskom's current electricity network. The integration of this additional electricity into the network would ensure that areas such as Secunda and Midrand would be supplied with additional electricity.

The proposed Bravo Integration Project will be considered within the Environmental Impact Assessment (EIA) studies. Five separate applications have been lodged with DEAT, which are as follows:

- **Bravo 1 (DEAT Ref. No: 12/12/20/1093):** The construction and operation of two (2) 400kV bypass transmission power lines, both approximately 10km in length, as follows:
 - One (1) 400kV bypass transmission power line between the Sol substation in Kriel and the Zeus substation in Secunda; and
 - One (1) 400kV bypass transmission power line between the Sol substation in Kriel and the Camden substation in Ermelo.
- **Bravo 2 (DEAT Ref. No: 12/12/20/1094):** The construction and operation of two (2) 400kV loop-in lines into the new Bravo Power Station, both approximately 10km in length, as follows:
 - One (1) 400kV loop-in line from the Kendal-Apollo transmission line (which runs between Ogies and Centurion); and
 - One (1) 400kV loop-in line from the Duvha-Minerva transmission line (which runs between Middelburg and Johannesburg).
- **Bravo 3 (DEAT Ref. No: 12/12/20/1097):** The construction and operation of a new 400kV transmission power line from the Bravo Power Station to the Lulumisa substation in Kayalami. This transmission power line will be approximately 90km in length.
- **Bravo 4 (DEAT Ref. No: 12/12/20/1095):** The construction and operation of two (2) new 400kV transmission power lines, both of which would be approximately 90km in length and would run parallel to each other, as follows:
 - One (1) 400kV transmission power line from the Kendal Power Station to the Zeus substation; and

- One (1) 400kV transmission power line from the Bravo Power Station to the Zeus substation.
- **Bravo 5 (DEAT Ref. No: 12/12/20/1096):** The construction and operation of one (1) 400kV bypass transmission power line of approximately 10km in length on the Bravo-Vulcan transmission power line in order to bypass the Duvha substation.

This particular report only focuses on **Bravo 3 (DEAT Ref. No: 12/12/20/1097)** and details the results of the Social Impact Assessment (SIA) specialist study conducted by MasterQ Research as part of the overall EIA process that is being conducted by Cymbian Enviro-Social Consulting Services. Separate Social Impact Assessment (SIA) Reports have been compiled for the Bravo 1-2 and 4-5 applications. In terms of Bravo 3, three (3) possible route corridor alternatives were identified for the proposed 400kV transmission power line from the Bravo power station to the Lulimisa substation.

The first subsection below gives a definition of a SIA, followed by details of the objectives of the study, whereas the third subsection details the approach and methodology that were followed to meet these objectives. The section is concluded with a discussion of the limitations and assumptions of the study, and applicable legislation.

1.1. Definition of a SIA

The definition of a SIA as defined by Vanclay (2002) gives an understanding of the backdrop against which this SIA was conducted. According to this definition, a **social impact** is defined as follows:

“The consequences to human populations of any public or private actions (these include policies, programmes, plans and/or projects) that alter the ways in which people live, work, play, relate to one another, organise to meet their needs and generally live and cope as members of society. These impacts are felt at various levels, including individual level, family or household level, community, organisation or society level. Some social impacts are felt by the body as physical reality, while other social impacts are perceptual or emotional.”

Vanclay (2002) defined a **social impact assessment** as follows:

“... the process of analyzing (predicting, evaluating and reflecting) and managing the intended and unintended consequences on the human environment of planned interventions (policies, programmes, plans and projects) and any social change processes invoked by those interventions so as to bring about a more sustainable and equitable biophysical and human environment.”

According to Vanclay (2002:3-10), one of the pitfalls of many SIAs are that these studies refer to social change processes as social impacts. In this regard, Vanclay stated: “social change processes are set in motion by project activities or policies”, whereas social impacts

“refer to the impacts actually experienced by humans in either a corporeal (physical) or cognitive (perceptual) sense.”

Bearing this in mind, a **change process** can therefore be defined as change that takes place within the receiving environment as a result of an intervention. A potential **social impact** follows as a result of the change process occurring. However, a change process can only result in an impact once it is experienced as such by the individual/household/community/organisation on a physical and/or cognitive level.

It should therefore be noted that the social specialists conducting this study made a definite distinction between change processes and impacts.

1.2. Objectives of the Study

The overall purpose of the SIA will be to contribute to the EIA in such a way that it will enable DEAT to make an informed decision on the way forward with the proposed project. The specific objectives were as follows:

- Gain an understanding of the proposed project, including the alternative alignments or route corridors, and the nature and timeframe of proposed activities;
- Obtain information on the baseline social profile characterising the study area in terms of the following change processes:
 - **Demographic processes:** the number and composition of people;
 - **Geographical processes:** land use patterns;
 - **Economic processes:** the way in which people make a living and the economic activities in society;
 - **Empowerment and institutional processes:** the ability of people to be involved and influence decision making processes; and the role, efficiency and operation of governments and other organisations; and
 - **Socio-cultural processes:** the way in which humans behave, interact and relate to each other and their environment and the belief and value systems which guide these interactions;
- Identify how these processes might be changed by the proposed project and identify and describe the resultant impacts from such changes;
- Rate these impacts along specific significance rating scales in order to obtain an overall view of their relative severity and significance;
- Identify measures that could be implemented to prevent or ameliorate any negative impacts, or that can be used to enhance any positive impacts; and

- Present these mitigation/enhancement measures for inclusion in the Environmental Management Plan (EMP).

The approach and methodology that were followed to fulfil the objectives are listed in section 1.3 below.

1.3. Approach and Methodology

To ensure that the objectives of the study are answered, data had to be collected. Primary and secondary data collection methods were used. Primary data included a field trip by motor vehicle on 8 November 2008 along the various proposed route corridors. The objectives of the site visit were for the social specialists to familiarise themselves with the surrounding receiving environment and to identify any social sensitive sites.

Secondary data mostly centred on a desktop study, in which the following documents were scrutinised:

- Locality maps;
- Census 2001 and Community Survey 2007 data to determine any significant social trends in the area;
- A aerial study of the affected area through the use of Google Earth (2007);
- The EIA Scoping Report;
- The Integrated Development Plans (IDP) of the affected District and Local Municipalities;
- The Spatial Development Frameworks (SDF) of the affected District and Local Municipalities; and
- Where available, a desktop study of the Growth and Development Strategies (GDS) of the affected District and Local Municipalities.

Information that was relevant to the project was identified and assessed from these sources, within the context of the construction, operational, and decommissioning phases of the proposed project. The construction and decommissioning phases have been grouped together, as it is believed that similar processes take place during these phases. However, during the decommissioning phase these processes take place in reverse, e.g. instead of a team erecting the transmission power line, they will now dismantle it. This report also only focuses on the transmission power line alternatives between the Bravo power station and the Lulumisa substation, known as Bravo 3.

1.3.1 Significance Rating Scales

This particular SIA also took into account the significance, spatial, duration, degree of probability and degree of certainty that a potential impact might have on the social environment. Impacts can either be negative, neutral or positive. The impacts are also categorised according to the various project stages, i.e. construction and decommissioning, and operation and maintenance. Mitigation measures have also been identified with the aim to reduce the potential negative impacts and to enhance the potential positive impacts. Also included in the assessment tables that follow in Section 3 is a rating of the significance of the impact.

To determine the significance of each identified issue, the following criteria were used.

Significance, which refers to the importance of impacts, and which has been defined as follows:

5	Very High	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	Moderate	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	Very Low	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the

		category represented on the scale, and if used, will replace the scale.
0	No Impact	There is no impact at all - not even a very low impact on a party or system.

Spatial, which refers to the physical extent of the impact, and which has been defined as follows:

5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible, and will be felt at a regional scale (District Municipality to Provincial Level).
3	Local	The impact will affect an area up to 5 km from the proposed route corridor.
2	Study Area	The impact will affect a route corridor not exceeding the Boundary of the corridor.
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the route site.

Duration, which refers to the persistence of an impact on the environment, and which has been defined as follows:

1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium term	The environmental impact identified will operate for the duration of life of the line.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

Degree of probability, which refers to the likelihood of the impact occurring, and which has been defined as follows:

1	Practically impossible
2	Unlikely
3	Could happen

4	Very Likely
5	It's going to happen / has occurred

Degree of certainty, which refers to the specialists confidence of an impact occurring, and which has been defined as follows:

Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.

In order for the impacts to be described in a quantitative manner in addition to the qualitative descriptions provided above, this was calculated as follows:

$$\text{Impact Risk} = \frac{(\text{Significance} + \text{Spatial} + \text{Temporal})}{3} * \frac{\text{Probability}}{5}$$

The impact risk was then classified as follows:

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

In order to assess the alternatives in respect of its anticipated social impacts, a distinction was made between the following impacts:

- **Category 1:** Impacts that are not expected to differ between the proposed alternatives, e.g. the number of employment opportunities that might be created by the proposed project are expected to remain the same, irrespective of the chosen alternative (except in the case of the 'no go' option); and

- **Category 2:** Impacts that are expected to cause significant changes between the proposed alternatives, e.g. the need to resettle certain households increases proportionately if the development traverses densely populated areas as opposed to skirting sparsely populated areas.

1.4. Scoping Phase Comments

An opportunity was created for interested and affected parties (I&APs) to become involved in the process through the public participation process (PPP). The PPP commenced during the scoping phase and extends across and includes the Impact Assessment phase (which is the current phase of the study). As part of the PPP, registered I&APs and other stakeholders were invited to comment on the proposed project. Table 1 below provides a summary of the comments received during the scoping phase as they pertained to the social environment, with a cross reference where such comments were addressed by the SIA.

Table 1: Comments on Social environment made during Scoping Phase

Comment	Stakeholder	Source	Reference in SIA
The employment of people might impact upon the enrolment of the school.	Mr Johan Els, Cultura High school in Bronkhorstpruit	Written submission in April 2008 in response to the BID	Section 3.2
Include in the impact study the impact of the power lines crossing over agricultural land, cattle fields and close to farmhouses.	Mrs Gertie Janse van Rensburg, De Hoogenveld Trust, Portion 17 and 9 of Witpoort 563 JR	Written submission in April 2008 in response to the BID	Section 3.4
Consider the financial losses due to property value decline.	Mrs Angela Lake, Plot 29 Bashewa	Written submission in April 2008 in response to the BID	Section 3.6
Re-route the proposed power lines away from main roads and developing residential areas.	Mr Mark Walker, owner of 39 Garsfontein Road, Tiegerpoort.	Written submission in April 2008 in response to the BID	Section 3.4
Portion 1 Jakhalsfontein is only 9, 3533 Ha in size. This is a high density export berry farm with all plantings under shade netting. Another servitude will reduce my livelihood and income drastically. Do not put the line next to	Mr Andreas Mellet Moll, BIO Select, Owner of Portion 1 Jakkalsfontein JR528	Written submission in April 2008 in response to the BID	Section 3.4 Section 3.6

Comment	Stakeholder	Source	Reference in SIA
the existing lines.			
What economic benefit will accrue for the community?	Mr Peter Letsetebe, Satea/Pikitup, Protea North	Written submission in April 2008 in response to the BID	Section 3.6

1.5. Limitations and Assumptions

- This study was carried out with the information available to the specialist at the time of executing the study, within the available time frames and budget. The sources consulted are not exhaustive, and additional information which might strengthen arguments or contradict information in this report and/or identify additional information might exist.
- It was assumed that the decommissioning phase is similar to the construction phase, and therefore the decommissioning phase was not assessed separately.
- The specialists did endeavour to take an evidence-based approach in the compilation of this report and did not intentionally exclude scientific information relevant to the assessment.
- It was assumed that the motivation for, and the ensuing planning and feasibility studies of the project were done with integrity, and that the information provided to date by the project proponent, the independent environmental assessment practitioner and the public participation consultant was accurate.
- The statistics that informed this report were primarily taken from Census 2001 and the more recent Community Survey 2007. The comparative analyses of these sets of data should only be regarded as an indication of broad trends in the area, because of concerns about data integrity. The South African Statistics Council was concerned about the following regarding the Community Survey (2007):
 - Institutional population is merely an approximation to 2001 numbers and not new data;
 - Unemployment in the Community Survey is higher and less reliable because of questions that were asked differently;
 - Grants do not match the (SASSA) data and should be interpreted with great care;
 - Income includes unreasonably high income for children – presumably misinterpretation of the question, listing parents' income for the child; and
 - Distribution of households by province has very little congruence with the General Household Survey or last census.

- A number of systematic errors were observed in the statistical data, which included:
 - An underestimate of men relative to women;
 - An underestimate of children younger than 10 years;
 - An excess of those aged 85+, in particular among men;
 - Missing women aged 20–34 from the Coloured population;
 - Misdistribution of the population by province;
 - Excess of people aged 10–24 in Western Cape and Gauteng;
 - A shortfall of women aged 20–34 in Free State, KwaZulu-Natal and Limpopo.

The council states (2008): *“In the absence of a comprehensive sampling frame, it is difficult to determine whether the differences are due to sampling error, biases or the reality that has changed beyond our expectations. There may be other variables that will require similar warnings after further interrogation.”*

1.6. Applicable Legislation

Cognisance was taken of the following legal requirements and regulatory documents:

- Constitution of the Republic of South Africa, Act No. No. 108 of 1996;
- Construction Regulations under the Occupational Health and Safety Act (OHSA);
- Electricity Regulation Act, No 4 of 2006, section 27;
- Extension of Security of Tenure Act (Act 62 of 1997) (ESTA);
- National Environmental Management Act (NEMA), No. 107 of 1998, as amended and Environment Conservation Act, No. 73 of 1989, as amended; and
- The Environmental Impact Regulations of 21 April 2006.

The following section describes the project and study area and then proceeds to address the objectives of the study.

2. PROJECT BACKGROUND

This section assesses the information relevant to the study area and the project. The first subsection provides an overview of the proposed project, followed by a description of the transmission power line route corridor alternatives, and then a general overview of the study area. The section concludes with an overview of the negotiation process, followed by an overview of the construction process.

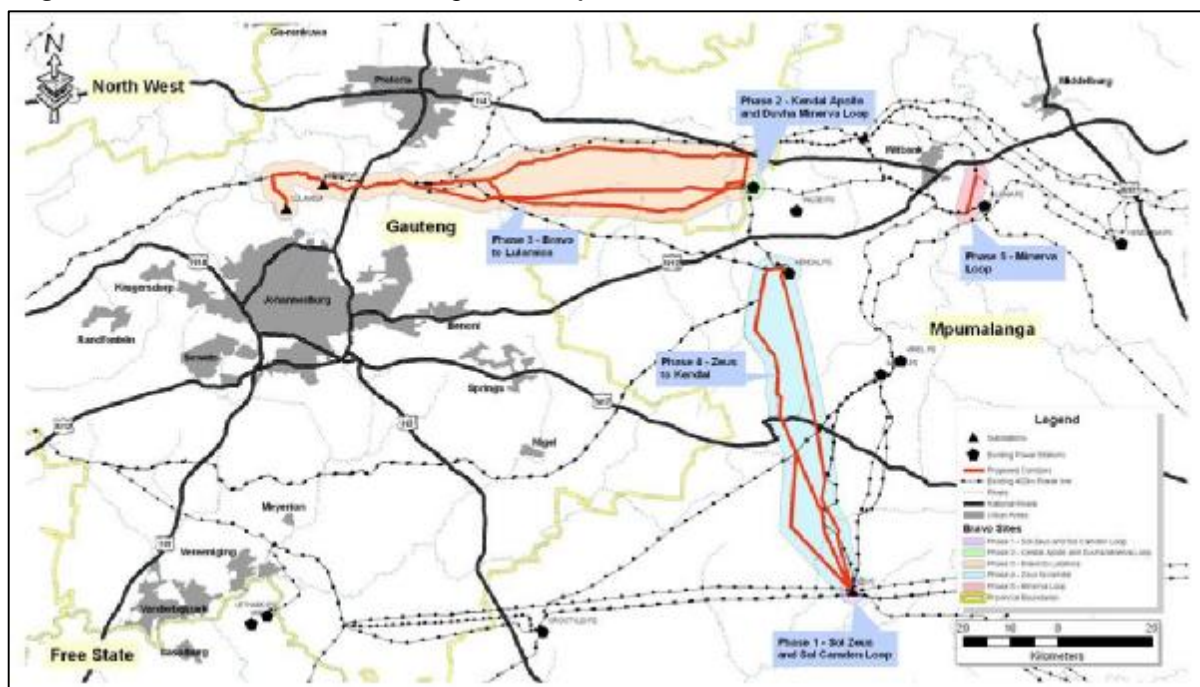
2.1 Project Overview

Eskom Holdings Ltd. (Eskom) has been mandated to ensure a reliable and affordable electricity supply to consumers within South Africa. As such, they are responsible for both the generation as well as the distribution of electricity, which cannot be stored but has to be used as it is generated. To this end, the generated electricity has to be transmitted from the generation point to the end user and as such, it is required that the transmission capacity forms a balance between electricity supply and demand. Therefore, for Eskom Transmission to ensure that it fulfils its mandate and to provide the required infrastructural support to Eskom Generation, they have to plan, establish and expand their transmission power line infrastructure on a continuous basis.

As part of Eskom Transmission's expansion programme, they are proposing the establishment of a number of bypass, turn-in and transmission power lines (as outlined in the introduction), and known as the Bravo Integration Project. The main objective of this project is to integrate the new Bravo Power Station into the existing electricity grid.

As previously mentioned, five separate applications have been lodged with DEAT in terms of the various components of the proposed Bravo Integration Project. Figure 1 below provides an overview of the transmission power line corridor alternatives for the proposed Bravo Integration Project as a whole.

Figure 1: Overview of the Bravo Integration Project



Source: Cymbian Enviro-Social consulting services (based on information received from Eskom Transmission)

As this report only deals with the proposed transmission power line corridor alternatives from the Bravo power station to the Lulumisa substation (known as **Bravo 3**), the following subsection is confined to providing an overview of the applicable transmission power line corridor alternatives between these points.

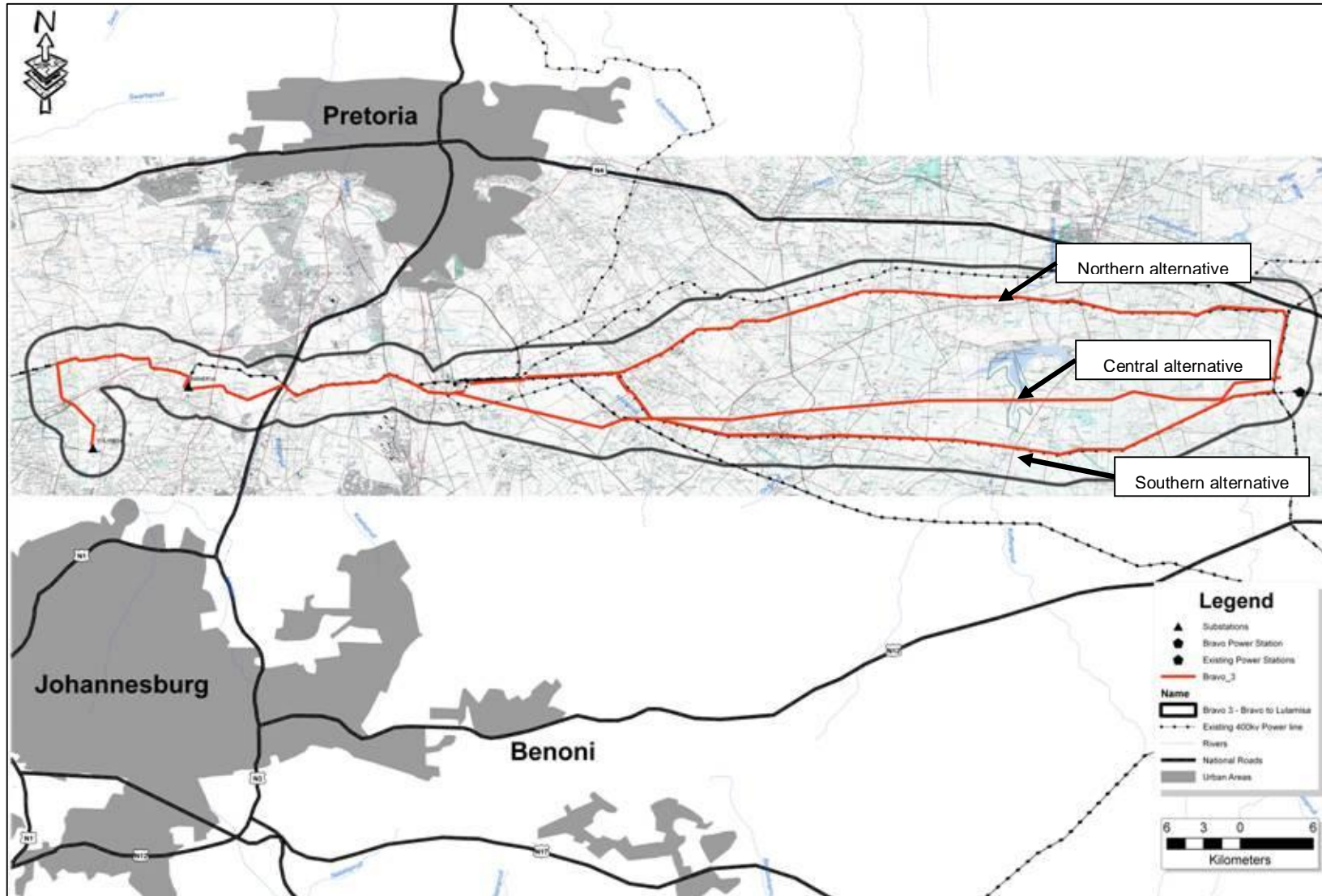
2.2 Transmission Power Line Corridors

Bravo 3 entails the construction and operation of a new 400kV transmission power line from the Bravo Power Station to the Lulumisa substation in Kayalami. This transmission power line will be approximately 90km in length.

Even though the permanent servitude for the transmission power lines would be 55m, the corridors under investigation is 5km wide (2.5km to either side of the central line) to ensure a comprehensive assessment process with the aim to identify any possible negative as well as positive impacts. For this reason, three (3) possible alternative route corridors have been identified between Bravo and Lulumisa for the assessment process, of which only one (1) would be selected in the end as the preferred corridor.

Figure 2 below provides an overview of these three alternative route corridors, known as Bravo 3, and which forms the subject of this SIA report.

Figure 2: Bravo 3 Alternative Route Corridors



Source: Cymbian Enviro-Social consulting services (based on information received from Eskom Transmission)

The **northern alternative** exits the Bravo power station to the west. It follows an existing transmission power line for approximately 3.5km where after it turns northwards and follows another existing transmission power line for approximately 6.2km. The corridor then turns westwards and again follows an existing transmission power line up to the Apollo converter station.

The **central alternative** also exits the Bravo power station to the west. As with the northern alternative, it follows an existing transmission power line for approximately 3.5km. It turns northwards for a distance of approximately 350m before turning westwards again. It continues in a westerly direction and traverses a greenfields area up to the Apollo converter station.

The **southern alternative** also exits the Bravo power station to the west. It then continues westwards along an existing transmission power line. Approximately 5.8km west of the R25, the corridor turns north-westwards (still following an existing transmission power line) and meets up with the northern alternative.

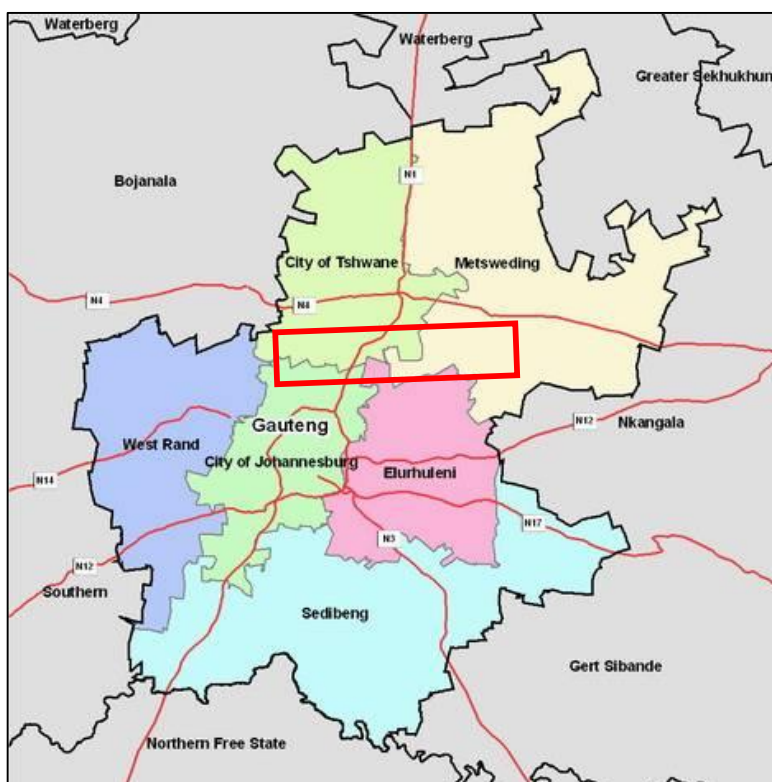
All of the corridor alternatives culminate in one corridor alternative at the Apollo converter station. From the Apollo converter station, the proposed transmission power line continues in a westerly direction along an existing transmission power line. It crosses the R21, the M57, the M18, the R101, the N1, and the R55. West of the R55 the corridor traverse Olievenhoutbosch within an existing servitude. It enters the Minerva substation from the east. It exits the Minerva substation to the north and continues along an existing transmission power line. It then crosses the R28, the M34 and the R511. Approximately 4.3km west of the R511 the corridor turns southwards and crosses the R28 again. It then passes west of Diepsloot and enters the Lulumisa substation from the north.

2.3 Regional Overview

The proposed transmission power line corridors start out in the Kungwini Local Municipality (which forms part of the Metsweding District Municipality) and the traverse the City of Tshwane Metropolitan Municipality (TSH), a very small portion of the Ekurhuleni Metropolitan Municipality (EKU) before it terminates in the City of Johannesburg Metropolitan Municipality (JHB). Most of the municipal areas are metropolitan municipalities, which are defined as municipal areas that execute all the functions of a local government for a city and which therefore does not form part of a bigger district area. All of the affected municipal areas are located within the Gauteng Province (GP) (refer to Figure 3 – study area marked in red).

Figure 3: *Municipal Delineation within the Nkangala District Municipality*

Source: Municipal Demarcation Board



The following subsections provide a regional overview of the study area on a broad based provincial and district level. For a more detailed account of the receiving environment or potentially affected area (i.e. local municipal level), refer to relevant change processes under the various subsections in Section 3.

2.3.1 Provincial Level

The Gauteng Province (GP) covers an area of approximately 16 927km², and is the smallest province in South Africa. The province consists of three (3) District Municipalities and three (3) Metropolitan Municipalities. The District Municipalities are Metsweding, West Rand and Sedibeng, and the Metropolitan Municipalities are the City of Tshwane, City of Johannesburg and Ekurhuleni Metropolitan Municipality.

Gauteng is generally perceived as the 'economic hub' of South Africa. According to the Gauteng Provincial Growth and Development Strategy 2005 (GPGDS), the Gauteng Province account for 33% of South Africa's Gross Domestic Product (GDP) and is the largest sub-national African economy. Gauteng is also responsible for 49.6% of all employee remuneration in the country and 52% of all turn-over of institutions. However, the GPGDS (2005) states that there is an ever-increasing divide between the rich and poor in the Province, and this divide is not decreasing. The opportunities created to engage meaningfully in economic activities and growth of the Province, have largely benefited those sectors of the society that are generally financially secure and stable and who have the

necessary skills, means and resources to participate in the economy. There are still high levels of unemployment and the resultant high levels of poverty evident in the Province¹.

Despite the fact that the GP covers such a small area, census 2001 indicated that the GP had an estimated total population of 9 178 873 people. The population has grown steadily at a rate of approximately 13.9% between 2001 and 2007 and now stands at a total population of approximately 10 451 713 people². This means that the population density within the GP has increased from 542.3 people per km² in 2001 to 617.5 people per km² in 2007, which represents an average growth of 12.5 people per km² per annum. Of all the provinces, Gauteng has a significantly higher population growth rate compared to the overall South African growth rate, which slowed down to 6.4% since 2001³.

The Gauteng population density is indicative of the fact that the province is by and large urbanised. According to StatsSA (2006), the urbanisation level in Gauteng is estimated at around 96% (based on 2001 census data). There are still large numbers of households living in either informal settlements, or living in “back yards” or traditional housing in the province, and supplying adequate housing to these people remain a challenge⁴. It was estimated that the additional need for housing up to 2014-2015 amounted to 1.9 million units⁵.

The increases in population size and density pose challenges for the integrated management of the natural, built and human environment. An increase in population will put pressure on the conservation of the remaining biodiversity, ecosystems and natural open spaces; the conservation of the cultural and historical heritage buildings, sustaining open spaces and buildings in an aesthetically pleasing manner and based on ecological principals; the maintenance of a healthy and safe environment for people which promote individual and community well-being.

In 2007 there were approximately 3 175 579 households within Gauteng, which represents an increase of 16.1% from 2001’s total of 2 735 168 households. The number of households have increased (at an average of 73 402 households per annum between 2001 and 2007), and the average household size within the province has decreased by approximately 8.3% from 3.6 persons per household in 2001 to 3.3 persons per household in 2007.

Migration contributes to the decrease in household size and the increase in household numbers, as only members of families tend to migrate to cities, as opposed to whole families. Households already resident in the cities are also splitting. The increase in households is reason for concern, and the South African Cities Network estimated that by

¹ Gauteng Provincial Government, <http://www.gpg.gov.za/docs/misc/gds/chap2.pdf>.

² Census 2001 and Community Survey 2007, StatsSA.

³ Community Survey 2007, StatsSA.

⁴ GPGDS, 2005.

⁵ Landsberg, C (2005). City Case Study Report: City of Johannesburg.

2015, the GP could become a continuous urban extension, amounting to a population of almost 15 million people⁶.

In terms of race, the predominant population group in Gauteng is represented by Black Africans (74.6% in 2001, which increased to 75.2% in 2007). This increase represents a growth of approximately 12 580 additional Black African people per annum within the province. This is followed by the White population group (19.9% in 2001, which decreased to 18.4% in 2007).

It is not clear what lead to the respective increases and decreases in the different population groups, but in general an increase in a population size might be ascribed to factors such as urbanisation, a high birth rate and a low mortality rate and a push/pull factor (people move away from rural areas in search of better opportunities within urban areas). A decrease in a population size can generally be ascribed to a low birth rate and high mortality rate and other factors such as migration and emigration.

Close on three quarters (70.0%) of the total population within GP falls within the working age group (15 and 64). This represents a decrease of approximately 1.4% in the working age population of 2001. The population is young (30.1% falls in the 20-34 age group) which has implications for housing needs. The majority of this age group is unable to afford high cost housing, and do not necessarily have jobs mainly due to lack of skills, education and job opportunities.

The GPGDS (2005) lists basic literacy education of the segment of the population who has had no education as one of the key issues that have to be addressed by the province. The education levels will contribute towards an increase in employment rates and decrease in poverty levels.

The Gauteng province as a whole has experienced a steady increase in the delivery of municipal services between the years 2001 to 2007. The number of households that make use of electricity for cooking, heating and lighting increased on average between 3-6%, so that by far the majority of households in Gauteng make use of electricity as their primary source of energy. In terms of other municipal services, such as refuse removal, sanitation, and water services, again the majority of households in Gauteng enjoy such services that are on par or above the minimum RDP standard.

2.3.2 District Level

The Metsweding District Municipality (MDM) is the only district municipality within the study area. The MDM borders on the City of Tshwane Metropolitan Municipality and is located some 45km east of the Pretoria CBD. To the north lies the Waterberg District Municipality of

⁶ Landsberg, C (2005). City Case Study Report: City of Johannesburg.

the Limpopo Province, the Nkangala District Municipality to the east, and the Ekurhuleni Metropolitan Municipality to the southwest. The MDM consists of 2 local municipalities, namely the Nokeng Tsa Taemane and Kungwini Local Municipalities. Of these two local municipalities, only the Kungwini Local Municipality is relevant to the study area.

The MDM is located within the GP and covers an area of 4 063km² and in 2001 had a total population of 160 740 people at a population density of approximately 40 people per km². The total population decreased by 7 381 people over the 6 year period between 2001 and 2007 so that, according to Community Survey 2007, the total population stood at 153 539 people in 2007. This means that the population density also decreased to approximately 37.8 people per km². The male population is slightly larger than the female population, where, in 2007, 51.3% of the population was male. The predominant population group is Black African (77.9%) followed by White (19.8%).

2.3.3 Local Level

On a local level, the following municipalities fall within the study area: the Kungwini Local Municipality (KLM), the City of Tshwane Metropolitan Municipality (CTMM), the Ekurhuleni Metropolitan Municipality (EMM) and the City of Johannesburg Metropolitan Municipality (CJMM). As only a very small portion of the EMM is located within the study area (refer to figure 3), the EMM has not been included in the baseline profiles as it is believed that the inclusion of the socio-demographic data of the EMM as a whole for such a small portion would tend to skew the data.

The baseline profiles of the affected local municipal areas have been discussed in detail under the various change processes in section 3.

2.4 Negotiation Process

Transmission power lines are constructed and operated within a servitude that is established along its entire length (55m wide per 400kV transmission power line). The servitude gives Eskom Transmission right of way for that piece of land. Right of way should not be confused with a rental agreement. Right of way gives Eskom certain rights and controls that support the safe and effective operation of the power line.

The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process, or just the negotiation process. This process is undertaken directly by Eskom Transmission. Important points relating to the EIA process are as follows:

- Servitude negotiation is a private matter between Eskom Transmission and the landowner concerned.
- The standard agreement can be expanded on depending on specific requests from the landowner.

- The negotiation process involves a number of stages, as outlined below, and culminates in the signing of a servitude agreement at which point Eskom Transmission enters into a legal agreement with the landowner.
- The agreements will detail such aspects as the exact location and extent of the servitude, and access arrangements and maintenance responsibilities.
- Compensation measures are agreed in each case.
- The negotiation process may take place at any time in the planning of a new line.
- This process must be completed (i.e. the agreement must be signed) before construction starts on that property.
- The negotiation process is independent of the EIA process.

The EIA process has become important in the initial planning and route selection of a new Transmission power line. For this reason, it would normally be preferable that the negotiation process begins after the EIA has been completed. At this stage there is greater confidence in the route to be adopted, and it would be supported by environmental authorisation.

However, it may be required that the negotiation process needs to start earlier, and may begin before or run in parallel to the EIA process. This may be due to tight timeframes, knowledge of local conditions and constraints, etc. Eskom Transmission has a right to engage with any landowner at any time, though they do so at risk if environmental authorisation has not been awarded.

The following process represents the steps that are followed in registering the servitude:

- The route is usually finalised before negotiation starts.
- Negotiators determine which properties are affected by the final route.
- The Survey-General is contacted to verify and confirm the properties to be affected.
- The Deeds Office provides the names of the legal owners of the properties.
- The services of an external property valuator are procured. Properties are valued by doing a strip valuation for which price ranges for the different properties are submitted.
- Maps are drafted for each property indicating the proposed route for the Transmission power line to be constructed on private or tribal land. The route is between 200 and 500m in width, which is based on international guidelines relating to the health and safety aspects of transmission power line installations.
- Eskom draws up an option to secure the servitude. The option indicates that the owner will accept that the line will cross his property, subject to conditions to be finalised in the negotiation of the servitude agreement. An option is valid for one year. The value of the

land to be negotiated is calculated by multiplying the area of the servitude required from the landowner with the valuator's unit price.

- Eskom's negotiators visit the landowners to start negotiations. The documentation, including the map of the affected area and the option are used to start negotiations. If landowners are not aware of the proposed line to be constructed on their property, the negotiator explains the procedures and conditions to them.
- The landowner signs the option. Special conditions are negotiated and added to the standard option form.
- Once the route is confirmed (i.e. options signed with the upstream and downstream affected landowners), the servitude agreement will be finalised with the landowners. This agreement will set out the compensation amount, and conditions for the establishment and operation of the servitude, and will be site specific (different landowners may have different requirements). Compensation payments are made when the servitude is registered at the Deeds office. If no agreement can be reached between Eskom and the landowner and all other avenues to resolve the issues has been investigated and failed, Eskom applies for expropriation of the land (see section 2.4.1). A full EIA has to be completed before an application of expropriation can be logged. This is not a preferred option for Eskom.
- Once the construction is complete and the land rehabilitated to the landowners' satisfaction, the landowner signs a 'Final Release' certificate.
- Once the clearance certificate is signed, the responsibility for the line and servitude is handed over to the regional Eskom Transmission office. Prior to this the Eskom national office is responsible for the process.
- If the landowner is not satisfied with the construction process, conditions cannot be renegotiated. However, the landowner can refuse to sign the 'Final Release' certificate should the rehabilitation of the land not have been done to a satisfactory level (i.e. to a similar condition as before the construction started).

2.4.1 Expropriation

Expropriation will only take place once the negotiation process has reached a deadlock and/or after a maximum period of 90 days have lapsed after the commencement of the negotiation process with a particular landowner and resolution has not been reached. However, Eskom aims to avoid expropriation as this process is time consuming and tedious. Apart from the delay in construction as a result of expropriation, Eskom does not prefer to follow the expropriation route as they believe that it damages their relationship with landowners. In the interests of minimising the impact of expropriation, Eskom will make all attempts to be flexible towards unique circumstances as it is believed that such an approach

would mitigate the risk of landowners refusing the registration of the servitude on their respective properties.

If required, expropriation will take place in accordance with the Expropriation Act (Act 63 of 1975) where the basis for compensation is outlined as follows:

(1) The amount of compensation to be paid in terms of this Act to an owner in respect of property expropriated in terms of this Act, or in respect of the taking, in terms of this Act, of a right to use property, shall not, subject to the provisions of subsection (2), exceed—

a. in the case of any property other than a right, excepting a registered right to minerals, the aggregate of—

i. the amount which the property would have realized if sold on the date of notice in the open market by a willing seller to a willing buyer; and

ii. an amount to make good any actual financial loss caused by the expropriation.

b. in the case of a right, excepting a registered right to minerals, an amount to make good any actual financial loss caused by the expropriation or the taking of the right.

2.5 Construction Process

The construction process follows on negotiations with landowners in which the servitude is secured.

There are a number of variables determining the sequence of events in the construction process, the number of people involved in each activity and the time spent on an activity. These variables include the timeframes for completion of the line, the natural environment and other local conditions. Some activities could happen simultaneously.

When the construction of the line starts, each activity will follow the previous one, so that a chain of events, with different teams involved will happen over time. On average, there are some 35 active days of construction at any point. However, this may take place over a period of up to two years.

At the EIA phase, prior to negotiations, the route of the line is investigated for approval by DEAT. Once approval is obtained, the following steps represent the process of construction:

1. The route is surveyed. This is done by air as well as by walking the route.
2. A profile of the line is designed based on soil conditions and other factors. At this stage decisions are made on conductor types, towers, insulators and foundations to be used.
3. Environmental review stage – a “walk-through” survey of the route is undertaken in order to determine any site-specific sensitivities which must be taken into account during the final placement of the towers and the construction and operational phases.

4. A final design of the line is made and placement of towers determined.
5. Tenders are issued and awarded to one or more construction companies.
6. Negotiations with landowners regarding access to the servitude during the construction phase are started. Access plans are drafted and signed by Eskom, the contractor and the landowner. At these discussions, the parties agree on rehabilitation measures to be implemented after construction. Photographs of the applicable infrastructure or land is taken beforehand to ensure that rehabilitation is done to the agreed upon standard. Access roads are established through recurring use – blading or scraping of a new road should not be expected, but this is site dependent.
7. The centre line is pegged. At this stage requirements and locations of new gates are recorded.
8. Bush clearance is done along the centre line. The width of the line to be cleared differs depending on the vegetation and the landscape of the area as well as on landowners' requirements. At each tower position, four strips are cleared (size depends on the type of tower to be erected) for assembly and erection of the tower. The bush clearance team(s) move through the whole length of the line. However, the time needed to finish this activity depends on the vegetation of the area. During bush clearance protected species are identified and appropriately handled. Certain plants could be salvaged and relocated while alien species are eradicated. Cut material is cleared from the servitude and appropriately disposed of.
9. New gates are often installed when bush clearance is done.
10. Before the contractor starts with the foundations of the towers, the towers should have been pegged. A surveyor is appointed to do this. When pegging is being done, the footing of the tower is set out. Any obstacles or potential problems with the tower positions and the consequent moving of tower positions are reported.
11. The first step in putting the foundations for the towers in place is in establishing foundation nominations. At this stage, soil types are checked to determine foundation requirements. Trial foundations are dug at the main foundation points. This is done through mechanical back-actor / auger methods. However, in certain circumstances manual labour is used.
12. Foundations are excavated mechanically with a back-actor where possible. At this stage it looks like a square pit of up to 4mx4m in areas and 4m deep, depending on soil conditions. The pit will be covered up or fenced off after it has been dug until the foundation is cast. This is done to prevent livestock from falling into these pits.
13. The foundation steelwork is fitted into the foundation pit not too long after it has been dug. This is done to reinforce the foundations. The steelwork is made up at base camp and brought to site by truck. However, all fitting and wiring is done on site.

14. The concrete for the foundations is poured after the steelwork has been fitted. Shuttering (which is a structure generally made of timber in which liquid concrete is placed, compacted, and allowed to harden) is done and a standard concrete truck used to cast the concrete. A 28-day period is required for curing after concrete has been laid. Where access problems exist, concrete may need to be mixed on site. Helicopters may need to be used in exceptional circumstances. During this stage, access or service roads will be used extensively.
15. Tower steelwork is delivered in sections by long trucks and assembled on site. One truck transports one tower section directly from the factory to site. Access roads are clearly marked to ensure that the correct tower is delivered to site.
16. Towers are assembled on site by an assembly team. The steelwork is fitted and assembled on the ground using a crane – thereby necessitating the area to be cleared of vegetation around the tower. At the time of the study it was not clear if a lay-down area would be required and if such a lay-down area would be cleared of any vegetation. These areas will be considered from an environmental perspective during the walk-through survey (refer to point 3). Once the nuts are punched, non corrosive paint is placed on the nuts.
17. Towers are erected with cranes. The size of these cranes starts at 50 tons. It is presumed that a flat area is required from which the crane could be operated. However, it was not clear if vegetation clearance would be required.
18. After towers have been erected, the stringing of the cables begins. Cable drums are placed next to each other and stringing takes place in both directions from the drum stations. Up to 4km can be strung from one station in each direction. The working area at each drum station can be as long as 130m but will be confined to the servitude width. Intensive vehicle movement may take place within this working area. A pilot tractor places the pilot cable on the ground, which is pulled up through the use of a pulley. Conductors must not touch the ground as this will result in damage which will impact on the operation of the line. In mountainous areas, a helicopter can be used for stringing or the pilot rope can be shot across valleys.
19. The line is tensioned from each cable station to ensure minimum ground clearance heights required for the particular power line in question are achieved.
20. Rehabilitation of the construction site (mainly the servitude) is a continuous process. However, final rehabilitation starts after about 100 towers have been strung. The contractor is required to give one year's guarantee on their work, in which time rehabilitation must be concluded. Each landowner has to sign a release form once their area has been rehabilitated, indicating that they are satisfied that everything has been left as agreed. Quotations are sourced and a proposal prepared to reimburse landowners for damages, if required. The proposal goes through a tender committee at

which the payment is approved. All damages, including damages to crops must be paid and also signed off by the landowner.

21. A final inspection is done by Eskom together with the affected landowner to determine whether rehabilitation has taken place to the satisfaction of the landowner.

Some of the initial activities only involve a limited number of specialised people that moves through the servitude. It is only when bush clearance starts that larger numbers of construction workers come onto site. The following teams are active on site:

- **Bush clearance team:** Consisting of between 10–20 people, depending on local conditions (e.g. less people would be needed in the Karoo than in the bushveld). This team could also be involved in erecting gates. If a separate team put up gates, a team size of around 5 people could be expected. The potential for recruiting local labour for these teams is extensive.
- **Foundations team:** Consisting of between 35–45 members per team. More than one team could be used to accelerate construction. Although there is an opportunity for local labour to be recruited in this team, it is limited to unskilled activities.
- **Assembly team:** Consisting of between 10–25 people per team. More than one team could be used to accelerate construction. Limited potential for recruitment of local labour exists as this task largely requires skilled labour.
- **Erection team:** Size 15 – 20 people per team. No potential for recruitment of local labour as highly skilled teams are required for this task.
- **Stringing team:** Consisting of approximately 120 people. Limited potential for recruiting local labour as this task largely requires skilled labour.
- **Rehabilitation team:** Consisting of between 5–15 people, depending on site conditions. These teams could be involved in different activities. Limited potential for recruiting local labour as this task largely requires skilled labour.

3. SOCIAL CHANGE PROCESSES AND IMPACT ASSESSMENT

In order to address the overall objective of this study, it was necessary to compile a detailed description of the study area. The first subsection below provides a profile of the social processes in terms of demographical, geographical, economical, institutional and empowerment, and socio-cultural baseline conditions in the study area. Each subsection concludes with a table summarising how the project is likely to change these baseline profiles, and a detailed assessment of the related impacts that could be expected as a result of the project.

A change process can be defined as change that takes place within the receiving environment as a result of a direct or indirect intervention. A potential impact follows as a result of the change process. However, a change process can only result in an impact once it is experienced as such by an individual/community on a physical and/or cognitive level.

Baseline Demographic Profile

Demographic processes relate to the number of people and composition of a community and include an overview of the population size and the educational profile of the affected communities.

Unless otherwise stated, the baseline social profile was compiled based on data obtained from Census 2001 and the Community Survey (CS) 2007. It is important for readers to note that CS data does not replace Census data, but that the CS is merely an attempt to adjust measurements to a best estimate. In this regard, Statistics South Africa has stated the following: *“Any adjustment done [in CS 2007] has maintained the profiling of the community in terms of the people and households while compensating and correcting the undercounted bias by different projections on national, provincial and municipalities.”*⁷

Therefore, please bear in mind that the following data should only be viewed as indicative of the broad trends within the area and not as a rigid representation of the area.

3.1.1 Population

The KLM covers an area of approximately 2 202km² and in 2007 had a total population of 104 150 people. Compared to the population size of 2001, when the population stood at approximately 160 752 people, this means that the population size within the KLM decreased at an average rate of 9 434 people per annum or a total of 56 602 over the 6-year period between 2001 and 2007. This population decrease also brought about a change in

⁷ Statistics South Africa: Community Survey 2007: Key Municipal Data: ix.

the population density in the area from 73.0 persons per km² in 2001 to 47.3 persons per km² in 2007.

The City of Tshwane Metropolitan Municipality (CTMM) covers an area of 2 175km², which is more or less the same size of the KLM. In 2001, the CTMM had a total population of 1 982 228 people (with a population density of approximately 911.8 people per km²), which increased at an average rate of 60 612 persons per annum to a total population of 2 345 907 people in 2007. This increase in the population size also affected the population density in the area, which grew at an average of 27.9 persons per km² to a population density of approximately 1 079.1 persons per km² in 2007. As is the case with the KLM, the predominant population group is Black African (74.6%), followed by White (22.1%).

In 2007, the CJMM was home to close on 3.9 million people. When compared to 2001, this translates to an average population growth rate of approximately 20.5%. The city's population is therefore expanding at an average rate of 110 480 people per annum. The population density is high at approximately 2 363.6 persons per km², which is more than double than that of the CTMM and approximately 50 times higher than the population density of the KLM. However, it should be noted that known high density areas such as Alexandra and Soweto might skew this data, whereas previously known 'white areas' are known to have lower population densities.

When considering the households within these areas, the following definition was applied: *"One or more people occupying a housing unit as their usual place of residence. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated people who share living arrangements"*.⁸

In 2001, the KLM had a total of 50 427 households which steadily decreased at a rate of 3 127 households per annum to a total of 31 666 households in 2007. In both the CTMM and the CJMM the number of households increased between the years 2001 and 2007, by approximately 26 379 additional households per annum in the CTMM, and 14 854 households per annum in the CJMM. The total number of households in the CTMM therefore stood at 686 641 in 2007, whereas in the CJMM it stood at 1 116 014 households.

It seems that in both areas (the CTMM and the CJMM) the number of households developed more or less on par with the population growth rate so that there has been an average increase of 0.1 persons per household over the 6-year period between 2001.

The predominant population groups in the whole of the study area remained the same between 2001 and 2007 and are therefore still Black African (84.0% for the KLM, 74.6% for the CTMM and 74.8% for the CJMM), followed by White (14.1% for the KLM, 22.1% for the CTMM and 15.0% for the CJMM). In all the areas, the female population group was slightly

⁸ irhr.ua.edu/blackbelt/glossary.html

bigger than that of their male counterparts at 51.2% for the KLM, 50.1% for the CTMM and 50.4% for the CJMM.

More than two thirds (ranging between 66% and 70%) of the total population of the study fall within the working age category, which is defined by Statistics South Africa as the ages between 15 and 64.

Table 2 below provides an overview of the population demographics of the study area in relation to South Africa as a whole, the province and the district. From this table it is evident that there are more females than males in the study area, which, might be ascribed to the migrant labour patterns in South Africa where the male moves to a different area in search of work. If this is the case, it can very well be assumed that these males are employed elsewhere and would therefore not be seeking work at the proposed project. It is therefore necessary to take cognisance of the fact that a large segment of work seekers might be female.

Table 2: Summary of Population Characteristics

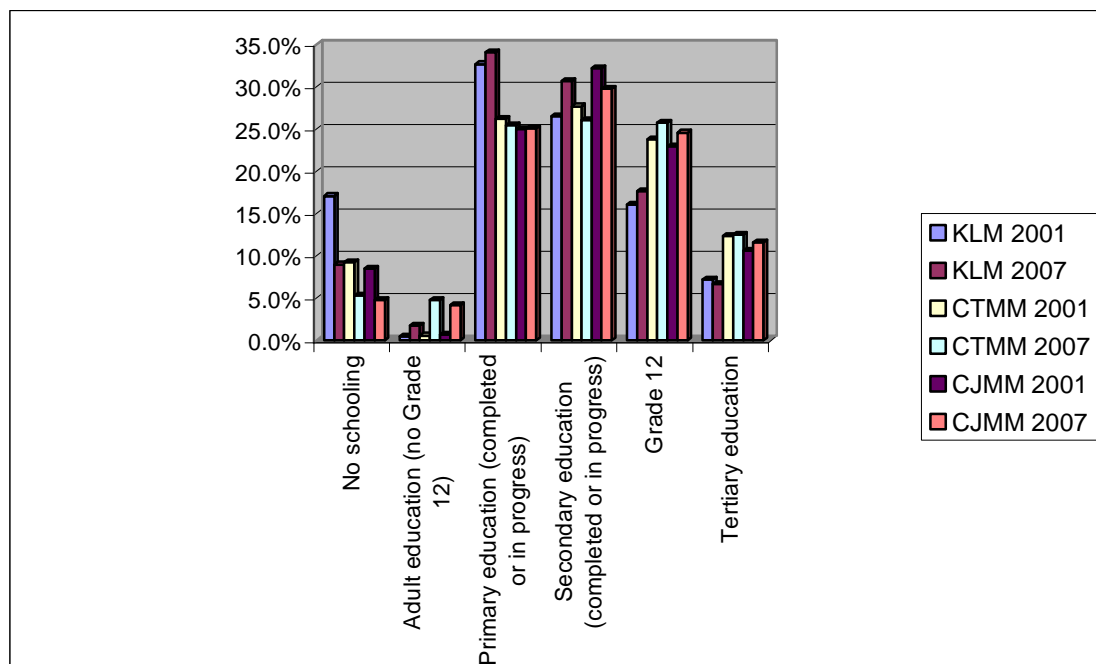
	South Africa	GP	CJMM		CTMM		MDM		KLM	
	2007		2001	2007	2001	2007	2001	2007	2001	2007
Area size (km ²)	1 219 912	16 927	1 645		2 175		4 063		2 202	
Total population	48 502 063	10 451 713	3 225 301	3 888 180	1 982 233	2 345 907	160 752	153 539	160 752	104 150
			Average increase of 110 480 persons per annum		Average increase of 60 612 persons per annum		Average decrease of 1 202 persons per annum		Average decrease of 9 434 persons per annum	
Population density (people per km ²)	39.8	617.5	1 960.7	2 363.6	911.8	1 079.1	39.6	37.8	73.0	47.3
			Average increase of xxx persons per km ² per annum		Average increase of 27.9 persons per km ² per annum		Average decrease of 0.3 persons per km ² per annum		Average decrease of 4.3 persons per km ² per annum	
Total households	12 500 610	3 175 579	1 006 742	1 165 014	597 515	686 641	50 427	46 503	50 427	31 666
			Average increase of 26 379 households per annum		Average increase of 14 854 households per annum		Average decrease of 654 households per annum		Average decrease of 3 127 households per annum	
Avg. persons per household	3.9	3.3	3.2	3.3	3.3	3.4	3.2	3.3	3.2	3.3
Predominant Population Groups	Black African (79.5%) ⁹	Black African (75.2%) White (18.4%)	Black African (73.5%) White (16.0%)	Black African (74.8%) White (15.0%)	Black African (72.6%) Whites (23.9%)	Black African (74.6%) Whites (22.1%)	Black African (78.0%) Whites (20.0%)	Black African (77.9%) Whites (19.9%)	Black African (78.0%) Whites (20.0%)	Black African (84.0%) Whites (14.1%)
			Black African population increased by approximately 1.3%, whereas White population decreased by		Black African population increased by approximately 2.0%, whereas White population decreased by		Both the Black African and White population decreased by approximately 0.1%, respectively.		Black African population increased by approximately 6.0%, whereas White population decreased by	

	South Africa	GP	CJMM		CTMM		MDM		KLM	
	2007		2001	2007	2001	2007	2001	2007	2001	2007
			approximately 1.0%.		approximately 1.8%.				approximately 5.9%.	
Predominant Gender	Female (50.8%) ⁹	Male (50.3%)	Male (50.0%) Female (50.0%)	Female (50.4%)	Female (50.7%)	Female (50.1%)	Male (52.3%)	Male (51.3%)	Male (52.3%)	Female (51.2%)
Predominant Age Group	Working age (% unknown)	Working age (70.0%)	Working age (73.2%)	Working age (70.4%)	Working age (71.0%)	Working age (70.6%)	Working age (70.0%)	Working age (67.9%)	Working age (70.0%)	Working age (66.2%)

3.1.2 Education

An overview of the educational profile for the study area on local municipal level is provided in Figure 4. Overall it would appear as if the area is characterised by a semi-skilled to skilled population, which is reflected in the fact that, in 2007, only a small minority of the population has had no form of formal education.

Figure 4: Comparative educational profile (Grouped) for the Study Area



When considering the educational levels reported for the total population of the study area between 2001 and 2007, the number of people who attended and/or completed a primary level education, decreased as reflected in figure 4 above. On the upside, the number of people who have had no schooling also decreased, while at the same time the number of people who completed some form of secondary education increased.

The number of people who obtained a higher (post-Grade 12) qualification also increased. The increase in the secondary and tertiary educational levels could be as a result of people's need to get out of the poverty cycle, thereby realising that some form of education might be beneficial.

One of the driving forces behind social change is educational attainment, which in turn is linked to poverty levels as there appears to be a correlation between the level of educational attainment and income levels. People with higher educational levels tend to be economically better off, and therefore contribute more to the reduction of the unemployment rate. Educational attainment is also linked to poverty in the sense that funds are required to

further studies, therefore people living in less favourable economic conditions tend to be unable to further their education, which in turn holds them in a downward poverty spiral.

Demographic Change Processes and Resultants Impacts

It is expected that the construction and operation of the proposed transmission power line will lead to a change in the number and composition of the population within the affected areas, which in turn may impact on health, safety and community cohesion (these impacts are discussed in more detail in the socio-cultural section).

Expected Impacts

Table 3 below provides an overview of the expected change process to occur as well as the expected impacts that might occur as a result of these change processes taking place.

Table 3: *Expected Demographic Change Processes*

DEMOGRAPHIC CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
Population change	Will the development lead to an increase in numbers of a certain section of the population, e.g. migratory workers?	X		Influx of construction workers that will lead to a change in the number and composition of the local community, and impact on economy, health, safety and social well-being.
In-migration of unemployed work seekers	Will the development intentionally or unintentionally contribute to the in-migration of work seekers into the area?	X		Influx of job seekers that will lead to a change in the number and composition of the local community, and impact on economy, health, safety and social well-being.
Relocation or displacement of individuals or families	Will the development at this or future stages lead to the relocation of residents?	X		Relocation of households would have an impact on people's way of life and the standard of life that these people have grown accustomed to.

Construction & Decommissioning Phases

This sub-section deals with the expected demographic change processes and resultant impacts that can be expected with the introduction of the proposed project to the affected areas. The demographic change processes that can be expected during this phase of the project are as follows:

- Influx of construction workers;

- Influx of job seekers;
- Relocation of households and/or population segments.

These change processes will be discussed separately together with a detailed assessment of the expected impact as a result of the change process taking place. All the demographic change processes during the construction and decommissioning phases, apart from relocation of households and/or population segments, are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives.

- **Influx of Construction Workers**

The impact of the influx of construction/decommissioning workers is mostly applicable to the areas surrounding the construction camps where workers spend evenings and weekends. Contact between the local community and the workers can be expected and conflict could be expected. An estimated total of approximately 245 people from various disciplines will form part of the construction team. As some of these disciplines require unskilled labour, up to a total number of approximately 20 people, it is assumed that this segment of the construction team would be sourced from within the local area, thereby reducing the number of construction workers who enter the area to approximately 225 people.

On a total population of 104 150 people, as is the case with the KLM, this means a population increase of approximately 0.2% over the construction period. In the CTMM and CJMM, this influx results in a population increase of between 0.005% and 0.01%, which is regarded as an insignificant increase. The influx of construction workers to the area is therefore not expected to cause any significant impacts on the baseline population size. It is however unclear if, and how many, of these construction workers will live in a construction village.

- **Influx of Job Seekers**

Job seekers can be expected in the area, either at the construction village or at the construction site. Although a small number of job seekers could be employed in this way, job seekers mostly hang around the camp for a few days in the hope of securing a job on site. Local individuals could jeopardise their current employment in leaving their workplace in the hope of earning a better income in construction. It is not possible to accurately predict the amount of job seekers that would flood to the area, which could range from a single job seeker to hundreds and thousands of job seekers.

The influx of job seekers into the environment will lead to an increased demand on local services and will not necessarily lead to a boost in the local economy, seeing as these job seekers are mostly unemployed. The influx of job seekers might further lead to conflict with local residents in respect of competition over limited job opportunities.

Apart from situations such as these, the influx of job seekers could also lead to the expansion of informal settlements, which could be close to the servitude area, as these settlers have no resources and therefore aim to settle as close to economic activity as possible. A construction site or process taking place in the area is viewed as an economic activity as it might offer the opportunity of employment. A job seeker would normally first live in the field while trying to secure employment at the construction site. Later on he/she might grow accustomed to the area (even if they did not secure employment) and then also move their family into the area, which is normally the period in which they would construct a more 'formal' housing structure.

An assessment of these category 1 impacts was conducted through the use of the assessment criteria (outlined in section 1.3.1) to determine the significance of each of the identified issues, as per table 3a below.

Table 3a: Construction & Decommissioning Phases: Demographic Change Processes Category 1 Impact Assessment

	Significance		Spatial		Duration		Degree of Probability		Degree of Certainty		Risk	Status
PRE-MITIGATION												
Influx of construction workers	Very low	1	Study area	2	Incidental	1	Could happen	3	Possible	0.78	Very low	Negative
Influx of job seekers	Low	2	Study area	2	Short term	2	Could happen	3	Possible	0.96	Very low	Negative
POST MITIGATION												
Influx of construction workers	No impact	0	Study area	2	Incidental	1	Could happen	3	Possible	0.6	Very low	Neutral
Influx of job seekers	Very low	1	Study area	2	Incidental	1	Could happen	3	Possible	0.78	Very low	Negative
MITIGATION MEASURES												
<p>Construction Workers:</p> <ul style="list-style-type: none"> • Raise awareness amongst construction workers about local traditions and practices. • Inform local businesses that construction workers will move into the area to enable local businesses to plan for the extra demand. • Ensure that the local community communicate their expectations of construction workers' behaviour with them. • Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers could also be issued with identification tags. 						<p>Job Seekers:</p> <ul style="list-style-type: none"> • Ensure that employment procedures / policy are communicated to local stakeholders, especially community representative organisations and ward councillors. • Have clear rules and regulations for access to the camp / site office to control loitering. Consult with the local SAPS to establish standard operating procedures for the control and/or removal of loiterers at the construction site. • Eskom (or its appointed contractor) should monitor areas where people gather in the field on a regular basis as this is normally the first indication that settlement might take place in the area. These people should be removed in co-operation with the local SAPS to prevent the formation and/or expansion of informal settlements in such an area, especially if it encroaches upon the servitude. 						

- **Relocation of Households and/or Population Segments**

In various cases along the proposed alternative route corridors, settlement has taken place within the existing transmission power lines' servitudes. By proxy this means that settlement would also encroach on or within the proposed new servitude. This also implies that relocation would have to take place of households that have settled within the existing servitude.

On the corridor between the Lulumisa and Minerva substations, a total of 12 buildings could be found that are either within the existing servitude or encroach upon the proposed new servitude. The majority of these structures (10 residential houses) are located within the Laezonia Agricultural Holdings area, west of the R511. Figure 5 below provides an approximate location of the incidences of settlement within the servitude (indicated by red arrows).

Figure 5: Areas of settlement within servitude on the section between the Lulumisa and Minerva Substations



Source: Google Earth and GPS waypoints

On the section through Olievenhoutbosch, a total of either 106 or 83 residential houses were observed within the proposed new servitude, depending on whether the proposed new transmission power line would be to the north or to the south of the existing transmission power line. If the new line is located to the north of the existing line, a total of 83 residential houses would be affected, whereas a total of 106 residential houses would be affected if the new line is located south of the existing line. However, on the northern side of the existing

line, an informal settlement was observed that encroached upon the servitude. A further 7 structures were observed either within or in very close proximity to the proposed servitude, as reflected in figure 6 below.

Figure 6: Areas of settlement within servitude on the section between Minerva Substation and the Apollo Converter Station



Source: Google Earth and GPS waypoints

A total of 28 structures were observed either within or in close proximity to the proposed servitude on the **northern alternative** section between the Apollo Converter Station and the Bravo Power Station. Most of these structures (25 residential houses) are located in the Tierpoort Small Holdings area, which is located east of the R50 and west of the R515. The approximate location of the affected structures on the northern alternative is as per figure 7 below.

Figure 6: Areas of settlement within servitude on the northern alternative section between the Apollo Converter Station and the Bravo Power Station



Source: Google Earth and GPS waypoints

On the **central alternative** section between the Apollo Converter Station and the Bravo Power station, a total of 7 structures were observed. However, as this is mostly a 'greenfields' alternative, it is believed that all these structures could be avoided by amending the alignment slightly. The approximate location of the affected structures on the central alternative is as per figure 7 below.

Figure 7: Areas of settlement within servitude on the central alternative section between the Apollo Converter Station and the Bravo Power Station



Source: Google Earth and GPS waypoints

A total of 11 structures have been observed either in or in close proximity of the servitude on the **southern alignment** section between the Apollo Converter Station and the Bravo Power Station. The approximate location of the affected structures on the southern alternative is as per figure 8 below.

Figure 8: Areas of settlement within servitude on the southern alternative section between the Apollo Converter Station and the Bravo Power Station



Source: Google Earth and GPS waypoints

In all instances it is not foreseen that these households would necessarily have to be resettled as it might also be possible to fine-tune the alignment that is preferred in the end to avoid such households.

Furthermore, the possibility cannot be ruled out that some areas will not be inhabited by the time construction commences, notably where the alignment comes in close proximity to the informal settlement at Olievenhoutbosch. In the past, there have been incidences where households have deliberately settled in an area that is known to be earmarked as a servitude. Such households then claim to have been living in that area for an extended period of time. Such claims are motivated by the fact that they might be able to claim compensation from Eskom for having to be resettled.

Furthermore, the uncontrolled development of informal settlements could lead to a situation where Eskom does not have unrestricted access to their servitudes. In such an instance, Eskom would not be able to reach the transmission power line in the event of either routine maintenance or an emergency (malfunctioning) on the line. This could cause severe delays on maintenance being carried out. People settling within the servitude would also impact on their own health and safety.

As the impact of relocation depends on the level of attachment to a place, which in turn is informed by variables such as age and number of years spent in that particular area, it is

believed that if the servitude is inspected for settlement on a regular basis, Eskom would be able to remove people and/or households from the servitude without causing severe negative impacts. The sooner that people are removed from the servitude, the less likely it becomes that they have become attached to the area, as they have only been living there for a short space of time. The impact is therefore not viewed as purely negative due to the fact that Eskom would have unrestricted access to their servitude in case of emergency. The safety of the relocated party would also be enhanced if they are removed from the servitude.

An assessment of this category 2 impact, which is those impacts that are expected to cause significant changes between the proposed alternatives, was conducted through the use of the assessment criteria (outlined in section 1.3.1) to determine the significance of the impact per site, as per table 4b below.

Table 4b: Construction & Decommissioning Phases: Demographic Change Processes Category 2 Impact Assessment: Relocation of Households and/or Population Segment

	Lulumisa – Minerva Section		Minerva – Apollo Section		Apollo – Bravo Section					
					Northern Alternative		Central Alternative		Southern Alternative	
PRE-MITIGATION										
Significance	High	4	High	4	High	4	High	4	High	4
Spatial	Study area	2	Study area	2	Study area	2	Study area	2	Study area	2
Duration	Permanent	5	Permanent	5	Permanent	5	Permanent	5	Permanent	5
Degree of Probability	Very likely	4	Going to happen	5	Very likely	4	Could happen	3	Very likely	4
Degree of Certainty	Probable		Definite		Probable		Possible		Probable	
Risk	2.96	Moderate	3.7	High	2.96	Moderate	2.22	Moderate	2.96	Moderate
Status	Negative		Negative		Negative		Negative		Negative	
POST-MITIGATION										
Significance	Moderate	3	Moderate	4	Moderate	3	Moderate	3	Moderate	3
Spatial	Isolated	1	Isolated	1	Isolated	1	Isolated	1	Isolated	1
Duration	Permanent	5	Permanent	5	Permanent	5	Permanent	5	Permanent	5
Degree of Probability	Very likely	4	Very likely	4	Very likely	4	Could happen	3	Very likely	4
Degree of Certainty	Probable		Probable		Definite		Possible		Probable	
Risk	2.4	Moderate	2.64	Moderate	2.4	Moderate	1.8	Low	2.4	Moderate
Status	Negative		Negative		Negative		Negative		Negative	

Lulumisa – Minerva Section	Minerva – Apollo Section	Apollo – Bravo Section		
		Northern Alternative	Central Alternative	Southern Alternative

MITIGATION MEASURES

- Avoid the resettlement and/or displacement of households as far as possible by realigning sections of the preferred route corridor to avoid areas of human settlement – this is especially required in Olievenhoutbosch. If technically feasible, it is suggested that the transmission power line exit the Minerva substation to the south and continue in a southerly direction past Olievenhoutbosch after which it can turn in a easterly direction.
- If resettlement is unavoidable, residents should be sufficiently compensated and assisted with the relocation process.
- A form of compensation should also be granted to individuals who are residing in informal settlements within the servitude.
- A formal grievance procedure should be implemented and communicated to landowners to ensure a fair and transparent process.
- Eskom (or its appointed contractor) should monitor areas where people gather in the field on a regular basis as this is normally the first indication that settlement might take place in the area. These people should be removed in co-operation with the local SAPS to prevent the formation and/or expansion of informal settlements in such an area, especially if it encroaches upon the servitude.
- The servitude should be inspected on a regular basis to determine whether any settlement has taken place, either within the servitude, or encroaching upon the servitude.
- Households that encroach upon or settle within the servitude have to be relocated as soon as possible. Eskom or its appointed contractors should assist these households with the relocation process.
- In some way, a barrier (psychological and/or physical) should indicate that no structures should be built in the servitude. One way of achieving such a barrier is to educate community leaders on the health and safety aspects of the servitude, who then in turn can ensure that settlement does not take place within the servitude.

PREFERRED ALIGNMENT

The **central alternative** affects the least amount of households, followed by the **southern alternative**. The **western alternative** affects the greatest amount of households.

Operation and Maintenance Phase

The size and composition of the maintenance team will depend on the type of maintenance that would be required on the transmission power line. Maintenance on the servitude involves teams who clear the servitude of any vegetation and/or other structures which may impede on the operation of the transmission power line. Prior to servitude maintenance, the servitude is inspected, either by a ground servitude inspection team or by flying over the servitude. Again the size of the maintenance team is dependant on the actual clearing that has to be done. It is however assumed that, because of the fact that bush clearance is viewed as unskilled labour, local residents could be employed on the bush clearance teams.

In any event it is not foreseen that the presence of maintenance teams would lead to the large scale influx of people to the area as maintenance teams are normally small groups. Therefore, no demographic change processes are foreseen during the operation and maintenance phases.

Baseline Geographical Profile

Geographical processes relate to land use patterns and infrastructure in the area. This section therefore describes the land use in the study area from a social perspective, specifically in terms of settlement patterns and land use developments.

Land use is defined as “the way land is developed and used in terms of the types of activities allowed (agriculture, residences, industries, etc.) and the size of buildings and structures permitted. Certain types of pollution problems are often associated with particular land uses, such as sedimentation from construction activities”.¹⁰

Another definition of land use is as follows: “Patterns of land use arise naturally in a culture through customs and practices, but land use may also be formally regulated by zoning, other laws or private agreements such as restrictive covenants”.¹¹

A general assessment of the land uses in the study area indicated the following trends:

- Residential;
- Commercial cattle and crop farming;
- Mining; and
- Industries.

The following subsections briefly describe the land use trends in the municipal areas that formed part of the study area, namely the KLM, the CTMM and the CJMM.

¹⁰ www.soil.ncsu.edu/publications/BMPs/glossary.html

¹¹ www.wikipedia.org/wiki/Land_use.html

Kungwini Local Municipality

According to the KLM IDP, agriculture is the most dominant land use in the total district area of Metsweding. Even though agriculture accounts for approximately 80% of the land use in the district, it only contributed approximately 3.7% to the local economy¹². The bulk of production within the agriculture sector takes place on privately owned commercial farms, notably farms around Bronkhorstspuit. The most significant farming commodities are cattle and crop farming. In terms of crop farming, commodities include maize, ground-nuts, sunflowers, cotton and sorghum. Vegetables are mostly produced on subsistence farms, which are cultivated for private use or sometimes sold on the informal market.

The tourism industry in the KLM is regarded as small, but developing. The best known tourist attractions in the area include the following:

- Bronkhorstspuit Dam;
- Various nature reserves;
- Conference and accommodation facilities;
- Nan Hua Buddhist temple; and
- Sizanani Cultural village.

Mining is another important land use within the KLM, and includes the extracting and beneficiating of minerals including solids, liquids and crude petroleum and gas. These minerals are extracted through underground and surface mining operations, as well as quarries. The majority of mines within the KLM extract silica.

According to the KLM IDP, there is a total of 23 informal settlements within the KLM, ranging in size from as small as 9 shacks to as large as 4 000 shacks per settlement.

Figures 9 to 11 below provides an overview of the land use surrounding the proposed transmission power line corridor sections within the KLM's area of jurisdiction.

¹² Kungwini Local Municipality Integrated Development Plan 2008/09

Figure 9: Land use surrounding the northern alternative within the KLM



Figure 10: Land use surrounding the central alternative within the KLM

Figure 11: Land use surrounding the southern corridor within the KLM (new corridor parallel to existing transmission power line in distance)



City of Tshwane Metropolitan Municipality

The City of Tshwane Metropolitan Municipality (CTMM) has developed a spatial development strategy to guide its Spatial Development Framework (SDF). It is believed that the CTMM should not be viewed as a single city, but rather as a polycentric (multi-nodal) metropolitan region. Currently the CTMM experiences development pressure in the central, eastern and southern parts of the city. Furthermore, the continued outward urban sprawl hampers the delivery of effective municipal services to these areas, even in cases where such developments are located within existing urban areas. The main aim of the Tshwane Spatial Development Strategy (TSDS) is therefore to integrate the municipal areas to enable an efficient, equitable, liveable and sustainable urban environment. In support of this aim, the following objectives have been identified:

- Residential areas should be integrated with areas of economic and social opportunity;
- Those segments of the population who are living in poverty should be integrated in to the mainstream functioning of the city;
- Increase the density in strategic areas within the CTMM;
- Areas that are suitable to economic development should be identified;
- Movement networks within the CTMM should be identified;
- Direct infrastructure investment should take place within strategic focus areas;
- Human settlements should be sustainable and foster healthy communities;
- The CTMM should play a unique roll within the GP; and

- A sustainable metropolitan area should be created in terms of environmental, social and economic aspects.

Furthermore, the CTMM has identified the metropolitan open space network as an important structuring element and therefore the presence of such open spaces has a decisive influence on where development would be allowed. Open spaces include rivers, mountains, protected areas, dams, nature reserves, wetlands, etc. These areas are excluded from any future developments to ensure that the ecological integrity of the city is protected.

The CTMM have also identified potential movement corridors and encourages development in relation to these movement corridors. Currently four existing and/or potential corridors have been identified:

- The N1/Ben Schoeman Highway link between Johannesburg/Midrand and Tshwane;
- The R21 link between Tshwane and O.R. Tambo International Airport;
- The Bakwena-Platinum Highway Corridor (Zone of Choice); and
- The Mabopane-Centurion Corridor around the proposed western bypass.

Apart from the protection of open spaces and the enhancement of developments along movement corridors, certain specialised activity areas have also been identified. A specialised activity area is an area that makes provision for specialised development such as industrial areas, educational areas, high-tech areas, etc. These specialised activity areas are mostly closely interlinked with the development corridors described above. The majority of these specialised activity areas are located within the quadrant between the PWV9, the N1 and the PWV2.

Figure 12 below provides an overview of the land use surrounding the proposed transmission power line corridor section within the CTMM's area of jurisdiction.



Figure 12: Land use surrounding the proposed route corridor section through the CTMM

City of Johannesburg Metropolitan Municipality

In keeping with the CJMM's 2030 vision for the City of Johannesburg, economic growth and improved levels of production and consumption should be socially, economically and environmentally sustainable. This in turn will require integrated management of the natural environment, the built environment and the human environment. In terms of these three environments the preferred state is as follows¹³:

- *Natural environment*: the remaining biodiversity, ecosystems and natural open spaces should be conserved and scarce natural resources should be used efficiently.
- *Built environment*: the cultural and historical heritage of the area should be conserved, and buildings and open spaces should be aesthetically pleasing and designed in such a way that it supports ecological principles.
- *Human environment*: the environment in which people work, relax and interact should be safe and healthy, the air and water should be clean and noise should not be invasive. The environment should also provide sufficient opportunities for leisure and should promote individual and community well-being.

The CJMM has a nodal hierarchy that distinguishes between mixed use nodes and specialist nodes. Every node has a distinct character with its own development rationale. The growth of these nodal points is regulated by the City to prevent situations where, for example, non-residential uses creep into residential nodes. Nodes are mostly characterised by:

- Activity clusters based on convenience and accessibility;
- Highly accessible by both public as well as private transport and transport routes;
- Mixed activities and diverse public facilities;
- Density of development; and
- A definite nodal core that supports mostly pedestrian traffic, but which does not exclude vehicular traffic completely.

In addition to these development nodes, there are also two major corridors in the city, namely the East-West Corridor and the North-South Corridor. Applicable to this study is the North-South Corridor which runs north of the municipal boundary along the alignment of the N1/M1 highways. The corridor is characterised by high-tech industries and offices.

Figures 13-15 below provides an overview of the land use surrounding the proposed transmission power line corridor sections within the CJMM's area of jurisdiction.

¹³ COJ State of the Environment, 2003.

Figure 13: Land use surrounding the Lulumisa substation in the Diepsloot area



Figure 14: Land use surrounding proposed route corridor north of the N14

Figure 15: *Olievenhoutbosch with corridor in distance (parallel to existing transmission power lines)*

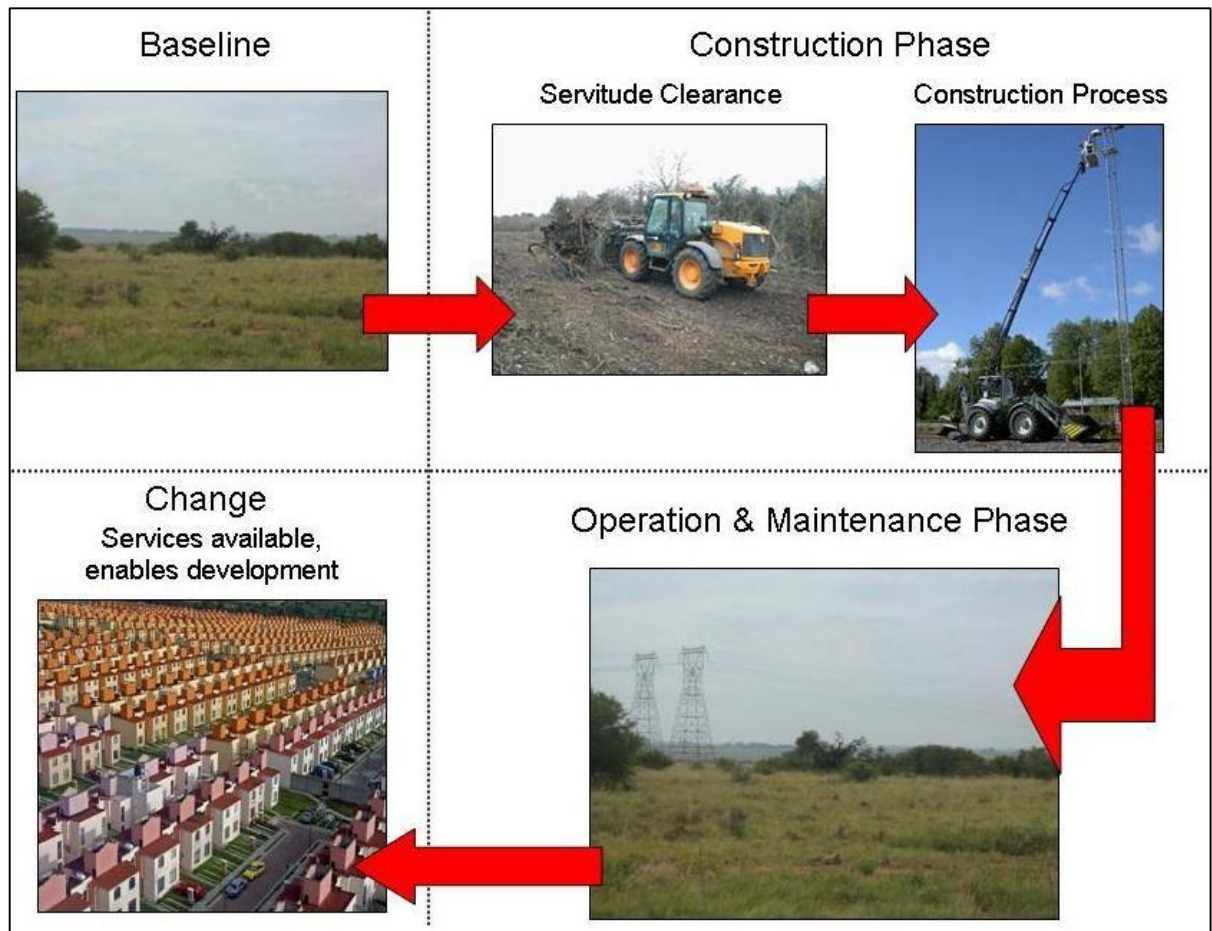


Expected Geographical Change Processes

Geographical change processes refer changes in land use, whether it is on a temporary or permanent basis. The construction and operation of a transmission power line will lead to a change in the land use, mostly as a result of the surface infrastructure. The assessment of a land use change process from a social perspective takes into account how the proposed transmission power lines might affect the behaviour and/or lives of landowners and/or land users in the area.

In light of the above, potential geographical impacts from a social perspective are considered within the context of change processes in the use of the land. An example of how the presence of a transmission power line could lead to land use changes is illustrated in figure 16.

Figure 16: Land use change process



Photos for illustration purposes only

Expected Impacts

Table 5 below provides an overview of the expected change process as well as the expected impacts that might occur as a result of the change process taking place.

Table 5: Geographical Change Processes

GEOGRAPHICAL CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
Access to environmental resources	Will the development impact on people's access to environmental resources, such as water, wood, medicinal plants etc?		X	No impact foreseen.
Change in access to resources that sustain livelihoods	Will the development impact on people's (legal or illegal, formal or informal) access to environmental resources that help to sustain their livelihoods, e.g. grazing land for their cattle; wood for	X		Temporary loss of cultivated and grazing land due to construction activities, leads to a decreased area for cultivation and grazing,

GEOGRAPHICAL CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
	heat/cooking/selling, etc.?			resulting in an economic impact. Also permanent loss of cultivated and grazing land through the land acquisition process.
Land acquisition and disposal, including availability of land	Will the development contribute to or directly impact on the ability of local residents to keep or acquire property/land?	X		Permanent servitude of 55m will restrict access to that portion of land, although certain land uses will still be permitted within the servitude.
	Will the development set a precedent for change in land use in the area?		X	No impact foreseen.
	Are there any potential land-claims for the area?		X	No impact foreseen.
	Will the development affect the claims process?	-	-	Not applicable.

Construction & Decommissioning Phases

This sub-section deals with the expected geographical change processes and resultant impacts that can be expected with the introduction of the proposed project to the affected areas. The geographical change processes that can be expected during this phase of the project relate to the following land uses:

- Cultivated land; and
- Grazing land.

These change processes will be discussed separately together with a detailed assessment of the expected impact as a result of the change process taking place. The change processes during the construction and decommissioning phases are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, as all of the corridor alternatives pass through agricultural land at same stage, either in whole or in part.

- **Cultivated land**

A temporary loss of cultivated land can be expected during the construction of the proposed Transmission power line due to the physical space needed for these construction activities. This would mean that a farmer would not have access to a part of his/her land for the

cultivation and/or harvesting of crops for the duration of the construction activities, which in turn would result in a temporary loss of income for that portion of the land. Where crops are cleared for the servitude, this would have an economic impact on the farmer as a result of a reduced harvest. However, normally the loss of cultivated land is considered during the negotiation process and included in the compensation amount payable to the landowner.

- **Grazing land**

As is the case with cultivated land, a temporary loss of grazing land can also be expected during the construction phase due to the physical space needed for the construction activities. This would mean that a farmer would not have access to a part of his/her grazing land for the duration of the construction activities, which might have planning and economic implications.

An assessment of these category 1 impacts was conducted through the use of the assessment criteria (outlined in section 1.3.1) to determine the significance of each of the identified issues, as per table 5a below.

Table 5a: Construction & Decommissioning Phases: Geographical Change Processes Category 1 Impact Assessment

	Significance		Spatial		Duration		Degree of Probability		Degree of Certainty		Risk	Status
PRE-MITIGATION												
Temporary loss of cultivated land	High	4	Study area	2	Short term	2	Very likely	4	Probable	2.16	Moderate	Negative
Temporary loss of grazing land	Moderate	3	Study area	2	Short term	2	Could happen	3	Probable	1.38	Low	Negative
POST MITIGATION												
Temporary loss of cultivated land	Moderate	3	Study area	2	Short term	2	Could happen	3	Probable	1.38	Low	Negative
Temporary loss of grazing land	Low	2	Study area	2	Short term	2	Could happen	3	Probable	1.2	Low	Negative to Neutral
MITIGATION MEASURES												
<p>Cultivated Land:</p> <ul style="list-style-type: none"> • Compensation for the temporary loss of cultivated land should be included in the negotiation process with the landowner. • Initial servitude clearing on the farmland should take place after the harvesting season, as far as possible. Landowners should be compensated for the loss of cultivated land. • The area should be rehabilitated upon completion of the construction activities to ensure that the land is returned in the same condition as prior to the construction activities. 						<p>Grazing Land:</p> <ul style="list-style-type: none"> • Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area). • Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction, as well as relocating cattle back to their original grazing area once construction in an area is completed. • Grazing areas should be rehabilitated to their original grazing conditions to ensure that cattle can continue to graze in the area once they are returned to that area. • Where the area cannot be rehabilitated to its original condition within a reasonable period of time, Eskom or its appointed contractor(s) should provide funding to obtain alternative food sources to the farmer for the time period required for natural rehabilitation to occur within the grazing area. 						

Operation & Maintenance Phase

The geographical change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during this phase of the project are as follows:

- Grazing land;
- Spatial development (future land use); and
- Presence of the transmission power line.

In addition, the following change process that would result in a Category 2 impact, which are those impacts that are expected to cause significant changes between the proposed alternatives, are as follows:

- Cultivated land (including irrigation); and
- Mining.

These change processes will be discussed separately together with a detailed assessment of the expected impact as a result of the change processes taking place.

- **Grazing land**

The presence of towers and Transmission power lines on grazing land pose fewer problems, as cattle can move around towers and therefore less land is lost. The portion of land that was used for construction activities is handed back to the landowner upon completion of these activities. Cattle can move freely under Transmission power lines and around towers to graze. The permanent loss of grazing land is therefore not regarded as significant.

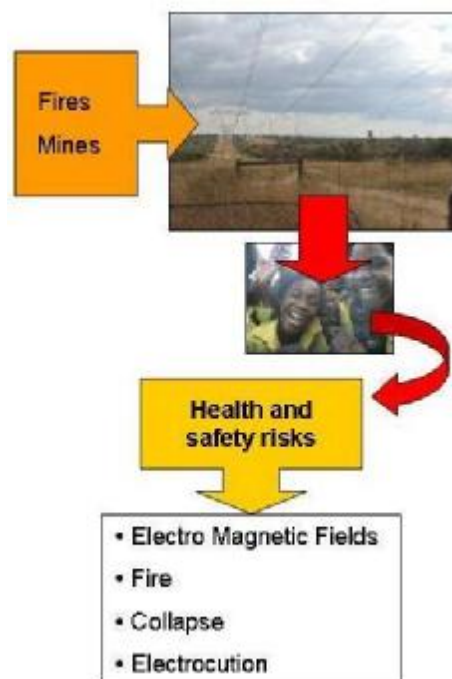
- **Spatial development (future land use)**

Transmission power lines may impact on the development patterns in an area, because structures are not allowed within the servitude. Once a transmission power line is operational, development may occur towards and into the servitude because of normal growth, merging of villages/developments, lack of alternative space, municipal development plans or job expectations because of a project (such as the construction of a transmission power line).

The presence of towers and Transmission power lines could restrict the development plans of local municipalities, as no structures are allowed within the servitude. This would impact on the planning process as development plans would have to be revised to accommodate the presence of a Transmission power line, which would have an economic impact on the municipality. The revision of development plans would also delay developments.

- **Presence of the Transmission power line**

The main social concerns which arise when considering the presence of a transmission power line close to human settlement and potential settlement in the servitude are health and safety aspects as illustrated in the diagram that follows. The intention is that the servitude mitigates these potential health and safety related impacts. Risks are related to Electro and Magnetic Fields (EMF), electrocution, fire and collapse. A line could cause fatal/traumatic accidents because of collapse of a tower and/or lines because of mechanical failure, fire and mining activities. Fire can be caused by of electrical malfunction or human error.



Utilities in South Africa involved in the generation and distribution of electrical energy, are bound by the Occupational Health and Safety (OHS) Act [63] to provide such services in a safe manner. There are currently no regulations (under the Hazardous Substances Act) in terms of exposure to power frequency EMF in South Africa and the International Commission for Non-Ionising Radiation Protection (ICNIRP) guidelines are used for assessing human exposure to these fields. The guidelines for electric and magnetic field exposure set by the ICNIRP, an organisation linked to the World Health Organisation (WHO), receive world-wide support (Pretorius 2006). To manage the risks, the line runs in a servitude in which buildings, and crops higher than 2-4 meters are not allowed (depending on voltage of the line).

The results of a study commissioned by ESKOM Holdings Limited (Pretorius 2006) on the possible health effects of EMF noted the following:

- * The main focus of research has been on a possible association between long term exposure to magnetic fields and childhood leukaemia.
- * Based on the epidemiological findings, the risk of EMF being a health hazard is small.
- * Based on current understanding of the topic, EMF is regarded a possible but not proven cause of cancer.
- * The suggestion for this health outcome stems mainly from a fairly consistent pattern of the increased but small risk observed from some epidemiological studies. This finding has not been confirmed by (notably all) controlled laboratory studies.
- * No evidence of a causal relationship between magnetic field exposure and childhood leukaemia has been found and no dose-response relationship has been shown to exist between EMF exposure and biological effects.
- * A possible explanation for the epidemiological findings may be confounding (a factor other than EMF) or bias (subjects studied are not representative of the target population for which conclusions are drawn) which render the data inconclusive and prevent resolution of the inconsistencies in the epidemiologic data.
- * In general, studies of animal reproductive performance, behaviour, milk production, meat production, health and navigation have found minimal or no effects of EMF. The literature published to date has shown little evidence of adverse effects of EMF from overhead power lines on farm animals and wildlife.

It was concluded that electric and magnetic fields with levels typical of a power line environment, complying with the requirements for proper servitude management as prescribed by the electric utility, are unlikely to affect plants in terms of growth, germination and crop production.

Considering electrocution, transmission lines could pose a safety risk. Induced charges can build up on fence wires mounted on wood posts near power lines.¹⁴ This phenomenon is generally restricted to higher voltage lines (200 kV or greater). The magnitude of the build-up depends on a variety of factors:

- * The size of the power line;
- * The length of fence paralleling the line;
- * The distance between the line and the fence;
- * The amount of moisture in the fence posts and the ground; and

¹⁴ www.greatriverenergy.com/community/power_line_safety.html

* The presence of grounding devices such as metal fence posts or weeds growing next to the fence.

An assessment of these category 1 impacts was conducted through the use of the assessment criteria (outlined in section 1.3.1) to determine the significance of each of the identified issues, as per table 5b below.

Table 5b: Operation & Maintenance Phase: Geographical Change Processes Category 1 Impact Assessment

	Significance	Spatial		Duration		Degree of Probability		Degree of Certainty		Risk	Status	
PRE-MITIGATION												
Permanent loss of grazing land	Low	2	Isolated	1	Incidental	1	Could happen	3	Possible	0.6	Very low	Negative to Neutral
Spatial development (future land use)	High	4	Isolated	1	Long term	4	Could happen	3	Possible	1.8	Low	Negative
Presence of the transmission power line	Moderate	3	Study area	2	Long term	4	Very likely	4	Possible	2.4	Moderate	Negative
POST MITIGATION												
Permanent loss of grazing land	Very low	1	Isolated	1	Incidental	1	Could happen	3	Possible	0.6	Very low	Neutral
Spatial development (future land use)	Moderate	3	Isolated	1	Incidental	1	Could happen	3	Possible	0.78	Very low	Negative
Presence of the transmission power line	Low	2	Study area	2	Long term	4	Could happen	3	Possible	1.62	Low	Negative to Neutral
MITIGATION MEASURES												
Grazing land: <ul style="list-style-type: none"> Where possible, towers should be located on the boundary of the farmland to lessen the loss of grazing land. 			Spatial development: <ul style="list-style-type: none"> Route alignment should avoid both existing and planned settlements, where possible. Route alignment should take cognisance of local development plans. 				Presence of the transmission power line: <ul style="list-style-type: none"> Education local residents on the real and perceived dangers of living close to a Transmission power line. Maintenance of the servitude in terms of restrictions associated with residences within this area. 					

- **Cultivated land (including irrigation)**

Although it is still possible to cultivate land around towers, the presence of a tower does complicate the cultivation process which in some instances could lead to a loss of available land for cultivation.

The presence of a Transmission power line complicates crop spraying by aeroplane and in some instances makes crop spraying from the air impossible due to the fact that the Transmission power lines are in the way.

Furthermore, Electromagnetic Fields (EMF) seems to interfere with Global Positioning System (GPS) equipment and other advanced electronic equipment that is used when ploughing. It has also been reported that Transmission power lines or the resultant EMF interferes with two-way radio systems when these are used in the vicinity of a power line.

In terms of crop irrigation, it is preferable that 400kV lines do not cross centre pivots, because of the proximity of the water to the Transmission power line. Also, the towers might interfere with sub surface irrigation pipes, and the space needed for the centre pivot. Centre pivots are mostly concentrated around the western alignment, with the closest centre pivot located to the south of the western alignment where the corridor exited the Kendal power station. The edge of this irrigated area is approximately 35m south of the southern edge of the western alignment. In all other instances, the centre pivots and irrigated areas are located at a distance of at least 800m or more away from the alignment.

Figure 17 below gives an indication of the location of the centre pivots. However, it should be noted that this image is *not to scale* and therefore it might appear that the some of the alignments cross through centre pivot areas, which is not the case.

Figure 17: Location of irrigation points (centre pivots) in relation to corridor alternatives



An assessment of this category 2 impact was conducted through the use of the assessment criteria (outlined in section 1.3.1) to determine the significance the impact per alignment, as per table 5c below.

Table 5c: Operation & Maintenance Phase: Geographical Change Processes Category 2 Impact Assessment: Cultivated land (including irrigation)

	Lulumisa – Minerva Section		Minerva – Apollo Section		Apollo – Bravo Section					
					Northern Alternative		Central Alternative		Southern Alternative	
PRE-MITIGATION										
Significance	Moderate	3	No impact	0	Moderate	3	Moderate	3	No impact	0
Spatial	Isolated	1	n/a		Isolated	1	Isolated	1	n/a	
Duration	Medium term	3	n/a		Medium term	3	Medium term	3	n/a	
Degree of Probability	Could happen	3	n/a		Could happen	3	Could happen	3	n/a	
Degree of Certainty	Possible		n/a		Possible		Possible		n/a	
Risk	1.62	Low		n/a	1.62	Low	1.62	Low		n/a
Status	Negative		n/a		Negative		Negative		n/a	
POST-MITIGATION										
Significance	Low	2	No impact	0	Low	2	Low	2	No impact	0
Spatial	Isolated	1	n/a		Isolated	1	Isolated	1	n/a	
Duration	Medium term	3	n/a		Medium term	3	Medium term	3	n/a	
Degree of Probability	Unlikely	2	n/a		Unlikely	2	Unlikely	2	n/a	
Degree of Certainty	Possible		n/a		Possible		Possible		n/a	
Risk	0.48	Very low		n/a	0.48	Very low	0.48	Very low		n/a
Status	Negative		n/a		Negative		Negative		n/a	

	Lulumisa – Minerva Section	Minerva – Apollo Section	Apollo – Bravo Section		
			Northern Alternative	Central Alternative	Southern Alternative
MITIGATION MEASURES					
<ul style="list-style-type: none"> • Consultation should take place between the landowner and Eskom to determine the extent of permanent loss of land for cultivation due to the presence of the tower(s). • Upon agreement between the landowner and Eskom, landowners should be compensated for the permanent loss of portions of the land that is unreachable due to the presence of the tower(s). • Where possible, pylons should be located on the border of the farmland to lessen the potential loss of cultivated land. • Alignment should be done in such a way that it is located a safe distance away from centre pivots. 					
PREFERRED ALIGNMENT					
<p>At the time of the study, no irrigation schemes were observed along the southern alternative. There is also only one existing transmission power line along this corridor alternative, which means that less land would be lost than with the northern alternative where there are already two existing transmission power lines.</p>					

- **Mining**

Transmission power lines should avoid mining activities due to the possibility of slumping and underground fires. Also, towers pose a risk to mining activities in the form of towers falling over, with health and safety as well as economic impacts as a result. In turn, the mining activities might also pose a risk to the safety of the Transmission power line; if for example, blasting takes place at the mining operation.

At least 6 existing mining operations have been identified within the study area, which includes the following operations (depicted in figure 18):

Name of Mining Operation	Type of Operation	Closest Alignment
Unknown	Open cast	Northern portion of mining operation within servitude of section between Lulumisa and Minerva substations
Unknown	Open cast	Approximately 1.4km east and 1.2km south of section between Lulumisa and Minerva substations
Unknown	Open cast	Entire operation located within servitude of section between Lulumisa and Minerva substations
Unknown	Open cast	Approximately 460m north of section between Minerva substation and Apollo converter station
Unknown	Open cast colliery	Approximately 240m south of northern alignment
Unknown	Open cast	Approximately 680m south of northern alignment and approximately 360m north of central alignment



Figure 18: Location of mining operations in relation to corridor alternatives

Mineral rights holders have rights to the surface area as well as far as they need the surface area to exercise their right to extract minerals. Therefore, any structures on the mineral rights surface areas have to be approved by the holders of these rights.

Blasting takes place on a regular basis at open cast mining areas, as is associated with many of the mines in the area. Therefore mining operations could have a negative impact on the Transmission power line itself due to blasting (i.e. flying rocks that could potentially hit the Transmission power line, leading to breakdowns and an interruption in electricity supply).

An assessment of this category 2 impact was conducted through the use of the assessment criteria (outlined in section 1.3.1) to determine the significance the impact per alignment, as per table 5d below.

Table 5d: Operation & Maintenance Phase: Geographical Change Processes Category 2 Impact Assessment: Mining Operations

	Lulumisa – Minerva Section		Minerva – Apollo Section		Apollo – Bravo Section					
					Northern Alternative		Central Alternative		Southern Alternative	
PRE-MITIGATION										
Significance	High	4	Moderate	3	Moderate	3	Moderate	3	No impact	0
Spatial	Isolated	1	Isolated	1	Isolated	1	Isolated	1	n/a	
Duration	Medium term	3	Medium term	3	Medium term	3	Medium term	3	n/a	
Degree of Probability	Going to happen	5	Could happen	3	Could happen	3	Could happen	3	n/a	
Degree of Certainty	Probable		Possible		Possible		Possible		n/a	
Risk	2.7	Moderate	1.62	Low	1.62	Low	1.62	Low	-	n/a
Status	Negative		Negative		Negative		Negative		n/a	
POST-MITIGATION										
Significance	Moderate	3	Low	2	Low	2	Low	2	No impact	0
Spatial	Isolated	1	Isolated	1	Isolated	1	Isolated	1	n/a	
Duration	Medium term	3	Medium term	3	Medium term	3	Medium term	3	n/a	
Degree of Probability	Very likely	4	Unlikely	2	Unlikely	2	Unlikely	2	n/a	
Degree of Certainty	Probable		Possible		Possible		Possible		n/a	
Risk	1.84	Low	0.48	Very low	0.48	Very low	0.48	Very low	-	n/a
Status	Negative		Negative		Negative		Negative		n/a	

	Lulumisa – Minerva Section	Minerva – Apollo Section	Apollo – Bravo Section		
			Northern Alternative	Central Alternative	Southern Alternative
MITIGATION MEASURES					
<ul style="list-style-type: none"> • Realignment on the Lulumisa-Minerva section to bypass mining operations, notably where the alignment crosses right over an open cast mining area. 					
PREFERRED ALIGNMENT					
During the time of the study, no mining operations were observed along the southern alternative .					

Baseline Economic Profile

Economic processes relate to the way in which people make a living and the economic activities within that society. The employment status within a community gives an indication of the economic stability of such a community and also serves as an indicator of such a community's general well-being.

Employment and Economic Sectors

Table 6 below provides an overview of the employment and economic sectors of the study area in relation to South Africa as a whole, the province and the district. From this table it is clear that the study area is not only characterised by a predominantly semi-skilled to skilled male population, but also a fairly high employment rate where, on average, close on three quarters of the working age population within the study area is formally employed.

Overall it would therefore appear as if the economy of the study area is growing at a steady pace. As economic industries are growing, more employment opportunities are created thereby further reducing the unemployment rate, creating sources of income which in turn leads to the creation of other opportunities such as further education, a need for housing (which in turn creates further employment opportunities, both directly and indirectly), etc.

Table 6: Summary of Employment and Economic Sectors

	South Africa	GP	CJMM		CTMM		MDM		KLM	
	2001	2007	2001	2007	2001	2007	2001	2007	2001	2007
Employed*	33.7%	52.2%	45.8%	53.7%	46.2%	52.0%	49.2%	52.6%	49.2%	55.7%
Unemployed*	24.0%	21.6%	27.3%	22.6%	21.5%	17.1%	19.4%	12.1%	19.4%	14.5%
Not economically active	42.3%	26.3%	27.0%	23.7%	32.3%	25.9%	31.4%	25.9%	31.4%	29.8%
Employment rate**	58.4%	70.7%	62.7%	70.4%	68.2%	75.3%	71.8%	81.3%	49.2%	79.4%
Predominant industry	Community services (29.1%)	Manufacturing (16.7%)	Unspecified (68.4%)	Unspecified (17.4%)	Unspecified (68.8%)	Unspecified (19.1%)	Unspecified (68.5%)	Unspecified (26.7%)	Unspecified (68.5%)	Unspecified (26.1%)

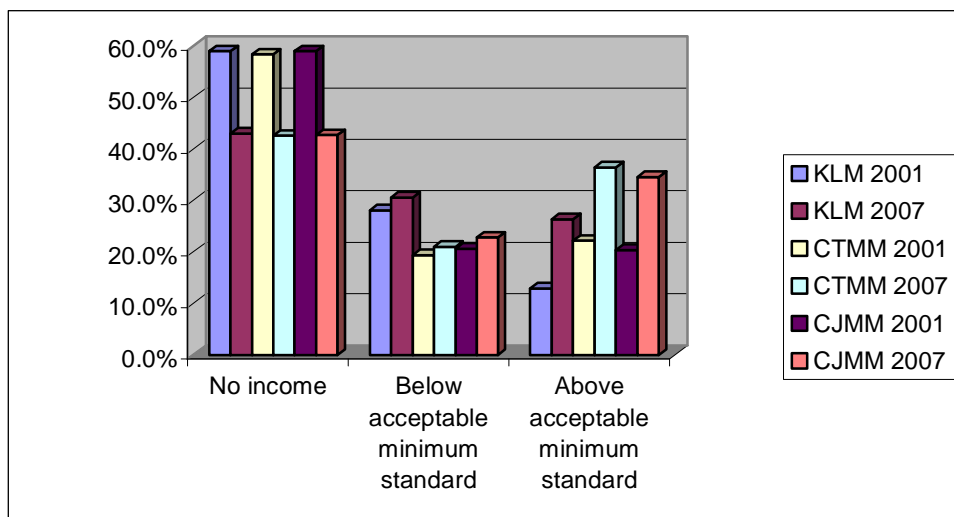
Household and Personal Income

In 2001, one in every 5-6 households in the study area had no annual household income. In addition, approximately a third of the households within the metropolitan areas (Tshwane and Johannesburg) lived below the acceptable minimum standard, with approximately a half (48.9%) of households in Kungwini who lived below the minimum standard. The minimum acceptable standard is nationally defined as an annual household income of at least R20 000 per annum.

Unfortunately Community Survey 2007 did not include data on household incomes and therefore this report also includes an overview of personal income (which was covered in CS 2007) in an attempt to provide an overview of the baseline economic conditions of individuals in the area.

The graph below (Figure 19) provides a comparative overview of the personal income levels of individuals in the study area between 2001 and 2007. However, it should be noted that the 'no income' category also includes persons under the age of 14 (who is not regarded as people within a working age category and therefore would earn no income) as well as persons from the 'not economically active' population, who are therefore not only unemployed, but who are also not actively seeking employment and therefore also do not earn an income.

Figure 19: Overview of Monthly Personal Income (2001 and 2007 compared)



The number of individuals with no personal income decreased by between approximately 15% and 18% over the 6 year period between 2001 and 2007, bearing in mind that a large segment of those with no personal income are either under the age of 14 or not economically active. The number of individuals who earn a personal monthly income below the national accepted minimum standard (defined as earning at least R1 600 per month) has increased by an average of 2% across all the municipal areas between 2001 and 2007. The

number of individuals who earn above the acceptable minimum standard increased on average by approximately 14% in the study area.

From this data, it would appear as if more people entered the economic market, which is linked to the increased employment rate and the broadening of the economic sectors within the study area.

Economical Change Processes and Resultant Impacts

Economical change processes relate to the changes brought about to the employment and general economic profile of the area as a result of the introduction of any development. Employment creates a source of income, which in turn enables the employed individual to access services and a support mechanism for his/her family, thereby enhancing not only the individual's quality of life, but also that of his/her household.

Expected Impacts

Table 7 below provides an overview of the expected change process as well as the expected impacts that might occur as a result of the change process taking place.

Table 7: Economical Change Processes

ECONOMIC CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
Increase in division between rich and poor	Will the development exacerbate class equalities?		X	No impact foreseen.
	Will the development enhance or enforce class inequality?		X	No impact foreseen.
	Will the development deny or enhance economic opportunities for vulnerable communities?	X		Unskilled labour, such as bush clearance, might be sourced from the local area thereby creating job and income opportunities.
	Will the project create different levels of economic opportunity?	X		Depending on the skills levels required, it is believed that different skills levels will have differently structured salary packages, thereby creating lower income to higher income opportunities.
	Will the employment opportunities created by the development be		X	It is believed that most of the employment

ECONOMIC CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
	sustainable?			opportunities would be restricted to the construction phase.
Change in the commercial / industrial focus of the community	Will the development change the income generating focus of the community?		X	No impact foreseen.
	Do residents have the required skills, life experience and contextual understanding to benefit from the proposed development?		X	No impact foreseen.
	Will a change in economic focus associated with the development have repercussions for social cohesion?		X	No impact foreseen.
Change in employment equity of vulnerable groups	Are vulnerable groups able to take advantage of changed employment opportunities associated with the development?	X		Unskilled labour, such as bush clearance, might be sourced from the local area thereby creating job and income opportunities.
	Will vulnerable groups have to compete with more appropriately qualified applicants from elsewhere?	X		The required skills might not be available in the local area, which means that the appropriate skills might have to be 'imported', thereby causing a reduction in the job and income opportunities available to local residents.
Change in occupational opportunities	Will the development lead to an increase or decrease in employment opportunities?	X		An increase in employment opportunities is expected.
	Will the development create different levels and types of employment?	X		Employment opportunities will range from unskilled to highly skilled positions.
	What types of skills will the development require?			Skilled workers would be required.
Land acquisition and disposal, including cost of land	Will the development lead to a significant increase in the cost of land/property in the area?	X		Visibility of transmission line could affect the property value in some areas, although a decrease is expected as opposed to an increase in property
	Will the development result in an increase of land/property prices?	X		

ECONOMIC CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
				value. No impact foreseen.
	Will the increase in land/property prices exacerbate class and race inequity?		X	No impact foreseen.

Construction & Decommissioning Phases

The economical change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during this phase of the project are as follows:

- Compensation for servitude;
- Direct formal employment opportunities to local individuals; and
- Indirect formal and/or informal employment opportunities to local individuals.

These change processes will be discussed separately together with a detailed assessment of the expected impact as a result of the change processes taking place. No category 2 impacts are foreseen during this stage of the project.

- **Compensation for servitude**

Eskom pays a once-off amount to landowners for right of way in the servitude of 55m per 400kV line. Compensation is also paid for the potential loss of livelihood as a result of the servitude. Normally compensation is calculated based on current market related land values, after which Eskom would offer 100% of the value of the land. Should the lines take up more than 50% of the land, Eskom will offer to buy the farm out (personal communication, Eskom). The value of the servitude to be negotiated is calculated by multiplying the area of the servitude required from the land owner with the valuator's unit price. The impact of financial gain should be long-term, because although a once-off amount is paid, this amount is deemed to reflect the lifelong economic effect. However, land owners are increasingly insisting on an annual access fee, which should be revised annually.

The financial gain is seen as a positive impact. The servitude is negotiated within a corridor (of up to 500 m wide) approved by DEAT. Some modification of the proposed line alignment is possible within this approved corridor, but significant modification in the alignment will be subject to additional environmental review. Effective mitigation measures could result in a servitude which satisfies both parties.

However, the final status of the impact is dependant on the negotiation process. A transparent negotiation process that leads to a positive outcome (i.e. both parties are satisfied with the agreement) will have a positive impact. A breakdown in negotiations would lead to a negative impact in terms of a lengthy legal process that can either lead to an alternative route for the Transmission power line or the expropriation of land for the servitude. In this instance the project will be severely delayed. If there is a breakdown in the negotiation process, the potential impact would be high levels of frustration as a result of the litigation process and the resultant delay in construction, as well as the potential for a perceived economic loss for both parties.

It is furthermore difficult to determine the significance post mitigation as Eskom has no control over how a particular landowner would invest the money and therefore a post-mitigation assessment has not been conducted.

- **Direct formal employment opportunities to local individuals**

It is believed that only a very limited number of local individuals within the study area could potentially be employed during construction. This is due to the fact that mostly skilled or semi-skilled labour is required during construction. Due to the skills levels required for the actual construction of the Transmission power lines, it is not foreseen that a large number of local labourers will be engaged in the construction phase.

However, if more than one construction team is utilised on various sections of the Transmission power lines, it is believed that more people will benefit from the employment opportunities created through this process, albeit on a shorter term. It is highly recommended that local individuals should be employed for work components that do not require a substantial amount of skill, e.g. foundation excavation, vegetation clearance, erection of gates, cleaning services, and security guards.

In construction projects commissioned by government, employment requirements usually include gender quotas, youth quotas and quotas for local labour to be employed during the project. In addition, a certain proportion of time for which construction workers are paid should be spent on skills development initiatives. According to the Human Resource Manager of the South African Federation of Civil Engineering Contractors (SAFCEC), the current norm in this industry is to use between 50–70% local labour during construction. This should be used as a guideline by Eskom as far as possible.

Although job opportunities are viewed as a positive impact, the fact that the job opportunities are only temporary in nature limits the extent of such a positive impacts in view of the fact that the economic relief and the associated impacts would only be temporary in nature. This impact also depends on the timeframe of the project.

- **Indirect formal and/or informal employment opportunities to local individuals**

Indirect informal job opportunities mainly relate to services that are not directly linked with the construction activities, e.g. domestic services, food stalls, etc., either at the construction village or the construction site. However, the size, nature and location of the construction village (if used) as well as the construction site, together with the number of construction workers and other employees at either the construction village or the construction site respectively, will determine the extent of the services required. In general, informal job opportunities are expected to be limited.

Another potential opportunity is the rental of land for the accommodation of the construction workers and storage of equipment in return for financial compensation, albeit confined to the landowner. Housing construction workers within local communities and the use of local contractors to supply material should be considered as this increases the economic investment into the affected area.

An assessment of these category 1 impacts was conducted through the use of the assessment criteria (outlined in section 1.3.1) to determine the significance of each of the identified issues, as per table 8a below.

Table 8a: Construction & Decommissioning Phase: Economical Change Processes Category 1 Impact Assessment

	Significance		Spatial		Duration		Degree of Probability		Degree of Certainty		Risk		Status
PRE-MITIGATION													
Compensation for servitude	Moderate	3	Isolated	1	Incidental	1	Going to happen	5	Definite	1.7	Low	Positive	
Direct formal employment opportunities to local individuals	Low	2	Local	3	Short term	2	Could happen	3	Possible	1.38	Low	Positive	
Indirect formal and/or informal employment opportunities to local individuals	Low	2	Local	3	Short term	2	Could happen	3	Possible	1.38	Low	Positive	
POST MITIGATION													
Compensation for servitude	-	-	-	-	-	-	-	-	-	-	-	-	
Direct formal employment opportunities to local individuals	Moderate	3	Local	3	Short term	2	Could happen	3	Possible	1.62	Low	Positive	
Indirect formal and/or informal employment opportunities to local individuals	Moderate	3	Local	3	Short term	2	Could happen	3	Possible	1.62	Low	Positive	
MITIGATION MEASURES													
Compensation: <ul style="list-style-type: none"> • Compensation (not necessarily in the form of monetary compensation) to individuals who are residing in informal settlements within the servitude should be considered. However, this issue should be approached with caution as this might set a precedent for future projects (people might deliberately move onto the servitude for the purpose of receiving compensation). • The land valuator should be experienced in valuating 				Direct formal employment: <ul style="list-style-type: none"> • Unskilled job opportunities should be afforded to local residents. Local trade unions could assist with the recruitment process to counteract the potential for social mobilisation. • Equal opportunities for employment should be created to ensure that the local female population also have access to these opportunities. Females should be 				Indirect formal and/or informal employment: <ul style="list-style-type: none"> • Where possible, formalise informal job opportunities (e.g. the provision of services such as food) at the construction site and/or camp. The formalisation process could include issuing permits to vendors and removing non-permitted individuals as a way to reduce the potential for conflict amongst vendors and to curb loitering at the site and/or camp. • Identify the segment of the local community that might 					

<p>the land in question.</p> <ul style="list-style-type: none"> • The process should be conducted with the necessary respect, and the negotiator should be transparent about the process and expectations (do not engage in “empty promises”). • The negotiation should be done for the whole servitude and not part of the servitude. • Contracts should be reviewed by an independent body. • Land owners should be made aware that a pre- and post evaluation of their land value is possible. • In the case of tribal authorities, Eskom should consider establishing a trust fund in consultation with the tribal authority (as a form of compensation) for the community that is jointly administrated by Eskom and the tribal authority. Community development projects can then be funded from the trust fund, which would aid sustainable development in the area. 	<p>encouraged to apply for positions.</p> <ul style="list-style-type: none"> • Individuals with the potential to develop their skills should be afforded training opportunities. Eskom or its appointed contractors should be involved in this process. • Mechanisms should be developed to provide alternative solutions for creating job security upon completion of the project. This could include formal and/or informal training on how to look for alternative employment, information on career progression, etc. to ensure that people are equipped to seek other jobs with the skills that they have gained. • Payment should comply with applicable Labour Law legislation in terms of minimum wages. • Where local labourers are employed on a more permanent basis, cognisance should be taken of the Labour Law in terms of registering the worker with the Unemployment Insurance Fund (UIF), Pay as You Earn (PAYE), workman’s compensation and all other official bodies as required by law. This would enable the worker to claim UIF as a means of continuous financial support when the worker’s position on the construction team has either become redundant or once the construction phase comes to an end. • Avoid employing foreign labour on the project. Immigrants are seen to be “taking” jobs or trading opportunities needed by South Africans - often at lower rates of pay or by evading trading regulations. 	<p>benefit from informal indirect opportunities, and assist them with skills development and subsidise sustainable initiatives.</p> <ul style="list-style-type: none"> • Encourage construction workers to use local services.
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Operation & Maintenance Phase

The economical change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during this phase of the project are as follows:

- Direct formal employment opportunities to local individuals;
- Electricity supply and economic growth; and
- Property values.

These change processes will be discussed separately together with a detailed assessment of the expected impact as a result of the change processes taking place. In addition, the following change process that would result in a Category 2 impact, which are those impacts that are expected to cause significant changes between the proposed alternatives, are as follows:

- **Direct formal employment opportunities to local individuals**

It is unlikely that maintenance workers will be sourced from within the local community, due to the skilled nature of the job requirements. Also, it is more likely that Eskom would employ a maintenance team that will cover the entire length of the transmission power lines instead of fragmented maintenance teams that only cover a certain section of these lines. Furthermore, transmission power line maintenance is a highly skilled job seeing as maintenance is normally carried out on live lines to prevent a disruption in the supply.

However, some local individuals may be employed on servitude maintenance teams, but that would to a large extent depend on the appointed servitude maintenance contractor. The number of people involved in a maintenance team depends on the type of maintenance that has to be conducted.

Due to the fact that local community members are unlikely to be employed as transmission power line maintenance team members, no tangible economic impacts are foreseen. Where local community members are used as servitude maintenance workers, this could lead to an economic impact and local social upliftment.

- **Electricity supply and economic growth**

Resources and infrastructure, such as electricity, water and fuel, enables normal economic growth as most economic activities are dependant on a sufficient and steady supply of electricity. Normal economic activities, e.g. industry and businesses, are affected when electricity is not available. The economic impact on such services increases the longer services such as electricity is unavailable.

The proposed transmission power line would enhance the electricity supply to the local area, thereby stimulating economic growth through the establishment and/or expansion of

businesses and industries. This in turn creates additional employment opportunities, which further enhances economic growth, permitting a positive economic impact to filter down to a more grassroots level.

- **Property Values**

When considering the impact of a transmission power line on property values, the following must be considered:

- * The location of the transmission power line (e.g. on the border, through the middle, or cutting a corner of a property);
- * The location of transmission power line towers;
- * The type of towers used;
- * The presence of existing transmission power lines; and
- * The presence of any visual mitigation.

In the case of the section between the Minerva substation and the Apollo converter station, the proposed transmission power line will follow an existing corridor that currently contains either 5 existing transmission power lines depending on location along the route. The corridor runs between residential property estates, but it is however, envisaged that lines will not cross properties and that there is no requirement for towers to be located on residential properties. The current proximity of transmission power lines also means that the value implications of their presence will in general already be reflected in values for residential properties in proximity to the transmission power line.

An exception may be applied to a number of properties bordering the corridor on the south as the proposed transmission line will be placed on the southern side of the corridor. This will decrease the distance between a transmission power line and adjacent properties from approximately 100-60m to approximately 60-30m, which may cause a slight decrease in property value for the bordering properties of approximately 5-10%.

An assessment of these category 1 impacts was conducted through the use of the assessment criteria (outlined in section 1.3) to determine the significance of the identified issue, as per table 8b below.

Table 8b: Operation & Maintenance Phase: Economical Change Processes Category 1 Impact Assessment

	Significance		Spatial		Duration		Degree of Probability		Degree of Certainty		Risk		Status
PRE-MITIGATION													
Direct formal employment opportunities to local individuals	Low	2	Study area	2	Incidental	1	Could happen	3	Possible	1.02	Low	Positive	
Electricity supply and economic growth	High	4	Regional	4	Medium term	3	Very likely	4	Probable	2.96	Moderate	Positive	
Property values	High	4	Study area	2	Medium term	3	Very likely	4	Probable	2.4	Moderate	Negative	
POST MITIGATION													
Direct formal employment opportunities to local individuals	Moderate	3	Study area	2	Incidental	1	Could happen	3	Possible	1.2	Low	Positive	
Electricity supply and economic growth	-	-	-	-	-	-	-	-	-	-	-	-	
Property values	Moderate	3	Isolated	1	Medium term	3	Could happen	3	Probable	1.38	Low	Negative	
MITIGATION MEASURES													
Employment opportunities: <ul style="list-style-type: none"> Individuals with the potential to develop their skills should be afforded training opportunities. Eskom should be involved in this process. Make use of local labour on unskilled maintenance components, such as servitude maintenance. Where local labourers are employed on a more permanent basis, cognisance should be taken of the Labour Law in terms of registering the worker with the Unemployment Insurance Fund (UIF), Pay as you earn (PAYE), workman's compensation and all other official 				Electricity supply and economic growth: None.				Property values: <ul style="list-style-type: none"> Implementation of visual mitigation measures as proposed in the Visual Impact Assessment. 					

<p>bodies as required by law. This would enable the worker to claim UIF as a means of continuous financial support when the worker's position on the construction team has either become redundant or once the construction phase comes to an end.</p>		
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Baseline Empowerment and Institutional Profile

Institutional and empowerment processes relate to the role, efficiency and operation of government sectors and other organisations within the area in terms of service delivery. It also investigates the ability of people to engage in decision-making processes to such an extent that they have an impact on the way in which decisions are made that would concern them.

Municipal Services

The years between 2001 and 2007 saw a steady increase in the delivery of municipal services to the households within the study area.

The municipal infrastructure is mostly located within the urban areas of the municipal areas. Municipal infrastructure backlogs are mostly confined to the previously disadvantaged township areas, and, as could be expected, in informal settlement areas. The outlying rural areas rely almost exclusively on water and sanitation services that are below Reconstruction & Development Programme (RDP) standard. In terms of water services, RDP standard is defined as piped water either within a dwelling or within 200m of such a dwelling. Sanitation services on par or above RDP standard is defined as any waterborne sanitation services that are connected to a municipal sewerage system or a ventilated pit latrine (VIP) system.

Table 9 below provides an overview of the municipal services of the affected area in relation to the province and the district as a whole. No data could be obtained for the overall municipal service delivery in South Africa.

Table 9: Overview of Municipal Service Delivery to the Affected Areas

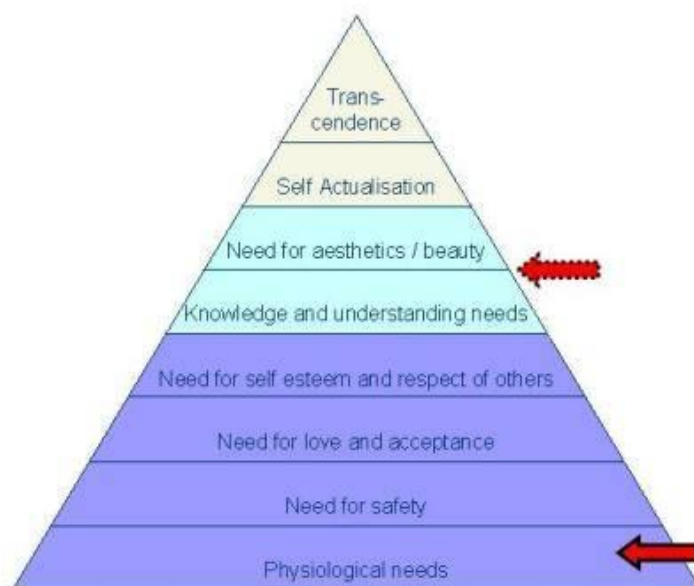
	South Africa	GP	CJMM		CTMM		MDM		KLM	
	2001	2007	2001	2007	2001	2007	2001	2007	2001	2007
Energy Cooking	Not available	Electricity (81.3%)	Electricity (78.5%)	Electricity (88.2%)	Electricity (71.3%)	Electricity (74.1%)	Electricity (56.3%)	Electricity (70.1%)	Electricity (56.3%)	Electricity (71.3%)
Energy Heating	Not available	Electricity (76.7%)	Electricity (77.2%)	Electricity (84.7%)	Electricity (70.2%)	Electricity (70.2%)	Electricity (53.8%)	Electricity (60.3%)	Electricity (53.8%)	Electricity (59.4%)
Energy Lighting	Not available	Electricity (83.3%)	Electricity (85.1%)	Electricity (89.4%)	Electricity (79.9%)	Electricity (77.4%)	Electricity (70.3%)	Electricity (79.2%)	Electricity (70.3%)	Electricity (82.8%)
Refuse	Not available	Removed once a week (84.8%)	Removed once a week (90.9%)	Removed once a week (90.2%)	Removed once a week (77.6%)	Removed once a week (75.5%)	Removed once a week (46.7%)	Removed once a week (50.0%)	Removed once a week (46.7%)	Removed once a week (45.4%)
Sanitation	Not available	RDP standard or above (86.1%)	RDP standard or above (88.2%)	RDP standard or above (92.4%)	RDP standard or above (74.9%)	RDP standard or above (76.3%)	RDP standard or above (68.7%)	RDP standard or above (68.8%)	RDP standard or above (68.0%)	RDP standard or above (67.4%)
Water	Not available	RDP standard or above (97.9%)	RDP standard or above (93.4%)	RDP standard or above (98.3%)	RDP standard or above (94.0%)	RDP standard or above (97.3%)	RDP standard or above (77.7%)	RDP standard or above (86.5%)	RDP standard or above (77.7%)	RDP standard or above (86.2%)

Empowerment and Participation

In terms of baseline empowerment processes, the hierarchy of needs as set out by Maslow, offers an insightful backdrop in terms of people's potential level of involvement in the EIA process and the issues that might be pertinent to them in a development of this nature. Maslow argued that the type of need that a person experiences is dependent on the fulfilment of other needs. The various categories of needs are organised in a hierarchy, which indicates which level of need has to be fulfilled before the next level of need would be experienced (refer to Figure 20).

Therefore, in order to expect people to fully participate in a process that might affect their future, people would have to function on a higher level within the hierarchy of needs (the need for self esteem, characterised by knowledge and understanding needs as well as the need for an environment that is aesthetically appealing, as indicated by the dashed red arrow). This means that their basic needs had to be met first (as indicated by the solid red arrow). The flipside is that people, who live in poverty as a result of high unemployment rates, low income levels and a poor education, struggle to survive on a daily basis and are therefore more focused on their more basic needs.

Figure 20: *Maslow's Hierarchy of Needs*



Source: www.arrod.co.uk

People who are more focused on their basic needs are therefore in a sense disempowered to fully participate in the process. The issue here is not that these communities are misinformed or lack information as such, but rather that these communities are ignorant about their rights and responsibilities as participants in the process. In such an instance it can very well be expected that such community members' expectation of the project mostly relates to employment opportunities. However, due to the fact such residents mostly function

on a very basic needs level, they might fail to comprehend the “bigger picture” or in other words, the associated impacts (both negative and positive) that the proposed project would bring to their area. Their lack of understanding has bearing on future generations that will inhabit the area.

Expected Empowerment and Institutional Change Processes

Negotiation for land is a change process on legal and empowerment level. The same applies to the stakeholders that will be involved in the public participation process. The EIA process is an opportunity for these stakeholders to give input into the process and project. However, stakeholders would have to offer up their time to become actively involved in the process and they should clearly understand their rights in terms of the process to enable them to use these rights.

Attitude formation may start during the EIA process. Attitude formation is a change process, and not an impact. Attitude formation might result in delays in project implementation, which might result in secondary impacts such as economic impacts.

Expected Impacts

Table 10 below provides an overview of the expected change process as well as the expected impacts that might occur as a result of the change process taking place.

Table 10: Institutional & Empowerment Change Processes

INSTITUTIONAL AND EMPOWERMENT CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
Change in / disruption of power relationships	Will the development impact on the levels of power, opportunity and access of individuals or sections of the community, e.g. during the negotiation process?	X		A breakdown in the negotiation process could severely delay the project and result in an economic impact on both the landowner as well as on Eskom.
	Is the development being used for the political gain of a section of the community, and what are the implications for the larger social environment?		X	No impact foreseen.
Exclusivity	Will the development contribute to the culture of exclusivity?		X	The development would create economic growth through the availability of electricity, which has been assessed in table 8b.

INSTITUTIONAL AND EMPOWERMENT CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
Inequality	Will the development increase unequal access to opportunities or resources?		X	The development will enhance more equal opportunities to resources as services become available, as assessed in table 8b.
Change in community infrastructure	Will the development change any aspect of community infrastructure, such as crèches, clinics, schools, churches, formal or informal sports fields, open areas, dumping grounds etc?		X	No impact foreseen.
	Will the development create increased demand for basic services, e.g. water, electricity, sewerage, roads?	X		Additional demand on municipal services could impact on health if such services are not available.
	Will the existing access of the community to basic services be impacted by the development?	X		Additional demand on municipal services could impact on health if such services are not available.
Change in housing needs / demands	Will the development create a housing need, e.g. due to the immigration of construction workers?		X	No impact foreseen.
	Has the need for more housing been addressed by the development and or the authorities?			Not applicable.

Construction & Decommissioning Phases

The economical change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during this phase of the project are as follows:

- Negotiation process; and
- Additional demand on municipal services.

These change processes will be discussed separately together with a detailed assessment of the expected impact as a result of the change processes taking place. No category 2 impacts are foreseen during this stage of the project.

- **Negotiation process**

The negotiation process is undertaken directly by Eskom and is independent of the EIA process. Eskom should determine in consultation with the landowners who should form part of this process and then ensure that all the relevant parties are present. Important points relating to the negotiation process were discussed in Section 2.4.

The results of a study conducted by MasterQ Research (2007) identified the differences amongst landowners in negotiation skills and knowledge as one of the weaknesses in the negotiation process. In addition, it seemed that the perception amongst certain stakeholders who participated in the study was that landowners with more money had more negotiating power. For example, during the negotiations for the Matimba-Witkop Nr. 2 400kV transmission power line, one landowner managed the moving of an existing line to the edge of his land before he agreed to the construction of the second line. However, this landowner was held responsible for the financial implications of the moving of the line.

If negotiations are not handled with the necessary sensitivity the impact of this process can be severely negative, i.e. a deadlock in negotiations resulting in an indefinite delay of the project. It would normally be preferable that the negotiation process begins after the EIA has been completed. At this stage there is greater confidence in the appropriateness of the site, and it would be supported by environmental authorisation. Although Eskom has the right to engage with any landowner at any time, they do so at risk if environmental authorisation has not been awarded.

- **Additional demand on municipal services**

Additional municipal services will be required at the construction site and the construction village during the construction phase. The additional demand on municipal services causes a slight concern as it would appear that, in some cases, the supply of these services are lacking, e.g. electricity is not well supplied throughout the area.

If a construction village is not managed properly, it may lead to a lack of adequate water as well as unhygienic conditions in the case of waste and sanitation services. This in turn could lead to waterborne diseases that will not only affect the construction worker, but could also spread to the local community.

An assessment of this category 1 impact was conducted through the use of the assessment criteria (outlined in section 1.3.1) to determine the significance of the identified issue, as per table 11a below.

Table 11a: Construction & Decommissioning Phase: Institutional & Empowerment Change Processes Category 1 Impact Assessment

	Significance		Spatial		Duration		Degree of Probability		Degree of Certainty		Risk	Status
PRE-MITIGATION												
Negotiation process	High	4	Study area	2	Short term	2	Going happen	5	Possible	2.7	Moderate	Depends on the outcome of the negotiation process
Additional demand on municipal services	Moderate	3	Study area	2	Short term	2	Could happen	3	Possible	1.38	Low	Negative
POST MITIGATION												
Negotiation process	High	4	Study area	2	Short term	2	Going happen	5	Possible	2.7	Moderate	Positive
Additional demand on municipal services	Low	2	Study area	2	Short term	2	Could happen	3	Possible	1.2	Low	Negative
MITIGATION MEASURES												
<p>Negotiation Process:</p> <ul style="list-style-type: none"> The implementation of a fair and transparent negotiation process, as discussed under Section 2.4. Negotiations in should be approached with the necessary cultural sensitivity. Eskom should consider making use of an approved interpreter during the negotiation process to ensure that there are no misunderstandings as a result of language barriers. 						<p>Additional demand on municipal services:</p> <ul style="list-style-type: none"> Construction workers should be made aware of the limited capacity of the municipal services network. Negotiations with the affected local municipalities must be conducted and a “demand-side management” should be implemented. Sufficient portable chemical toilets should be provided on site and at the construction village. These must be regularly maintained and serviced. Contractors should ensure adequate sanitation services (e.g. showers) at the construction village with effective drainage facilities to ensure that used water is appropriately treated and carried away from the site. 						

Operation & Maintenance Phase

An increase in the availability of electricity to the local area has been identified as an institutional and empowerment change process that can be expected during the operational and maintenance phase of the project. This issue has been assessed under “electricity supply and economic growth” in section 3.6.3.

Baseline Socio-Cultural Processes

Socio-cultural processes relate to the way in which humans behave, interact and relate to each other and their environment, as well as the belief and value systems which guide these interactions.

Expected Social-Cultural Change Processes and Resultant Impacts

Socio-cultural change processes that are associated with the construction and operation of the proposed project include changes to aspects such as health and safety and sense of place. In a social sense, it should be noted that the concept of ‘health’ is not only limited to physical health (i.e. the absence of ailments or illness), but also includes mental and social health. The expected changes that can occur in relation to health and safety aspects can be as a result of the presence of the proposed transmission power line and its associated infrastructure during operation, as well as the presence of construction workers and/or job seekers during construction.

The significance of the impacts of socio-cultural changes is difficult to determine on a prospective basis and are dependent on the demographic profile of, for example, construction workers and whether or not such differences affected local residents. For example, if construction workers were from a different cultural background than locals, conflict can be expected if such different cultural backgrounds are not respected. Conflict as a result of cultural differences or community disintegration as a result of the acceptance of construction workers’ culture might occur – should the demographic profile of these construction workers be different, and should it matter to the communities involved.

A study conducted by MasterQ Research (2007) to provide an evidence-based approach for the assessment of social impacts during the construction of high voltage Transmission power lines, gave an indication of the changes that can be expected as a result of the project. This study evaluated the social impacts anticipated for the construction of the Matimba-Witkop Nr. 2 400kV Transmission power line in the Limpopo Province, against the actual social impacts that were experienced in the end. The findings of this study were supplemented with the actual social changes that occurred during the construction of the Beta-Delphi 400kV Transmission line. The results of this study are briefly discussed under the following points:

- ***Sexual relationships***

According to literature and interviews with representatives from contractors and Eskom (MasterQ Research 2007), sexual relations between construction workers and local individuals are mainly driven by the possibility of financial gain by local women from the more affluent construction workers. In this study (MasterQ Research 2007), it became clear that these sexual relations might be different from traditional sex work where sexual services were exchanged for money. Women from poor communities seemed to engage in transactional sex with construction workers where an exchange of commodities could take place.

Women seemed to visit men at the construction camp or in the local communities in which workers stayed. Representatives from the contractor interviewed, indicated that some women stayed in the construction camps even though they were strictly speaking not allowed to. This was said to be allowed as “construction workers work long hours and should be allowed these freedoms”.

In both of the construction camps that were visited, women were found inside, washing clothes or hanging around the barracks. In a discussion with one of the construction workers on site, he said that the girls with whom they have a ‘jol’ also wash and cook for them. This was confirmed by one of the women found in the camp who said that she wasn’t paid for washing and cooking as she had a relationship with the man she washed and cooked for. In interviews with community members sexual relations between the workers and local women were seen as a natural occurrence and no-one mentioned that these relationships were based on the exchange of money or other benefits.

The impact of sexual relationships between construction workers and women from the community could manifest in children being born after construction has finished. Even though no evidence could be found in this regard, the possibility was confirmed by a number of people interviewed. The councillor interviewed in Sebole, said that the community saw an increase in teenage pregnancies since they had started to welcome construction workers from different projects to stay in their community, and the implication was that construction workers were responsible for these pregnancies.

- ***Alcohol abuse***

Alcohol abuse among construction workers seemed to be a problem during construction, especially after workers had received payment. The issues relate to alcohol’s effect on behaviour – sometimes causing irresponsible behaviour that could escalate to violence or conflict between individuals or groups – which was mentioned by stakeholders on both the Matimba-Witkop Nr. 2 400kV and the Beta-Delphi 400kV Transmission power lines.

However, according to one of the contractor representatives that were interviewed, alcohol abuse had decreased in the last few years. He said that as workers were required to work harder while on site, there was not much time left for workers to drink heavily.

- ***Access Control***

One of the most prominent issues amongst landowners was how they had lost control over who entered and moved about on their property due to the construction of the Transmission power line (MasterQ Research 2007). Landowners felt that their privacy was invaded with the construction and maintenance of the transmission power line. A common emotion amongst landowners, according to one interviewee, was: "You're on my land; I don't have any control over what happens here." This sentiment was confirmed by a number of landowners that were interviewed. For a landowner that valued and cared for his property, the invasion of strangers was difficult. One of the comments made on what this invasion feels like was related as follows: "Maande lank is daar vreemdelinge wat in jou huis is" (there are strangers in your house for months on end).

- ***Safety & security fears***

The presence of these 'strangers' on their property also sparked some safety and security concerns amongst landowners. This was said within the context of increased violent crimes conducted against farmers in South Africa. Landowners said they wanted to know when Eskom will be on their property. One of the interviewees said that with access to his property during construction, there was a possibility that unwanted people could enter to observe the property - thereby making him vulnerable to safety and security risks.

- ***Integration of construction workers in local communities***

Relationships between construction workers and local communities in the construction of the Matimba-Witkop Nr. 2 400kV Transmission power line were good according to all parties interviewed. Where conflict was experienced between construction workers from outside and the local communities, it seemed to be largely sparked by the use of alcohol. The difference in income between these groups was also cited as an additional source of conflict.

- ***Cultural landscape changes***

Changes in noise, dust, and pollution levels may be experienced as intrusion impacts, which impact on the cultural landscape and sense of place. MasterQ Research results (2007) indicate that the impacts on cultural landscape are considered to be:

- Littering. One (1) landowner discovered cans and remains from construction on his land. Other complaints regarding littering were reported in site meeting minutes.

- Some construction activities were noisy. While some (2) landowners reported that the noise bothered and irritated them, others did not have a problem with the noise caused by construction activities. Noise originated from chainsaws, drill machines and bulldozers on site. Helicopters along the line also bothered one landowner.
- Dust on roads due to vehicular movement. One (1) landowner complained about the prevalence of dust during construction.

Expected Impacts

Table 12 below provides an overview of the expected change process as well as the expected impacts that might occur as a result of the change process taking place.

Table 12: Socio-Cultural Change Processes

SOCIO-CULTURAL CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
Disruption of social networks	Will the development impact on existing social networks?		X	No impact foreseen.
Disruption in daily living and movement patterns	Will the development change the lifestyle of residents?		X	No impact foreseen.
	Will the development impact on access to facilities and resources, such as schools, hospitals, fields, forests, etc?		X	No impact foreseen.
	Will it impact on movement patterns, such as pedestrians crossing roads?	X		Impact of construction activities on movement patterns of local communities, potentially impacting on safety and ease of movement.
	Will it divide communities physically (e.g. through the building of a highway)?		X	No impact foreseen.
Dissimilarity in social practices	Do new residents have dissimilar social practices to current residents?		X	No impact foreseen.
	Do the new residents have different values, religious practices, social standard, etc?		X	No impact foreseen.
Alteration in family	Could the development threaten family cohesiveness?	X		Socially acceptable integration, including the risk

SOCIO-CULTURAL CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
structure	Could it impact on immediate or extended family networks?	X		of spreading STIs and HIV/AIDS with an impact on health. The spread of STI and HIV is a matter of great concern, also in view of the light that construction workers move out of the area into another area where the spread of these STI and HIV continues. Apart from the obvious health implications, HIV infection in particular also has an economic impact.
	Could it impact on the traditional roles played by members of the family?	X		
Conflict	Will the development lead to conflict between sectors of the social environment?	X		If social integration between newcomers and residents is hindered, it can lead to conflict, which in turn delays the construction process and has economic implications for the developer.
	Is there conflict between the developer and the public?		X	No impact foreseen.
	Is this conflict being addressed?			Not applicable.
Safety and crime impacts	Will the development impact on existing crime and safety patterns?	X		Presence of construction workers and job seekers leads people to believe that there will be an increase in crime, which impacts on surrounding landowners' sense of safety and security.
Change in sense of place	Will the development impact on people's "sense of place", e.g. through the large scale development of a rural community?	X		As the transmission power line might impact on people's perception of safety, these people might now feel unsafe in the area knowing that such infrastructure is in close proximity to their houses. The presence of such a line also has a visual impact, changing the landscape from unspoilt to 'spoilt'.
	Will the change "in sense of place" impact on people's relationship to the environment?	X		
Implications for social history	Does the development have any implications for the social history of affected communities?		X	No impact foreseen.

SOCIO-CULTURAL CHANGE PROCESSES				
Expected Change Process		Yes	No	Expected Impact
	Will the development further marginalise communities that have been relocated during <i>apartheid</i> ?		X	No impact foreseen.
	Will the development affect processes, structures or patterns that are valued as part of the social history of an area?		X	No impact foreseen.
Change in leisure opportunities	Will the development impact on access to existing leisure opportunities?	X		Linked to 'sense of place'.

Construction & Decommissioning Phases

The socio-cultural change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during this phase of the project are as follows:

- Integration with local community;
- Health;
- Safety and security; and
- Construction noise.

These change processes will be discussed separately together with a detailed assessment of the expected impact as a result of the change processes taking place. No category 2 impacts are foreseen during this stage of the project.

- **Integration with local community**

This change process relates to the ease with which construction workers integrate into the local community and the ease with which the local community accepts the presence of the construction workers. If integration is hindered, it can lead to conflict, e.g. due to cultural differences.

Conflict can take place on multiple levels. Firstly, inter-conflict between the construction workers and the local community in terms of job opportunities and where the local community perceives the construction workers as competing for housing opportunities. Secondly, intra-conflict between construction workers themselves in terms of housing offered, and potentially in terms of salary packages. In a construction village conflict might

be more intense due to the concentrated living and working conditions of the construction workers.

Where conflict is not resolved quickly and efficiently, it could give rise to labour strikes, site lock-outs, etc, which in turn delays the construction process and has clear economic implications for the developer. Not only does the contractor have to pay for the labour during the days of a legal strike, but they might also be required to acquire the services of a mediator in an attempt to resolve the issues.

- **Health**

Construction workers form part of a significant section of the population known as migratory workers. The social cultural issues associated with this section of the population have been thoroughly researched. Due to their unique situation, construction workers engage in behaviour that makes them vulnerable, such as risky sexual behaviour (e.g. unprotected sex) and destructive behaviour (e.g. alcohol abuse, damaging the environment), which could be explained by their migratory status. When they are separated from their homes, they are also distanced from traditional norms, prevailing cultural traditions and support systems that normally regulate behaviour within a stable community. In addition, it might also be that construction workers who are faced with dangerous working conditions and the risk of physical injury might be more preoccupied by immediate (direct) risks and therefore tend to disregard salient (more indirect) risks, such as HIV infection. Again, it is likely that HIV transmission occurs, as the local population might be uneducated about the risk and transmission of HIV and would therefore more easily engage in risky behaviour as a result of ignorance.

Construction workers' situations seem to make them vulnerable to high-risk sexual behaviour. There are ample research results to indicate that there is a direct link between temporary migration and HIV infection. Research also seems to indicate that construction workers might be more at risk of contracting HIV from members of local communities, as opposed to transmitting the infection to community members.

In this context health impacts focus mainly on the spread of certain sexually transmitted infections (STI), including HIV/AIDS. It is not uncommon for construction workers who are separated from their families for a period of time to establish temporary sexual relationships with members of the local community. It can also be expected that sex workers might visit the construction workers at their place of residence. The spread of STI and HIV then becomes a matter of great concern, also in view of the light that construction workers move out of the area into another area where the spread of these STI and HIV continues.

Apart from the obvious health implications, HIV infection in particular also has an economic impact, not only on the local area, but extending to the regional and national context. If viewed within the context of an increase in HIV/AIDS related deaths amongst the economically active individuals, it becomes clear that the workforce might potentially be

reduced and that this in turn will affect basic services, as well as the smooth running of an economy.

It is a complex task to understand the macro-economic impact of HIV/AIDS on a country or region. Not only should one consider the direct and indirect costs, but also the loss of human capital and the natural system of developing a generation through the transference of knowledge and skills necessary for development.

- **Safety and security**

Not only do health issues impact on communities, but the physical safety of communities can also be endangered as a result of the influx of job seekers and construction workers (e.g. potential increase in crime). There is perception that crime increases in an area the moment that construction workers arrive on site. Because of this perception, occurrences of crime during the time of the project are likely to be ascribed to the construction workers. This has a mental health impact, such as fear. However, it should be noted that in most instances it is not the actual construction worker who engage in criminal activities but more likely job seekers who loiter at the site in search of employment.

- **Construction noise**

A constant high level of noise has a prolonged detrimental effect on a person's general well-being and functioning. People living in close proximity to a construction site will be exposed to such a constant level of noise generated by the construction activities taking place.

The experience of the increase in noise levels because of the construction village will differ from person to person. Griffiths (1983) is of the opinion that as long as a stimulus remains the same, the impact of noise would not decrease. He referred to studies on noise pollution where habituation (people getting used to the noise in an area) had not taken place approximately 2 years after a new road had been opened. De Jong (1990) is further of the opinion that people's resistance to noise levels seems to be decreasing, despite the fact that there was no change in their environment that could add to the noise levels. He termed this finding "psychological sensitisation".

An assessment of these category 1 impacts was conducted through the use of the assessment criteria (outlined in section 1.3) to determine the significance of each of the identified issues, as per table 14a below.

Table 14a: Construction & Decommissioning Phase: Socio-Cultural Change Processes Category 1 Impact Assessment

	Significance	Spatial	Duration	Degree of Probability	Degree of Certainty	Risk	Status					
PRE-MITIGATION												
Integration with local community	Moderate	3	Local	3	Incidental	1	Could happen	3	Possible	1.38	Low	Negative
Health	High	4	National	5	Long term	4	Could happen	3	Possible	2.58	Moderate	Negative
Safety and security	Low	2	Local	3	Short term	2	Could happen	3	Possible	1.38	Low	Negative
Construction noise	Moderate	3	Study area	2	Short term	2	Could happen	3	Possible	1.38	Low	Negative
POST MITIGATION												
Integration with local community	Low	2	Local	3	Incidental	1	Unlikely	2	Possible	0.8	Very low	Negative to Neutral
Health	Moderate	3	National	5	Long term	4	Could happen	3	Possible	2.4	Moderate	Negative
Safety and security	Low	2	Local	3	Short term	2	Unlikely	2	Possible	0.92	Very low	Negative
Construction noise	Low	2	Study area	2	Short term	2	Unlikely	2	Possible	0.8	Very low	Negative
MITIGATION MEASURES												
Integration with local community: <ul style="list-style-type: none"> The community should be informed in advance of the influx of construction workers and the time they will spend in the community as well as the activities they will be involved in. This will enable the community to prepare for a possible (temporary) change in functioning. A code of conduct should be established for construction workers in their dealings with the local community. Creating of 		Health: <ul style="list-style-type: none"> An aggressive STI and HIV/AIDS awareness campaign should be launched, which is not only directed at construction workers but also at the community as a whole. Condoms should be distributed by placing them at centrally located points and by ensuring that construction workers and community members are aware of the availability and location of 		Safety and Security: <ul style="list-style-type: none"> Construction workers should be clearly identifiable. Overalls should have the logo of the construction company on it and/or construction workers should wear identification cards. The construction site should be fenced and access should be controlled by means of a security access point. Loitering of outsiders at the either the 		Construction noise: <ul style="list-style-type: none"> Construction activities should be restricted to daytime hours between 06:00 and 18:00. Adjacent property owners should be consulted and notified of any construction activities that could lead to excessive noise levels. Adjacent property owners should also be consulted if any night time construction 						

<p>awareness on both sides (community and outsiders) is crucial for the success of the project.</p> <ul style="list-style-type: none"> • Potential conflict situations can be reduced beforehand using a transparent recruitment process, i.e. where labourers would be sourced from the local community. • A labour desk should be implemented where the local community members could register. A rotary system could be used for unskilled labour to ensure that all job seekers have an equal opportunity to employment. • Potential conflict situations within the construction village itself can be managed by means of weekly forum meetings. During these meetings residents should have the opportunity to raise any problems experienced and make suggestions in terms of their living space. Where feasible, these problems and suggestions should be addressed as soon as possible to ensure a conflict-free environment. 	<p>condoms. The distribution of condoms should be approached with the necessary cultural sensitivity.</p> <ul style="list-style-type: none"> • Access at the construction site should be controlled to prevent sex workers from either visiting and/or loitering at the construction village. • Local women should be empowered. This could be achieved by employing them to work on the project, which in turn would decrease their (financial) vulnerability. 	<p>construction site or at the construction village should not be allowed. Loiterers at the site should be removed in cooperation with the local branch of the South African Police Service (SAPS).</p>	<p>activities were to take place.</p>
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Operation & Maintenance Phase

The geographical change processes that are expected to result in Category 1 impacts, which are defined as those impacts that are not expected to differ between the proposed alternatives, during this phase of the project are as follows:

- Movement of maintenance workers;
- Physical splintering; and
- Third party tampering.

In addition, the following change process that would result in a Category 2 impact, which are those impacts that are expected to cause significant changes between the proposed alternatives, are as follows:

- Sense of place.

These change processes will be discussed separately together with a detailed assessment of the expected impact as a result of the change processes taking place.

- **Movement of maintenance workers**

As is the case with construction workers, a lack of control over the movement patterns of maintenance workers is a source of concern to landowners. Furthermore, landowners are concerned about the fact that they seem to lose control over who has access to their property and who has not. Again, there is perception that crime increases in an area the moment that maintenance workers arrive on site, more so in terms of servitude maintenance workers as with actual Transmission power line maintenance workers. Because of this perception, occurrences of crime during the operational lifetime of the project are likely to be ascribed to the maintenance workers.

- **Physical splintering**

It is unlikely that the presence of a Transmission power line would splinter communities, seeing as people can still move freely underneath a Transmission power line. However, the perception that a Transmission power line is dangerous might prohibit people from moving around or underneath the line, but it is foreseen that this would mostly be on an individual basis based on personal perception and would therefore not affect the collective community.

- **Third party tampering**

If third party tampering occurs, it would most probably be in the form of cable theft, which is an extremely high risk criminal activity with the probability and occurrences of accidental electrocution. Although cable theft, from a technical point of view, is not possible on a 400kV line, the possibility that someone would attempt cable theft out of ignorance cannot be

excluded. An uninformed person only sees a Transmission power line and does not necessarily take cognisance of the size of the Transmission power line.

According to the Opportunity Model of Cohen, Kleugel and Land (in Snyman, 2007), there are five factors that indicate the probability of risk of victimisation. The basic underlying principle of the Opportunity Model is that the daily operations and physical location of the Transmission power line not only brings it into direct contact with potential offenders, but that capable guardians are also absent. To curb such vulnerability it is further important that Eskom establish a trusting relationship with residents as these residents can act as informants and social protectors of the Transmission power line.

The Opportunity Model moves away from the characteristics of the potential offender and his/her motivation, to the characteristics of the situation in which the crime may occur. The risk rate is not dependent on the number of factors that are present or absent, but rather on the combination of factors that are present or absent. The five factors are:

- * **Exposure:** The physical visibility and accessibility of the Transmission power lines to persons who may vandalise or sabotage it. On the other hand the Transmission power line is also visible to informers and social protectors (residents).
- * **Proximity:** The physical distance between the Transmission power line and potential offenders. Some sections of the Transmission power line on the western alternative pass in close proximity to settlements, both formal and informal.
- * **Guardianship:** Guardianship is determined by the number of persons and devices that prevent contact between the Transmission power line and potential offenders. However, it is important to note that guardianship does not relate to the quantity of the guardian elements, but to the quality and surety of response. Again it is not only important for Eskom to have a fully operational and effective Disaster Management Plan, but also to establish a trusting relationship with the residents to act as “informal” guardians of the Transmission power lines.
- * **Target attractiveness:** The inherent value and symbolism of the target have a direct bearing on the risk of the target.
- * **Property of committing the offence:** The specialisation in skills level to commit the crime decreases the risk of victimisation. Despite this, it does not decrease the risk of an opportunistic (or ignorant) offender to attempt cable theft.

Any third party tampering on the Transmission power lines could increase the vulnerability of communities in close proximity to the Transmission power lines, which in turn would impact on their health and safety. Sabotage will have an immediate impact on safety and security as it is a wilful act intended to deliberately damage or destroy the Transmission power line. Cable theft will also compromise the functionality of the Transmission power line, resulting in power failures possibly at a national level.

Apart from the impact on safety on the surrounding area, there will also be an immediate safety impact on the offender, resulting in possible death as a result of high voltage electrocution.

An assessment of these category 1 impacts was conducted through the use of the assessment criteria (outlined in section 1.3) to determine the significance of each of the identified issues, as per table 14b below.

Table 14b: Operation & Maintenance Phase: Socio-Cultural Change Processes Category 1 Impact Assessment

	Significance		Spatial		Duration		Degree of Probability		Degree of Certainty		Risk	Status
PRE-MITIGATION												
Movement of maintenance workers	Moderate	3	Isolated	1	Incidental	1	Could happen	3	Possible	1.02	Low	Negative
Physical splintering	Low	2	Isolated	1	Incidental	1	Unlikely	2	Possible	0.52	Very low	Negative
Third party tampering	Moderate	3	Isolated	1	Incidental	1	Could happen	3	Possible	1.02	Low	Negative
POST MITIGATION												
Movement of maintenance workers	Low	2	Isolated	1	Incidental	1	Unlikely	2	Possible	0.52	Very low	Negative to Neutral
Physical splintering	Very low	1	Isolated	1	Incidental	1	Unlikely	2	Possible	0.4	Very low	Negative to Neutral
Third party tampering	Low	2	Isolated	1	Incidental	1	Unlikely	2	Possible	0.52	Very low	Negative to Neutral
MITIGATION MEASURES												
<p>Movement of maintenance workers:</p> <ul style="list-style-type: none"> Maintenance workers should be clearly identifiable, either by wearing overalls and/or identification cards. Consult with local landowners prior to maintenance work taking place, to inform them of when the maintenance team will be on site, for how long, and approximately how many persons the team will consist of. Supply landowners with a contact number to report suspicious persons or persons who loiter around the maintenance team, but that does not form part of the maintenance team. (For example: If Eskom indicated that the maintenance team would consist of 20 people, but the landowner notices that there are 30 people on his property, he should be able to inform Eskom of this fact.) 			<p>Physical splintering:</p> <ul style="list-style-type: none"> Community awareness on the safety mechanisms of a Transmission power line and potential dangers. Such an awareness campaign should be based on and address Frequently Asked Questions (FAQs) regarding a Transmission power line, e.g. is it safe to walk underneath a Transmission power line if the surrounding area is wet or it is raining? The awareness campaign should also focus on standard operating procedures when there is a breakdown in the line, e.g. people should steer clear of the area, who to contact, etc. 					<p>Third party tampering:</p> <ul style="list-style-type: none"> Conduct a vulnerability assessment to identify essential portions and dimensions of the Transmission power line that is particularly vulnerable to wilful damage. Ensure that physical security systems and emergency tactical response measures are adequate and effective. Increase random aerial and ground surveillance of the entire length of the Transmission power line or sections thereof. Fence off and control access to towers and other key facilities on the Transmission power line. 				

- **Sense of place**

Much of what is valuable in a culture is embedded in place, which cannot be measured in monetary terms. It is because of a sense of place and belonging that some people loath to be moved from their dwelling place, despite the fact that they will be compensated for the inconvenience and impact on their lives.

The potential impact on socio-cultural behaviour and the related perception of environmental changes could either have a positive or a negative impact on sense of place (i.e. peace of mind or frustration/anger). It could be viewed as a positive impact if people perceive the project as a means of job creation, which is true in the case of the tribal authorities, and infrastructural and/or economic development, which is not intrusive on their lives and do not cause them immediate danger. Potential negative impacts include the visual impact and the resultant intrusion on sense of place.

Research on the psychological experience of sense of place suggests that people rapidly discount a landscape as soon as the first scar occurs, rather like a stain ruining a favourite garment (Petrich 1993). Thereafter, any additional impacts on the landscape have a correspondingly smaller effect. Hence, the aesthetic impact of placing a transmission line in a landscape that already bears the marks of development would be less than that of placing it in a relatively unspoilt environment. People overwhelmingly prefer "nature scenes" to urban and built environments, according to research. Zadik (1985) explains "people seem to respond to environments as natural if the areas are predominantly vegetation and do not contain human artefacts such as roads or buildings (Relf 1992)."

Steven Kaplan (1992) attributes the restorative value of participation with nature, particularly wilderness experiences, to the ability to fulfil several criteria: Being away, Extent, Fascination, and Compatibility which is established by an environment that is conducive to meeting personal goals; that is, in a compatible environment, what you want to do and are inclined to attempt are needed and feasible.

In some instances the potential presence of the Transmission power lines might affect residents' sense of place. In the past they might have felt safe and secure in the area and therefore stayed in the area for those specific reasons. As the proposed Transmission power lines might impact on people's *perception* of safety, these people might now feel unsafe in the area knowing that the lines are located within the area. Furthermore, the visibility of the transmission power line might impact on people's quality of life in terms of the aesthetics of the area that they have grown accustomed to.

It is important to note that sense of place has been assessed from a social point of view, which relates to people's perception of the project in relation to the area. Due to the fact that large segments of the affected area live in poverty, have fairly low educational levels coupled with unemployment, it is expected that their expectation of the project would mostly relate to positive impacts (the expectation of being employed), whereas the private landowners

(farmers) are more aware of the potential negative impacts that the installation might have on their current and future land use. Private landowners have described the area as 'pristine' and 'unique' and therefore a change in the environment brought about by the introduction of the proposed project might influence this perception. People who are, for example, unemployed and living in poverty have different needs than preserving the area or the environment and are therefore less likely to oppose the proposed project as they believe it will bring about change in the area in terms of employment and upliftment.

Lulumisa to Minerva section: In addition to scattered households, the closest human settlements to this section of the corridor include the following areas:

Settlement	Proximity of proposed transmission line to settlement	Potential changes
Diepsloot	Approximately 80m west	Might limit future development towards the line
Laezonia AH	Encroachment upon servitude to north and south	Might limit future development towards the line
Olievenhoutbosch	Approximately 80m west	Might limit future development towards the line

Minerva to Apollo section: In addition to scattered households, the closest human settlements to this corridor include the following areas:

Settlement	Proximity of proposed transmission line to settlement	Potential changes
Olievenhoutbosch	Encroachment upon servitude to north and south	Might limit future development towards the line
Mountain Farm AH	Approximately 280m north	Might limit future development towards the line
Randjesfontein AH	Encroachment upon servitude to north	Might limit future development towards the line
Elandsfontein development	Approximately 200m to the south	Might limit future development towards the line

Apollo to Bravo section: In addition to scattered households, the closest human settlements to this corridor include the following areas:

Settlement	Proximity of proposed transmission line to settlement	Potential changes
Balhewa AH	Approximately 120m south of northern alternative and approximately 140m east of southern alternative	Might limit future development towards the line
Tierpoort AH	Approximately 140m north of northern alternative	Might limit future development towards the line

An assessment of this category 2 impact was conducted through the use of the assessment criteria (outlined in section 1.3.1) to determine the significance the impact per alignment, as per table 14c below.

Table 14c: Operation & Maintenance Phase: Socio-Cultural Change Processes Category 2 Impact Assessment: Sense of Place

	Lulumisa – Minerva Section		Minerva – Apollo Section		Apollo – Bravo Section						
					Northern Alternative		Central Alternative		Southern Alternative		
PRE-MITIGATION											
Significance	Moderate	3	High	4	Moderate	3	High	4	Low	2	
Spatial	Study area	2	Study area	2	Study area	2	Local	3	Study area	2	
Duration	Long term	3	Long term	3	Long term	3	Long term	3	Long term	3	
Degree of Probability	Very likely	4	Very likely	4	Could happen	3	Very likely	4	Could happen	3	
Degree of Certainty	Probable		Probable		Probable		Probable		Probable		
Risk	2.16	Moderate	2.4	Moderate	1.62	Low	2.64	Moderate	1.38	Low	
Status	Negative		Negative		Negative		Negative		Negative		
POST-MITIGATION											
Significance	Low	2	Moderate	3	Low	2	Moderate	3	Very low	1	
Spatial	Study area	2	Study area	2	Study area	2	Local	3	Study area	2	
Duration	Long term	3	Long term	3	Long term	3	Long term	3	Long term	3	
Degree of Probability	Could happen	3	Could happen	3	Could happen	3	Could happen	3	Could happen	3	
Degree of Certainty	Probable		Probable		Probable		Probable		Probable		
Risk	1.38	Low	1.62	Low	1.38	Low	1.8	Low	0.72	Very low	
Status	Negative to Neutral		Negative to Neutral		Negative to Neutral		Negative to Neutral		Negative to Neutral		

Lulumisa – Minerva Section	Minerva – Apollo Section	Apollo – Bravo Section		
		Northern Alternative	Central Alternative	Southern Alternative
MITIGATION MEASURES				
<ul style="list-style-type: none"> • Sufficient and transparent information should be supplied to local residents within the area to enhance their sense of safety and thereby reducing the negative impact on sense of place. • Due consideration should be given to any visual screening mitigation measures identified and suggested by the Visual Impact Assessment. 				
PREFERRED ALIGNMENT				
The southern alternative , followed by the northern alternative .				

4. CONCLUSIONS

Summary

The change processes are grouped per project phase in Table 15a (expected category 1 impacts) and in Table 15b (expected category 2 impacts) with an indication of the significance of these potential impacts before and after mitigation. The significance of potential category 1 impacts is then grouped per change process in Table 16a, while Table 16b reflects a summary of the potential category 2 impacts per change process.

Table 15a: Summary of Category 1 Impacts per Project Phase

CHANGE PROCESS	ASSESSMENT AREA	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
CONSTRUCTION & DECOMMISSIONING			
Demographic	Influx of construction workers	Very Low -	Very low ±
	Influx of job seekers	Low -	Very low ±
Geographic	Temporary loss of cultivated land	Moderate -	Low -
	Temporary loss of grazing land	Low -	Low – to ±
Economic	Compensation for servitude	Low +	n/a
	Direct formal employment opportunities to local individuals	Low +	Low +
	Indirect formal and/or informal employment opportunities to local individuals	Low +	Low +
Institutional and Empowerment	Negotiation process	Moderate	Moderate +
	Additional demand on municipal services	Low -	Low -
Socio-Cultural	Integration with local community	Low -	Very low – to ±
	Health	Moderate -	Moderate -

CHANGE PROCESS	ASSESSMENT AREA	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
	Safety and security	Low -	Very low -
	Construction noise	Low -	Very low -
OPERATION & MAINTENANCE			
Demographic	None	n/a	n/a
Geographic	Permanent loss of grazing land	Very low -	Very low ±
	Spatial development	Low -	Very low -
	Presence of transmission power line	Moderate -	Low - to ±
Economic	Direct formal employment opportunities to local individuals	Low +	Low +
	Electricity supply and economic growth	Moderate +	n/a
	Property values	Moderate -	Low -
Institutional and Empowerment	None	n/a	n/a
Socio-Cultural	Movement of maintenance workers	Low -	Very low - to ±
	Physical splintering	Very low -	Very low - to ±
	Third party tampering	Low -	Very low -

Table 15b: Summary of Category 2 Impacts per Project Phase

Change Process	Assessment Area	Lulumisa – Minerva Section		Minerva – Apollo Section		Apollo – Bravo Section					
						Northern Alternative	Central Alternative	Southern Alternative			
CONSTRUCTION & DECOMMISSIONING											
Demographical	Relocation	Mod -	Mod -	High -	Mod -	Mod -	Mod -	Mod -	Low -	Mod -	Mod -
Geographical	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Economical	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Empowerment and Institutional	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Socio-Cultural	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
OPERATION & MAINTENANCE											
Demographical	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Geographical	Cultivated land and irrigation	Low -	Very low -	No impact	n/a	Low -	Very low -	Low -	Very low -	No impact	n/a
	Mining	Mod -	Low -	Low -	Very low -	Low -	Very low -	Low -	Very low -	No impact	n/a
Economical	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Empowerment and Institutional	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Socio-Cultural	Sense of place	Mod -	Low -	Mod -	Low -	Low -	Low -	Mod -	Low -	Low -	Very low -

The pre-construction and construction phase of the proposed project is characterised by a number of negative impacts. This is mainly due to the nature of the activities that take place during these phases. The same holds true for the operational phase of the proposed project. Most of the negative impacts within these various phases can be mitigated successfully.

There are also a number of positive impacts, which could be further enhanced if managed effectively (as outlined in the enhancement measures for the various impacts and summarised in section 5). These impacts mostly relate to a temporary change in the employment and economic profile of the local area by means of employment opportunities, which in turn leads to a positive economic impact on local households.

Table 16a: Summary of Category 1 Impacts per Change Process

CHANGE PROCESS	ASSESSMENT AREA	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
DEMOGRAPHICAL			
Construction & De-commissioning	Influx of construction workers	Very Low -	Very low ±
	Influx of job seekers	Low -	Very low ±
Operation & Maintenance	None	n/a	n/a
GEOGRAPHICAL			
Construction & De-commissioning	Temporary loss of cultivated land	Moderate -	Low -
	Temporary loss of grazing land	Low -	Low – to ±
Operation & Maintenance	Permanent loss of grazing land	Very low – to ±	Very low ±
	Spatial development	Low -	Very low -
	Presence of transmission power line	Moderate -	Low – to ±
ECONOMICAL			
Construction & De-commissioning	Compensation for servitude	Low +	n/a
	Direct formal employment opportunities to local	Low +	Low +

CHANGE PROCESS	ASSESSMENT AREA	SIGNIFICANCE (pre-mitigation)	SIGNIFICANCE (post-mitigation)
	individuals		
	Indirect formal and/or informal employment opportunities to local individuals	Low +	Low +
Operation & Maintenance	Direct formal employment opportunities to local individuals	Low +	Low +
	Electricity supply and economic growth	Moderate +	n/a
	Property values	Moderate -	Low -
EMPOWERMENT & INSTITUTIONAL			
Construction & De-commissioning	Negotiation process	Moderate	Moderate +
	Additional demand on municipal services	Low -	Low -
Operation & Maintenance	None	n/a	n/a
SOCIO-CULTURAL			
Construction & De-commissioning	Integration with local community	Low -	Very low – to ±
	Health	Moderate -	Moderate -
	Safety and security	Low -	Very low -
	Construction noise	Low -	Very low -
Operation & Maintenance	Movement of maintenance workers	Low -	Very low – to ±
	Physical splintering	Very low -	Very low – to ±
	Third party tampering	Low -	Very low -

Table 16b: Summary of Category 2 Impacts per Project Phase

Change Process	Assessment Area	Lulumisa – Minerva Section		Minerva – Apollo Section		Apollo – Bravo Section					
						Northern Alternative		Central Alternative		Southern Alternative	
DEMOGRAPHICAL											
Construction & De-commissioning	Relocation	Mod -	Mod -	High -	Mod -	Mod -	Mod -	Mod -	Low -	Mod -	Mod -
Operation Maintenance &	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
GEOGRAPHICAL											
Construction & De-commissioning	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Operation Maintenance &	Cultivated land and irrigation	Low -	Very low -	No impact	n/a	Low -	Very low -	Low -	Very low -	No impact	n/a
	Mining	Mod -	Low -	Low -	Very low -	Low -	Very low -	Low -	Very low -	No impact	n/a
ECONOMICAL											
Construction & De-commissioning	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Operation Maintenance &	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

INSTITUTIONAL AND EMPOWERMENT											
Construction & De-commissioning	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Operation & Maintenance	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
SOCIO-CULTURAL											
Construction & De-commissioning	None	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Operation & Maintenance	Sense of place	Mod -	Low -	Mod -	Low -	Low -	Low -	Mod -	Low -	Low -	Very low -

The geographic, demographic and socio-cultural processes all have a number of negative impacts. However all of these impacts can be mitigated successfully if effectively managed. Economic impacts as a result of the project are for the most part positive in nature, which is mainly due to the economic investment and development that will take place in the community as a result of the project.

Although the expected construction impacts across all the change processes are mostly negative, these impacts are for the most part only temporary in nature and only expected to last over the construction period. In comparison, operational impacts are expected to last over the longer term and therefore would have a prolonged effect on especially the geographical environment in terms of the presence of the Transmission power lines in the area. People are more inclined to get “used” to the infrastructure in their area if servitude and line maintenance are applied effectively and with due diligence. The regular monitoring and evaluation of the Transmission power lines as a whole would also ensure that corrective measures can be taken immediately to prevent adverse effects either on the infrastructure itself, or on the local area.

Preferred Route Corridor

To come up with a preferred corridor, a comparison among the alternative corridor alignments was conducted by assessing all of the category 2 impacts identified with a certain change process. A summary of the outcome of this brief assessment is as per table 17 below, where:

	Sensitive area, not recommended from a social perspective (high to very high significance impact rating prior to mitigation).
	Acceptable area neither ideal nor flawed from a social perspective (moderate significance impact rating prior to mitigation).
	Ideal area, from a social perspective (low to very low significance impact rating prior to mitigation).

Please note that a ‘red site’ does not constitute a fatal flaw, but does however imply that careful consideration should be given to the development and implementation of mitigation measures in the event that such a site is selected.

Also note that category 1 impacts have not been included in this table, as it is believed that these impacts would occur regardless of which site is selected in the end.

Table 17: Summary of Assessments (category 2 impacts)

Change Process	Assessment Area	Lulumisa – Minerva Section	Minerva – Apollo Section	Apollo – Bravo Section		
				Northern Alternative	Central Alternative	Southern Alternative
Demographical	Relocation	2.96	3.7	2.96	2.22	2.96
Geographical	Permanent loss of cultivated land (including irrigation)	1.62	0	1.62	1.62	0
	Mining operations	2.7	1.62	1.62	1.62	0
Economical	No category 2 impacts	-	-	-	-	-
Institutional & Empowerment	No category 2 impacts	-	-	-	-	-
Socio-Cultural	Sense of place	2.16	2.4	1.62	2.64	1.38
TOTAL		9.44	7.72	7.82	8.1	4.34

Based on the comparison of category 2 impacts prior to mitigation, overall the **southern alternative** emerged as the preferred route corridor from a social perspective. This is based on the fact that the potential impacts as a result of the expected change process taking place, significantly decreases as outlined below:

- **Irrigation (centre pivots):** Although the current alignments are all located a safe distance away from centre pivots, the northern and central alternative encroaches upon a number of irrigation schemes, which would be further compounded if transmission power lines are placed in parallel. Also, transmission power lines in parallel on the northern alternative would mean that farmers along this corridor would lose more land (most of these farms already have registered servitudes due to the existing transmission power line) – and in some cases an additional 55m of servitude might render some of these farms economically unviable.
- **Mining operations:** Again the northern and central alternatives pass in close proximity to open cast mining areas, which would be further compounded if more than one transmission power line is placed in parallel to the existing transmission power lines. If this alternative is chosen as the preferred alignment, it is believed that some realignment would be required to bypass the open cast mining areas to ensure the safe operation of both the transmission power lines as well as that of the mining operation itself, notably on the sections between the Lulumisa and Minerva substations, as well as the section between the Minerva substation and the Apollo converter station.
- **Sense of place:** The area surrounding the central alternative is still quite pristine and unspoilt, whereas the area surrounding the northern and southern alternatives is regarded as ‘spoilt’ due to the presence of the existing transmission power line(s).

Recommendations

Based on the findings of this report, it can be concluded that the social environment in general pose no fatal flaws to the development of the proposed transmission power lines known as Bravo 3, under the condition that the identified mitigation measures in this document and as recommended for inclusion in the EMP, are implemented and adhered to, particularly where construction activities either takes place in close proximity to or passes through residential areas that could affect the quality of live of these households in terms of noise, dust, safety and security.

This recommendation was based on the specialist's:

- Understanding of the proposed project, including the alternative route alignments and the nature and timeframe of the proposed activities;
- Assessment of the affected communities, settlements and institutions in terms of:

* Demographic processes: the number and composition of people;

- * Geographical processes: land use patterns – including tourism;
 - * Economic processes: the way in which people make a living and the economic activities in society – including tourism;
 - * Institutional and Empowerment processes: the ability of people to be involved and influence decision making processes; and the role, efficiency and operation of governments and other organisations; and
 - * Socio-cultural processes: the way in which humans behave, interact and relate to each other and their environment and the belief and value systems which guide these interactions, including physical and mental health processes.
- Assessment of potential change processes that might occur as a result of the project.

5. ENVIRONMENTAL MANAGEMENT PLAN: SOCIAL REQUIREMENTS

From a social perspective, it is recommended that the following mitigation measures be included in the EMP.

Demographical Change Processes

Influx of Construction Workers

- Raise awareness amongst construction workers about local traditions and practices.
- Inform local businesses that construction workers will move into the area to enable local businesses to plan for the extra demand.
- Ensure that the local community communicate their expectations of construction workers' behaviour with them.
- Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers could also be issued with identification tags.

Influx of Job Seekers

- Ensure that employment procedures / policy are communicated to local stakeholders, especially community representative organisations and ward councillors.
- Have clear rules and regulations for access to the camp / site office to control loitering. Consult with the local SAPS to establish standard operating procedures for the control and/or removal of loiterers at the construction site.
- Eskom (or its appointed contractor) should monitor areas where people gather in the field on a regular basis as this is normally the first indication that settlement might take place in the area. These people should be removed in co-operation with the local SAPS to prevent the formation and/or expansion of informal settlements in such an area, especially if it encroaches upon the servitude.

Relocation of households and/or Population segments

- Avoid the resettlement and/or displacement of households as far as possible by realigning sections of the preferred route corridor to avoid areas of human settlement – this is especially required in Olievenhoutbosch. If technically feasible, it is suggested that the transmission power line exit the Minerva substation to the south and continue in a southerly direction past Olievenhoutbosch after which it can turn in a easterly direction.

- If resettlement is unavoidable, residents should be sufficiently compensated and assisted with the relocation process.
- A form of compensation should also be granted to individuals who are residing in informal settlements within the servitude.
- A formal grievance procedure should be implemented and communicated to landowners to ensure a fair and transparent process.
- Eskom (or its appointed contractor) should monitor areas where people gather in the field on a regular basis as this is normally the first indication that settlement might take place in the area. These people should be removed in co-operation with the local SAPS to prevent the formation and/or expansion of informal settlements in such an area, especially if it encroaches upon the servitude.
- The servitude should be inspected on a regular basis to determine whether any settlement has taken place, either within the servitude, or encroaching upon the servitude.
- Households that encroach upon or settle within the servitude have to be relocated as soon as possible.
- Eskom or its appointed contractors should assist these households with the relocation process.
- Educate surrounding communities about the dangers of living in the servitude.
- A form of signage on the towers should also indicate that it is dangerous.
- In some way, a barrier (psychological and/or physical) should indicate that no structures should be built in the servitude. One way of achieving such a barrier is to educate community leaders on the health and safety aspects of the servitude, who then in turn can ensure that settlement does not take place within the servitude.

Geographical Change Processes

Temporary loss of cultivated land

- Compensation for the temporary loss of cultivated land should be included in the negotiation process with the landowner.
- Initial servitude clearing on the farmland should take place after the harvesting season, as far as possible. Landowners should be compensated for the loss of cultivated land.
- The area should be rehabilitated upon completion of the construction activities to ensure that the land is returned in the same condition as prior to the construction activities.

Temporary loss of grazing land

- Mitigation measures should be implemented to avoid any negative impact on animals (e.g. fencing off the construction area).
- Eskom or its appointed contractor(s) should assist with the temporary relocation of livestock during construction, as well as relocating cattle back to their original grazing area once construction in an area is completed.
- Grazing areas should be rehabilitated to their original grazing conditions to ensure that cattle can continue to graze in the area once they are returned to that area.
- Where the area cannot be rehabilitated to its original condition within a reasonable period of time, Eskom or its appointed contractor(s) should provide funding to obtain alternative food sources to the farmer for the time period required for natural rehabilitation to occur within the grazing area.

Permanent loss of grazing land

- Where possible, towers should be located on the boundary of the farmland to lessen the loss of grazing land.

Spatial development

- Route alignment should avoid both existing and planned settlements, where possible.
- Route alignment should take cognisance of local development plans.

Presence of the transmission power line

- Education local residents on the real and perceived dangers of living close to a Transmission power line.
- Maintenance of the servitude in terms of restrictions associated with residences within this area.

Permanent loss of cultivated land, including irrigation

- Consultation should take place between the landowner and Eskom to determine the extent of permanent loss of land for cultivation due to the presence of the tower(s).
- Upon agreement between the landowner and Eskom, landowners should be compensated for the permanent loss of portions of the land that is unreachable due to the presence of the tower(s).

- Where possible, pylons should be located on the border of the farmland to lessen the potential loss of cultivated land.
- Alignment should be done in such a way that it is located a safe distance away from centre pivots.

Mining operations

- The location of the Transmission power line should be determined in consultation with mining companies.
- It is preferable to avoid mining operations at these plants altogether.

Economical Change Processes

Compensation for servitude

- Compensation (not necessarily in the form of monetary compensation) to individuals who are residing in informal settlements within the servitude should be considered. However, this issue should be approached with caution as this might set a precedent for future projects (people might deliberately move onto the servitude for the purpose of receiving compensation).
- The land valuator should be experienced in valuating the land in question.
- The process should be conducted with the necessary respect, and the negotiator should be transparent about the process and expectations (do not engage in “empty promises”).
- The negotiation should be done for the whole servitude and not part of the servitude.
- Contracts should be reviewed by an independent body.
- Land owners should be made aware that a pre- and post evaluation of their land value is possible.

Direct formal employment to local individuals

- Unskilled job opportunities should be afforded to local residents. Local trade unions could assist with the recruitment process to counteract the potential for social mobilisation.
- Equal opportunities for employment should be created to ensure that the local female population also have access to these opportunities. Females should be encouraged to apply for positions.
- Individuals with the potential to develop their skills should be afforded training opportunities. Eskom or its appointed contractors should be involved in this process.

- Mechanisms should be developed to provide alternative solutions for creating job security upon completion of the project. This could include formal and/or informal training on how to look for alternative employment, information on career progression, etc. to ensure that people are equipped to seek other jobs with the skills that they have gained.
- Payment should comply with applicable Labour Law legislation in terms of minimum wages.
- Where local labourers are employed on a more permanent basis, cognisance should be taken of the Labour Law in terms of registering the worker with the Unemployment Insurance Fund (UIF), Pay as You Earn (PAYE), workman's compensation and all other official bodies as required by law. This would enable the worker to claim UIF as a means of continuous financial support when the worker's position on the construction team has either become redundant or once the construction phase comes to an end.
- Avoid employing foreign labour on the project. Immigrants are seen to be "taking" jobs or trading opportunities needed by South Africans - often at lower rates of pay or by evading trading regulations.
- Individuals with the potential to develop their skills should be afforded training opportunities. Eskom should be involved in this process.
- Make use of local labour on unskilled maintenance components, such as servitude maintenance.

Indirect formal and/or informal employment opportunities to local individuals

- Where possible, formalise informal job opportunities (e.g. the provision of services such as food) at the construction site and/or camp. The formalisation process could include issuing permits to vendors and removing non-permitted individuals as a way to reduce the potential for conflict amongst vendors and to curb loitering at the site and/or camp.
- Identify the segment of the local community that might benefit from informal indirect opportunities, and assist them with skills development and subsidise sustainable initiatives.
- Encourage construction workers to use local services.

Property values

- Implementation of visual mitigation measures as proposed in the Visual Impact Assessment.

Empowerment and Institutional Change Processes

Negotiation process

- The implementation of a fair and transparent negotiation process, as discussed under Section 2.4.
- Negotiations in should be approached with the necessary cultural sensitivity.
- Eskom should consider making use of an approved interpreter during the negotiation process to ensure that there are no misunderstandings as a result of language barriers.

Additional demand on municipal services

- Construction workers should be made aware of the limited capacity of the municipal services network.
- Negotiations with the affected local municipalities must be conducted and a “demand-side management” should be implemented.
- Sufficient portable chemical toilets should be provided on site and at the construction village. These must be regularly maintained and serviced.
- Contractors should ensure adequate sanitation services (e.g. showers) at the construction village with effective drainage facilities to ensure that used water is appropriately treated and carried away from the site.

Socio-Cultural Change Processes

Integration with local community

- The community should be informed in advance of the influx of construction workers and the time they will spend in the community as well as the activities they will be involved in. This will enable the community to prepare for a possible (temporary) change in functioning.
- A code of conduct should be established for construction workers in their dealings with the local community. Creating of awareness on both sides (community and outsiders) is crucial for the success of the project.
- Potential conflict situations can be reduced beforehand using a transparent recruitment process, i.e. where labourers would be sourced from the local community.
- A labour desk should be implemented where the local community members could register. A rotary system could be used for unskilled labour to ensure that all job seekers have an equal opportunity to employment.

- Potential conflict situations within the construction village itself can be managed by means of weekly forum meetings. During these meetings residents should have the opportunity to raise any problems experienced and make suggestions in terms of their living space. Where feasible, these problems and suggestions should be addressed as soon as possible to ensure a conflict-free environment.

Health

- An aggressive STI and HIV/AIDS awareness campaign should be launched, which is not only directed at construction workers but also at the community as a whole.
- Condoms should be distributed by placing them at centrally located points and by ensuring that construction workers and community members are aware of the availability and location of condoms. The distribution of condoms should be approached with the necessary cultural sensitivity.
- Access at the construction site should be controlled to prevent sex workers from either visiting and/or loitering at the construction village.
- Local women should be empowered. This could be achieved by employing them to work on the project, which in turn would decrease their (financial) vulnerability.

Safety and Security

- Construction workers should be clearly identifiable. Overalls should have the logo of the construction company on it and/or construction workers should wear identification cards.
- The construction site should be fenced and access should be controlled by means of a security access point.
- Loitering of outsiders at the either the construction site or at the construction village should not be allowed. Loiterers at the site should be removed in cooperation with the local branch of the South African Police Service (SAPS).

Construction noise

- Construction activities should be restricted to daytime hours between 06:00 and 18:00.
- Adjacent property owners should be consulted and notified of any construction activities that could lead to excessive noise levels.
- Adjacent property owners should also be consulted if any night time construction activities were to take place.

Movement of maintenance workers

- Maintenance workers should be clearly identifiable, either by wearing overalls and/or identification cards.
- Consult with local landowners prior to maintenance work taking place, to inform them of when the maintenance team will be on site, for how long, and approximately how many persons the team will consist of.
- Supply landowners with a contact number to report suspicious persons or persons who loiter around the maintenance team, but that does not form part of the maintenance team. (For example: If Eskom indicated that the maintenance team would consist of 20 people, but the landowner notices that there are 30 people on his property, he should be able to inform Eskom of this fact.)

Physical splintering

- Community awareness on the safety mechanisms of a Transmission power line and potential dangers.
- Such an awareness campaign should be based on and address Frequently Asked Questions (FAQs) regarding a Transmission power line, e.g. is it safe to walk underneath a Transmission power line if the surrounding area is wet or it is raining?
- The awareness campaign should also focus on standard operating procedures when there is a breakdown in the line, e.g. people should steer clear of the area, who to contact, etc.

Sense of Place

- Sufficient and transparent information should be supplied to local residents within the area to enhance their sense of safety and thereby reducing the negative impact on sense of place.
- Due consideration should be given to any visual screening mitigation measures identified and suggested by the Visual Impact Assessment.

Third party tampering

- Conduct a vulnerability assessment to identify essential portions and dimensions of the Transmission power line that is particularly vulnerable to wilful damage.
- Ensure that physical security systems and emergency tactical response measures are adequate and effective.

- Increase random aerial and ground surveillance of the entire length of the Transmission power line or sections thereof.
- Fence off and control access to towers and other key facilities on the Transmission power line.

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