Eskom Holdings Limited
Transmission Division

PROPOSED FOSKOR-MERENSKY 400 kV±131 KM LINE AND ASSOCIATED SUBSTATION WORKS

DEA Reference Number: DEA REFERENCE: 12/12/20/2411

SOCIAL IMPACT ASSESSMENT REPORT
January 2017

Prepared by:

Dr. Neville Bews & Associates
Social Impact Assessors
PO Box 145412
Bracken Gardens
1452

Submitted to:

NSOVO Environmental Consulting
1056 Crescentwood Estate
8th Road,
Noordwyk
1687

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List of Acronyms

A1	Alternative 1 (Green Route)
A2	Alternative 2 (Blue Route)
A3	Alternative 3 (Pink Route)
A4	Alternative 4 (Yellow Route)
AIDS	Acquired immunodeficiency syndrome
DC47	Greater Sekhukhune District Municipality
DC33	Mopani District Municipality
DC35	Capricorn District Municipality
DEAT	Department of Environmental Affairs and Tourism (National)
EIA	Environmental Impact Assessment
EMFs	Electromagnetic fields
ESKOM	Eskom Holdings SOC Limited
GPS	Global Positioning System
HIA	Heritage Impact Assessment
HIV	Human Immunodeficiency Virus
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IRR	Issues Response Report
kV	Kilovolt
LIM475	Greater Tubatse Local Municipality
LIM474	Fetakgomo Local Municipality
LIM355	Lepele-Nkumpi Local Municipality
LIM334	Ba-Phalaborwa Local Municipality
LIM335	Maruleng Local Municipality
MW	Megawatt
MR	Main Route
NBA	Dr. Neville Bews & Associates
NGO	Non-Governmental Organisation
PA	Per Annum (Yearly)
PPP	Public Participation Process
RAP	Resettlement Action Plan
SIA	Social Impact Assessment
SMME	Small Medium and Micro Enterprises
Stats SA	Statistics South Africa
STDs	Sexually Transmitted Diseases
ToR	Terms of Reference
WHO	World Health Organisation

Details and Experience of Independent Consultant

Consultant:	Dr Neville Bews & Associates
Contact person:	Neville Bews
Physical address:	84 Hennie Alberts Street, Brackenhurst Alberton
Postal address:	P O Box 145412, Bracken Gardens, Alberton, 1452
Telephone:	+27 11 867-0462
Mobile:	+27 82 557-3489
Fax:	+27 86 621-8345
Email:	bewsco@netactive.co.za
Website:	www.socialassessment.co.za

Qualifications:

University of South Africa: B.A. (Honours) – 1984

Henley Management College, United Kingdom: The Henley Post-Graduate Certificate in Management – 1997

Rand Afrikaans University: M.A. (cum laude) – 1999

Rand Afrikaans University: D. Litt. et Phil. – 2000

Experience:

Over 30 years in the Human Resources (HR) field and 11 years in Social Impact Assessments.

Neville Bews has consulted extensively in the field of Social Impact Assessments. Some of the projects completed by Neville include the Gautrain Rapid Rail Link SIA, Australian – South African sports development programme impact, Kumba Resources Sishen South Project SIA, The United Nations Office on Drugs and Crime Evaluation of a Centre for Violence Against Women, SIAs at Leeuwpan Coal Mine Delmas, Glen Douglas Dolomite Mine Henely-on-Klip, Grootegeluk Open Cast Coal Mine, SANRAL – Social Impact Assessment of tolling the Gauteng Highway System, SANRAL – Social Impact Assessment of the N2 Wild Coast Toll Highway, University of Johannesburg – Research into research outputs of the University, the Social Impact Assessment for Waterfall Wedge housing and business development in Midrand Gauteng, the social impact assessment for the Environmental Management Plan for Sedibeng District Municipality. Exxaro Ltd. – Social and Labour Plan for the Belfast Project, Golder Associates Africa (Pty) Ltd – SIA for the Transnet New Multi-Product Pipeline (Commercial Farmers); Golder Associates Africa (Pty) Ltd – SIA for the Proposed Vale Moatize Power Plant Project in Mozambique. Kumba

Resources Ltd. – SIA for the Proposed Dingleton Resettlement Project at Sishen Iron Ore Mine; EcoPartners – SIA for Gold Fields West Wits Project. Exxaro Resources Ltd. – SIA for the Belfast Project. KV3 Engineers – SIA for Eskom Holdings Ltd's Proposed Ubertas 88/11 kV Substation. Cave Klapwijk and Associates SIA for the N3 Toll Road Route Location Initiative – Tugela Plaza to Warden. NEMAI Consulting – SIA for the Mokolo and Crocodile River (West) Water Augmentation Project. Kalahari Survey Solutions – SIA for the Proposed 150 MW Photovoltaic Power Plant and Associated Infrastructure, Potchefstroom. NEMAI Consulting – SIA for Eskom Holdings Limited's Neptune-Poseidon 400 kV Power Line near East London. eThekwini Municipality – SIA for the Proposed Infilling of the Model Yacht Pond at Blue Lagoon, Stiebel Place, Durban. NEMAI Consulting – SIA for the Ncwabeni: Off-Channel Storage Dam, KwaZulu-Natal.

Neville regularly lectures as a guest lecturer in the Department of Sociology at both the Universities of Johannesburg and Pretoria. At the University of Johannesburg he collaborated with Prof. Henk Becker of Utrecht University, the Netherlands, in a joint lecture to present the Social Impact Assessment Masters course via video link between the Netherlands and South Africa. Neville has also presented papers on Social Impact Assessments at both national and international seminars and has published widely at both a national and international level.

Declaration of Consultant's Independence

I, the undersigned,

Neville Frederick Bews

Id No: 5201085107083

do hereby declare as follows:

- I am employed at Dr. Neville Bews & Associates and have been appointed to undertake a Social Impact Assessment in respect of the following Environmental Authorisation application

- **Eskom Holdings' Transmission Division's Proposed Foskor Merensky 400 kV ±131 km Line and Associated Substation Works DEA REFERENCE: 12/12/20/2411**

- I hereby confirm my independence, as well as that of Dr. Neville Bews & Associates as a specialist;

- Neither I nor Dr. Neville Bews & Associates have any interest, be it business, financial, personal or other, in any proposed activity, other than fair remuneration for work performed;

- I have performed the work relating to the application in an objective manner;

- I have the expertise as required in terms of Sections 17 and 32 of Regulation 543 issued in terms of the National Environmental Management Act 107 of 1998. In this regard refer to the "Details and Experience of the Independent Consultant" above;

- I have complied with the National Environmental Management Act and all applicable legislation.

SIGNED AT ALBERTON ON THIS 28th DAY OF JANUARY, 2016

Executive Summary

1. Dr. Neville Bews & Associates was sub-contracted by NSOVO Environmental Consulting to undertake a Social Impact Assessment (SIA) for Eskom Transmission Division's proposed Foskor Merensky 400 kV ±131 km Line and Associated Substation Works.

2. The construction of the proposed power line has become necessary as the existing Eskom network has reached its capacity and will no longer be able to cope with projected future demands.

3. Consequently, Eskom plans to strengthen the existing network by constructing a 2nd Foskor Merensky 400 kV ±131 km power line and associated substation works in order to strengthen the supply network in the area and thus cater for future demand which is driven by mines and rural development in the region.

4. The proposed project stretches over a distance of ±131 km with 5 route alternatives having been identified.

5. These alternatives traverse various farms, including game farms, nature and game reserves, residential and industrial areas all located between Phalaborwa and Steelpoort within the municipal areas of.

    Mopani District Municipality (DC33)
        Ba-Phalaborwa Local Municipality (LIM334)
        Maruleng Local Municipality (LIM335)
    Capricorn District Municipality (DC35)
        Lepele-Nkumpi Local Municipality (LIM355)
    Greater Sekhukhune District Municipality (DC47)
        Fetakgomo Local Municipality (LIM474)
        Greater Tubatse Local Municipality (LIM475).

6. These areas are characterised by high levels of poverty, unemployment and an unequal distribution of income with relatively low service delivery. The prevalence of HIV and AIDS amongst antenatal women in the area is at its highest in Mopani at 24.9% and lowest in Sekhukhune at 20.2% which is somewhat lower than the national average of 30.2%.

7. The project consists of a construction and operational phase, with much of the activity centred on the construction of the line.

8. Construction will commence with the pegging of the footprint followed by setting up of a construction camp, securing the servitude, building of access roads, excavation and preparation of the tower foundation through to the stringing of the transmission cables. During the operational phase of the project Eskom requires access to the line at all times in order to undertake maintenance and repair work which is expected to occur on average twice a year.

9. The following 20 impacts associated with the project were identified and assessed, across each of the 5 alternative routes, in respect of both the construction and operational phases of the project.
    - Access across site
    - Access to servitude across private property
    - Crime and security
    - Disturbance of cultural, spiritual and religious sites
    - Disturbance of sense of place
    - Economic issues
    - Fencing
    - Fire risk
    - Health issues
    - Impact on farming operations
    - Job creation
    - Noise
    - Resettlement
    - Safety hazards associated with people and animals
    - Services and infrastructure
    - SMME opportunities
    - STDs, HIV and AIDS risk
    - Social instability
    - Traffic disruption

10. In respect of these impacts it was found that most related to the construction phase of the project and that many of these impacts could be reduced through appropriate mitigation measures being applied.

11. Amongst the more serious impacts were those relating to the operational phase of the project and associated with health issues and property values.

12. Of concern is that alternatives 1, 2 and 4 all affect a number of properties within the Balule Nature Reserve and the management of the reserve believes that this will negatively impact the vision, mission and objectives of the reserve, thus having a negative effect on the future management of the value of properties in the reserve.

13. In the village of Finale a pylon, associated with Alternative 1, is positioned virtually at the gate of a primary school and the transmission line will pass over a number of dwellings and will affect a number of burial sites. The village of Alverton also has a number of dwellings positioned directly under the transmission line and, at the village of Mashamthane, a law firm has been built directly under the proposed line.

14. Considered on a social basis if a compromise can be found in placing the route along or closer to existing corridors in an effort to limit the impact on ecotourism, as suggested by the ecotourism specialists in respect of Alternative 5, then Alternative 5 would emerge as the socially preferred route alternative. This, however, needs to be considered both on a technically viable basis as well and against the other environmental impacts across the study area. The following issues as pointed out by the ecotourism specialists would also need to be considered;
    - That the route be located slightly to the north of the R526 to minimise the visual impact from Kingfisher Hill residential and golf resort currently under construction;
    - Ideally avoid the Blyde Olifants Conservancy until reaching the R36;
    - Preferably follow the 'pink' route so as to run close to the R36 and the R555 until Burgersfort, to avoid any need to build new construction and maintenance tracks in relatively undeveloped and rugged countryside;

15. Along the R555 between Burgersfort and Steelpoort take care to limit potential negative impacts on the eco-tourism values of the commercial game lodge situated along this route.

16. With the upgrade of the project from a 275 kV to a 400 kV transmission line the question of the health effect of electromagnetic fields becomes somewhat of a more contentious issue and will need to be considered. Apart from noting public perception associated with the transmission of electricity and electromagnetic fields the technicalities of this risk are beyond the scope of expertise of this report.

17. Considering the no-go alternative this is likely to have even greater social consequences, particularly if the security of electricity supply is compromised. With the various developments, both industrial and residential, taking place in the country the need to secure a dependable electricity supply is of national importance and consequently the no-go alternative is not a viable option.

18. Considering the social effects of this project and the clear need to strengthen the electricity grid in this region a compromise will need to be negotiated between project proponents and affected parties. Further to this, consideration will need to be given to the technical limitation that a project of this nature faces as well as to the broader environmental threats it poses in respect of such matters as fauna and flora and threats to sensitive natural areas. The nature of the transmission line is such that it is possible to retain a route alternative while making more localised adjustments in an effort to accommodate local conditions. This is particularly relevant in respect of the extra 8 meters required for the 400 kV transmission line, which is 55 meters wide as opposed to 47 meters associated with the 275 kV transmission line. The need for and nature of localised adjustments will only become clearly evident during a corridor walk-down, when the central line and footprint of the transmission line and towers will be pegged and any flaws to the initial route will be identified.

19. Apart from the effects of possible higher levels of electromagnetic fields referred to under point 16 above and the increase of servitude width from 47 to 55 meters adding an extra 8 meters to the required servitude, the upgrade of the transmission line from 275 kV to 400 kV is likely to have limited social.

1. Introduction

Dr. Neville Bews & Associates have been sub-contracted by NSOVO Environmental Consulting to undertake a Social Impact Assessment (SIA) for Eskom Transmission Division's proposed Foskor Merensky 400 kV ±131 km Line and Associated Substation Works. The construction of the proposed power line has become necessary as the existing Eskom network has reached its capacity and will no longer be able to cope with projected future demands. Consequently, Eskom plans to strengthen the existing network by constructing a 2nd Foskor Merensky 400 kV ±131 km power line and associated substation works in order to strengthen the supply network in the area and, thus cater for future demand which are being is driven by mines and rural development in the region.

2. Project Description

The proposed scope of work entails construction of second Foskor-Merensky ±131km power line between the existing Merensky (Steelpoort) and Foskor (Phalaborwa). The proposed power line will be built at 400kV specification and construction will include associated substation works at the two substations to accommodate the new power line and its required infrastructure such as new transformers. The proposed activities are listed below as follows:

- Build and operate Foskor-Merensky 275kV second line at 400kV specification;
- Establish 400kV bus bars at Foskor MTS;
- Install the 1st 400MVA, 400/275kV transformer at Foskor MTS;
- Establish 400kV feeder bays at Merensky MTS and Foskor MTS.

2.1. Project location

The proposed line is located within the Limpopo Province stretching between the towns of Phalaborwa in the northeast and Steelpoort in the southwest. It crosses a number of farms, the majority of which are privately owned game farms as well as tribal authorities and council owned land. The following district and local municipalities are traversed by the project.

- Mopani District Municipality (DC33)
    - Ba-Phalaborwa Local Municipality (LIM334
    - Maruleng Local Municipality (LIM335)
- Capricorn District Municipality (DC35)
    - Lepele-Nkumpi Local Municipality (LIM355)

- Greater Sekhukhune District Municipality (DC47)
    - Fetakgomo Local Municipality (LIM474)
    - Greater Tubatse Local Municipality (LIM475)

The following towns are also crossed;

- Class 1 towns – Phalaborwa and Hoedspruit
- Class 2 towns – Gamarota, Burgersfort, Orighstad and Steelpoort
- Class 3 towns – Diphuti, Finale, Mica, Kromkloof and Brandraai

The land use description of the general area of the project includes mining; farming, predominantly game farming; residential; commercial and industrial use. The area has a vibrant tourist industry with a number of game reserves, lodges and guesthouses and is renowned for its natural attraction. There are also existing power lines in the area as well as airstrips and airports and an Air Force base. The line will also cross various regional and local roads.

There are five route alternatives and a no-go option that will be considered. These route alternatives are illustrated in the location map provided in Figure 1 and are described below.

2.2. Route alternatives

The following four route alternatives are considered for the project.

- Alternative 1 (Green Route)

This route loops out of the existing Foskor substation in a south-westerly direction. It continues along the R530 towards Mica crossing the R40 continuing in the same direction within the Phuza Moya Game Farm. The line intersects the villages of Finale and Diphutin eventually crossing the R36 towards the Orchards. It crosses the R36 again on two more occasions before entering a lightning prone mountainous area which it exits while descending in a south westerly direction towards the low lying Burgersfort villages. After that it crosses the R37 continuing into the town of Burgersfort and then along the secondary road 555 to Steelpoort, which it crosses before eventually entering the substation.

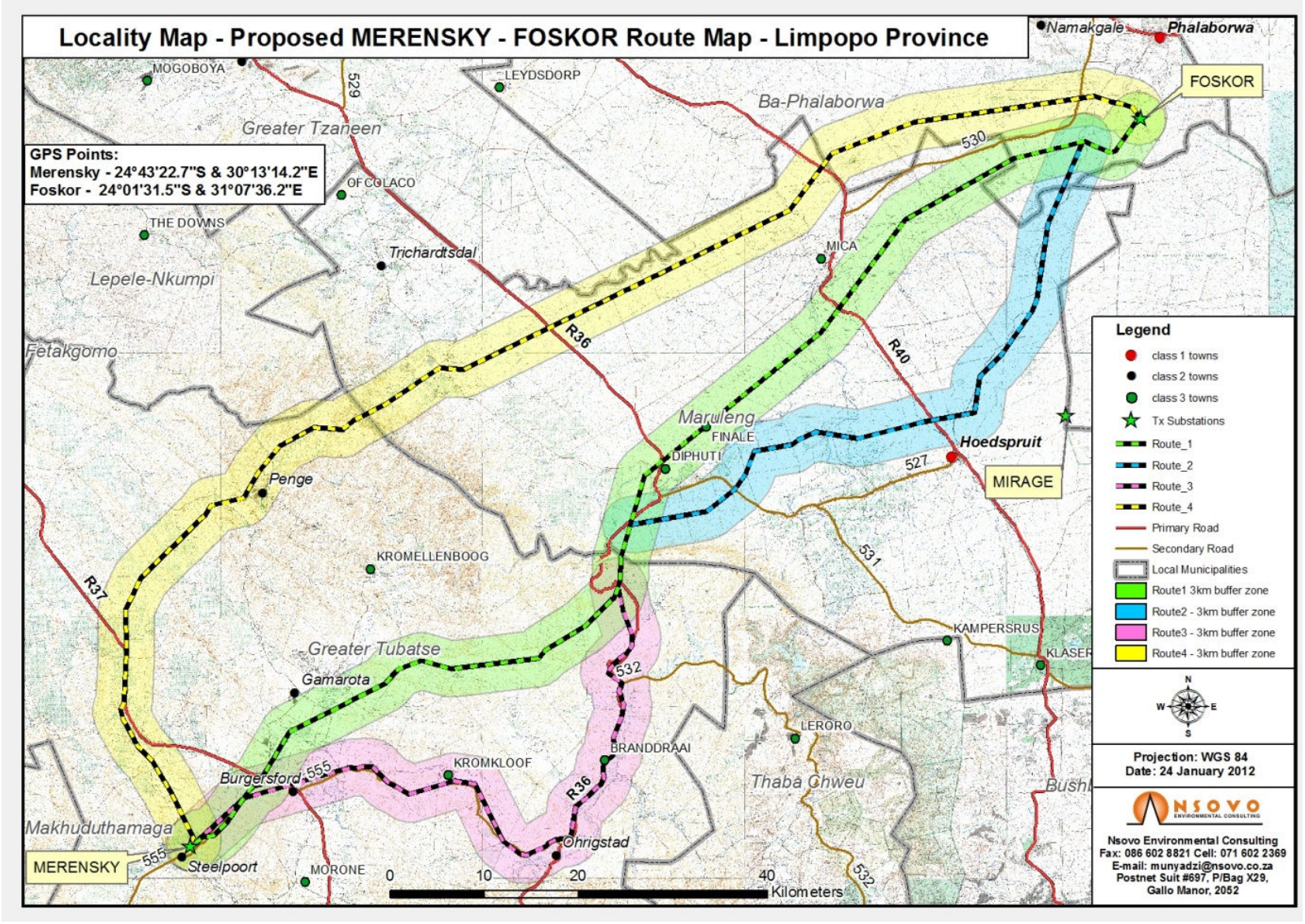


Figure 1: Locality map of route alternatives

- Alternative 2 (Blue Route)

This route loops out of the existing Foskor substation in Phalaborwa in a south-westerly direction for approximately 5 km. It then curves in a westerly direction for another 5 km and then bends southward towards the town of Hoedspruit following the existing 132 kV line. Just before Hoedspruit the route crosses the R40 and curves westwards where it is situated between the existing 400 kV line and secondary road 527 on the eastern side of Finale and Diphuti villages. The route then crosses the secondary road 531 and heads for the lightning prone mountainous region which it eventually exits following the exact path of alternative 1 described above.

- Alternative 3 (Pink Route)

This route leaves the Foskor substation following that of alternative 1 until it exits the mountainous areas where it descends in a southerly direction towards Orighstad progressing along a river and bending westwards along the secondary road 555. It passes Kromkloof, re-joining alternative 1 at Burgersfort until it enters the Merensky substation in Steelpoort.

- Alternative 4 (Yellow Route)

This route loops out of the existing Foskor substation in a northerly direction bending north-westerly before progressing along the secondary road 530 and eventually crossing the R40 some 15 km north of Mica. As it continues the route traverses villages and farmlands until crossing the R36 and entering the mountainous areas where it approaches Penge. After Penge it progresses towards the R37 curving southwards and eventually crossing the R37. The route finally enters the Merensky substation on the western side.

- Alternative 5 (Public Alternative)

During the public participation process for the proposed Forskor-Mernsky 400kv Powerline Project the public, in consultation with the ecotourism specialists, identified a further route alternative. This route alternative is an approximately 3km wide expansion of the buffer zone of Alternative 1 and stretches between Foskor and a point just east of Diphuti just across the Olifants River.

Route description

The route is described in the ecotourism report as follows:

- The corridor should lead westwards from FOSKOR to the R40 that links Phalaborwa to the junction with the R526;
- At this junction it would head south towards Mica;

- Shortly after Mica, the line should follow the R526 that connects to the R36. NOTE: There is a major residential and golf resort under construction in this area (Kingfisher Hill) and the corridor should be routed slightly to the north of the R526 as it passes this development so that it cannot be seen from the resort;
- The corridor should continue along the northern side of the R526 so that it does not pass through the Blyde Olifants Conservancy until it reaches the R36;
- At this junction it should head south along the R36 to The Oaks village;
- It would then cross the Olifants River and follow the proposed 'green' route that climbs over the escarpment east of the Strijdom Tunnel and continues to the village of Ga-Moraba;
- Ideally, the corridor should then follow the 'pink' route because this ensures that it runs alongside both the R36 and the R555 to Burgersfort. This means that no new construction and maintenance tracks have to be built in relatively undeveloped and rugged countryside;
- From Burgersfort to Steelpoort it would continue to follow the R555 but there is a commercial game lodge along this route and care will have to be taken in selecting a route that does not impact in any negative way on the eco-tourism values of this operation.

The above process resulted in the public alternative, Route 5, being approved in respect of a 275 kV power line. The capacity of the line has subsequently been upgraded to a 400 kV power line which follows the same course as Route 5 depicted in Figure 2 below.

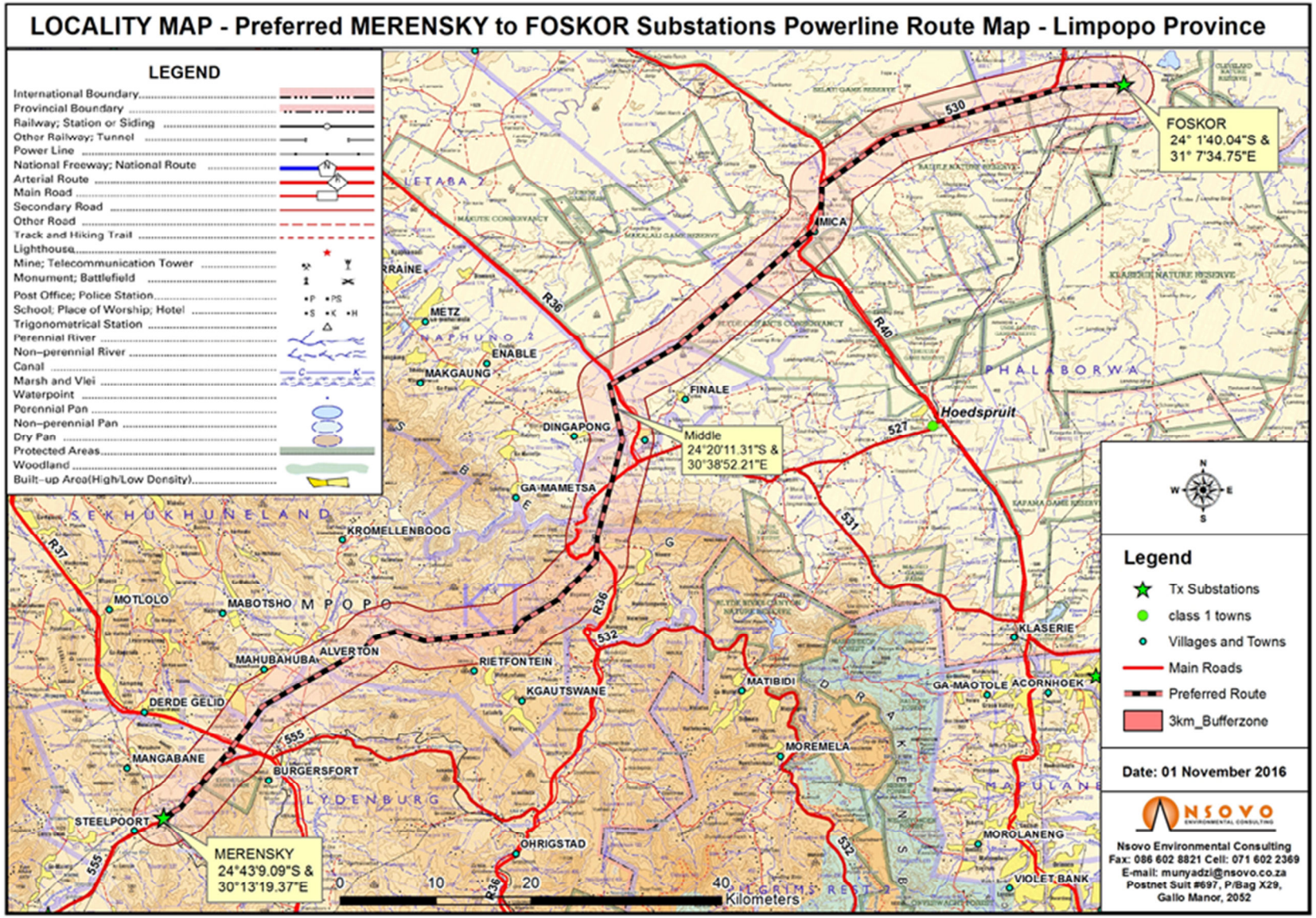


Figure 2: Locality map of approved route alternative

- No-Go Alternative

The final alternative concerns the project not proceeding. This would result in the current state remaining and future electricity supply in the area being compromised which would have both regional and national consequences.

2.3. Technical alternatives

As the capacity of the cable exceeds 132 kV the option of placing the cable underground is not viable for a number of reasons.

- Due to electrical loss and heat control underground cables are up to 4 times the diameter and 10 times the weight of overhead lines;
- The three phases of low and medium voltage cables, up to 132 kV, can be placed in the same trench, while the phases for higher voltage cables must be spaced apart, typically in a flat formation;
- Maintenance of underground cables is technically difficult, time consuming and expensive;
- The cost of underground cabling is 3 to 10 times more than that of overhead lines;
- The lifespan of underground lines is about half that of overhead lines.

2.4. Construction process

It is estimated that construction will take 18 months to complete and will entail the following processes:

- Corridor walk-down:

To identify the exact coordinates on which the pylons will be situated and to identify any sensitive areas and create the necessary conservation buffer zones. The central line and footprint of the transmission line and towers will be pegged by a team of surveyors. This process requires that access to properties be negotiated with the relevant property owners and will result in the first basic track being laid along the route. Through this process any flaws to the initial route will be identified which may result in route relocation.

- Construction Camps

The establishment of construction camps through negotiations with landowners. These sites are to be established in accordance with Eskom Transmission's '*Generic Environmental Management Plan – Line Construction*' and are likely to take a similar form to that illustrated below in Figure 3.

Figure 3: Examples of typical Eskom construction camps

- Vegetation clearance

The requirements for a 400 kV line is a 47 meter wide servitude which is cleared of any tall trees along the entire length and maintained in this condition throughout the operation of the line.

- Pylon footings

Excavation for tower and anchor foundations are made by drilling-rig, and foundations are filled with concrete to form a concrete plinth on which to fix the towers. The size of the foundations varies depending on variables such as type of tower and soil conditions. This work is usually undertaken by teams of between 10 and 15 people operating equipment such as a drilling rig and generator. Where the safety of people and/or animals may be at risk it is required that the contractors fence off the construction site during construction. The anchor holes are covered with a safety plate. Typical drilling equipment and excavation activities are illustrated in Figure 4 below.

Drilling equipment

Drilling activity

Foundation steelwork

Figure 4: Excavations for pylons

Foundation steelwork is undertaken by a separate team who position and secure the premade foundation structures in the foundation holes as illustrated above in Figure 4. A third team will fill the foundation with 'Ready-Mix' concrete delivered by truck containing 6 m^2 of concrete or, where access is a problem for delivery, concrete is mixed on site by hand or using a mini mixer. Concrete is left to cure for 28 days.

- Steelwork structures

The assembly of the steel structures commences approximately 1 month after the foundation has been poured. Steel is delivered to the site by truck or, if access is difficult, by helicopter and the pylon is assembled on site. Access roads are clearly marked to facilitate access to and between towers. Once assembly is completed the erection team will take over using a 70-ton mobile crane to raise the pylon or, if access is difficult, a helicopter may be used. This procedure is illustrated below in Figure 5.

Steel delivered for assembly

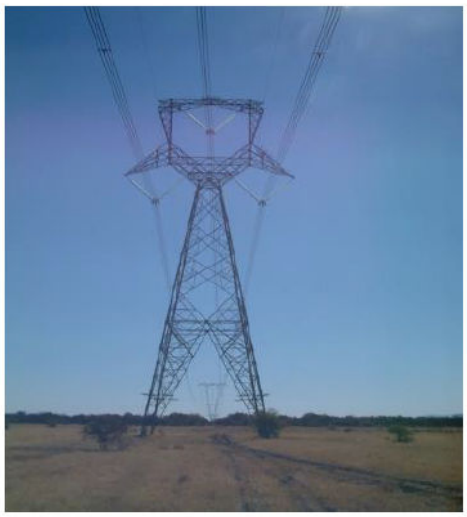
Assembled pylon

Raising the pylon

Figure 5: Pylon assembly

Two tower design alternatives have been proposed for this project, the cross-rope suspension type and the self-supporting type. The choice of tower alternative will largely depend on topographical conditions. Where the line crosses mountainous terrains and when it changes direction at an angle, the preferred choice is self-supporting towers. In areas where space is a limiting factor, narrow base towers may be utilised. The proposed tower structure design is illustrated below in Figure 6.

400KV TOWERS



MAX HEIGHT = 40M

WIDTH AT TOP = 17.2M

WIDTH AT BOTTOM = 9M

PHASE CONDUCTOR	QUAD "ZEBRA"
EARTH CONDUCTOR	TWO x 19/2,65
CONDUCTOR ATTACHMENT HEIGHT	21m
NOMINAL DESIGN SPAN	400m
WIND PRESSURE ON CONDUCTORS	850Pa
WIND PRESSURE ON TOWERS / POLE	2100Pa
INSULATORS: GLASS	190kN Susp 300kN Strain

400KV TRANSPOSITION TOWER SELF SUPPORTING SUSPENSION- 518E

Figure 6: Tower structures

- Stringing

Figure 7The final stage of the process, illustrated below in Figure 7, is stringing the transmission line. The first phase of this process is the delivery of cable and equipment to site by truck. Following this two cable drums, carrying about 2.5 km of cable are placed roughly 5 km apart and a winch is positioned between these two cable drums. A pilot tractor is then driven along the route to lay the pilot cable by means of hoisting the cable onto the pylons through a pulley system. In mountainous areas as is the case with this project, the pilot cables may be flown in by helicopter or shot across valleys. The line is generally strung in sections usually from bend to bend. In the final steps in the process the correct tension is created by a small team using survey equipment. Conductors are then clamped at the towers and any excess cable is cut off.

Cable drums

Stringing pilot cable with pilot tractor

Using pulleys to hoist cable

Figure 7: Stringing transmission cable

- Site reinstatement and rehabilitation

After each of the construction stages described above site reinstatement and rehabilitation will take place as follows;

- Removal of excess building material, and waste;
- Repairing any damaged caused as part of the construction activities;
- Rehabilitating the area affected by temporary access roads;
- Reinstating existing roads and
- Replacing topsoil and planting indigenous grasses if necessary.

- Inaccessible sites

In areas where it is difficult to reach and/or in sensitive areas it may be necessary to excavate by hand and/or use a helicopter to deliver material and/or to raise towers and/or string cables. Due to expense, this approach is not the preferred approach and will only be used if required.

- Other infrastructure

Feeder bays will be erected in the existing footprint of the Foskor and Merensky Substations in Phalaborwa as well as at Steelpoort. Underrated switchgear at Merensky Substation will be upgraded. A capacitor bank is to be installed at Foskor Substation and Foskor Substation is to be extended. The Acornhoek-Foskor terminal tower will be relocated as will the existing oil holding dam in both cases to accommodate the new power line. The existing Foskor and Merensky substations are illustrated in Figure 8 below, together with an example of an oil holding dam.

View of Foskor Substation

View of Merensky Substation

Busbar for the proposed 400kV line

Example of an oil holding dam

Figure 8: View of substations and associated infrastructure

2.5. Operation and maintenance

During the operational phase of the project general farming activities, such as the grazing of animals and the cultivation of crops, may continue within the servitude. However, the servitude will need to be kept clear of any vegetation, structures or activities that that may interfere with the line. Eskom will also require access to the transmission lines in order to undertake maintenance and perform any necessary repair work. Such activities are unlikely to occur more than twice a year. During operation it is likely that the line will emit

electromagnetic fields of varying intensity, this would depend on a range of factors, such as carrying capacity of the line, proximity of people and animals along the route, humidity levels.

3. Terms of Reference

The terms of reference of the study are to:

- Conduct a review of available data, including Statistics SA data, various reports generated for the Proposed Foskor Merensky 400 kV ±131 km Line and Associated Substation Works and documentation compiled during the public participation process;
- Identify potential social impacts during both the construction and operational phases of the proposed project;
- Recommend appropriate optimisation measures to maximise positive impacts and mitigation measures to avoid or minimise the severity of the identified negative social impacts.

Issues excluded from this study and dealt with in other specialist reports are:

- The macro economic impacts associated with the project;
- The potential impacts of the project on property values;
- It was assumed that the data provided by Nsovo Environmental Consulting was a correct reflection of the EIA process to this point.

The methodological approach employed during the study will now be described.

4. Methodology

Both a quantitative and qualitative methodological approach was applied throughout the study, in a research technique referred to as triangulation. A recognised impact assessment technique was applied in assessing the impacts and is described below in greater detail.

4.1. Data collection methods

Data was gathered through:

- A scan and analysis of the Draft Scoping Report prepared for the project by Nsovo Environmental Consulting
- Statistics South Africa, Census 2001; Community Survey 2007; Mid-year population estimates; Quarterly Labour Force Survey 2012.

- A comprehensive scan of the Public Participation containing the issues and responses.
- A review of maps and aerial photographs of the routes.
- Interviews and discussions with the Public Participation Consultant.
- Interviews and discussions with the Environmental Impact Assessment Consultants.
- A literature review of various documents such as the relevant municipal Integrated Development Plans (IDPs) and other specialist reports and documents.
- A broader literature scan.

4.2. Assessment technique

The assessment criteria used in evaluating the impacts of the various route alternatives of the Proposed Foskor Merensky 400 kV ±131 km Line and Associated Substation Works are as follows.

Status
The project could have a positive, negative or neutral impact on the environment.

Extent
- **Local** - extend to the site and its immediate surroundings.
- **Regional** - impact on the region but within the province.
- **National** - impact on an interprovincial scale.
- **International** - impact outside of South Africa.

Magnitude
Degree to which impact may cause irreplaceable loss of resources.
- **Low** - natural and social functions and processes are not affected or minimally affected.
- **Medium** - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way.
- **High** - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

Duration
- **Short term** - 0-5 years.
- **Medium term** - 5-11 years.
- **Long term** - impact ceases after the operational life cycle of the activity either because of natural processes or by human intervention.
- **Permanent** - mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient.

Probability
- **Almost certain** - the event is expected to occur in most circumstances.
- **Likely** - the event will probably occur in most circumstances.
- **Moderate** - the event should occur at some time.
- **Unlikely** - the event could occur at some time.
- Rare/Remote - the event may occur only in exceptional circumstances.

Significance
Provides an overall impression of an impact's importance, and the degree to which it can be mitigated. The range for significance ratings is as follows-
0 – Impact will not affect the environment. No mitigation necessary.
1 – No impact after mitigation.
2 – Residual impact after mitigation.
3 – Impact cannot be mitigated.

Attention will now turned towards the limitations of the study.

4.3. Study limitations and assumptions

The most recent data at municipal ward level, that is available from Statistics South Africa, dates back to that gathered during Census 2011. Consequently there are certain limitations attached to the data available from Statistics South Africa that will be reflected in this study.

An effort was made to gather data from a wide range of sources, however, much of the data in this report was made available by the Environmental Impact Assessment (EIA) consultants, Nsovo Environmental Consulting, and relies on the accuracy of the data made available. As is the nature of social research, the results of this study cannot be generalised and applied to the entire population across the whole area and is restricted to the specific study area. A demographic description of the study area will now be provided.

5. Legislation and Policy Guidelines

The following legislation and policy documents were considered as part of this study.

National legislation and guidelines:

- Constitution of the Republic of South Africa, 1996 (Act 108 of 1996) (Constitution)
- The National Environmental Management Act (107 of 1998) (NEMA)
- The National Energy Act (34 of 2008)
- The Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended
- National Development Plan (2030)
- Department of Energy Strategic Plan 2015-2020
    - White Paper on the Energy Policy of the Republic of South Africa (1998)
- National Integrated Resource Plan for South Africa (2010-2030)
- Strategic Infrastructure Projects (SIPs)
- Health and Safety Act (Act 85 of 1993)
- Construction Regulations (2014)

- Guideline for Involving Social Assessment Specialists in EIA Processes (Barbour, 2007)
- Social Impact Assessment: Guidance document (2015).

Provincial and municipal policies:

- Limpopo Development Plan (LDP) 2015-2019

District and Local Policies:

- Capricorn District Municipality: 2016/17-2021 Final Draft IDP/Budget
- Mopani District Municipality Reviewed Integrated Development Plan 2016-2021 (2016/17 version 1)
- Sekhukhune District Municipality Final IDP 2016/17-2020/21
- Lepelle-Nkumpi Local Municipality 2016-2021 Integrated Development Plan
- Ba-Phalaborwa Municipality IDP Document 2016/17-2017/18
- Maruleng Local Municipality Draft Reviewed IDP 2016-2017/21
- Fetakgomo Local Municipality Provisional 2016/2017-2018/2021 Final IDP/Budget
- Greater Tubatse Municipality Final Integrated Development Plan 2016/17-2020/21

The application of the legislation and policies is discussed below.

5.1. Application of legislation and policies

An overview of the more relevant legislation, policies and guidelines, as they relate to the project is provided below.

The Constitution of the Republic of South Africa (Act 108 of 1996)

The Constitution is relevant in that it stipulates a number of basic rights enjoyed by South African citizens which, amongst others, include:

- Section 24: The right to a healthy environment and to have the environment protected for the benefit of present and future generations.
- Section 25: The right to property and no law may permit arbitrary deprivation of property, limited in that property may only be expropriated under a law of general application, for a public purpose and subject to compensation.
- Section 26: The right to adequate housing, including the right to due process with regard to court-ordered eviction and demolition.

- Section 27: The rights to access to food, water, health care and social assistance, which the state must progressively realise within the limits of its resources.

The Kennedy Road Project is in line with a number of the requirements of the Constitution pertaining to the right to adequate housing and a healthy environment.

The National Environmental Management Act (107 of 1998) (NEMA)

The preamble of Act 107 of 1998 indicates that:

> "*everyone has the right to an environment that is not harmful to his or her health or well-being;*
>
> *the State must respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities;*
>
> *inequality in the distribution of wealth and resources, and the resultant poverty, are among the important causes as well as the results of environmentally harmful practices;*
>
> *sustainable development requires the integration of social, economic and environmental factors in the planning implementation and evaluation of decisions to ensure that development serves present and future generations".*

Chapter 1 of the Act emphasises that development must be socially, environmentally and economically sustainable. The SIA considers the project in respect of the social sustainability of the social environment.

National Development Plan (2030)

The National Development Plan is a long-term National strategic plan with the aim of reducing inequality and eliminating poverty by 2030. The plan focuses on the following four broad objectives:

1. The establishment of overarching objectives to be achieve by 2030.
2. To find consensus on the key obstructions to the achievement of these objectives and to what needs to be accomplished in overcoming these obstacles.

3. To advance the long-term goals of the NDP through the establishment of a commonly shared long-term strategic framework against which future planning can occur.
4. To creating a framework against which choices can be made as to how best to utilise limited resources.

The following core elements of a decent standard of living are identified in the NDP:

- Housing, water, electricity and sanitation
- Safe and reliable public transport
- Quality education and skills development
- Safety and security
- Quality health care
- Social protection
- Employment
- Recreation and leisure
- Clean environment
- Adequate nutrition.

In accordance with the NDP the proposed Foskor-Merensky 400 Kv±131 Km Line and Associated Substation Works aims to provide electricity infrastructure to the area.

The National Energy Act (34 of 2008)

Amongst others an objective of the Act is to:

> *"To ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors; to provide for energy planning, increased generation and consumption of renewable energies, contingency energy supply, holding of strategic energy feedstocks and carriers, adequate investment in, appropriate upkeep and access to energy infrastructure; to provide measures for the furnishing of certain data and information regarding energy demand, supply and generation; to establish an institution to be responsible for promotion of efficient generation and consumption of energy and energy research; and to provide for all matters connected therewith."*

The aim of the proposed Foskor-Merensky 400 Kv±131 Km Line and associated substation works is to ensure the supply of electrical energy to the area.

The Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended

The purpose of the Act is to:

> "*To establish a national regulatory framework for the electricity supply industry; to make the National Energy Regulator of South Africa the custodian and enforcer of the national electricity regulatory framework; to provide for licences and registration as the manner in which generation, transmission, distribution, reticulation, trading and the import and export of electricity are regulated; to regulate the reticulation of electricity by municipalities; and to provide for matters connected therewith.*"

The Foskor-Merensky 400 Kv±131 Km Line and Associated Substation Works will supplement the supply of electricity to municipalities on the region.

Department of Energy Strategic Plan 2015-2020

The aim of the Department of Energy Strategic Plan is to:

"*Formulate energy policies, regulatory frameworks and legislation, and oversee their implementation to ensure energy security, promotion of environmentally-friendly energy carriers and access to affordable and reliable energy for all South Africans.*"

The DoE strategic outcome-orientated goals include:

> *"1. Security of Supply:* To ensure that energy supply is secure and demand is well managed.
>
> 1. *Infrastructure:* To facilitate an efficient, competitive and responsive energy infrastructure network.
> 2. *Regulation and Competition:* To ensure that there is improved energy regulation and competition.
> 3. *Universal Access and Transformation:* To ensure that there is an efficient and diverse energy mix for universal access within a transformed energy sector.
> 4. *Environmental Assets:* To ensure that environmental assets & natural resources are protected and continually enhanced by cleaner energy technologies.
> 5. *Climate Change:* To implement policies that adapt to & mitigate the effects of climate change.
> 6. *Corporate Governance:* To implement good corporate governance for effective and efficient service delivery.

Considering the above the proposed project is in line with the DoE Strategic Plan 2015-2020 as the Foskor-Merensky 400 Kv±131 Km Line and Associated Substation Works will contribute towards facilitating an efficient, competitive and responsive energy infrastructure.

White Paper on the Energy Policy of the Republic of South Africa (1998)

The White Paper indicates that:

> "*Before deriving detailed energy policy objectives, however, it is necessary to understand the energy policy context and energy sector challenges. Three aspects are considered:*
>
> - *economic, social and environmental policies and forces;*
> - *the nature of the South African energy sector and its linkages with broader forces; and*
> - *what the sector needs to achieve overall policy goals*."

National Integrated Resource Plan for South Africa (2010-2030)

One of the points in the conclusions of the Plan indicates that:

> "*The assessment of the transmission impact of the Update indicates that five possible Transmission Power Corridors will be required to enable key generation scenarios. The main difference between these scenarios is the physical amount of transmission infrastructure within these corridors and their timing. The transmission impact assessment has been based on the reasonable spatial location of the future generation taking into account current knowledge and information. Therefore there is still opportunity to consider better generation location strategies in the longer term. One generation strategy that can provide advantages in terms of reducing the network integration costs and minimising system losses is to consider a large distributed generation network with more appropriately sized units. These would be smaller sized plants that can be integrated into the distribution networks utilising their infrastructure and reducing the loading of the Transmission Grid. Initially this can be achieved with PV but later extended, with the associated transport infrastructure, to gas and even coal plants located near large loads or major load centres.*"

Considering the above the proposed Foskor-Merensky 400 Kv±131 Km Line and Associated Substation Works will increase the capacity within the existing Transmission Power Corridors.

Strategic Infrastructure Projects (SIPs)

The Government's Strategic Infrastructure Projects (SIPs) identifies the following five core functions:

1. To unlock opportunity;
2. Transform the economic landscape;
3. Create new jobs;
4. Strengthen the delivery of basic services, and
5. Support the integration of African economies;

In this regard a balanced approach is being fostered through encouraging an environmentally sympathetic economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development, and enabling regional integration. In this regard the following

SIP 10: Electricity transmission and distribution.

- Expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development.
- Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity.

Health and Safety Act (Act 85 of 1993)

The purpose of this Act is:

> "*To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; to provide for matters connected therewith.*"

The activities associated with the construction of the project will be subjected to the provisions of this Act and will influence the construction associated mitigation measures throughout this report.

Construction Regulations (2014)

These regulations apply to all persons involved in construction work and would need to be considered during the construction phase of the project.

Guideline for Involving Social Assessment Specialists in EIA Processes (Barbour, 2007)

These guidelines direct the role of social assessment specialists in the Environmental Impact Assessment (EIA) process within the South African context.

Social Impact Assessment: Guidance document (2015) (Vanclay, 2015)

This document encapsulates the core values of the international SIA community providing a set of principles to guide SIA practitioners in incorporating the social element into environmental impact assessments.

Limpopo Development Plan (LDP) 2015-2019

The purpose of the Limpopo Development Plan is to:

"
- *Outline the contribution from Limpopo Province to the National Development Plan (NDP) and national Medium-Term Strategic Framework (MTSF)1 for this period;*
- *Provide a framework for the strategic plans of each provincial government department, as well as the IDPs and sector plans of district and local municipalities;*
- *Create a structure for the constructive participation of private sector business and organised labour towards the achievement of provincial growth and development objectives; and*
- *Encourage citizens to be active in promoting higher standards of living in their communities."*

The plan promotes the improvement of service deliver across the province which the proposed Foskor Merensky 400 kV ±131 km Line and Associated Substation Works is aligned with.

District and Local Municipal Integrated Development Plans

Local municipalities are required, in accordance with The Municipal Systems Act (No.32) of 2000 to prepare Integrated Development Plans (IDPs). The IDP provides a framework against which municipal authorities manage development within their areas of jurisdiction.

The IDPs of the following municipalities are applicable in respect of the proposed Foskor Merensky 400 kV ±131 km Line and Associated Substation Works.

- Mopani District Municipality (DC33).
  - Ba-Phalaborwa Local Municipality (LIM334
  - Maruleng Local Municipality (LIM335)
- Capricorn District Municipality (DC35).
  - Lepele-Nkumpi Local Municipality (LIM355)
- Greater Sekhukhune District Municipality (DC47)
  - Fetakgomo Local Municipality (LIM474)
  - Greater Tubatse Local Municipality (LIM475)

6. Demographic Description of the Area

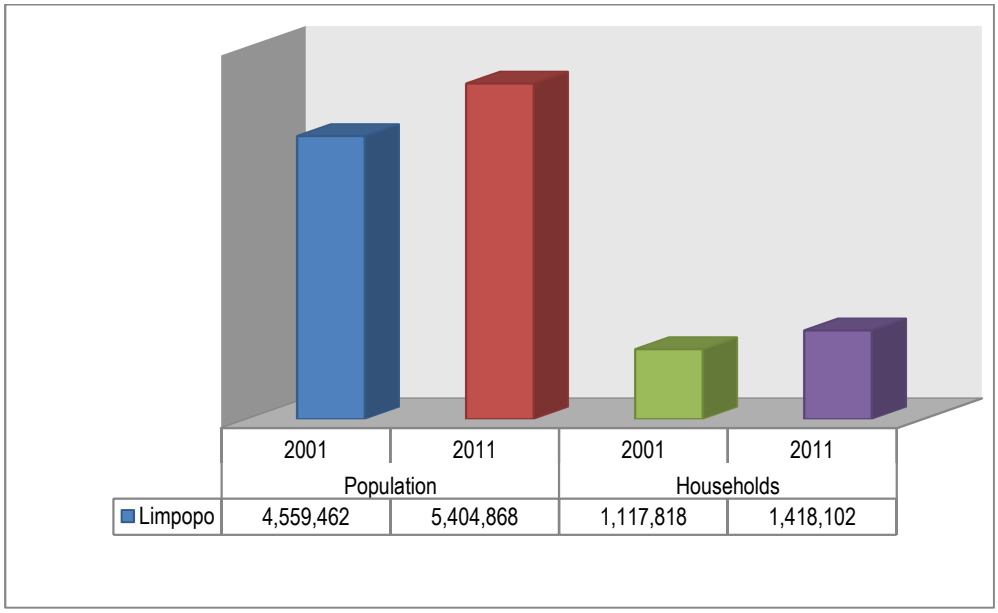
The proposed project is located within the Limpopo Province and traverses the following district and local municipalities:

- Mopani District Municipality (DC33).
  - Ba-Phalaborwa Local Municipality (LIM334.
  - Maruleng Local Municipality (LIM335)
- Capricorn District Municipality (DC35).
  - Lepele-Nkumpi Local Municipality (LIM355)
- Greater Sekhukhune District Municipality (DC47)
  - Fetakgomo Local Municipality (LIM474);
  - Greater Tubatse Local Municipality (LIM475);

A demographic description of the region at the provincial, district and local municipal levels is provided below.

6.1. Provincial description

Limpopo Province covers a geographical area of approximately 125 754 km^2 which accounts for some 10.2% of the land mass of South Africa. During Census 2011 the population was calculated at 5 404 868 people distributed within 1 418 102 households giving the Province a population density of 43/km^2 and a household density of 11/km^2. By 2016 the population was estimated to have increased to 5 803 900 people (Statistics South Africa, 2016, p. 2). This data is graphically illustrated by means of Figure 9 below.



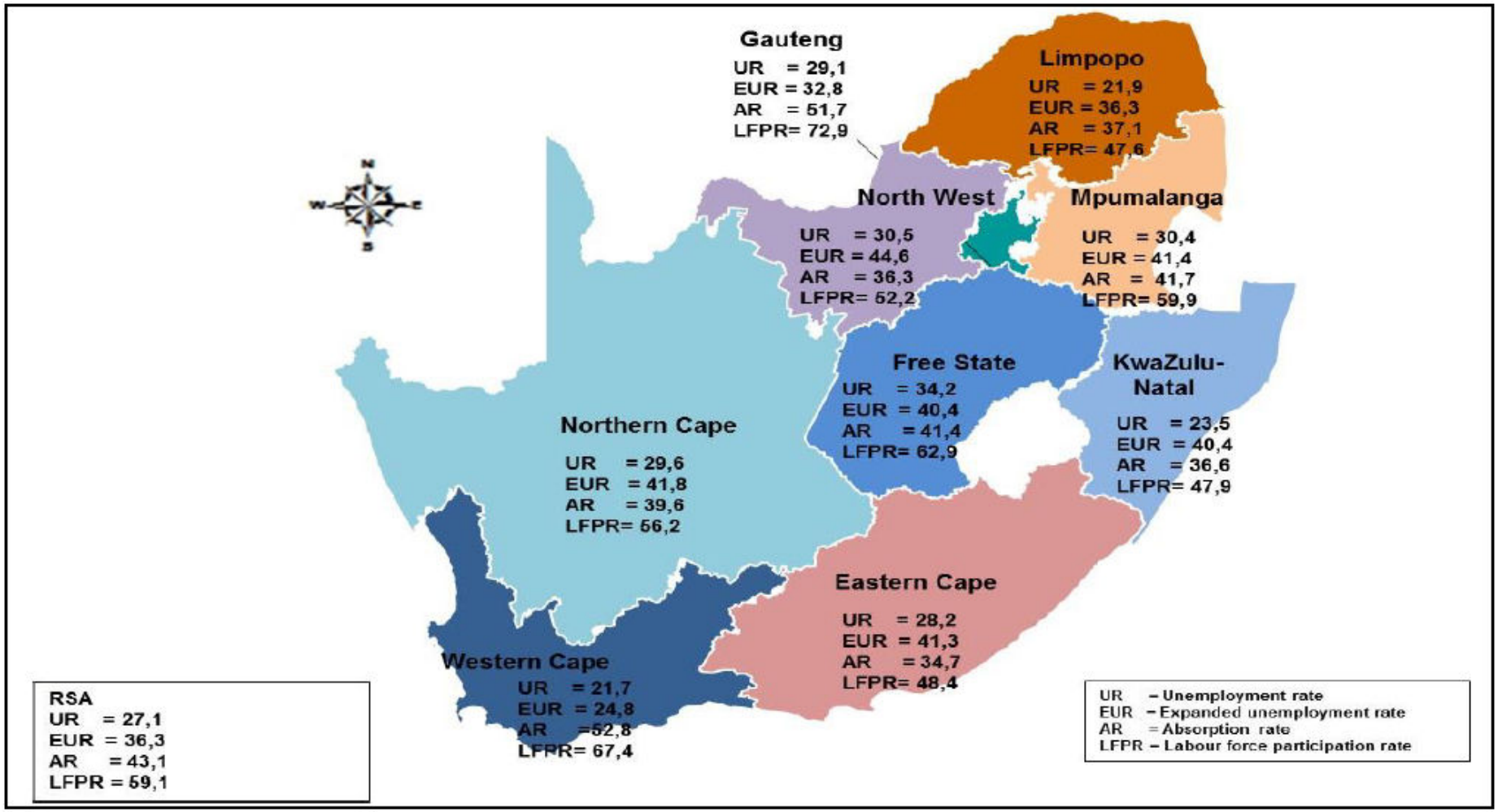
Data source: (Statistics South Africa, 2011)

Figure 9: Population Limpopo Province

The province incorporates the following 5 districts:

- Capricorn;
- Mopani;
- Vhembe;
- Waterberg;
- Sekhukhune.

A comparison of the unemployment figures for Limpopo Province indicates that the level of official unemployment in the province increased year-on-year from 18.8% in the 3rd Quarter of 2015 to 21.9% in the 3rd Quarter of 2016, while unofficial unemployment marginally decreased from 36.6% to 36.3%. When compared to that of the rest of South Africa, Limpopo has the second lowest level of official unemployment in the country with only the Western Cape Province having a lower level at 21.7% (Statistics South Africa, 2016, p. 9). This data is presented below in Figure 10.



Data source: (Statistics South Africa, 2016)

Figure 10: Unemployment in South Africa Q3:2015-Q3:2016

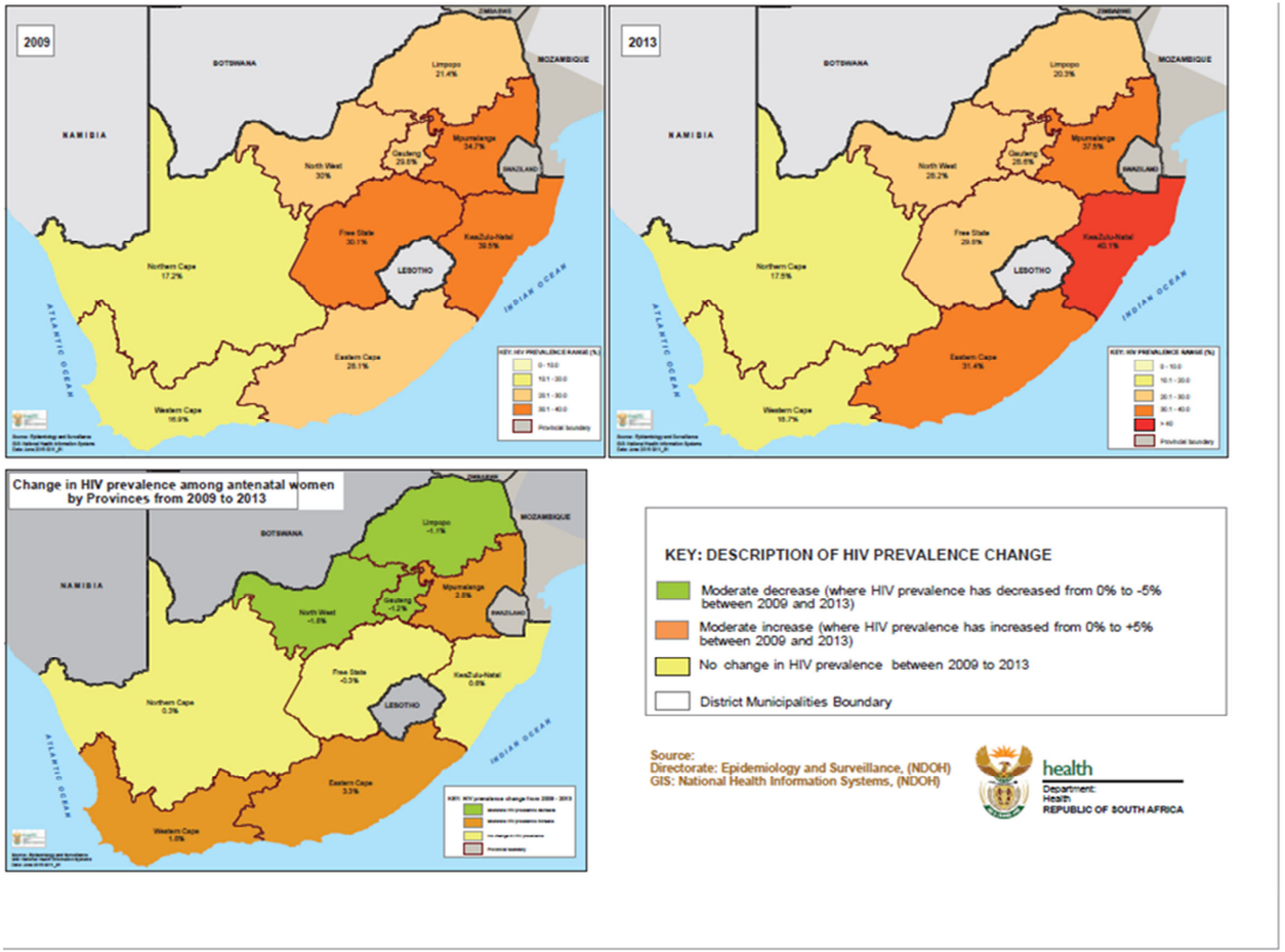
It is, however, important to note that when considering the unemployment levels discussed above, Statistics South Africa's official definition of unemployment is used. This definition includes amongst the unemployed, those persons between 15 – 64 years who, "[*a]ctively looked for work or tried to start a business in the four weeks preceding the survey interview*" (Statistics South Africa, 2016, p. 18). This, being the narrow definition of unemployment excludes those discouraged work seekers who may no longer have been actively looking for work but who remained unemployed and disillusioned.

In recent research undertaken by the National Department of Health (2015) it is indicated that Limpopo Province has an HIV prevalence rate amongst antenatal women of 20.3% compared to a national prevalence rate of 29.7% in 2013. The HIV prevalence rate amongst antenatal women between 2009 and 2013 is compared below in Figure 11 across all provinces.

Limpopo Province is largely a rural area and, in 2004, was identified as the poorest province in South Africa with 77% of its population living in poverty, just above the Eastern Cape which has 72% of its population living in poverty (Schwabe, 2004). The province has a typical developing economy reliant on the export of primary products and the import of services and manufactured goods. The drivers of the economy are agriculture, with a heavy emphasis on game farming; mining, particularly the platinum metals, chromium, iron ore and coal and tourism, due largely to the high number of game reserves and farms in the area.

6.2. Municipal description

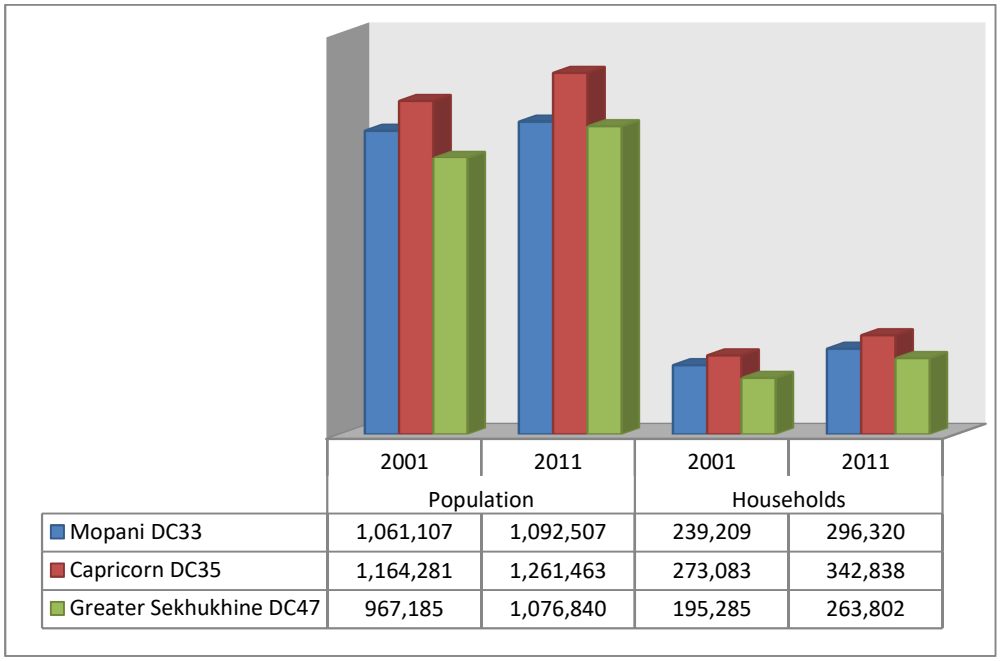
The demographics of the 3 district and 5 local municipalities through which the transmission line passes, will now be discussed and compared. This comparison is undertaken, on the basis of data gathered during Census 2011 and is the most recent data available from Statistics South Africa at a municipal level. In respect of HIV prevalence rate amongst antenatal women the only data available is at the national, provincial and district levels and consequently, the local municipalities cannot be included in this comparison.



(National Department of Health, 2015, p. 40)

Figure 11: Prevalence of HIV amongst antenatal women - 2013

Of the three districts that are traversed by the power line, at 21 705 km^2 Capricorn covers the largest geographical area and, with a population of 1 261 463 people living within 342 838 households in 2011, Capricorn has a population density of 58.12/km^2 and a household density of 15.80/km^2. Mopani covers the 2nd largest area at 20 011 km^2 and, with a population of 1 092 507 people living in 296 320 households in 2011. Mopani's population density is 54.60/km^2 and household density is 14.81/km^2. Greater Sekhukhune, which covers a geographical area of 13 528 km and has a population of 1 076 840 people living within 263 802 households making it the most densely populated district, with a population density of 79.60/km^2 and household density of 19.50/km^2. The population distribution across all three district municipalities is illustrated in Figure 12 below.

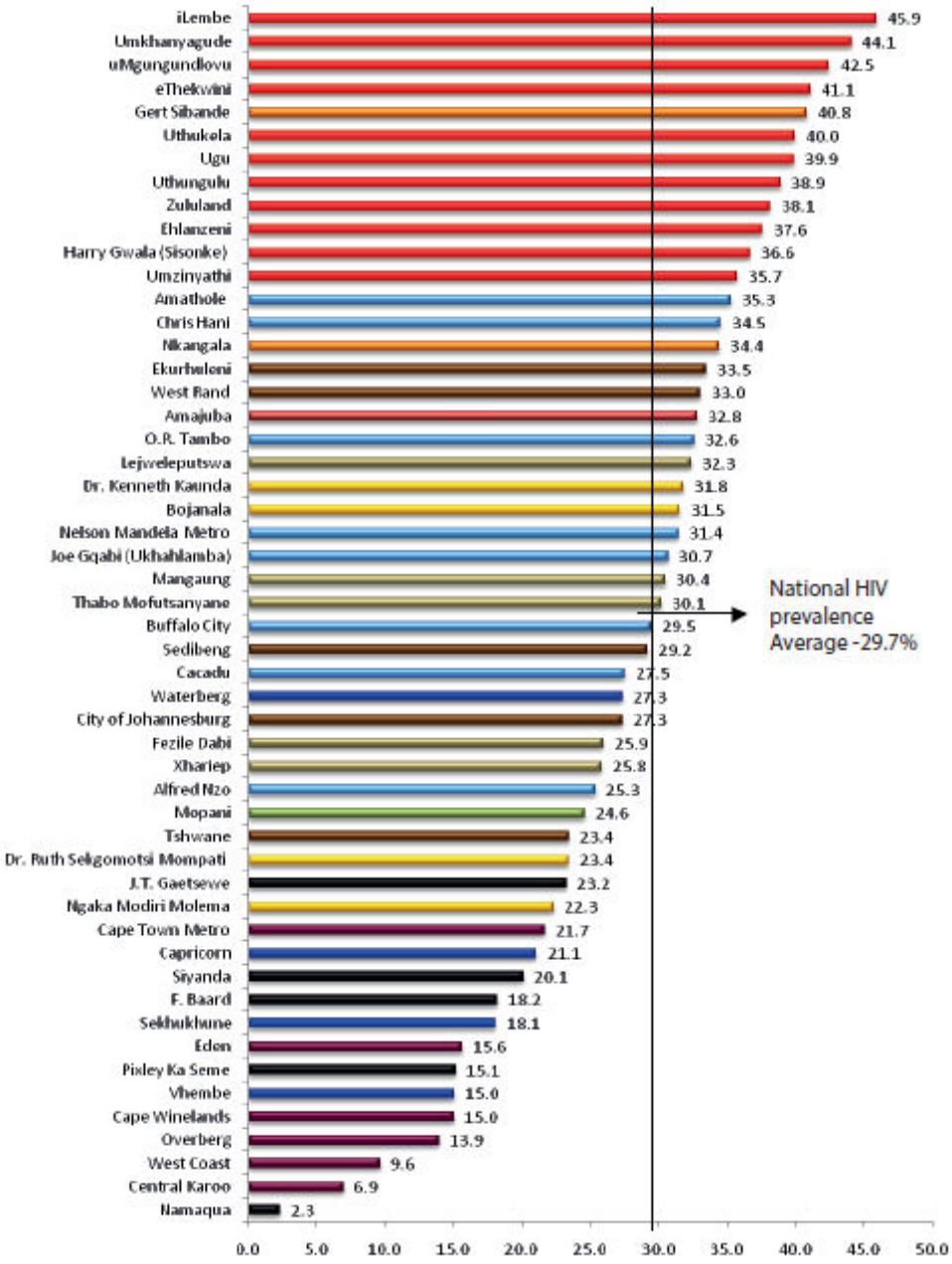


	Population		Households	
	2001	2011	2001	2011
Mopani DC33	1,061,107	1,092,507	239,209	296,320
Capricorn DC35	1,164,281	1,261,463	273,083	342,838
Greater Sekhukhine DC47	967,185	1,076,840	195,285	263,802

Data source: (Statistics South Africa, 2011)

Figure 12: Population at district level

In respect of HIV prevalence amongst antenatal women, at 24.6%, the Mopani district has the highest rate compared to Capricorn at 21.1% and Greater Sekhukhune at 18.1% as is illustrated in Figure 13. All district municipalities, however, have a lower prevalence rate than the national average which stood at 29.7% in 2013.

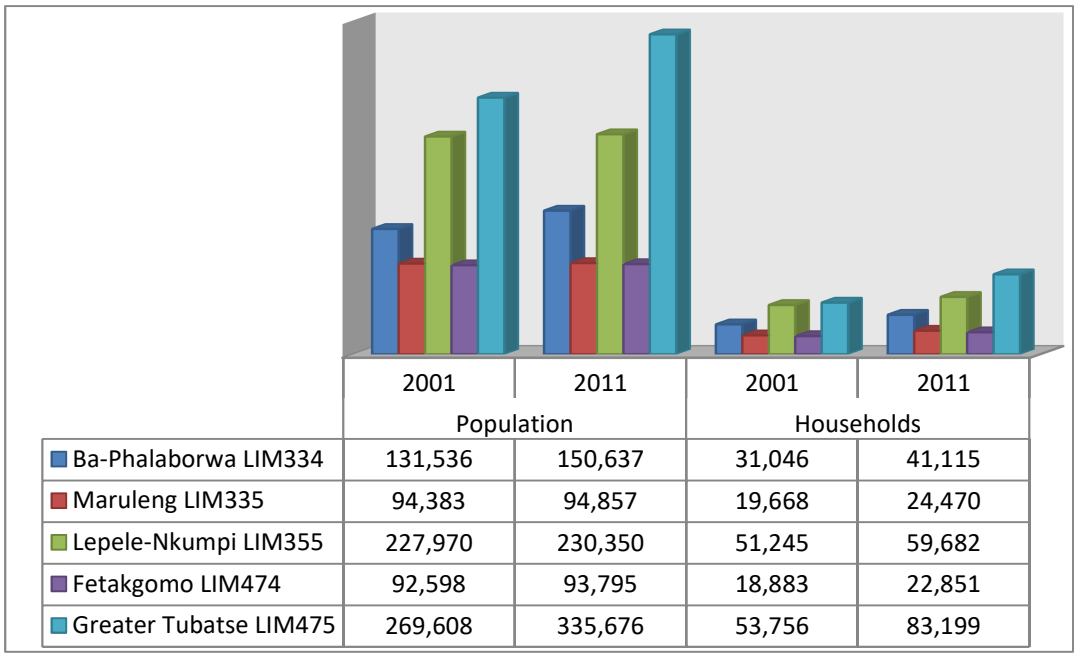


(National Department of Health, 2015, p. 73)

Figure 13: HIV prevalence rate across districts – 2010

At the local municipal level the Ba-Phalaborwa municipality covers the greatest geographical area at 7 461.73 km^2 and has a population of 150 637 people livening in 41 115 households thus giving it a population density of 20.19/km^2 and household density of 5.51/km^2. At 4 601.96 km^2 the Greater Tubatse Local Municipality covers the second greatest geographical area and, with a population of 335 676 people living within 83 199 households, has a population density of 72.94/km^2 and household density of 18.08/km^2. Covering the third largest geographical area at 3 463.45 km^2 is the Lepele-Nkumpi Local Municipality which has a population of 230 350 people living in 59 682 households. This gives Lepele-

Nkumpi a population density of 66.51/km^2 and a household density of 17.23/km^2. The Maruleng and Fetakgomo local municipalities cover the smallest geographical areas at 3 244.30 and 1 104.53 km^2 respectively. Maruleng has a population of 94 857 people living within 24 470 households giving it a population density of 29.24/km^2 and a household density of 7.54/km^2. The Fetakgomo Local Municipality has a population of 93 795 people living in 22 851 households resulting in a population density of 84.92/km^2 and household density of 20.69/km^2. Consequently, Fetakgomo has the highest population density across all local municipalities with Greater Tubatse having the second highest population density. The population distribution across all local municipalities, in respect of persons and households, is illustrated in Figure 14 below.

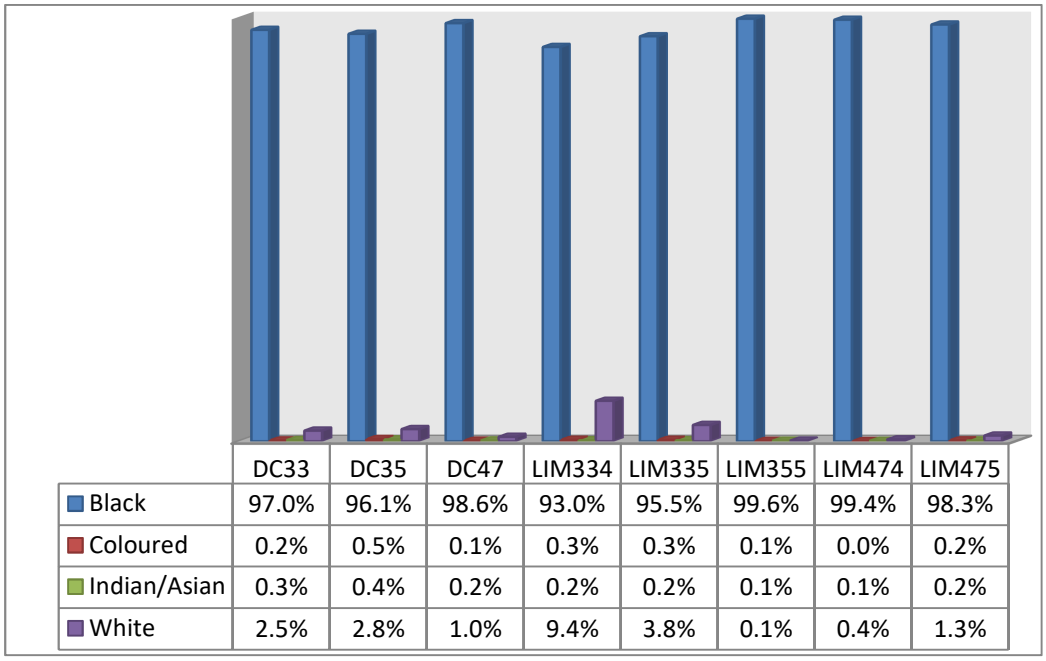


	Population		Households	
	2001	2011	2001	2011
Ba-Phalaborwa LIM334	131,536	150,637	31,046	41,115
Maruleng LIM335	94,383	94,857	19,668	24,470
Lepele-Nkumpi LIM355	227,970	230,350	51,245	59,682
Fetakgomo LIM474	92,598	93,795	18,883	22,851
Greater Tubatse LIM475	269,608	335,676	53,756	83,199

Data source: (Statistics South Africa, 2016)

Figure 14: Populations across local municipalities 2001 & 2011

The rest of the social indicators, based on Census 2011 data, will now be compared across both the district and local municipal levels. Most people across the area are black people, ranging between 93% in Ba-Phalaborwa and 99.4% in Fetakgomo with the second largest population group being white people at 9.4% in Ba-Phalaborwa. The distribution of population groups across the area is illustrated below in Figure 15.

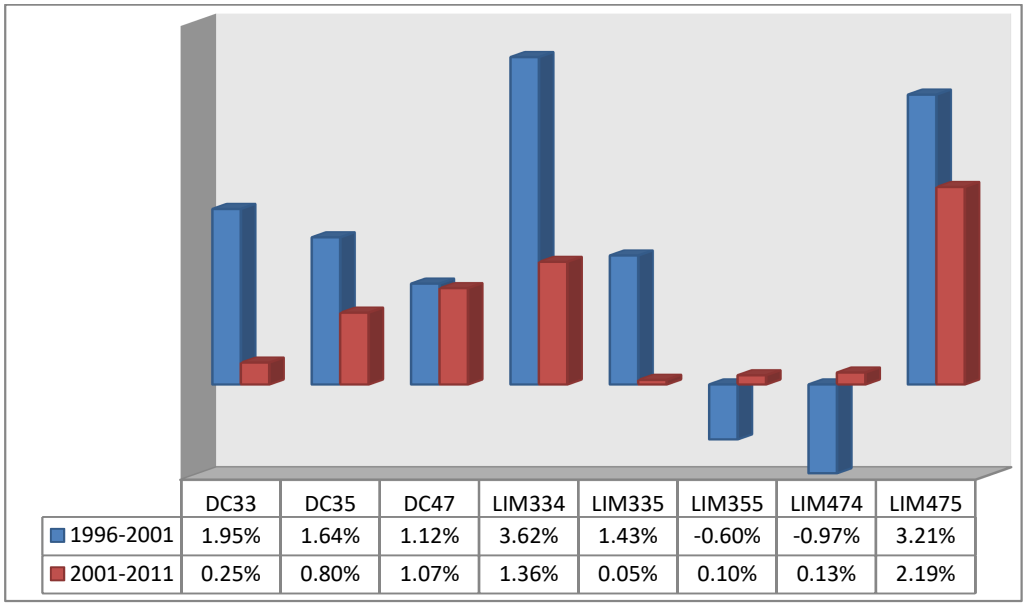


	DC33	DC35	DC47	LIM334	LIM335	LIM355	LIM474	LIM475
Black	97.0%	96.1%	98.6%	93.0%	95.5%	99.6%	99.4%	98.3%
Coloured	0.2%	0.5%	0.1%	0.3%	0.3%	0.1%	0.0%	0.2%
Indian/Asian	0.3%	0.4%	0.2%	0.2%	0.2%	0.1%	0.1%	0.2%
White	2.5%	2.8%	1.0%	9.4%	3.8%	0.1%	0.4%	1.3%

Data source: (Statistics South Africa, 2011)

Figure 15: Population group

As Figure 16 illustrates, the population growth in the area ranges between 1.36% in Ba-Phalaborwa and 0.1% in Lepele-Nkumpi.

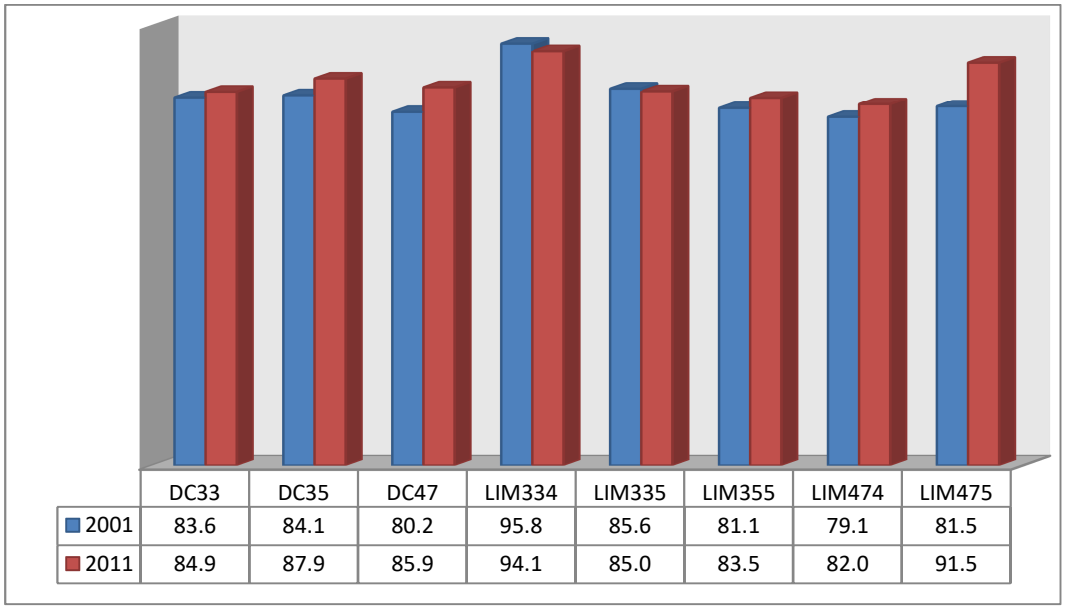


	DC33	DC35	DC47	LIM334	LIM335	LIM355	LIM474	LIM475
1996-2001	1.95%	1.64%	1.12%	3.62%	1.43%	-0.60%	-0.97%	3.21%
2001-2011	0.25%	0.80%	1.07%	1.36%	0.05%	0.10%	0.13%	2.19%

Data source: (Statistics South Africa, 2011)

Figure 16: Population growth

There is a higher ratio of females to males across the region with the Ba-Phalaborwa Local Municipality having the closest female to male ratio at 94.1. The sex ration across the region is illustrated below in Figure 17.

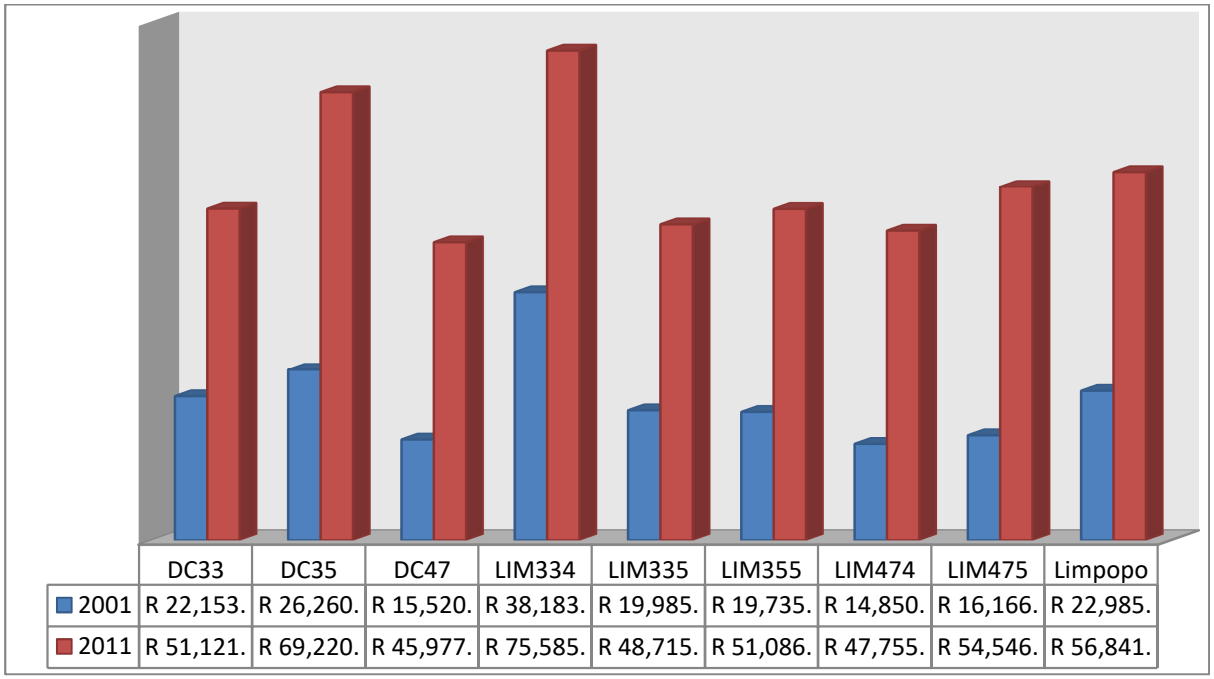


	DC33	DC35	DC47	LIM334	LIM335	LIM355	LIM474	LIM475
2001	83.6	84.1	80.2	95.8	85.6	81.1	79.1	81.5
2011	84.9	87.9	85.9	94.1	85.0	83.5	82.0	91.5

Data source: (Statistics South Africa, 2011)

Figure 17: Sex ratio

The highest average annual household income across the district municipalities is found in the Capricorn district at R 69 220 with the lowest being found in Greater Tubatse at R 45 977. Considered at a local municipal level Ba-Phalaborwa has the highest level of annual household income at R 75 585 compared to Fetakgomo which has the lowest at R 47 755 per annum. This data is illustrated in Figure 18.

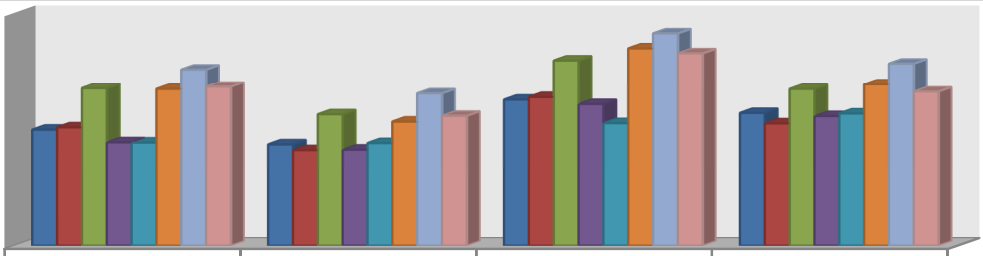


	DC33	DC35	DC47	LIM334	LIM335	LIM355	LIM474	LIM475	Limpopo
2001	R 22,153.	R 26,260.	R 15,520.	R 38,183.	R 19,985.	R 19,735.	R 14,850.	R 16,166.	R 22,985.
2011	R 51,121.	R 69,220.	R 45,977.	R 75,585.	R 48,715.	R 51,086.	R 47,755.	R 54,546.	R 56,841.

Data source: (Statistics South Africa, 2011)

Figure 18: Average annual household income

With regard to the labour market unemployment is highest within Fetakgomo with an official unemployment level of 58.9% and an official youth, 15-34 years age group, unemployment rate of 70.5% in 2011. The lowest level of official unemployment is found across the Capricorn district at 37.2% with 47.4% amongst the youth. The labour market data across the region is illustrated in Figure 19.

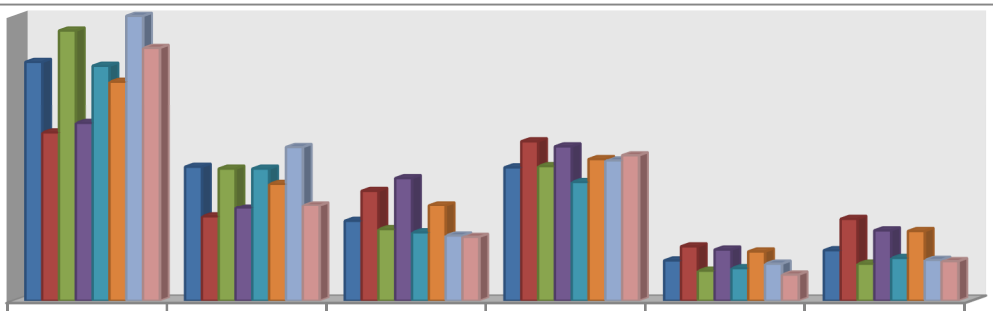


	2001	2011	2001	2011
	Unemployment Rate (official)		Youth Unemployment Rate (official) 15-34 years	
DC33	45.0%	39.4%	56.5%	51.4%
DC35	45.9%	37.2%	57.5%	47.4%
DC47	60.9%	50.9%	71.7%	60.6%
LIM334	40.2%	37.4%	54.8%	50.2%
LIM335	40.1%	39.9%	47.5%	51.2%
LIM355	60.6%	48.1%	76.4%	62.4%
LIM474	68.2%	58.9%	82.2%	70.5%
LIM475	61.5%	50.3%	74.5%	59.6%

Data source: (Statistics South Africa, 2011)

Figure 19: Labour market

Concerning the level of education amongst those who are 20 years and older, the highest percentage having no schooling is found in Fetakgomo at 24.3%. This compared to the lowest level found across the Capricorn District Municipality at 13.2%. At 12.8% the Capricorn district also has the highest percentage of those having an education level higher that Matric. The education levels as they occur across the region are illustrated in Figure 20.

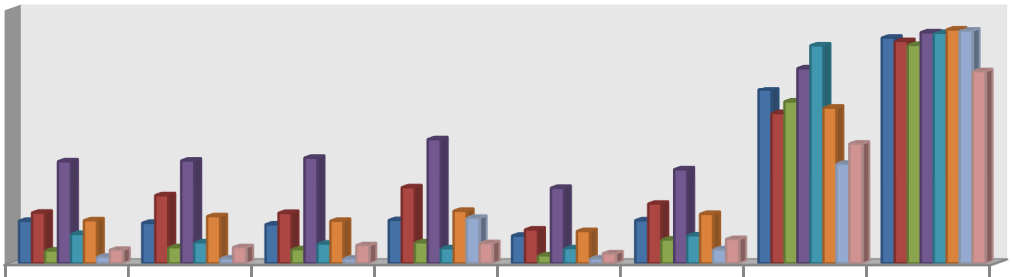


	2001	2011	2001	2011	2001	2011
	No Schooling		Matric		Higher Education	
DC33	37.8%	21.2%	12.5%	21.1%	6.3%	7.9%
DC35	26.6%	13.2%	17.4%	25.2%	8.5%	12.8%
DC47	42.7%	20.9%	11.2%	21.3%	4.7%	5.8%
LIM334	28.1%	14.6%	19.4%	24.4%	8.0%	11.0%
LIM335	37.2%	20.9%	10.7%	18.8%	5.1%	6.7%
LIM355	34.7%	18.5%	15.1%	22.4%	7.7%	10.9%
LIM474	45.0%	24.3%	10.2%	22.2%	5.8%	6.4%
LIM475	40.0%	15.1%	10.0%	23.0%	4.1%	6.2%

Data source: (Statistics South Africa, 2011)

Figure 20: Distribution of no education amongst those 20 years and older

Attention will now be turned towards household service delivery indicators across both district and local municipalities. In this respect Ba-Phalaborwa has the highest percentage of households enjoying flush toilet connected to the sewerage facility at 40.5%, weekly refuse removal at 48.8% and piped water delivered inside dwellings at 37.1%. As far as the use of electricity as a means of lighting is concerned this is highest within the Lepele-Nkumpi Local Municipality at 91.9%. The distribution of services across the district and local municipalities is illustrated in Figure 21 below.

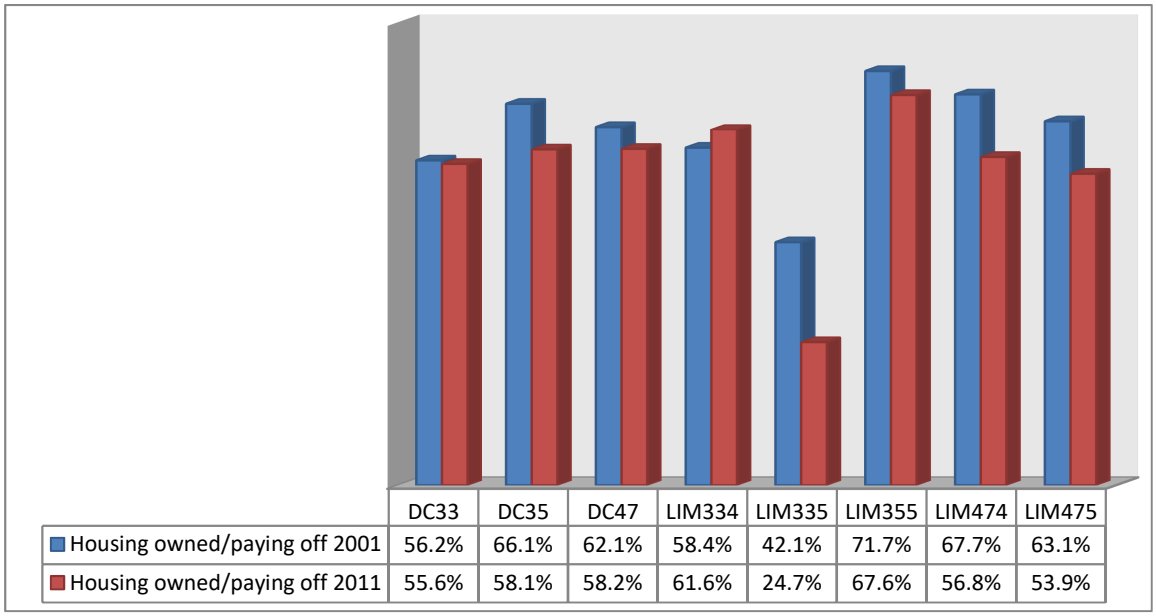


	Flush toilet to sewerage		Weekly refuse removal		Piped water inside dwelling		Electricity for lighting	
	2001	2011	2001	2011	2001	2011	2001	2011
DC33	16.6%	15.8%	15.2%	16.9%	10.8%	16.8%	68.1%	88.7%
DC35	19.8%	26.6%	19.7%	29.7%	13.2%	23.3%	59.0%	87.4%
DC47	5.0%	6.3%	5.5%	8.2%	3.1%	9.3%	63.5%	85.9%
LIM334	40.2%	40.5%	41.6%	48.8%	29.5%	37.1%	76.8%	90.8%
LIM335	11.5%	8.2%	7.7%	5.9%	5.9%	10.9%	85.7%	90.6%
LIM355	16.8%	18.4%	16.6%	20.5%	12.6%	19.3%	61.1%	91.9%
LIM474	2.6%	1.9%	1.9%	17.8%	1.9%	5.5%	39.3%	91.5%
LIM475	5.3%	6.3%	7.1%	7.9%	3.9%	9.5%	47.1%	75.7%

Data source: (Statistics South Africa, 2011)

Figure 21: Service delivery

Regarding tenure status the highest percentage of dwellings owned or being paid off are found within the Lepele-Nkumpi area at 67.6%. While, at 24.7%, the Maruleng Local Municipality has the lowest percentage of households owning or paying off their dwellings. Tenure status across the area is illustrated in Figure 22.

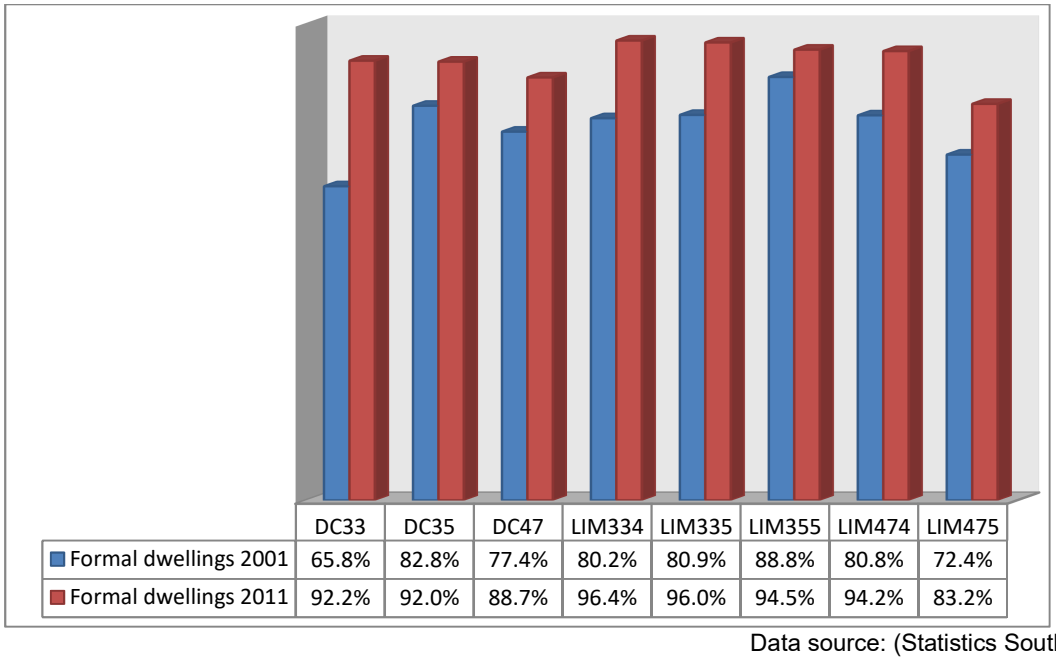


	DC33	DC35	DC47	LIM334	LIM335	LIM355	LIM474	LIM475
Housing owned/paying off 2001	56.2%	66.1%	62.1%	58.4%	42.1%	71.7%	67.7%	63.1%
Housing owned/paying off 2011	55.6%	58.1%	58.2%	61.6%	24.7%	67.6%	56.8%	53.9%

Data source: (Statistics South Africa, 2011)

Figure 22: Tenure status

At 96.4% the highest percentage of formal dwellings are found in Ba-Phalaborwa with the lowest percentage, at 83.2%, being located within Greater Tubatse. The distribution of formal dwellings as they are spread across the region is illustrated in Figure 23.

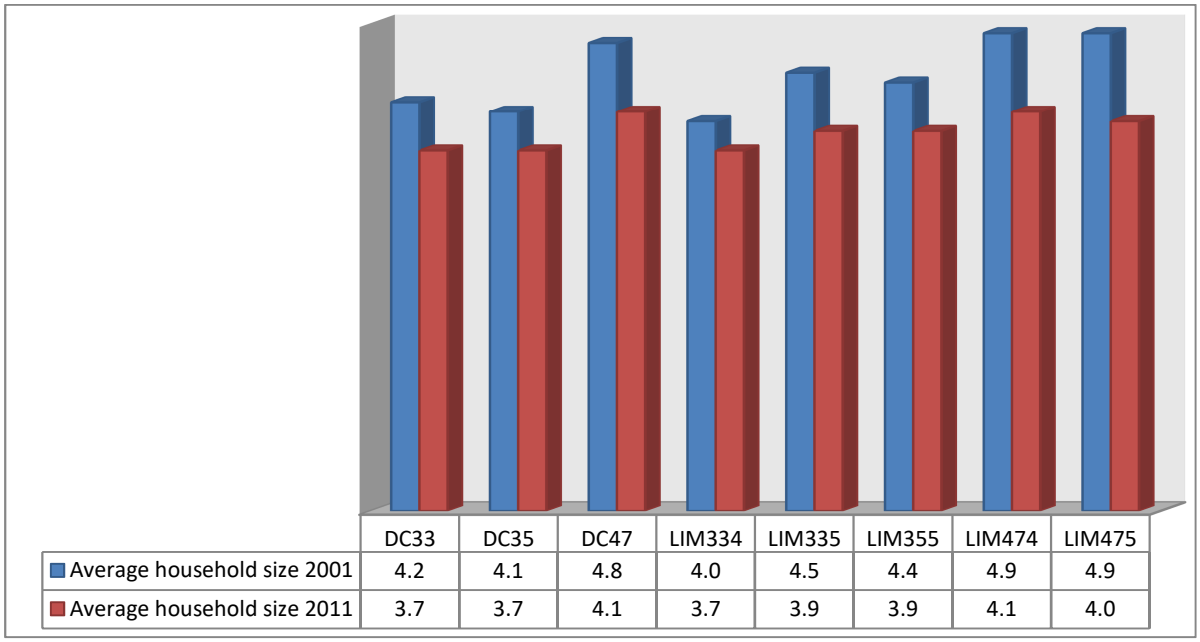


	DC33	DC35	DC47	LIM334	LIM335	LIM355	LIM474	LIM475
Formal dwellings 2001	65.8%	82.8%	77.4%	80.2%	80.9%	88.8%	80.8%	72.4%
Formal dwellings 2011	92.2%	92.0%	88.7%	96.4%	96.0%	94.5%	94.2%	83.2%

Data source: (Statistics South Africa, 2011)

Figure 23: Formal dwellings

The average household size within the region ranges between 3.7 people per household in the Mopani and Capricorn districts to 4.1 in the Greater Sekhukhune district and Fetakgomo local municipalities. This data is illustrated in Figure 24.

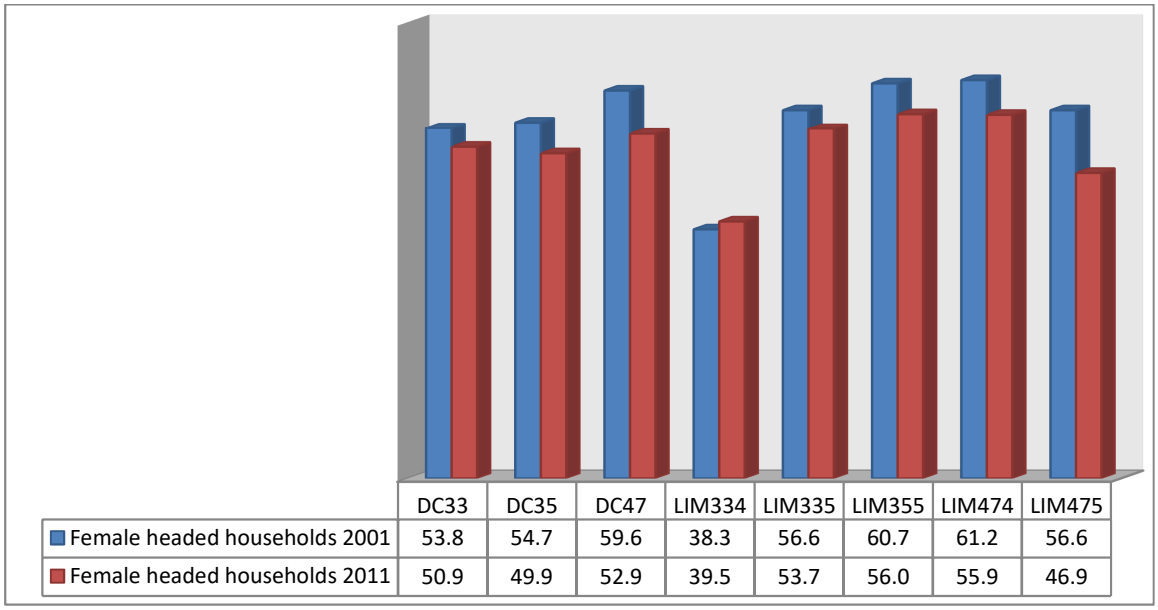


	DC33	DC35	DC47	LIM334	LIM335	LIM355	LIM474	LIM475
Average household size 2001	4.2	4.1	4.8	4.0	4.5	4.4	4.9	4.9
Average household size 2011	3.7	3.7	4.1	3.7	3.9	3.9	4.1	4.0

Data source: (Statistics South Africa, 2011)

Figure 24: Average household size

The highest percentage of female headed household is found in Lepelele-Nkumpi with 56% of households being headed by females while the highest percentage of male headed households, at 60.5% is found in Ba-Phalaborwa. The parentages of female headed households across the region are illustrated in Figure 25.

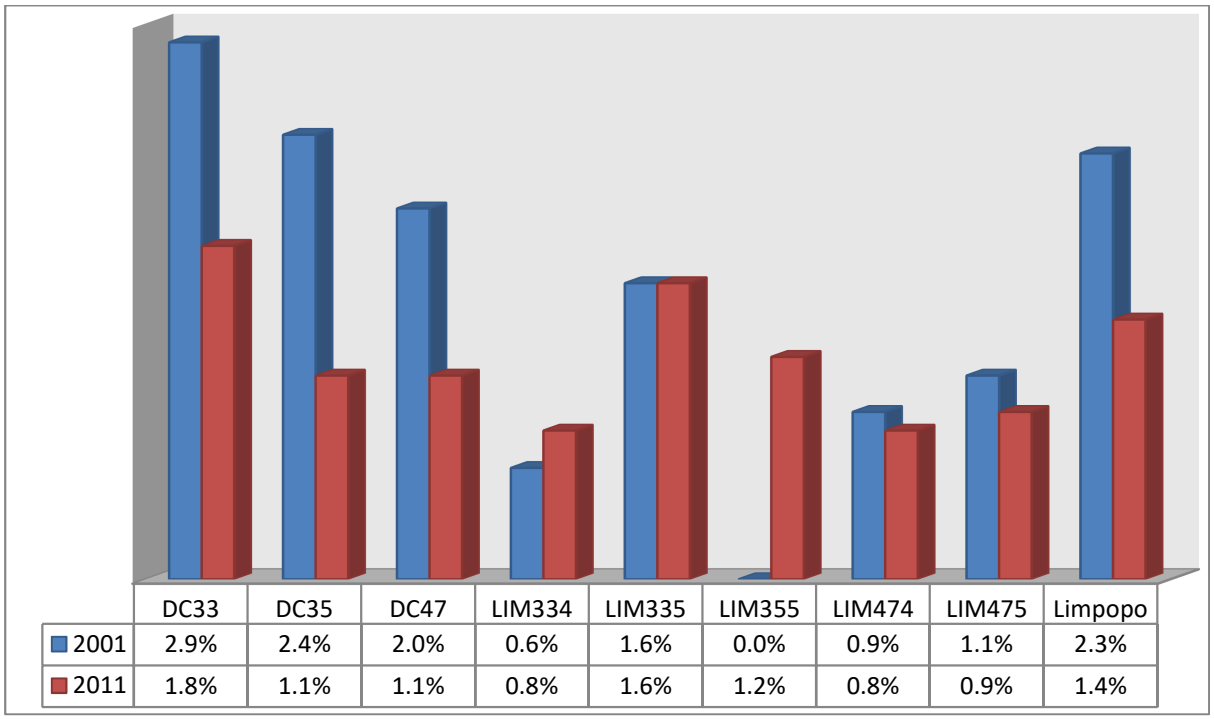


	DC33	DC35	DC47	LIM334	LIM335	LIM355	LIM474	LIM475
Female headed households 2001	53.8	54.7	59.6	38.3	56.6	60.7	61.2	56.6
Female headed households 2011	50.9	49.9	52.9	39.5	53.7	56.0	55.9	46.9

Data source: (Statistics South Africa, 2011)

Figure 25: Female headed households

The highest percentage of child headed households, as illustrated in Figure 26, is found across the Mopani district with 1.8% of households being headed by children. The lowest percentage of child headed households, at 0.8%, is found across both Ba-Phalaborwa and Fetakgomo.



	DC33	DC35	DC47	LIM334	LIM335	LIM355	LIM474	LIM475	Limpopo
2001	2.9%	2.4%	2.0%	0.6%	1.6%	0.0%	0.9%	1.1%	2.3%
2011	1.8%	1.1%	1.1%	0.8%	1.6%	1.2%	0.8%	0.9%	1.4%

Data source: (Statistics South Africa, 2011)

Figure 26: Child headed households

The social impact of the proposed Foskor Merensky 400 kV ±131 km Line and Associated Substation Works were identified and assessed against the demographic background described above.

7. Social Impacts

In general, the transmission line will traverse a number of ecologically sensitive areas, such as the Balule Nature Reserve incorporating the Olifants West Game Reserve, Klaserie Nature Reserve and Gwala Gwala Nature Reserve amongst a number of others all of which are dependent on nature conservation and associated tourism. It also passes through various residential areas, amongst which are the villages of Finale, Diphuti, Makgwareng, Lebogang, Monareng and Ga Sepaka, and at times is located in close proximity to people engaging in their daily activities. Some of the commercial and industrial enterprises affected are Burgersfort Brick Yard, Ferrochrome Bricks and Paving and Johnson Crane Hire amongst others. With this in mind and based on the project description, the social baseline study and an analysis of the focus group meetings and various submissions, the following 20 social impacts have been identified and are assessed.

- Access across site
- Access to servitude across private property
- Crime and security
- Disturbance of cultural, spiritual and religious sites
- Disturbance of sense of place
- Economic issues
- Fencing
- Fire risk
- Health issues
- Impact on farming operations
- Job creation
- Noise
- Resettlement
- Safety hazards associated with people and animals
- Services and infrastructure
- SMME opportunities
- STDs, HIV and AIDS risk
- Social instability
- Traffic disruption

These impacts will now be described in greater detail, optimisation or mitigation measures will be suggested and each impact will be assessed in respect of either the construction or operational phases of the project or both, depending on relevance.

7.1. Access across site

Description of impact: During both construction and operation it is likely that the transmission line will result in restriction of access across sections of the servitude.

This impact will essentially be associated with the construction phase of the project and in this sense is likely to be temporary in nature. The intensity of this impact will depend largely on the construction activity being undertaken at the time. For instance during excavation and foundation work, access will be more confined than during the tower assembly and stringing process, as this is likely to stretch across sections exceeding 1 km. Access across the site during the construction of access roads may also be more restrictive as will entrance into the vicinity of construction camps.

In areas where there is a higher population such as in the residential and commercial and industrial areas access across the site is likely to be more disruptive to a higher number of people engaging in their daily activities than it is in less populated rural areas.

Disruption of access across the site is not entirely restricted to the construction phase of the project as disruption is likely to occur during the operational phase particularly when maintenance and repair work is being carried out. This is, however, only likely to occur on sporadic occasions and for a relatively short period at a time.

Mitigation objective: To limit disruption of access across the selected servitude route.

Mitigation measures:

- Provide strategically distributed crossing points to secure existing routes currently used by both farmers and local communities;
- Consult with property owners, local authorities and communities to ensure that all affected parties are informed of the timing and extent of any disruptions;
- Ensure that service nodes such as schools, clinics, water sources, places of worship, etc. remain easily and safely accessible at all times;

The impact on access across the site is assessed and presented in Table 1 below.

Table 1: Access across site

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	2
A2	Negative	Local	Medium	Short term	Almost certain	2
A3	Negative	Local	Medium	Short term	Almost certain	2
A4	Negative	Local	Medium	Short term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	Low	Long term	Likely	2
A2	Negative	Local	Low	Long term	Likely	2
A3	Negative	Local	Low	Long term	Likely	2
A4	Negative	Local	Low	Long term	Likely	2
A5	Negative	Local	Low	Long term	Likely	2

7.2. Access to servitude across private property

Description of impact: During both the construction and operational phases of the project Eskom will require access to the servitude which, at times, will need to be gained through privately owned property.

Although, largely associated with the construction phase, access to the transmission line will also be required for repair and maintenance work. During construction the required access will be over the short term and although more intense this will last for approximately 18 months over the length of the project. As with the previous impact the intensity of this impact will depend on the construction activity being undertaken at the time.

During the operational phase required access across private property will last over the life span of the transmission line. It will, however, be more sporadic in nature probably only occurring two to three times a year on average.

Mitigation objective: To manage access to private property across the selected servitude route.

Mitigation measures:

- Negotiate with landowners to ensure agreement concerning any access to private property;
- Consult with property owners, prior to any access, to ensure that they are timeously informed of the duration and nature of the required access;
- Ensure that all staff as well as the staff of contractors can be clearly identified at all times;

- Ensure that all staff and the staff of contractors are enlightened with regard to the appropriate protocol when entering and working on private property and that they adhere to this protocol at all times;
- On properties on which wild animals roam freely, ensure that the appropriate safety precautions are taken to safeguard employees from any potential injury that may be caused by encounters with wild animals.

The impact on access to servitude across private property is assessed and presented in Table 2 below.

Table 2: Access to servitude across private property

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	2
A2	Negative	Local	Medium	Short term	Almost certain	2
A3	Negative	Local	Medium	Short term	Almost certain	2
A4	Negative	Local	Medium	Short term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	Low	Long term	Almost certain	1
A2	Negative	Local	Low	Long term	Almost certain	1
A3	Negative	Local	Low	Long term	Almost certain	1
A4	Negative	Local	Low	Long term	Almost certain	1
A5	Negative	Local	Low	Long term	Almost certain	1

7.3. Crime and security

Description of impact: The increased risk of criminal activity due to an influx of workers and activities during construction and operation.

A possibility exists that, during the construction phase of the project, an opportunistic criminal element may take advantage of increased activities in some areas around the construction site. During construction workers will be accommodated in construction camps with these construction camps being situated on land obtained, on a temporary basis, by means of agreement with landowners.

During operation the only activity that will be associated with the project will be maintenance and repair work which will be sporadic in nature only occurring on average two to three times a year.

There is, however, great concern that has been raised by various I&APs about the threat the construction and operation of the line will pose to game in the area. In this regard in a letter to the environmental consultant, with reference to Alternative 2, it is pointed out that;

> "*The route traverses prime white and black rhino habitat which will present a security threat to our endangered rhino during the construction and maintenance phases of the project. In the light of current rhino poaching statistics I am sure you will appreciate our concerns.*"

And with regard to Alternatives 1, 3 and 4:

> "*The route passes through an area of prime Black Rhino Habitat, home to a number of these endangered animals*" (Ferguson, 2012, p. 5).

It is also indicated in an objection to Alternative 1, that:

> "*The construction phase of the project will bring potential management problems into the reserve. These include illegal bush-meat and poaching as well as other security concerns, as well as the associated fire-threats from cooking fires, access control, etc."* (Spencer, 2012, p. 3)

Current threats associated with rhino poaching and with no apparent medium to long term solution to the problem result in the risks remaining high during the operational phase of the project.

Mitigation objective: To reduce the risk of criminal activity associated with the project.

Mitigation measures:

- Where appropriate establish liaison structures with local police and communities to monitor changes during the construction phase;
- Where necessary, particularly where there is a threat to wild life due to poaching, additional security should be provided;
- Workers should be provided with identity cards and should wear identifiable clothing at all times;
- Keep landowners well informed of movements in and around their properties;
- Liaise with landowners prior to entering their property.

The impact of crime and security is assessed and presented in Table 3 below.

Table 3: Crime and security

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	High	Short term	Almost certain	2
A2	Negative	Local	High	Short term	Almost certain	2
A3	Negative	Local	High	Short term	Almost certain	2
A4	Negative	Local	High	Short term	Almost certain	2
A5	Negative	Local	High	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	High	Medium term	Almost certain	2
A2	Negative	Local	High	Medium term	Almost certain	2
A3	Negative	Local	High	Medium term	Almost certain	2
A4	Negative	Local	High	Medium term	Almost certain	2
A5	Negative	Local	High	Medium term	Almost certain	2

7.4. Disturbance of cultural, spiritual and religious sites

Description of impact: The likelihood of the project having a physical impact on areas of cultural, spiritual or religious significance.

During a site visit undertake by Nsovo it was pointed out by Mr. Kgohloane, a ward committee member, that there are a number of grave sites on the properties occupied by some residents of the village of Finale. Mr Delport of Foskor Mine also raised the issue of heritage sites in the area. This impact is only mentioned here as it is the subject of a separate specialist heritage study and, as such, is assessed in accordance with that study. It must, however, be noted that there remains the possibility that a culturally sensitive site may be discovered during construction and it is important to have an archaeologist on stand-by, over the construction period, to address any such eventualities.

7.5. Disturbance of sense of place

Description of impact: The effect that the project may have on the vista, atmosphere and lifestyle of the region through which it passes.

With regard to Alternative 1 Craig Spencer (2012, p. 2) points out that;

> "*It is our belief that the market values of the properties within the OWNR will be adversely affected by the proposed Route 1. Although there is already a similar line through the reserve, we firmly believe that an additional over-head power-line will impact negatively on the intrinsic values of the properties and reduce their appeal."*

Karin Kamponga of Olifants River Game Reserve Share Block Ltd. (2012, p. 4), points out that in respect of Alternative 2:

> "*5. There will be visual unsightliness of the lines, as well as of any construction area.*

6. There will be audible disturbance due to machinery and general vocality (sic) *of labourers.*"

Ismail Mia of Oxford Trading Company (2012, p. 1) writes that with regard to Alternative 1;

"*There is already an existing line traversing through our property and having another line adjacent to this line with a servitude width of 47m would be a visual nightmare, in this very lovely and scenic part of the country. The visual impact of such a line will ultimately have a negative impact of the value of the land, as well as the natural habitat of the area, as indicated in the objection submitted by the Warden of Olifants West Nature Reserve."*

It is also indicated by Craig Ferguson of Balule Nature Reserve (2012, p. 5) that Alternative 2 will have a negative effect on the experiences of guests and landowners in the area who "…*will be forced to travel to their big five destination with the powerlines visible for 30km. This will definitely impact negatively on the market prices of the properties and on the guests wildlife experience.*" And that alternatives 1 and 3 " …*pass within 500m of an established lodge on the Olifants River that caters to international and local tourists.*"

At the meeting held at the Sefapane Lodge, Phalaborwa on the 19th September, 2012 it was pointed out that.

"*The specialist who investigated the visual impact of the powerline recommended that the line be placed along the road and seemingly this recommendation is ignored. We would like to submit that alternative 5 as recommended by the visual impact specialist be investigated and the findings must be communicated to landowners. Sentiments were echoed that the landowners are more inclined to agree with the specialist that the powerline close to the road will not have big impact like when it was introduced to a new area.*"

It is clear that the construction of the transmission line through what is largely a rural area is likely to change the rural atmosphere and lifestyle of the region and consequently, will have a negative effect on the sense of place for some residents. It is quite feasible that this will also negatively impact the tourist potential of some game farms and nature reserves through which the line will pass

Mitigation objective: To limit the negative impact that the project may have on the environment and to retain the sense of place as best as possible.

Mitigation measures:

- Consult with affected communities in an effort to identify and address issues relating to the visual impact and sense of place;
- Reinstate the natural environment as swiftly as possible;
- Where feasible, follow the recommendations of the visual impact specialist.

The disturbance of sense of place is assessed and presented in Table 4 below.

Table 4: Disturbance of sense of place

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	High	Short term	Almost certain	2
A2	Negative	Local	High	Short term	Almost certain	2
A3	Negative	Local	High	Short term	Almost certain	2
A4	Negative	Local	High	Short term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	High	Medium term	Almost certain	2
A2	Negative	Local	High	Medium term	Almost certain	2
A3	Negative	Local	High	Medium term	Almost certain	2
A4	Negative	Local	High	Medium term	Almost certain	2
A5	Negative	Local	Medium	Medium term	Almost certain	2

7.6. Economic issues

Description of impact: The macro-economic effects of the project.

The economic effects of the project are addressed here at macro-economic level from a social perspective. The construction of the proposed transmission line has become necessary as part of Eskom's undertaking to upgrade the country's existing electricity infrastructure. Eskom has indicated that the Foskor-Merensky load centre is driven by mines and rural development and that the proposed project is necessary to:

- Help strengthen the supply network between Foskor and Merensky Substations;
- Improve the security of electricity supply thus benefit users in the region and country as a whole;
- Improve the economic status of the country.

Although the project may carry with it certain negative economic consequences, mainly at a micro level such as the effect on property values, this is not addressed here as it falls outside the scope of proficiency of this report.

Optimisation objective: To enhance the Macro-economic benefit of the project.

Optimisation measures:

- Ensure that the project is run in a responsible manner and that the environment is adequately protected from negative impacts;
- Put adequate monitoring systems in place throughout the duration of the project;
- Ensure that the value of the project is balanced against costs related to both the negative environmental and social impacts in the region;
- Apply the mitigation measures suggested in the economic report.

The economic issues related to the project are assessed and presented in Table 5 below.

Table 5: Economic

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Operational Phase						
A1	Positive	National	Medium	Long term	Almost certain	2
A2	Positive	National	Medium	Long term	Almost certain	2
A3	Positive	National	Medium	Long term	Almost certain	2
A4	Positive	National	Medium	Long term	Almost certain	2
A5	Positive	National	Medium	Long term	Almost certain	2

7.7. Fencing

Description of impact: The repair of existing fencing damaged during construction and/or maintenance operations and the provision of adequate fencing around construction sites.

Damage that may occur to fencing is of specific concern to game farmers as they need to ensure that their farms are secured at all times to prevent any loss of game. In addition to this the required fence structures must conform to particular standards resulting in repairs being expensive to undertake. For the safety of both people and animals it is also important to ensure that construction sites are properly fenced off, during the construction phase

Mitigation objective: To reinstate any damage to existing fencing and to secure the construction site.

Mitigation measures:

During construction;

- Fence the construction site to prevent access;
- Inspect fencing on a weekly basis and ensure it is properly maintained by the contactor until completion of construction;

- Adequately and promptly repair damaged caused to fencing by contractors to an acceptable standard.

During the operation;

- Adequately and promptly repair damaged caused to fencing during maintenance and repair work to an acceptable standard.

The impact of fencing is assessed and presented in Table 6 below.

Table 6: Fencing

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	1
A2	Negative	Local	Medium	Short term	Almost certain	1
A3	Negative	Local	Medium	Short term	Almost certain	1
A4	Negative	Local	Medium	Short term	Almost certain	1
A5	Negative	Local	Medium	Short term	Almost certain	1
Operational Phase						
A1	Negative	Local	Low	Long term	Almost certain	1
A2	Negative	Local	Low	Long term	Almost certain	1
A3	Negative	Local	Low	Long term	Almost certain	1
A4	Negative	Local	Low	Long term	Almost certain	1
A5	Negative	Local	Low	Long term	Almost certain	1

7.8. Fire risk

Description of impact: Increase in fire risk as a result of construction and maintenance activities.

There may be some increase in the risk of veld fires as a result of construction activities. This is as a result of workers smoking and cooking food within the vicinity of the construction sites. Although the risk may be somewhat less during operation it would still exist to some degree during maintenance and repair activities.

This risk has been raised by various I&APs.

Craig Ferguson (2012, p. 5) points that;

"*We will not allow contractors camps to be constructed within the Reserve as they present a security and fire risk.*"

Karin Kampinga (2012, p. 4) claims that;

"*There will be an increase in the risk of runaway fires – mostly accidental with regards to cooking fires and cigarettes – this would lead to damage to land and flora and*

injury to humans and flora and be potentially devastating to the conserved region as a whole should it get out of hand."

Craig Spencer (2012, p. 3) points out that;

"*The OWNR supports the "adaptive-interference model" regarding the management of the ecology and ecological processes necessary to maintain the ecological integrity of our region. The proposed Route 1has the potential to create a barrier for one of the critical ecological drivers (processes) of the Arid Savanna – fire. This could be a double-edged sword and requires further investigation. Whereas ESKOM will require a wide fuel-free buffer to protect their infrastructure, the potential to compound our fire-management strategy (in line with the adaptive-interference model) needs further investigation to understand the management requirements. Our annual phytomass surveys indicate that should favourable climatic conditions persist, the likelihood of ecologically appropriate basal fires is increasing.*"

Mitigation objective: To reduce fires risks that may be created through the project.

Mitigation measures:

- Strategically placed emergency access points along servitude at times when access is restricted to ensure that landowners and emergency services are able to respond to any outbreak of a fire.
- Ensure that both construction and maintenance personnel are made aware of the risks and dangers of veld fires and that, at all times, they behave in a manner to reduce the risk of fire.
- Ensure close co-operation between landowners and construction and maintenance teams to ensure an effective fire management strategy.

The impact of fire risk is assessed and presented in Table 7 below.

Table 7: Fire risk

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	2
A2	Negative	Local	Medium	Short term	Almost certain	2
A3	Negative	Local	Medium	Short term	Almost certain	2
A4	Negative	Local	Medium	Short term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	Medium	Long term	Almost certain	2
A2	Negative	Local	Medium	Long term	Almost certain	2
A3	Negative	Local	Medium	Long term	Almost certain	2
A4	Negative	Local	Medium	Long term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2

7.9. Health issues

Description of impact: The affect that the project is likely to have in respect of the health of communities living and working within the vicinity of the transmission lines.

Health issues have been identified at two levels. Karin Kampinga (2012, p. 3) claims that;

> "*There may be an increased risk of malaria in the area due to increased number of potential carriers on the reserve during the construction phase and during periods of maintenance, which will have a negative impact on its appeal to owners and visitors (affect land value) issues have been identified at two levels.*"

Health related issues are also related to electromagnetic fields (EMFs) associated with the operational phase of the project. It is important to note, that although the effects of EMFs are addressed at the social level the scientific assessment of such health issues is beyond the scope of the specialisation of this study. Accordingly, at the social level, health issues are addressed in terms of public perceptions amongst the affected communities rather than on a scientific basis. The issue of health risks associated with electromagnetic fields (EMFs) on communities living within close proximity of transmission lines and electrical substations as well as on animals is, and remains, a controversial and well documented issue (Wartenberg, 1993; UK Childhood Cancer Study Investigators, 1999; UK Childhood Cancer Study Investigators, 2000; Draper, Vincent, Kroll, & Swanson, 2005; Wood, 2006; Copes & Barn, 2008; Electric Power Research Institute, 2009; Huss A. , Spoerri, Egger, & Röösli, 2008; Blank, 2009; Electric Power Research Institute, 2009). This controversy has led to a high degree of concern amongst many residents in respect of five issues in particular.

- The risk of childhood leukaemia;
- The risk of breast cancer particularly amongst women, but should not be restricted to women only;

- A link between Alzheimer's Disease and EMFs;
- The effect of EMFs on animals, particularly the rate and quality of production amongst dairy cattle and poultry but not restricted to only dairy herds and poultry;
- The devaluation of property within close proximity of power lines and electrical substations.

Although it is difficult to establish the real dangers of exposure to EMFs, what is clear is that many people at least perceive this as a risk to health and that in turn this may also cause secondary health risks brought about through high stress levels.

Mitigation objective: To manage health risks related to the project.

Mitigation measures:

- Undertake an independent health assessment in respect of the dangers that may be associated with electromagnetic fields;
- Follow mitigation measures recommended in the appropriate specialist report/s;
- Put in place a monitoring system to monitor health risks throughout the life of the project;
- Ensure that there is broad based representation, capable of serving both community and company interests in respect of the monitoring facility referred to above.

The impact of health issues is assessed and presented in Table 8 below.

Table 8: Health issues

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Low	Short term	Almost certain	1
A2	Negative	Local	Low	Short term	Almost certain	1
A3	Negative	Local	Low	Short term	Almost certain	1
A4	Negative	Local	Low	Short term	Almost certain	1
A5	Negative	Local	Low	Short term	Almost certain	1
Operational Phase						
A1	Negative	Local	Medium	Long term	Almost certain	2
A2	Negative	Local	Medium	Long term	Almost certain	2
A3	Negative	Local	Medium	Long term	Almost certain	2
A4	Negative	Local	Medium	Long term	Almost certain	2
A5	Negative	Local	Medium	Long term	Almost certain	2

7.10. Impact on farming operations

Description of impact: Routine farming operations are likely to be disrupted during both the construction and operational phases of the project.

During construction certain farming activities may be disrupted for a short while as construction teams access farming areas. During the operational phase the effect on farming activities is likely to be less significant as normal farming activities, such as grazing and cultivation may continue within the servitude. There are, however, certain restrictions such as the growing of vegetation or building of structures, which could interfere with the safe operation of the power line.

At a meeting for communities in the Steelpoort–Burgersfort area held in the Boardroom of the Greater Tubatse Local Municipality on the 2nd February, 2012, Mr Pretorius indicated that his farm is a nature reserve with wild animals which attracts tourists. He pointed out that extra power line servitude will reduce grazing for his animals and that he is planning new residential development. With the increased capacity from a 275 kV (47 m servitude) to a 400 kV (55 m servitude) transmission line and extra 8 meters will be added to the required servitude which will increase this loss.

At the meeting held at Sefapane Loge, Phalaborwa on the 19th September 2012 the following comment was made.

> "*Eskom is advised to consider the issue of working hours during construction. Landowners will allow construction workers on their properties only between 10h00 and 15h00. This suggest that line 1 and 5 are better options with less interference with construction workers.*"

To which the Eskom responded as follows.

> "*Normal working hours are between 08h00 and 17h00; however, working times can always be negotiated with the landowner.*"

Mitigation objective: To limit disruptions to farming operations caused by the construction and maintenance of the power line.

Mitigation measures:

- Liaise with farmers and farmer associations with the aim of finding solutions to possible restrictions placed on the movement of farm equipment and animals within and between farms during construction and maintenance;

- If, and where feasible, coordinate construction activities with farming activities, to minimise disruptions in respect of both sets of activities;
- Where technically feasible, adjust the route to minimise any long-term disruptions to farming operations.

The impact on farming operations across the site is assessed and presented in Table 9 below.

Table 9: Impact on farming operations

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	High	Short term	Almost certain	2
A2	Negative	Local	High	Short term	Almost certain	2
A3	Negative	Local	High	Short term	Almost certain	2
A4	Negative	Local	High	Short term	Almost certain	2
A5	Negative	Local	High	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	Medium	Medium term	Almost certain	2
A2	Negative	Local	Medium	Medium term	Almost certain	2
A3	Negative	Local	Medium	Medium term	Almost certain	2
A4	Negative	Local	Medium	Medium term	Almost certain	2
A5	Negative	Local	Medium	Medium term	Almost certain	2

7.11. Job creation

Description of impact: The power line will result in the creation of jobs during construction and operation.

Job opportunities will be limited as the construction process is put out to tender and contractors are appointed to construct the transmission line. These contractors employ skilled workers and although they are encouraged to employ local people for semi and unskilled work such jobs are limited and temporary in nature.

This is illustrated when the following question "[w]*hat will be the empowerment benefits i.e. skills transfer and use of local labour, for the youth community in this project*" was asked at a meeting held at Sefapane Loge, Phalaborwa on 20th September 2012 and the Eskom representative responded as follows.

> "*Eskom uses a tender system and the selected contractor is only advised to use local skills and labour. There are also corporate social responsibilities that are procured by Eskom and local / affected residents could submit request for such assistance. Locals can also benefit from economic spin offs such as small business activities within the area.*"

Further at a meeting at the same venue on the 19th September an I&AP commented as follows.

"*This project will have long term negative economic impact on jobs created by environment and short term positive economic impacts coming from the construction side of the project. This is similar to mining activities which create short term economic benefits and when the resources are depleted the mine closes and jobs are lost as opposed to Ecotourism which creates long term sustainable jobs.*"

Optimisation objective: To increase the benefit of job creation.

Optimisation measures:

- Use local labour as far as possible;
- Create opportunities for the employment of women;
- Where possible use labour-intensive methods of construction;
- Go beyond the minimum wage rate and invest in local staff.

The impact on job creation is assessed and presented in Table 10 below.

Table 10: Job creation

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Positive	Local	Low	Short term	Almost certain	1
A2	Positive	Local	Low	Short term	Almost certain	1
A3	Positive	Local	Low	Short term	Almost certain	1
A4	Positive	Local	Low	Short term	Almost certain	1
A5	Positive	Local	Low	Short term	Almost certain	1
Operational Phase						
A1	Positive	Local	Low	Long term	Almost certain	1
A2	Positive	Local	Low	Long term	Almost certain	1
A3	Positive	Local	Low	Long term	Almost certain	1
A4	Positive	Local	Low	Long term	Almost certain	1
A5	Positive	Local	Low	Long term	Almost certain	1

7.12. Noise

Description of impact: The power line possibly could result in an increase in noise.

The project is situated in a rural area, well known for tourism and game farming. Consequently, the issue of noise reduction during both construction and operation is important as heightened noise levels will have a negative effect on tourist experiences.

The construction process is likely to result in an increase in noise levels due to the use of heavy machinery and, a helicopter if used during construction, inspection and maintenance activities. Increased noise can have psycho-social effects which could manifest in irritation, mental health disturbances, noise induced stress and sleep disturbances and has been found to lead to depression (Öhrström, 1991). Although difficult to measure at the social level these effects are likely to be most severe where the relative quiet of a rural area is disrupted by noise associated with the construction and operation of the transmission line.

The typical noise emitted by transmission line is the corona noise heard as a crackling or hissing sound. The intensity of this noise varies depending on voltage levels and weather conditions. With high voltages and in high humidity and extremely wet weather this noise could peak at between 50 to 60 dBA placing it at no higher level than that of a normal conversation at about 1 meter (Aspen Environmental Group, 2012). Other noise can be that cased by dirty or damaged insulators or aeolian noise as a result of wind blowing across the line.

The international tendency for evaluating the impact caused by intruding noise is to specify an average ambient noise level of 55 dBA and 45 dBA during the day and night respectively, as the maximum average ambient noise levels to which residential premises in urban areas should be exposed (Berglund, Lindvall, & Schwela, 1999). It is unlikely that any constant noise emanating from the transmission line will exceed the World Health Organisation's recommended noise limits. It is, however, the irritation factor caused through a prolonged crackling or hissing sound, particularly during wet weather, which is of concern. During construction there may also be occasions when the noise level approaches what could be considered to be an unacceptable level.

Mitigation measures:

- Restrict construction activities and vehicle movement to daylight hours;
- Maintained all vehicles and construction machinery to a standard that prevents the noise levels causing any unnecessary and avoidable nuisance to the workforce and local communities;
- Keep the transmission line in a condition that minimises any unnecessary noise emanating from the line during operation.

The impact of noise is assessed and presented in Table 11 below.

Table 11: Noise

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	2
A2	Negative	Local	Medium	Short term	Almost certain	2
A3	Negative	Local	Medium	Short term	Almost certain	2
A4	Negative	Local	Medium	Short term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	Medium	Long term	Almost certain	1
A2	Negative	Local	Medium	Long term	Almost certain	1
A3	Negative	Local	Medium	Long term	Almost certain	1
A4	Negative	Local	Medium	Long term	Almost certain	1
A5	Negative	Local	Low	Long term	Almost certain	1

7.13. Resettlement

Description of impact: The resettlement of households as a result of the construction of the power line.

Alternative 1 passes between the villages of Finale and Diphuti with one of the pylons at the gate of the primary school in Finale illustrated in Figure 27 below. Graves are also apparent in the ground of residential dwellings as illustrated in Figure 28 below. The route also passes through the villages of Makgwareng, Lebogang, Morareng and Ga Sepaka and in Alverton some families are affected by the line. In Mashamthane Village, regardless of earlier discussions with Eskom, the offices of a law firm have been built on the servitude.

Figure 27: School in the village of Finale

Figure 28: Graves in residential area of Diphuti

There is clear evidence that in some areas there may well be a need to relocate dwellings, graves and businesses, however, the exact extent of this will only be established when pegging the central line and footprint of the transmission line. Consequently, the developers may need

to commission independent experts to undertake a land audit and to facilitate the development of a resettlement action plan (RAP). In accordance with such a plan alternative housing and/or compensation would also need to be provided to the affected parties prior to the actual relocation activities.

It is important that the resettlement complies with recognised acceptable relocation practices. In this regard international experience has shown that, unless the best practice benchmarks are achieved, resettlement exposes affected people to a range of risks which include:

- landlessness
- homelessness
- joblessness
- economic and social marginalisation
- increased morbidity and mortality
- food insecurity
- loss of access to common property resources
- social and cultural disarticulation/disruption

It is pointed out that poorer households are particularly vulnerable and need to be protected (Cernea, 1997). Accordingly, if the need for resettlement does arise it must be conducted in terms of international best practice and accompanied by a comprehensive resettlement action plan. This goes further than merely fulfilling the legislative requirements of compensation.

Mitigation objective: To reduce the disruptive effects that resettlement could have on the lives of people.

Mitigation measures:

- Resettlement needs to be undertaken in accordance with a recognised protocol.

According to the World Bank's Revised Policy on Involuntary Resettlement (OP/BP 4.12) (2006), best practices must ensure that:

- Involuntary resettlement should be avoided, or minimised where unavoidable.
- Where resettlement is unavoidable, resettlement plans and activities should be seen and executed as development programmes.
- Resettled persons should be provided with sufficient investment resources and opportunities to share in project benefits.

- Displaced persons should be meaningfully consulted, and should participate in the planning and implementation of resettlement programmes.
- Displaced persons should be compensated, prior to the move, for their losses at full replacement cost.
- Resettled persons should be assisted with the move and provided with support during the transition period.
- Resettled persons should be assisted with their efforts to improve, or at least restore, their former living standards, income earning capacity and production levels – whichever is higher.

As resettlement will need to be completed prior to construction it will only be assessed in respect of the construction phase of the project and, as such, is assessed and presented in Table 12 below.

Table 12: Resettlement

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	2
A2	Negative	Local	Medium	Short term	Almost certain	2
A3	Negative	Local	Medium	Short term	Almost certain	2
A4	Negative	Local	Medium	Short term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2

7.14. Safety hazards associated with people and animals

Description of impact: During construction and operation the safety of people and animals may be at risk.

During construction, repairs and maintenance of the line heavy equipment will be used that will increases the risks to the safety of people and animals in the vicinity of these activities. Apart from this the line transverses area where there are wild animals roaming freely which will pose specific safety hazards for construction, maintenance and repair teams. In this vein the following comments are made;

Craig Ferguson (2012, p. 5) indicates in regards to Alternative 2 and with reference to Eskom that;

> "*Your construction workers will be working over a distance of 30km in a big five environment with dangerous animals that will present a risk to your staff. We cannot afford to provide armed guards for all the crews and cannot allow armed outsiders onto the Reserve.*"

Karin Kampinga (2012, p. 4) also highlights the dangers in warning that;

"There will be an increased risk to the safety of Eskom personnel by lion, leopard, elephant and buffalo."

Mitigation objective: To reduce the risk of safety hazards associated with the project.

Mitigation measures:

- Liaise closely with game farmers and/or game wardens to ensure the safety of all construction and maintenance personnel;
- Ensure all equipment is maintained to the required standards;
- Ensure that the appropriate safety procedures are in place and that they are followed at all times during both construction and maintenance;
- Fence off all construction sites to prevent people and animals straying onto the site;
- Liaise with land owners prior to entering their property to ensure an understanding between contractors and property owners;

The impact of safety hazards is assessed and presented in Table 13 below.

Table 13: Safety hazards associated with people and animals

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	High	Short term	Almost certain	2
A2	Negative	Local	High	Short term	Almost certain	2
A3	Negative	Local	High	Short term	Almost certain	2
A4	Negative	Local	High	Short term	Almost certain	2
A5	Negative	Local	High	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	High	Medium term	Almost certain	2
A2	Negative	Local	High	Medium term	Almost certain	2
A3	Negative	Local	High	Medium term	Almost certain	2
A4	Negative	Local	High	Medium term	Almost certain	2
A5	Negative	Local	High	Medium term	Almost certain	2

7.15. Services and infrastructure

Description of impact: Interfering with and/or disrupting service infrastructure and provision in the vicinity of the servitude.

There is some risk that construction activities could result in damage to or disruption of existing services such as electrical transmission lines, roads, water and sewerage facilities. The following airports are noted along the

- Phalaborwa Airport, outside Phalaborwa;
- Burgersfort Airport, located in Greater Tubatse;
- East Gate Airport outside Hoedspruit;
- Hoedspruit Air force Base Airport in Hoedspruit along the R41;
- Private air strips within the farms

In respect of Alternative 2 it is indicated that;

> "*The line crosses directly across the end of an airstrip (24 09 46S; 31 01 27 E) on Olifants River Game Reserve near the railway line. This could increase the danger to aircraft landing and taking off from this strip*" (Ferguson, 2012, p. 5)

Existing power lines in the study area, including a 400 kV power line. This line runs parallel to Alternative 1 between Foskor and Merensky for a distance of 129 km with a 47 m wide servitude. Other Eskom lines in the area include:

- A 400 kV overhead power line;
- A 132 kV Eskom overhead power lines; and
- The existing 11/22 kV distribution line.

Road infrastructure in the vicinity of the project includes the following regional roads, R36, R37, R40, R71 as well as the following local roads, R527, R530, R531, R532, R536, R 555.

On 20th December, 2011, an issue regarding a possible conflict with regard to land zoning in the Mareuleng Local Municipality was raised by Khensani Sithoile of the municipality.

Mitigation objective: To reduce any negative affect the power line may have on existing infrastructure.

Mitigation measures:

- Liaise with all relevant services providers such as the district and local municipalities, South African National Roads Agency Limited (SANRAL), the water authorities in the area and airports authorities to ensure that any disruption to existing infrastructure is limited.
- Liaise with property owners to ensure that existing infrastructure is recorded and any damage repaired or compensated for;
- Liaise with the owners of private airstrips to find solutions to any conflict with the power line route.

The impact on service and infrastructure across the site is assessed and presented in Table 14 below.

Table 14: Services and infrastructure

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	2
A2	Negative	Local	Medium	Short term	Almost certain	2
A3	Negative	Local	Medium	Short term	Almost certain	2
A4	Negative	Local	Medium	Short term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	Low	Medium term	Likely	1
A2	Negative	Local	Low	Medium term	Likely	1
A3	Negative	Local	Low	Medium term	Likely	1
A4	Negative	Local	Low	Medium term	Likely	1
A5	Negative	Local	Low	Medium term	Likely	1

7.16. SMME opportunities

Description of impact: Opportunities for Small Medium and Micro Enterprise (SMMEs) will possibly occur during both the construction and operational phases of the project.

The possibility of a limited number of opportunities for small businesses and entrepreneurs could arise. These opportunities will be both directly and indirectly associated with the project with a number being related to the upgrading of the national grid.

At a meeting held in the boardroom of the Greater Tubatse Local Municipality on 2nd February, 2012, the expectations of some people along all route alternatives were highlighted by Mr. Tsepo Shayi when he asked;

> "*What are the benefits that can be derived by small business from this project? We also expect Eskom to plough back to communities in the receiving environment.*"

Mitigation objective: To optimise the benefit that the project may have for SMMEs.

Optimisation measures:

- Establish a local SMME recruitment preference policy;
- Implement a monitoring system to ensure that the local SMME recruitment preference policy is followed.

The impact on SMME opportunities is assessed and presented in Table 15 below.

Table 15: SMME opportunities

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Positive	Local	Medium	Short term	Almost certain	2
A2	Positive	Local	Medium	Short term	Almost certain	2
A3	Positive	Local	Medium	Short term	Almost certain	2
A4	Positive	Local	Medium	Short term	Almost certain	2
A5	Positive	Local	Medium	Short term	Almost certain	2
Operational Phase						
A1	Positive	Local	Low	Medium term	Almost certain	1
A2	Positive	Local	Low	Medium term	Almost certain	1
A3	Positive	Local	Low	Medium term	Almost certain	1
A4	Positive	Local	Low	Medium term	Almost certain	1
A5	Positive	Local	Low	Medium term	Almost certain	1

7.17. STDs, HIV and AIDS

Description of impact: The risk of STDs, HIV and AIDS infections due to an influx of workers and work seekers during construction.

The prevalence of HIV amongst antenatal women in Limpopo is 21.9% which is lower than its neighbouring provinces of Gauteng at 30.4% and Mpumalanga at 35.1% (National Department of Health, 2015). In respect of the districts affected by the project the HIV prevalence rate amongst antenatal women ranges between 24.9% in Mopani and 20.2% in Greater Sekhukune with Capricorn having a rate of 23.7%. It is therefore possible that an influx of contract workers from these areas could pose a risk to the HIV status of the province, particularly when this is considered against the fact that the area has a high level of poverty. Prostitution often follows contract workers due to there being a source of income. However, what is a limiting factor is that the contract workforce will not be that large and some labour will be locally sourced.

The impact of STDs, HIV and AIDS across the site is assessed and presented in Table 16 below.

Table 16: STDs, HIV and AIDS

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	2
A2	Negative	Local	Medium	Short term	Almost certain	2
A3	Negative	Local	Medium	Short term	Almost certain	2
A4	Negative	Local	Medium	Short term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	Low	Medium term	Almost certain	1
A2	Negative	Local	Low	Medium term	Almost certain	1
A3	Negative	Local	Low	Medium term	Almost certain	1
A4	Negative	Local	Low	Medium term	Almost certain	1
A5	Negative	Local	Low	Medium term	Almost certain	1

Mitigation objective: To reduce the risk of the spread of STDs, HIV and AIDS.

Mitigation measures:

- The contractor/operator should, in consultation with local HIV/AIDS organisations and government structures, design and implement an STD, HIV and AIDS awareness and prevention campaign for employees. This campaign should use various common practice methodologies in order to ensure social and cultural sensitivity;
- The contractor/operator should make STD, HIV and AIDS awareness and prevention programmes a condition of contract for all suppliers and sub-contractors;
- The contractor/operator should provide an adequate supply of free condoms to all workers;
- Condoms should be located in the bathrooms and other communal areas on the construction site and at the construction camps;
- If feasible, a voluntary counselling and testing programme should be introduced during the construction phase and continued during operations. This should be undertaken in conjunction with the existing VCT programmes within the region.

During the operational phase:

- The operator should, in association with HIV/AIDS organisations and government structures, implement an STD, HIV and AIDS awareness and prevention campaign directed at employees.

7.18. Social instability

Description of impact: The effect that an influx of job seekers and workers may have on existing family networks and social structures.

An increase of workers and job seekers can have a number of negative effects for host communities regarding;

- An increase in prostitution;
- Unplanned and unwanted pregnancies;
- An increase in alcohol and drug related incidents;
- Pressure on local services, including housing, clinics, schools, water supplies;
- An increase in local prices and the cost of living;
- Tension and conflict within the community and an effect on family networks and relationships; and
- Increased competition for available jobs and resources.

It is unlikely that the project will result in a significant increase in job opportunities in the area. As a consequence it is most unlikely that it will lead to a significant influx of workers and job seekers coming into the area. Besides this, during construction workers will be accommodated in construction camps and during the operational phase maintenance and repair personnel will operate across a wide area.

The impact on social instability across the site is assessed and presented in Table 17 below.

Table 17: Social instability

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	2
A2	Negative	Local	Medium	Short term	Almost certain	2
A3	Negative	Local	Medium	Short term	Almost certain	2
A4	Negative	Local	Medium	Short term	Almost certain	2
A5	Negative	Local	Medium	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	Low	Medium term	Almost certain	1
A2	Negative	Local	Low	Medium term	Almost certain	1
A3	Negative	Local	Low	Medium term	Almost certain	1
A4	Negative	Local	Low	Medium term	Almost certain	1
A5	Negative	Local	Low	Medium term	Almost certain	1

Mitigation objective: To reduce the effect that an influx of workers and job seekers may have on existing family networks and social structures.

Mitigation measures:

- Maintain communication channels between the contractor and local community structures in an effort to maximise the employment of local labour;
- Make condoms readily accessible to workers;
- Liaise with the South African Police Services and community structures to ensure that the workforce is controlled;
- Where practical, workers from other area should be provided with adequate on-site temporary accommodation and amenities;
- Dismantle and remove all temporary accommodation on completion of work to prevent the development of informal settlements.

7.19. Traffic disruption

Description of impact: Traffic disruptions and delays during the construction and operational phases of the project.

Moving from east to west the route will either cross or at times be within the vicinity of the following regional and local roads.

- Alternative 1 – R40, R36, R37, Road 555.
- Alternative 2 – R40, R36, R37; Road 527 Road 531, Road 555.
- Alternative 3 – R40, R36, R37, Road 532, Road 555.
- Alternative 4 – Road 530, R40, R36, R37; Road 555.

During construction heavy vehicle traffic will increase with the delivery of material, equipment and construction personnel to site. As the line crosses a number of regional roads there is the likelihood that, during the stringing process some traffic disruption could occur, however, construction techniques are available that will keep these disruptions to a minimal level. Traffic disruptions during the maintenance phase, when considered across the lifespan of the project, will be minimal.

The impact of traffic disruption across the site is assessed and presented in Table 18 below.

Table 18: Traffic disruption

Site	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
A1	Negative	Local	Medium	Short term	Almost certain	2
A2	Negative	Local	Medium	Short term	Almost certain	2
A3	Negative	Local	Medium	Short term	Almost certain	2
A4	Negative	Local	Low	Short term	Almost certain	2
A5	Negative	Local	Low	Short term	Almost certain	2
Operational Phase						
A1	Negative	Local	Low	Medium term	Likely	1
A2	Negative	Local	Low	Medium term	Likely	1
A3	Negative	Local	Low	Medium term	Likely	1
A4	Negative	Local	Low	Medium term	Likely	1
A5	Negative	Local	Low	Medium term	Likely	1

Mitigation objective: To ensure the efficient and effective management of traffic disruptions.

Mitigation measures:

- Carefully schedule construction activities to minimize traffic delays;
- Inform the public of any envisaged disruptions;
- Provide adequate traffic warning signs and traffic control measures that comply with national standards.

7.20. No-go alternative

Description of impact: Not to construct the power line leaving the status quo in place.

If the project did not proceed then;

- All the impacts discussed above would be irrelevant and the status quo would remain in place;
- The national electricity supply grid would be compromised in that it would not be possible to supply any additional electricity through the existing transmission network;
- Eventually there would be insufficient electricity to meet the demand of all Eskom's customers which would lead to the interruption of supply to certain areas resulting in load shedding;
- The dependability and quality of supply would be compromised resulting in serious regional and possibly national economic consequences.

The impact of not proceeding with the project is assessed and presented in Table 19 below.

Table 19: No-go alternative

Status	Extent	Magnitude	Duration	Probability	Significance
Negative	National	High	Long-term	Almost certain	3

Having assessed the impacts identified on a social basis in relation to the project these alternatives will now be compared.

8. Assessment of alternatives

After carefully considering all 5 route alternatives it is clear that, on a social basis, there is no obvious fatal flaw with regard to any of the routes. There are, however, a number of concerns that would require careful consideration and the application of mitigation measures in an attempt to reduce the severity of the social impacts. Of concern is that alternatives 1, 2 and 4 all effect a number of properties within the Balule Nature Reserve and the management of the reserve believes that "[i]*ncreasing the number of lines will definitely have a negative impact on the vision, mission and objectives and consequently the property values and future management of the Reserve…* " (Ferguson, 2012, p. 4).

In the village of Finale a pylon, associated with Alternative 1, is positioned virtually at the gate of a primary school and the transmission line will pass over a number of dwellings and will affect a number of burial sites. The village of Alverton also has a number of dwellings positioned directly under the transmission line and, in the village of Mashamthane, a law firm has been built directly under the proposed line.

Apart from this it was also pointed out, in an email dated 09 January 2012 sent by Mr Jaco du Plessis of Pieterse, du Toit & Associates (Pty) Ltd. that the;

> "*proposed Routes 1 & 3 will/might affect the properties and/or future developments of 2 of my clients at Burgersfort / Khumula Lodge (along Steelpoort R555 road)*".
>
> This was subsequently followed up by a letter dated 06 December 2016 from which the following extract is taken.
>
> "*The Foskor – Merensky powerline affects the layout plan of Burgersfort Extension 75 as it extends through the northern portion of the layout and affects 7 residential erven and a residential street – see attached Layout Plan with powerline indicated in purple.*

[Not included here]. *The increase in capacity of the powerline from 275kV to 400kV will surely cause an increase in the width of the powerline servitude that will affect Burgersfort Extension 75 to a greater extent. The larger powerline will also have a greater visual impact on the eco-estate and impact negatively on the sales of the properties."*

This is an issue that will need to be addressed with the land owner as the requirement for a 400 kV line is a 55 m servitude compared to the 47 m servitude was originally required for the 275 kV line thus adding an extra 8 m on to the original width of the servitude.

Considered on a social basis if a compromise can be found in placing the route along or closer to existing corridors in an effort to limit the impact on ecotourism, as suggested by the ecotourism specialists in respect of Alternative 5, then Alternative 5 would emerge as the socially preferred route alternative. This, however, needs to be considered both on a technically viable basis as well and against the other environmental impacts across the study area. The following issues as pointed out by the ecotourism specialists would also need to be considered;

- That the route be located slightly to the north of the R526 to minimise the visual impact from Kingfisher Hill residential and golf resort currently under construction;
- Ideally avoid the Blyde Olifants Conservancy until reaching the R36;
- Preferably follow the 'pink' route so as to run close to the R36 and the R555 until Burgersfort, to avoid any need to build new construction and maintenance tracks in relatively undeveloped and rugged countryside;
- Along the R555 between Burgersfort and Steelpoort take care to limit potential negative impacts on the eco-tourism values of the commercial game lodge situated along this route.

Considering the no-go alternative this is likely to have even greater social consequences, particularly if the security of electricity supply is compromised. With the various developments, both industrial and residential, taking place in the country the need to secure a dependable electricity supply is of national importance and consequently the no-go alternative is not a viable option.

On a general basis the upgrade of the transmission line from 275 kV to a 400 kV is likely to have limited social impacts apart from the effects of possible increases in electromagnetic fields (EMFs) and in respect of some landowners the loss of an extra 8 meters in respect of the required 55 meter servitude. The actual assessment of any increase in EMFs and the

effect that this may have on people and animals is beyond the scope of specialisation of this report and would require specific specialist attention.

9. Conclusion

In general, the generation and supply of electricity are associated with the following 3 somewhat contentious issues;

- Scarcity of suitable sites on which to place new infrastructure;
- Exposure of people and animals to electromagnetic fields (EMFs) and
- Potential decline in property values associated with both EMFs and the visual impact of transmission lines.

All of which are apparent with respect to this project.

Regarding the first of these issues, both the requirement to upgrade existing infrastructure and the availability of suitable sites are in contradiction. This conflict emphasises the need to attempt to balance the national interest of securing a dependable electricity supply network against the interests and welfare of neighbouring communities. Consequently it is important to carefully select a suitable route and in so doing to attempt to find a compromise that would ensure that the sense of place of the area remains intact as far as is practicable and that any health risks to communities along the route are controlled.

The second contentious issue, the exposure of people and animals to electromagnetic fields (EMFs) has, since Wertheimer & Leeper's research in 1979, generated a great deal of public attention. Attention has led to robust public debate on a global scale with little or no consensus seeming to have been emerged (for a more detail discussion see 7.9 Health issues on page 63 above). In 2012, Teepen and van Dijck evaluated the evidence of a causal relationship between EMF and childhood leukaemia. They then suggest that, although evidence points to the potential health impacts being limited, it would be advisable in densely populated areas and close to schools, to reduce exposure from power lines. They also advocate for further research to gain greater insight on the topic.

What has been highlighted at the social level is that all this uncertainly has indeed resulted in concerns, whether real or not, amongst the public about the risks of living in close proximity to electrical power lines and electrical substations, with a growing body of knowledge warning of the dangers of EMFs. These fears need to be noted and addressed in the light of this mounting evidence and the upgrade of the project from a 275 kV to a 400 kV

transmission line. Apart from noting public perception associated with the transmission of electricity and electromagnetic fields the technicalities of this risk are beyond the scope of expertise of this report.

The third contentious issue is associated with the second and, together with any visual impact that may occur, relates to the potential decline in the value of properties associated with the power line. In this regard a number of I&APs, north-east of Hoedspruit and to the east of the R40 between Hoedspruit and Phalaborwa, extending along both sides of the Olifants River for approximately 40 km, have raised their concern. They claim that increasing the number of lines in the area known as Balule Nature Reserve will definitely have a negative impact on the vision, mission and objectives of the nature reserve and consequently, will have a negative effect on the property values as well as on the future management of the reserve.

Considering the social effects of this project and the clear need to strengthen the electricity grid in this region a compromise will need to be negotiated between project proponents and affected parties. Further to this, consideration will need to be given to the technical limitation that a project of this nature faces as well as to the broader environmental threats it poses in respect of such matters as fauna and flora and threats to sensitive natural areas. The nature of the transmission line is such that it is possible to retain a route alternative while making more localised adjustments in an effort to accommodate local conditions. This is particularly relevant in respect of the extra 8 meters required for the 400 kV transmission line, which is 55 meters wide as opposed to 47 meters associated with the 275 kV transmission line. The need for and nature of localised adjustments will only become clearly evident during a corridor walk-down, when the central line and footprint of the transmission line and towers will be pegged and any flaws to the initial route will be identified.

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