Eskom Holdings Limited
Transmission Division

DRAFT SCOPING REPORT FOR THE PROPOSED DEVELOPMENT OF APPROXIMATELY 170 KM 1X400 kV MAPHUTHA – WITKOP POWERLINE WITHIN THE SEKHUKHUNE AND CAPRICORN DISTRICT MUNICIPALITIES IN THE LIMPOPO PROVINCE

BASIC SOCIAL IMPACT ASSESSMENT REPORT
March 2018

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List of Acronyms

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AIDS	Acquired immunodeficiency syndrome
DC47	Greater Sekhukhune 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
LIM354	Polokwane Local Municipality
LIM355	Lepele-Nkumpi Local Municipality
LIM473	Makhuduthamaga Local Municipality
LIM474	Fetakgomo Local Municipality
LIM475	Greater Tubatse Local Municipality
NBA	Dr. Neville Bews & Associates
NGO	Non-Governmental Organisation
PA	Per Annum (Yearly)
PPP	Public Participation Process
RAP	Resettlement Action Plan
SACPVP	South African Council for the Property Valuers Profession
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

List of Units

MW	Mega Watt
m	Metres
km	Kilometres
km^2	Square Kilometres
GW	Gigawatt
GWh/a	Gigawatt hour per annum
ha	Hectare
°C	Degrees Celsius
%	Percentage

Details and Expertise of the Specialist

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

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Projects:

The Social Impact Assessment (SIA) for the Gautrain Rapid Rail Link; The impact assessment for the Australian – South African sports development programme; SIA for Kumba Resources, Sishen South Project; Evaluation of a Centre for Violence Against Women for The United Nations Office on Drugs and Crime; SIAs for the following Exxaro Resources Ltd.'s mines, Leeuwpan Coal Mine Delmas, Glen Douglas Dolomite Mine Henley-on-Klip, Grootegeluk Open Cast Coal Mine Lephalale; SIA for the South African National Road Agency Limited (SANRAL) on Gauteng Freeway Improvement Project; SIA for SANRAL on the N2 Wild Coast Toll Highway; Research into research outputs of the University for the University of Johannesburg; SIA for Waterfall Wedge housing and business development in Midrand Gauteng; SIA for the Environmental Management Plan for Sedibeng District Municipality; Social and Labour Plan for the Belfast Project on behalf of Exxaro Resources Ltd; SIA for the Transnet New Multi-Product Pipeline (Commercial Farmers) on behalf of Golder Associates Africa (Pty) Ltd; SIA for the Proposed Vale Moatize Power Plant Project in Mozambique on behalf of Golder Associates Africa (Pty) Ltd; SIA for Kumba Resources Ltd.'s proposed Dingleton Resettlement Project at Sishen Iron Ore Mine on behalf of Water for Africa (Pty) Ltd; SIA for Gold Fields West Wits Project for EcoPartners; SIA for the Belfast Project for Exxaro Resources Ltd; SIA for Eskom Holdings Ltd.'s Proposed Ubertas 88/11kV Substation on behalf of KV3 Engineers (Pty) Ltd; SIA for the Mokolo and Crocodile River (West) Water Augmentation Project for the Department of Water and Sanitation on behalf of Nemai Consulting and the Trans Caledonian Water Authority; Assisted Octagon Consulting with the SIA for Eskom's Nuclear 1 Power Plant on behalf of Arcus GIBB Engineering & Science. SIA for the 150MW Photovoltaic Power Plant and Associated Infrastructure for Italgest Energy (Pty) Ltd, on behalf of Kalahari Survey Solutions cc. SIA for Eskom Holdings Limited, Transmission Division's Neptune-Poseidon 400kV Power Line on behalf of Nemai Consulting. Ncwabeni Off-Channel Storage Dam for security of water supply in Umzumbe, Mpumalanga. Social Impact assessment for Eskom

Holdings Limited, Transmission Division, Forskor-Merensky 275kV ±130km Powerline and Associated Substation Works in Limpopo Province. Social impact assessment for the proposed infilling of the Model Yacht Pond at Blue Lagoon, Stiebel Place, Durban.ABC Prieska Solar Project; Proposed 75 MWp Photovoltaic Power Plant and its associated infrastructure on a portion of the remaining extent of ERF 1 Prieska, Northern Cape.Sekoko Wayland Iron Ore, Molemole Local Municipalities in Limpopo Province.Langpan Chrome Mine, Thabazimbi, Limpopo; Jozini Nodal Expansion Implementation Project, Mpumalanga, on behalf of Nemai Consulting; SIA for Glen Douglas Dolomite Burning Project, Midvaal Gauteng, on behalf of Afrimat Limited; SIA for Lyttelton Dolomite mine Dolomite Burning Project, Marble Hall Limpopo on behalf of Afrimat Limited; Tubatse Strengthening Phase 1 – Senakangwedi B Integration for Eskom Transmission on behalf of Nsovo Environmental Consulting; Department of Water and Sanitation, South Africa (2014). Environmental Impact Assessment for the Mzimvubu Water Project: Social Impact Assessment DWS Report No: P WMA 12/T30/00/5314/7. Umkhomazi Water Project Phase 1 – Raw Water Component Smithfield Dam - 14/12/16/3/3/3/94; Water Conveyance Infrastructure - 14/12/16/3/3/3/94/1; Balancing Dam - 14/12/16/3/3/3/94/2. Umkhomazi Water Project Phase 1 – Potable Water Component: 14/12/16/3/3/3/95. Expansion of Railway Loops at Arthursview; Paul; Phokeng and Rooiheuwel Sidings in the Bojanala Platinum District Municipality in the North West Province for Transnet Soc Ltd; Basic Social Impact Assessment for the Cato Ridge Crematorium in Kwazulu-Natal Province; SIA for the Kennedy Road Housing Project, Ward 25 situated on 316 Kennedy Road, Clare Hills (Erf 301, Portion 5); Eskom's Mulalo Main Transmission Substation and Power Line Integration Project, Secunda;

Regularly lecture in the Department of Sociology at the University of Johannesburg and 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. Presented papers on Social Impact Assessments at both national and international seminars. Published on both a national and international level.

Affiliation:

- The South African Affiliation of the International Association for Impact Assessment.
- Registered on the database for scientific peer review of iSimangaliso GEF project outputs.

DECLARATION OF INDEPENDENCE

I, Neville Bews as authorised representative of Dr Neville Bews & Associates hereby confirm my independence as a specialist and declare that neither I nor Dr Neville Bews & Associates have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which Dr Neville Bews & Associates was appointed as social impact assessment specialists in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for work performed, specifically in connection with the Social Impact Assessment for the Eskom 400 kV power line from Maphutha to Witkop Substation Limpopo Province. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in my attached report.

Signature: 

Date: 06 March, 2018

Executive Summary

INTRODUCTION

Nsovo Environmental Consulting was appointed to undertake an impact assessment for the proposed 400 kV Eskom Maphutha – Witkop Powerline in Limpopo Province and subcontracted Dr. Neville Bews & Associates to undertake the basic social impact assessment for the project.

The project, which forms part of the Tubatse Network Strengthening Project, extends for approximately 170 km across the following district and local municipalities:

- Capricorn District Municipality (DC35)
  - Polokwane Local Municipality (LIM354)
  - Lepele-Nkumpi Local Municipality (LIM355)
- Sekhukhune District Municipality (DC47) (referred to as Greater Sekhukhune during Census 2011)
  - Makhuduthamaga Local Municipality (LIM473)
  - Fetakgomo Local Municipality (LIM474)
  - Greater Tubatse Local Municipality (LIM475)

The construction process is typical of the construction and stringing of 400 kV powerline pylons and once completed will allow for most normal activities, such as general farming activities, to resume beneath the powerline with certain restrictions to ensure access is not restricted to the line and that nothing interferes with the powerline.

ALTERNATIVES

Three route corridors, the no-go alternative and a technical alternative of placing the cable underground were considered.

In respect of the three route corridors considered, due to the likelihood of Alternative 1, inclusive of the proposed corridor adjustment, affecting more people when compared to the other route alternatives, Alternative 1 has at this point emerged as the socially least preferred route. Notwithstanding this, however, at this stage of the process no obvious reason to consider any of the alternatives, including Alternative 1, as being fatally flawed has emerged. This is based on the fact that the nature of the project is such that it is flexible and

therefor feasible that at a localised level marginal adjustments can be made to the final route alignment so as to avoid any socially sensitive areas.

From a social perspective it was also established that both the no-go option and the technical alternative were not considered viable options, the first based on socio-economic reasons and the latter due to technical reasons.

SUMMARY OF FINDINGS

The following social impact variables have been identified as being associated with the project. These impacts are in accordance with Vanclay's list of social impact variables clustered under the following seven main categories as follows;

1. **Health and social well-being impacts**
    - Annoyance, dust and noise
    - Increase in crime
    - Increased risk of HIV and AIDS
    - Personal safety, increased hazard exposure
2. **Quality of the living environment (Liveability) impacts**
    - Disruption of daily living activities
    - Perceived quality of life.
3. **Economic and material well-being impacts**
    - Increase in employment opportunities
    - Increased opportunities for SMMEs.
4. **Cultural impacts**
5. **Family and community impacts**
6. **Institutional, legal, political and equity impacts**
    - Effect on existing infrastructure facilities and social services
    - Attitude formation towards project
    - Decreased level of community participation in decision making, loss of empowerment
    - Compliance with municipal by-laws
7. **Gender relations impacts**
    - Cultural resistance towards women
    - Division of labour.

With regard to similar infrastructure as the Maphutha to Witkop Project most social impacts are experienced during the construction phase, as this is when construction related activities, relating to the influx of labour and the use of heavy machinery and explosives occurs.

It is evident that there are a number of villages and settlements within the 3 km EIA zone and, being within a 3 km radius of the powerline, most of these settlements are unlikely to be directly affected. The fact that this is an elevated transmission line means that, once constructed, most daily activities can continue as usual under the powerline and communities further from the line, considering a 55 meter servitude, are unlikely to be affected. Notwithstanding this, the possible effect of electromagnetic fields (EMFs) remains a contentious issue to be answered within the realms of physics and medicine although it does have social consequences.

Reflecting on this from a social perspective there are a number of issues that can be considered on a preliminary basis:

- At a site specific level the actual route of the line is flexible and can be adjusted to avoid most socially based obstacles.
- It is unlikely that the social will be the determining factor in route choice because of the flexibility to adjust the route in order to mitigate some social issues.
- In general terms the shorter the route the better.
- The less communities, farms, tourist attraction, businesses etc. along the route the better but they too are subject to the flexibility of the final route.
- During the operational phase most activities can continue under the line.
- The construction process is less obstructive than what may be the case in respect of other linear projects such as the construction of pipe lines, roads and railway lines, so daily living patterns can be restored within a relatively short period.
- Alternative 1, the blue corridor inclusive of the proposed corridor adjustment, seems to affect most people and is the socially less preferred route.
- It seems that Alternative 2, the red route, would be the socially preferred route but this can easily be overridden for either technical or environmental reasons or both. Route 3, the magenta route, is also likely to have less of a social impact.
- The technical reasons for the project seem to fit with the socio-economic requirements of the region i.e. to strengthen the power grid.

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 localised conditions. 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 route will be identified. In this regard, where applicable, it will be important for Eskom to engage with the affected parties in an effort to reach mutually acceptable arrangement on a reasonable basis.

INFORMATION REQUIRED

The following project related information will be required in order to undertake and complete a social impact assessment.

Construction phase

- A project information document indicating the construction process to be followed including estimates of time sequences and deadlines;
- Type and size of vehicles required in the transportation of components and construction equipment and the routes that will be used to transport large components to the site;
- An estimate of the number of vehicle trips required and duration of each trip;
- Comments received from I&APs during the public participation process, including comments reflected in the Final Scoping Report;
- Information concerning any negotiations and agreements with affected land and property owners in respect of compensation for any damages caused as a result of the project;
- An estimation of the number of people to be employed during the construction phase;
- Breakdown of number of people employed with regard to skills levels (low skilled, semi-skilled, skilled and managerial);
- On-site skills development and training opportunities associated with the project;

- Estimation of the overall wage bill for the construction phase and breakdown in percentage in respect of the various skills categories;
- Estimate of the overall capital expenditure for construction phase;
- Indication of where construction workers will be housed and an indication of the total number of workers to be housed;

Operational phase

- Typical activities, i.e. maintenance procedures and timelines, associated with the operational phase of the project;
- The annual operating budget for the project;
- Estimated number of people to be employed over the operational phase of the project;
- Breakdown in terms of the skills levels (low skilled, semi-skilled, skilled and managerial);
- Annual wage bill;
- Information on opportunities for skills development and training;
- Information regarding the restricted activities associated with the powerline such as restriction to building and tree heights required beneath the powerlines.

SUGGESTED APPROACH TO THE STUDY

It is suggested that a combined quantitative and qualitative methodological approach be applied during the study and that data is gathered via:

- A scan of the Draft Scoping Report;
- Various reports and responses generated in respect of the project;
- Statistics South Africa, Census 2011; Mid-year Population estimates and Quarterly Labour Force Survey.
- Field work in the form of a site visits and, where appropriate, interviews with affected parties;
- The issues and concerns raised by the Interested and Affected Parties (I&APs) and recorded in the Comments and Response Report.
- Findings of other specialist studies such as those of the heritage, tourism and agricultural economists studies where available.
- 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.

It is important that the impacts are assess and rated in accordance with a recognised environmental impact assessment methodology and rating scale. In order to maintain consistency with the other specialist reports it would be preferably that an assessment and rating scale is suggested by Nsovo Environmental Consulting and used across most specialist studies were appropriate.

1. Introduction

Dr. Neville Bews and Associates have been appointed by Nsovo Environmental Consulting to undertake the Social Impact Assessment (SIA) as part of the environmental authorisation process for the proposed development of the Eskom Maphutha – Witkop 400 kV powerline stretching between the Maphutha and Witkop substations.

2. Project Description

Due to developments in platinum and ferrochrome mines the forecasted high growth rate between 2013 and 2030 is expected to exceed the maximum transfer capability of the transmission network supplying the area. Consequently, Eskom proposes the development of Maphutha – Witkop 400 kV powerline in order to mitigate the short term network reliability constraints and also to create additional capacity for the forecasted load in the Tubatse area.

The fundamental aim of the proposed development is to increase the transfer capacity of the network beyond the forecasted 2030 load under all N-1 contingencies in Limpopo Province and the country as a whole. The proposed development will directly and indirectly improve the standard of living for Limpopo communities as it will create employment opportunities, generate income and contribute to the local economy and to a larger extent the country as a whole. The proposed powerline, which forms part of the Tubatse Network Strengthening Project, requires a 3 km wide corridor extending for approximate 170 km across the Capricorn and Sekhukhune district municipalities within the Limpopo Province.

2.1. Project location

The Maphutha to Witkop Powerline Project is located within the Limpopo Province and traverses the following district and local municipalities:

- Capricorn District Municipality (DC35)
    - Polokwane Local Municipality (LIM354)
    - Lepele-Nkumpi Local Municipality (LIM355)
- Sekhukhune District Municipality (DC47) (referred to as Greater Sekhukhune during Census 2011)
    - Makhuduthamaga Local Municipality (LIM473)
    - Fetakgomo Local Municipality (LIM474)
    - Greater Tubatse Local Municipality (LIM475)

The powerline will cross a number of farms and will pass through various villages resulting in it affecting a mixed agricultural residential area. The location of the project is illustrated in **Figure 1**.

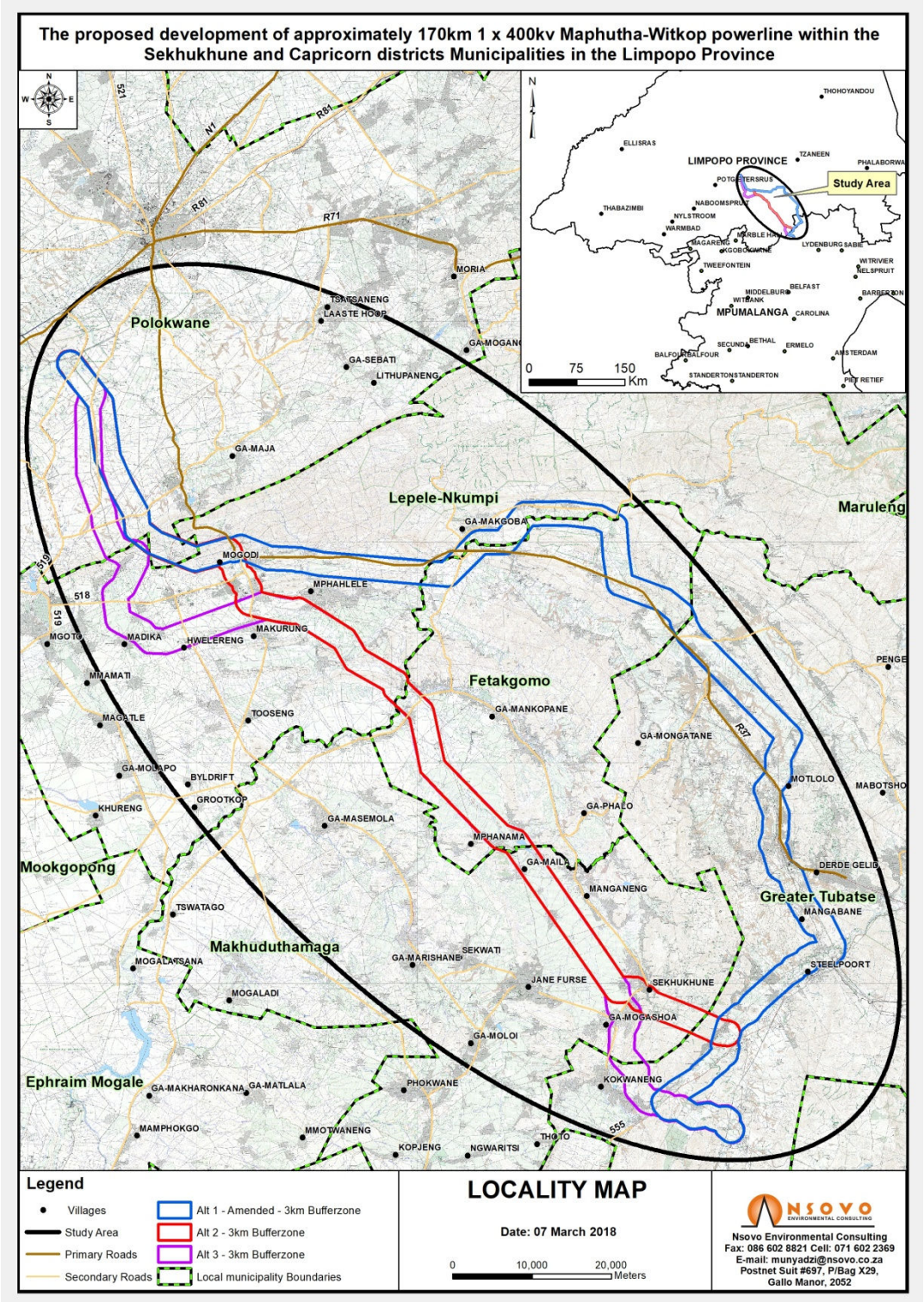


Figure 1: Locality map

2.2. Route corridor alternatives

The following three route corridor alternatives, as depicted in **Figure 1**, are considered for the project.

- **Alternative 1 (Blue Corridor)**

Alternative 1 leaves the Witkop Substation in a south, south-easterly direction turning easterly just north of the village of Mogodi where it crosses the R37 for the first time. The route continues in an easterly direction just south of the village of Ga-Makgoba crossing the R37 all-in-all on six occasions with the final crossing of the R37 at a point north west of the village of Motlolo. The route continues in a south south-easterly direction veering towards the southwest at a point north of Steelport and continues in that direction as it passes between two settlements and eventually joins either the red route, Alternative 2 or the magenta route, Alternative 3 to connect to the Maphutha Substation. Apart from the various villages and settlements indicated above the route also traverses a number of farms.

Alternative 1 Corridor adjustment:

Approximately 8 km of the Alternative 1 corridor traversed the southernmost section of the Potlake Nature Reserve which is classified as a protected area. Consequently Eskom has proposed that that section of the route be moved further north, and placed outside the boundaries of the Potlake Nature Resurve so as to avoid this area.

On a social level this brings the route closer to a number of human settlements such as Moleke, Ebenhaeser and Grootfontein to the north. Apart from these villages there is a string of dwellings along the southerly boarder of the proposed corridor deviation as well as a cluster of dwellings that fall within the corridor as it turns south to reconnect to Alternative 1 as illustrated in **Figure 2**. Considering this the nature of the powerline is such that it can be adjusted to avoid these dwellings during the final pegging of the line. In this regard it would be important that Eskom engages with the affected communities to ensure that the effects of the project are kept to a minimum.

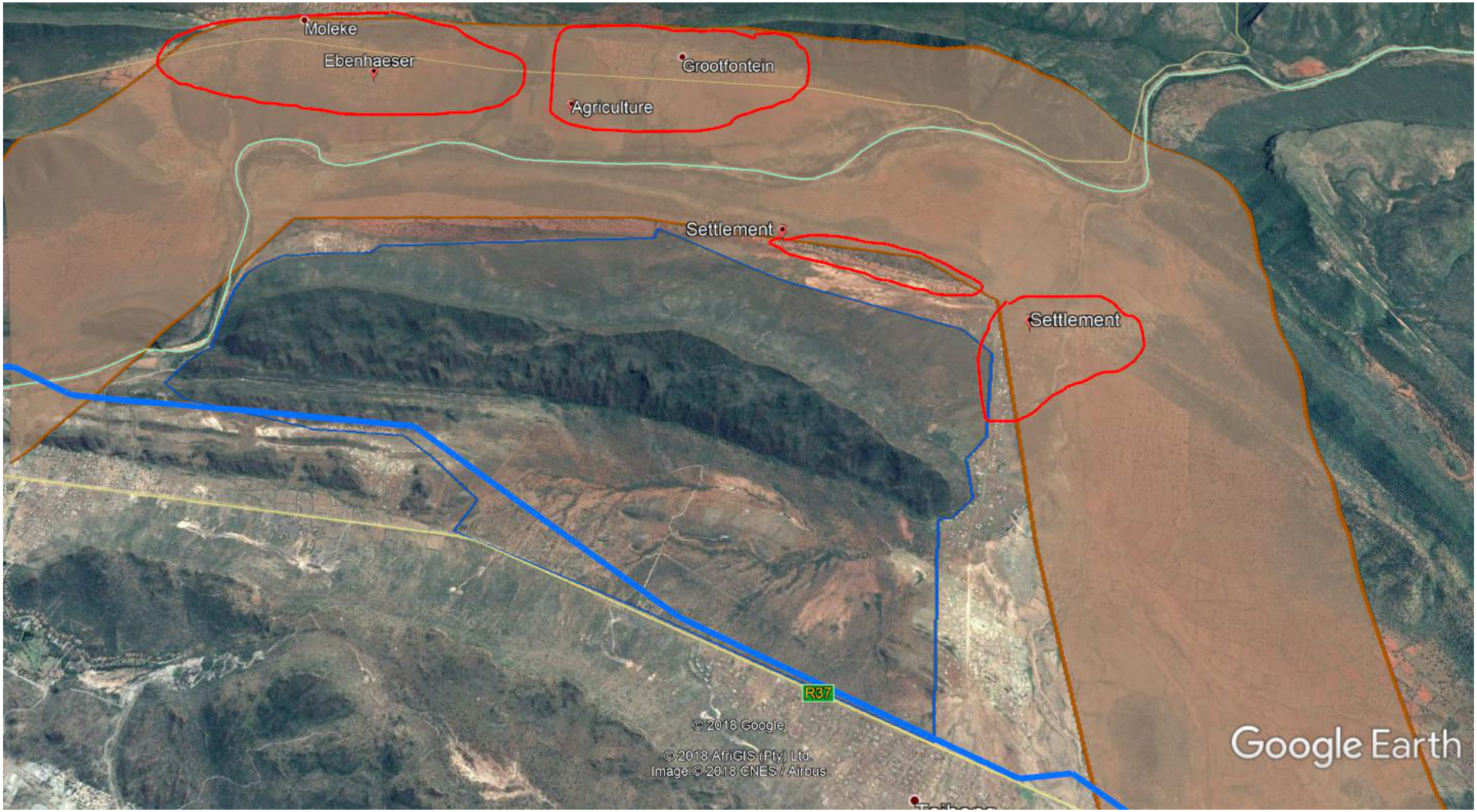


Figure 2: Alternative 1 corridor adjustment

- **Alternative 2 (Red Corridor)**

Alternative 2 leaves the Witkop Substation and initially travels along the same route as Alternative 1 only deviating from that route at a point just north east of the village of Mogodi. At this location Alternative 2 veers in a south south-easterly direction passing between two settlements before swinging in a south-easterly direction passing a number of settlements as well as pass east of the villages of Mphanama and Ga-Maila and west of the village of Sekhukhune until re-joining the blue route, Alternative 1, where it moves in a south-westerly direction to again swing east southeast to follow the same route as Alternative 3 until connecting to the Maphutha Substation. Apart from the various settlements and villages mentioned above, this route also crosses a number of farms.

- **Alternative 3 (Magenta Corridor)**

The magenta route, Alternative 3, leaves the Witkop Substation in the same direction as Alternative 1 but shortly after leaving the Witkop Substation it veers south south-west of Alternative 1 and eventually loops eastwards just north of the villages of Madika, Hwelereng and Makurung were it joins the red route, Alternative 2. The route then follows the same route as Alternative 2 until a point west of the village of Sekhukhune where it changes direction to travel in a southerly direction east of the villages of Ga-Mogasha and Kokwaneng and then veering south easterly until connecting to the Maphutha Substation. As with both other alternatives this route also passes a number of settlements and villages and traverses a number of farms.

- **No-go alternative**

The consequences of the project not procced will also need to be considered in terms of the 'no-go alternative'. If the project was not to proceed the current state would remain and future electricity supply in the area would be compromised which is likely to have negative regional as well as national consequences in terms of the security of electricity supply in the region.

- **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.

2.3. 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 powerline 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 55 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 in **Figure 5**.

Steel delivered for assembly

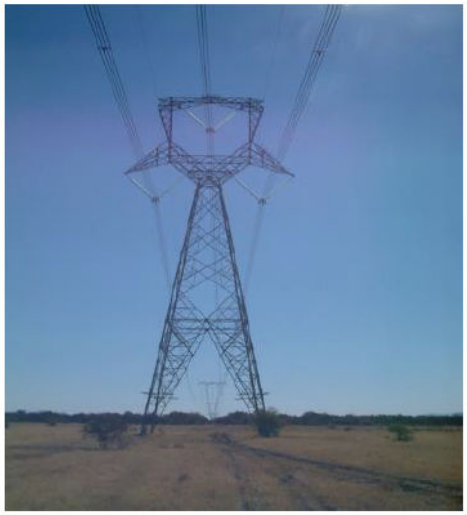
Assembled pylon

Raising the pylon

Figure 5: Pylon assembly

Two tower design alternatives are under consideration 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

The final stage of the process, illustrated below in **Figure 7**, is the stringing of 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.

2.4. 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 may interfere with the powerline. 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 powerline 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:

- Describe the environment that may be affected by the project as well as the manner in which the environment may be affected;
- Identify the potential social issues associated with the project;
- Describe the approach proposed for assessing the potentially significant issues that should be addressed by the SIA during the EIA phase.

Attention will now turned towards the limitations of the study.

3.1. Approach to study

The approach to the study was based on The Western Cape Department of Environmental Affairs and Development (DEA&DP) Planning Guidelines for Social Impact Assessment (Barbour, 2007). These guidelines are based on accepted international best practice guidelines and principles which include the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, May 1994). Accordingly the scoping level study includes a review of:

- Relevant socio-economic data;
- Relevant planning and policy frameworks for the area;

- Information gathered while undertaking similar studies;
- Social issues associated with similar powerline projects.

3.2. Study limitations and assumptions

The following assumptions and limitations apply to the study.

Assumptions:

- It is assumed that the information provided by the project proponents was accurate.
- It is assumed that all information provided by the independent environmental assessment practitioner was accurate.

Limitations:

- The study is based on data obtained by Statistics SA during Census 2011 which, dating back to October, 2011, is becoming somewhat out dated.
- At this the scoping phase of the study the SIA consultant did not engage with the affected communities as the project was in its initial stage and affected communities are currently being identified. Having worked on a number of similar projects the author was able to draw on experience as the issues identified across these projects are most likely to be similar in nature and extent. Consultation will be undertaken during the assessment phase of the EIA.

4. Legislation and Policy Guidelines

The Social Impact Assessment (SIA) forms part of the environmental authorisation process and is guided by the following legislation and policy documents.

- **National Legislation and Policies:**
  - The Constitution of the Republic of South Africa (Act 108 of 1996)
  - The National Environmental Management Act (107 of 1998) (NEMA)
  - The National Energy Act (34 of 2008)
  - White Paper on Energy Policy of the Republic of South Africa (1998)
  - Integrated Resource Plan (IRP) for South Africa (2010-2030)
  - National Infrastructure Plan (2012)
  - Occupational Health and Safety Act (Act 85 of 1993)
  - Construction Regulations (2014)
  - Guideline for Involving Social Assessment Specialists in EIA Processes (Barbour, 2007)

  - International Labour Office (ILO). Resource guide on gender issues in employment and labour market policies: working towards women's economic empowerment and gender equality (Otobe, 2014).
- **Provincial Policies:**
  - Limpopo Provincial Spatial Development Framework Draft 2017
- **Local and District Policies:**
  - District and local municipal IDPs

The essence of these policies, plans and guidelines, as they apply to the proposed project, are discussed 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.* ***Environment.*** *-Everyone has the right-*
  (a) to an environment that is not harmful to their health or well-being; and
  (b) to have the environment protected, for the benefit of present and future generations
- Section 25. ***Property****. -(1) No one may be deprived of property except in terms of law of general application, and no law may permit arbitrary deprivation of property.*
  (2) Property may be expropriated only in terms of law of general application—
  (a) for a public purpose or in the public interest; and
  (b) subject to compensation, the amount of which and the time and manner of payment of which have either been agreed to by those affected or decided or approved by a court.

As a result of the project social and economic development opportunities are likely to improve. It has been indicated that there is a need to upgrade the electricity grid in the area and that the area will benefit as a result of the upgrade.

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 sustainability of the social environment.

The National Energy Act (34 of 2008)

Amongst the objectives of the National Energy Act is the aim of to promoting a diverse energy source and supply. Towards this end the preamble of the Act makes direct reference to renewable resources in an effort:

> *"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 proposed project will support economic growth by augmenting the electricity network in the area in an effort to meet load requirements within the region.

Department of Energy Strategic Plan 2015-2020

The Department of Energy (DoE) is mandated to ensure the provision of secure and sustainable energy to support socio-economic development within the country. Towards this end an Integrated Resource Plan (IRP) has been formulated for the entire energy sector to promote investment with a focus on energy through the following strategic outcome-orientated goals:

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

The Strategic plan also discusses long-term infrastructure and capital plans. The proposed project fits with the DoE Strategic Plan 2015-2020 as the project will contribute towards the energy infrastructure in the area.

The National Development Plan

The National Development Plan is focused on the elimination of poverty and the reduction of inequality by 2030. Towards this end the plan sets out a number of interlinked priorities which include:

- *Eliminate income poverty – Reduce the proportion of households with a monthly income below R419 per person (in 2009 prices) from 39 percent to zero.*
- *Reduce inequality – The Gini coefficient should fall from 0.69 to 0.6.*

Some of the enabling milestones, amongst other, include:

- *Increase employment from 13 million in 2010 to 24 million in 2030.*
- *Raise per capita income from R50 000 in 2010 to R120 000 by 2030.*
- *Increase the share of national income of the bottom 40 per cent from 6 per cent to 10 per cent.*
- *Establish a competitive base of infrastructure, human resources and regulatory frameworks.*
- *Ensure that skilled, technical, professional and managerial posts better reflect the country's racial, gender and disability makeup.*
- *Produce sufficient energy to support industry at competitive prices, ensuring access for poor households, while reducing carbon emissions per unit of power by about one-third.*

The proposed project will enhance the supply of electricity to industry in the region which in turn will result in job creation in the area.

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

The White Paper on Energy Policy emphasizes the need to:

- Increase access to affordable energy services
- Improve energy governance
- Stimulate economic development
- Manage energy-related environmental and health impacts
- Secure supply through diversity

It also highlights the challenges faced by the distribution industry as it strives to " …*meet electrification targets and continue to provide low cost, equitably priced, quality supplies to consumers.*" In this regard the project will assist in strengthening the National Grid in accordance with the White Paper.

National Infrastructure Plan

The National Infrastructure Plan focuses on the transformation of the economic landscape while simultaneously creating a significant numbers of new jobs and strengthening the delivery of basic services.

The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions. To unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. In this regard SIP 10 has the following relevance in respect of the project.

SIP 10: Electricity transmission and distribution for all-

- 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.

Occupational 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, Esteves, Aucamp, & Franks, 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.

International Labour Organisation. Resource guide on gender issues in employment and labour market policies: working towards women's economic empowerment and gender equality

> "*The objective of this resource guide is to strengthen the capacities of ILO constituents and development policy makers in the formulation of employment policies. There is a well-known proclivity among many policy-makers and practitioners to treat employment as a "residual" of economic growth*" (Otobe, 2014).

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 Maphutha – Witkop ≈170 km Transmission Line 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 Maphutha – Witkop ≈170 km Transmission Line.

- Capricorn District Municipality.
  - Polokwane Local Municipality
  - Lepele-Nkumpi Local Municipality
- Sekhukhune District Municipality
  - Makhuduthamaga Local Municipality
  - Fetakgomo Local Municipality
  - Greater Tubatse Local Municipality.

5. Demographic Description of the Area

The project is located within the Limpopo Province and traverses the follows district and local municipal areas;

- **Capricorn District (DC35)**
  - Polokwane Local Municipality (LIM354)
  - Lepele-Nkumpi Local Municipality (LIM355)
- **Sekhukhune (Greater Sekhukhune) District (DC47)**
  - Makhuduthamaga Local Municipality (LIM473)
  - Fetakgomo Local Municipality (LIM474)
  - Greater Tubatse Local Municipality (LIM475).

An overview of the area, commencing at the provincial and proceeding to the district and local municipal levels is provided under the follows sections of the report.

5.1. Provincial Description

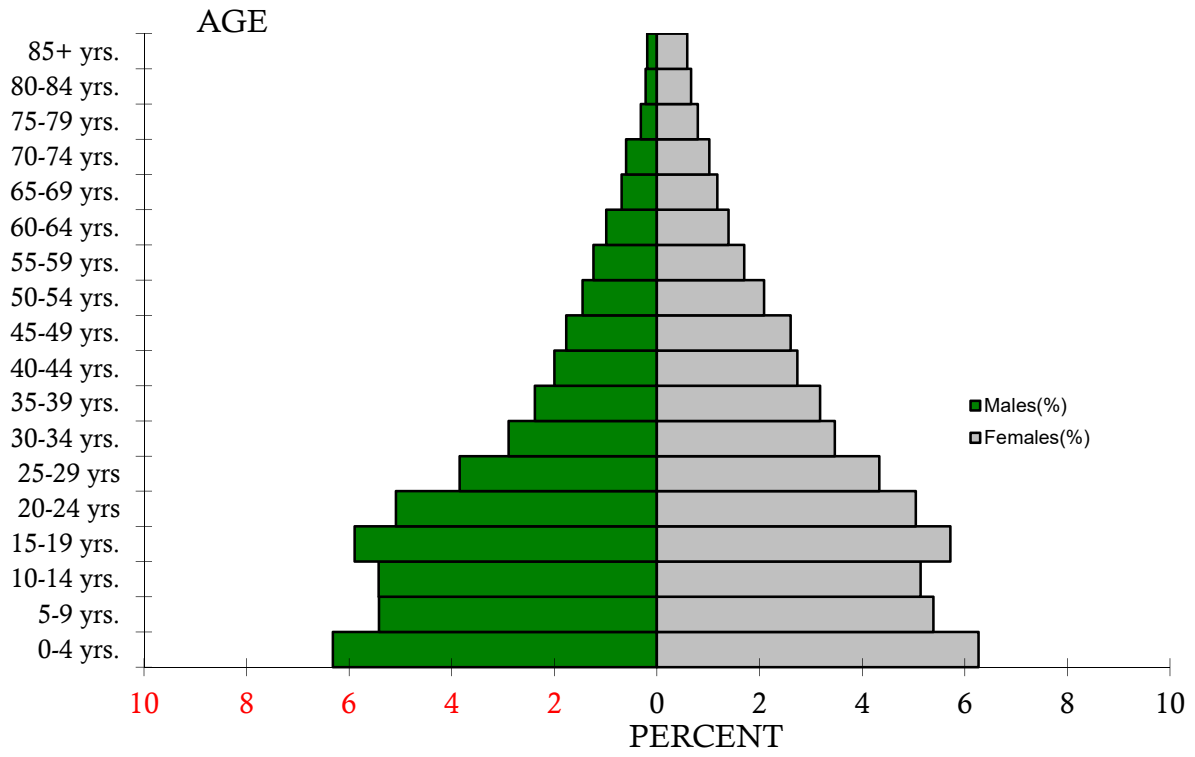
Limpopo Province, which covers a geographical area of approximately 125 754 km^2 and accounts for some 10.2% of the land mass of South Africa, incorporates the following 5 district municipalities:

- Mopani (DC33);
- Vhembe (DC34);
- Capricorn (DC35);
- Waterberg (DC36);
- Sekhukhune (DC47).

5.1.1. Demographics

During Census 2011 the population of Limpopo 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 2017 the population was estimated to have increased to 5 778 400 people (Statistics South Africa, 2017, p. 2)

In respect of population grouping, 96.7% of the population of Limpopo comprises of black African people, followed by white people at 2.6%, Indian/Asian people at 0.33% and coloured people at 0.27%. The most prolific home language spoken across the province is Sepedi which is spoken by 52.9% of the population followed by Xitsonga at 17%, Tshivenda at 16.7%, Afrikaans at 2.6% and Setswana at 2%. The dependency ratio of the province, which indicates the burden placed on the population of working age, between 15 and 64 years, who support children under 15 years and people over 65 years, is 67.3%. The sex ratio, which measures the proportion of males to females, is 87.6 indicating a higher proportion of females in the province. Between 1996 and 2001 the population growth rate was 1.75% p.a. while between 2001 and 2011 it was 0.79% p.a. The population pyramid of Limpopo is illustrated in **Figure 8** below.

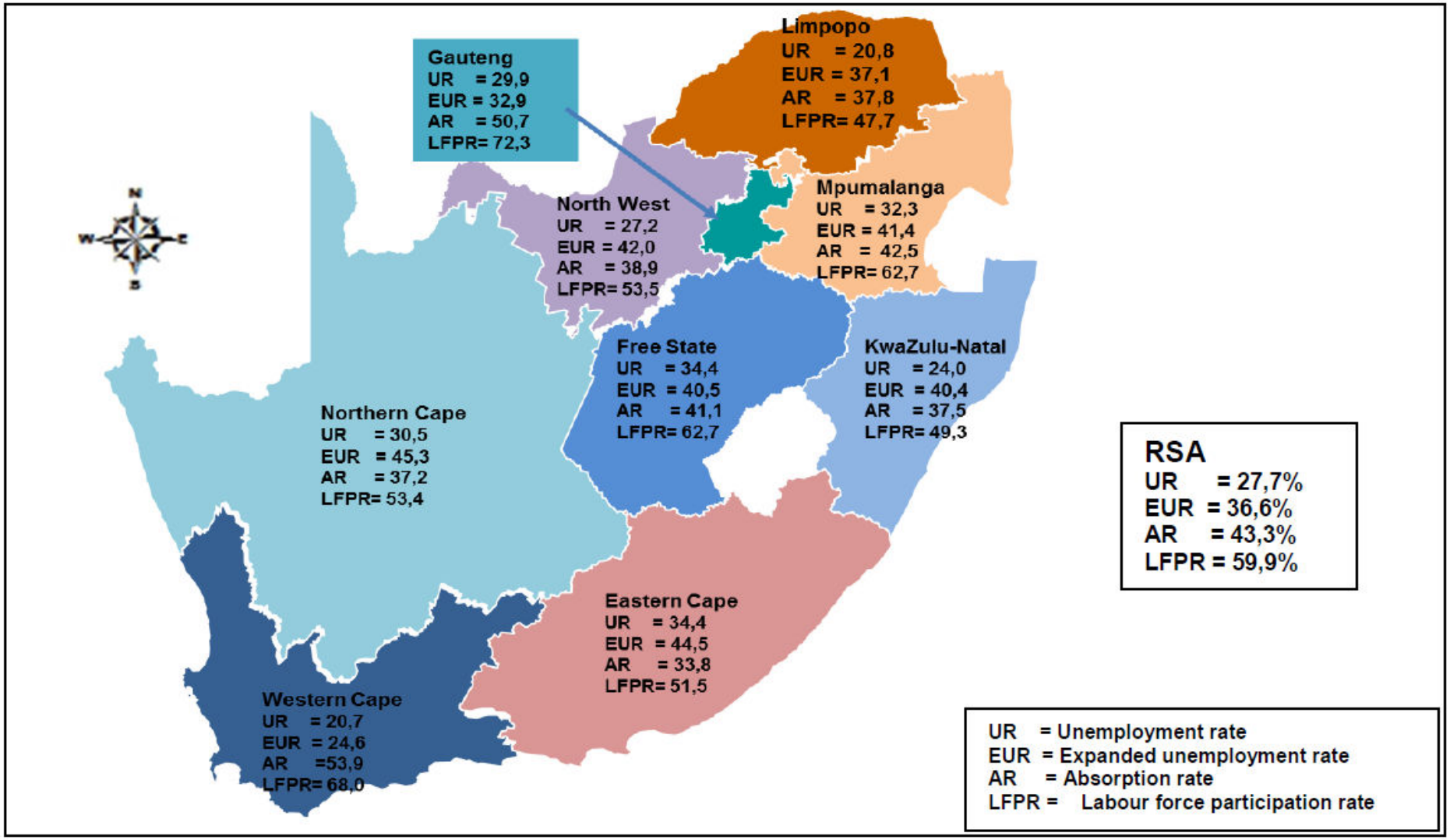


Data source: (Statistics South Africa, 2011)

Figure 8: Population pyramid Limpopo Province

5.1.2. Labour Force

A comparison of the unemployment figures for Limpopo Province indicates that the level of official unemployment in the province increased on a year-on-year basis from 18.3% in the 1st Quarter of 2016 to 20.8% in the 2nd Quarter of 2017. 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 20.7%. 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 2017, 20). 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. Considering this, over the same period unofficial unemployment decreased marginally from 38.5% to 38.2%. (Statistics South Africa, 2017, p. 19). The labour force data is presented below in **Figure 9**.



Data source: (Statistics South Africa, 2017, p. 12)

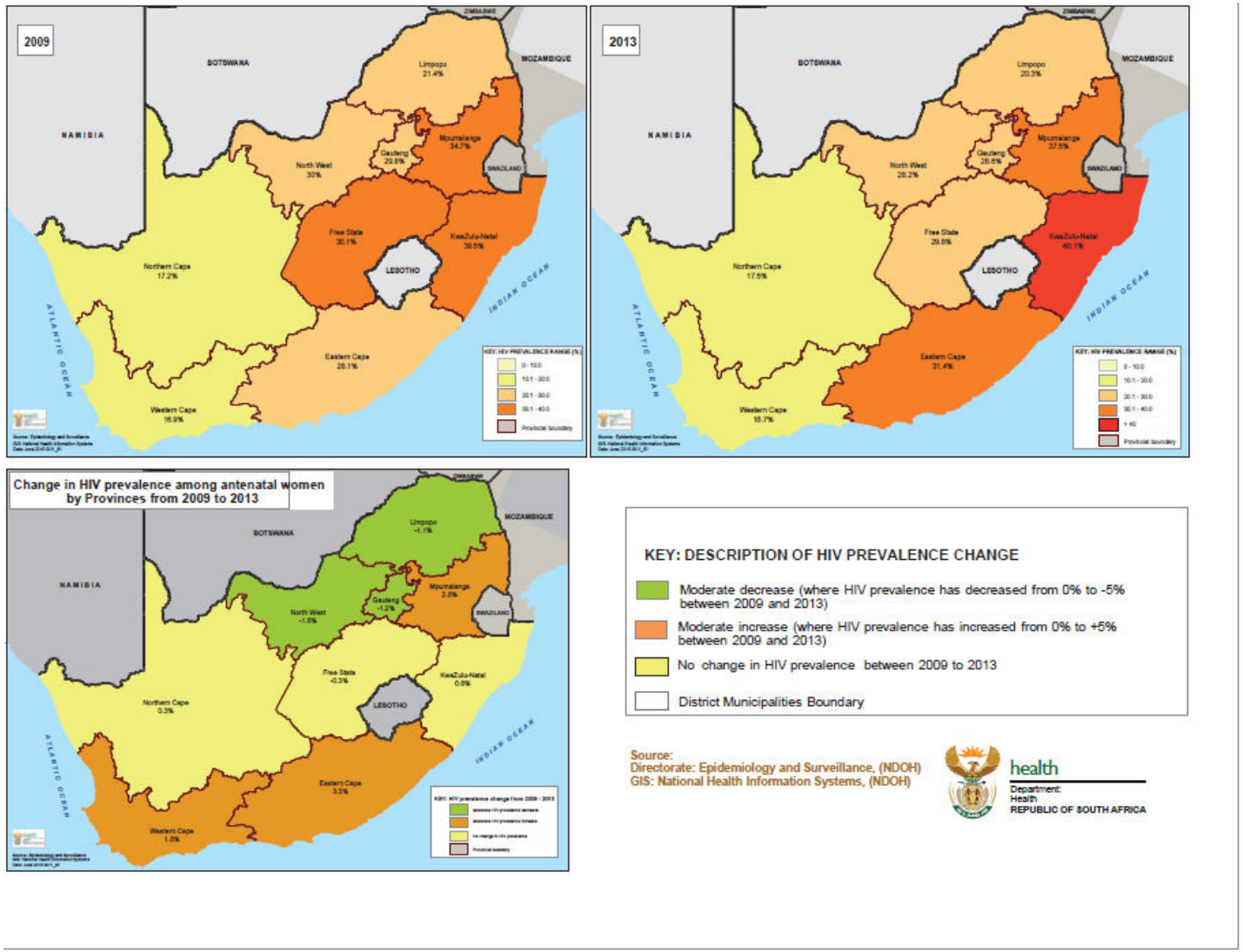
Figure 9: Unemployment in South Africa, Quarter 2, 2017

5.1.3. Human Immunodeficiency Virus (HIV)

Turning towards the HIV prevalence rate research undertaken by the National Department of Health (2015) indicated that in 2013 Limpopo Province had an HIV prevalence rate amongst antenatal women of 20.3% compared to the national prevalence rate of 29.7%. The HIV prevalence rate amongst antenatal women between 2009 and 2013 is compared across all provinces, in **Figure 10** while the situation as it unfolds across the district municipalities is illustrated in **Figure 11**. In this regard, at 27.3%, the Waterberg District Municipality has the 23rd highest prevalence rate amongst antenatal women compared with all district and metropolitan municipalities in South Africa.

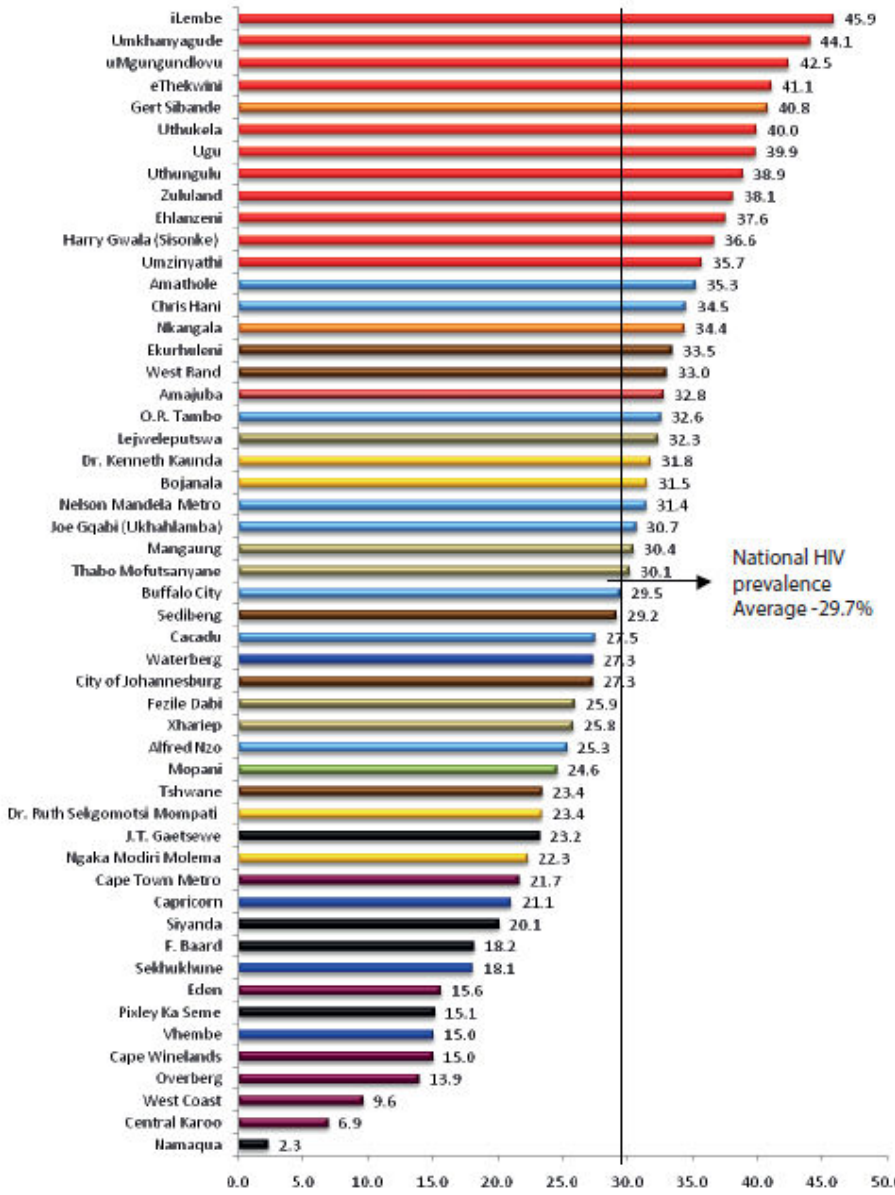
5.1.4. Economy

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 an emphasis being placed on game farming attracting tourism and mining with respect to the platinum metals, chromium, iron ore and coal reserves in the region.



Source: (National Department of Health, 2015, p. 27)

Figure 10: Prevalence of HIV amongst antenatal women - 2013



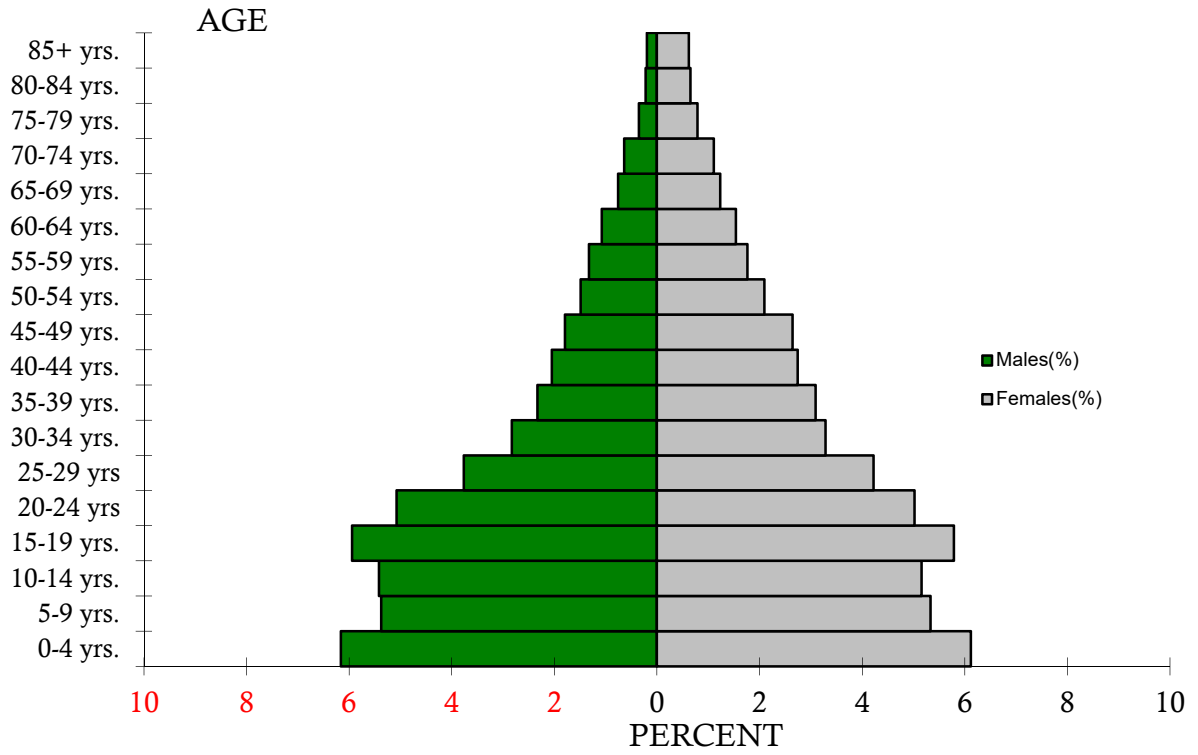
Source: (National Department of Health, 2015, p. 29)

Figure 11: HIV prevalence rate: Antenatal women by district 2009 – 2011

5.2. Municipal Description

The demographic profile of the district and local municipalities affected by the project will now be described. The Capricorn District Municipality covers a geographical area of 21 705.46 km^2 and, according to Census 2011, has a population of 1 261 463 people living in 342 838 households. This gives the district a population density of 58.1/km^2 and a household density of 15.8/km^2. With regard to population grouping the majority, 96.1% of the population, are black African people with 2.8% being white people followed by coloured

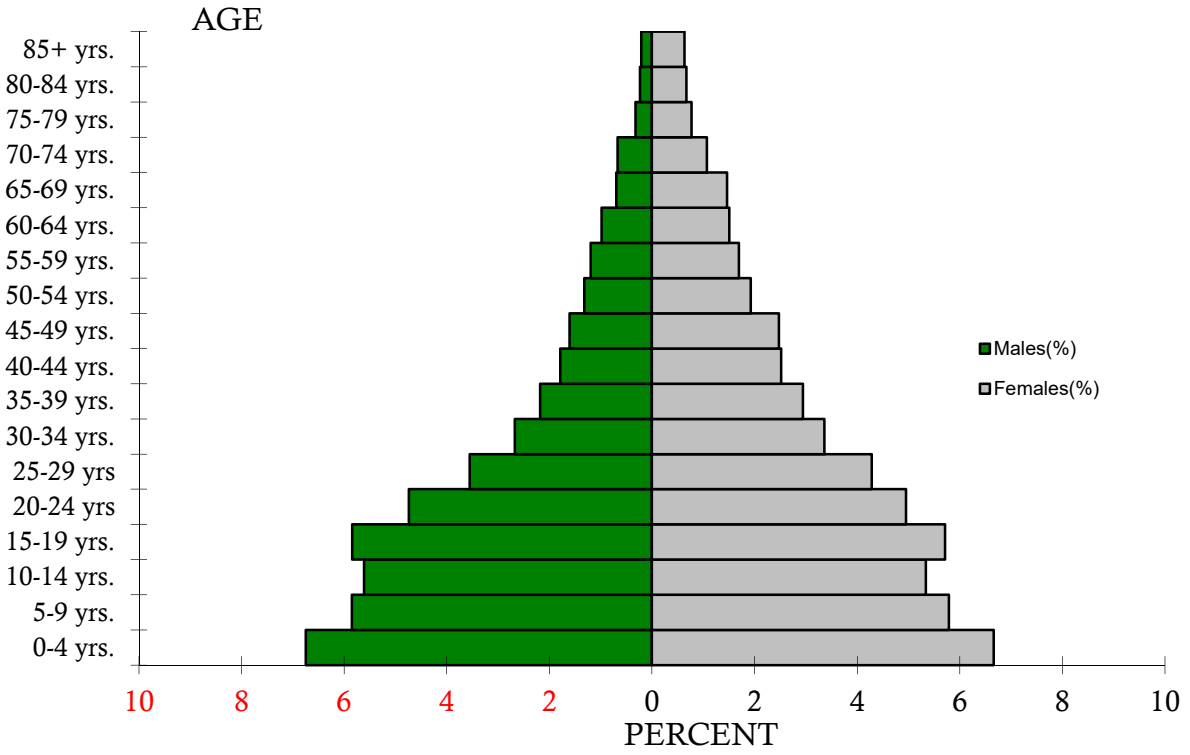
people at 0.50% and Indian/Asian people at 0.4%. The most prolific home language spoken in the district is Sepedi with 84.9% of the population speaking Sepedi followed by Afrikaans at 3%, Xitsonga at 2.6% and English and isiNdebele at 2%. The population pyramid of Capricorn is illustrated in **Figure 12**.



Data source: (Statistics South Africa, 2011)

Figure 12: Population pyramid Capricorn District Municipality

The Sekhukhune District Municipality covers a geographical area of 13 527.72 km² and, with a population of 1 076 840 people living within 263 802 households, has a respective population and household density of 79.6/km² and 19.5/km². At 98.6% black African people form the largest part of the population followed by white people at 1%, Indian/Asian people at 0.2% and coloured people 0.1%. Sepedi is the home language spoken by 82.3% of the population with isiNdebele being the home language spoken by 4.4% of the population followed by isiZulu at 3.3%, Setswana and Xitsonga at 2%. The population pyramid of the Sekhukhune District Municipality is illustrated in **Figure 13**.



Data source: (Statistics South Africa, 2011)

Figure 13: Population pyramid Sekhukhune District Municipality

At the local municipal level, covering 4 601.96 km^2, Greater Tubatse covers the largest geographical area followed by Polokwane at 3 765.97 km^2. Polokwane has the largest population with 628 999 people living in the region and Greater Tubatse has the second largest population with 335 676 people within its boundaries. Fetakgomo covers the smallest geographical area at 1 104.53 km^2 and has the smallest population at 93 795. A comparison of the geographical area covered by each of the municipalities as well as populations, households, gender, population group and home language spoken is provided in **Table 1**.

Table 1: Geographical area, gender population grouping and home language

	Limpopo	DC35 Capricorn	LIM354 Polokwane	LIM355 Lepele-Nkumpi	DC47 Sekhukhune	LIM473 Makhuduthamaga	LIM474 Fetakgomo	LIM475 Greater Tubatse
Geographical Area	125,755.09 km²	21,705.46 km²	3,765.97 km²	3,463.45 km²	13,527.72 km²	2,096.60 km²	1,104.53 km²	4,601.96 km²
Population	5,404,868	1,261,463	628,999	230,350	1,076,840	274,358	93,795	335,676
Households	1,418,102	342,838	178,001	59,682	243,802	65,217	22,851	83,199
Population Density	42.89/km²	58.17/km²	167.02/km²	66.51/km²	79.60/km²	130.86/km²	84.92/km²	72.94/km²
Household Density	11.28/km²	15.80/km²	47.27/km²	17.23/km²	19.50/km²	31.11/km²	20.69/km²	18.08/km²
Female	53.30%	53.21%	51.95%	54.50%	53.79%	55.79%	54.95%	52.22%
Male	46.70%	46.79%	48.05%	45.50%	46.21%	44.21%	45.05%	47.78%
Black African	96.67%	96.07%	92.87%	99.61%	98.58%	99.71%	99.38%	98.25%
White	2.58%	2.81%	5.22%	0.13%	1.02%	0.06%	0.41%	1.31%
Coloured	0.27%	0.50%	0.93%	0.09%	0.16%	0.04%	0.03%	0.19%
Indian/Asian	0.33%	0.41%	0.74%	0.07%	0.11%	0.12%	0.07%	0.16%
Home Language	Sepedi 52.9%	Sepedi 84.9%	Sepedi 80.4%	Sepedi 86.9%	Sepedi 82.3%	Sepedi 93.8%	Sepedi 94.1%	Sepedi 88.1%
	Xitsonga 17%	Afrikaans 3%	Afrikaans 5.5%	isiNdebele 4.6%	isiNdebele 4.4%	Siswati 1.5%	isiZulu 1.2%	Siswati 2.6%
	Tshivenda 16.7%	Xitsonga 2.6%	English 3.2%	Xitsonga 4%	isiZulu 3.3%	isiZulu 1.4%	Xitsonga 0.7%	isiZulu 1.7%
	Afrikaans 2.6%	English 2.0%	Xitsonga 2.8%	isiZulu 0.9%	Xitsonga 2%	isiNdebele 0.9%	isiNdebele 0.6%	Afrikaans 1.5%

Source: Statistics South Africa, Census 2011

In respect of age structure, 64.8% of the population of Polokwane fall within the economically active population group of between 15 and 64 years of age giving the area the lowest dependency ration of all affected local municipalities at 54.3. At the other end of the scale Makhuduthamaga has the lowest percentage of its population falling within the economically active age group at 53.9% and consequently, at 85.4, the highest dependency ration of all local municipalities affected through the project.

With a population growth rate of 2.19% in 2011 the Greater Tubatse Municipality had the highest population growth rate closely followed by Polokwane with a growth rate of 2.13%. These high population growth rates are indicative of in migration as people flock to the area in search of work. Conversely, the local municipalities of Fetakgomo, Lepele-Nkumpi and Makhuduthamaga all showed negative population grow rates of -0.97, -0.60 and -0.55 percent respectively indicative of a high level of out migration from these area as people leave home in search of better job opportunities elsewhere.

Another indicator of levels of out and in migration in certain areas is the sex ratio as males are more inclined to leave home in search of work while females may remain to raise the family. In this sense areas with better job opportunities usually have higher male to female sex ratios than those areas with few job opportunities. Although the population of Polokwane has a higher proportion of females to males it has the closest male to female ration of all affected municipalities at 92.5. This closely followed by Greater Tubatse with a sex ratio of 91.5. The municipalities with the widest sex ratio, indicating a higher proportion of females to males within the population, are Makhuduthamaga, Fetakgomo and Lepele-Nkumpi with respective sex ratios of 79.2, 82.0 and 83.5. The statistical data discussed in the last three paragraphs above is presented in **Table 2**.

Table 2: Population, age structure, dependency and sex ratios

Municipality	Population		Age Structure						Dependency Ratio		Sex Ratio		Population Growth (% p.a.)	
			<15		15-64		65+		Per 100 (15-64)		Males per 100 females			
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
LIMPOPO	4,995,426	5,404,868	39.1%	34.0%	55.2%	59.8%	5.7%	6.3%	81.0	67.3	83.4	87.6	1.75	0.79
DC35: Capricorn	1,164,281	1,261,463	39.2%	33.6%	54.8%	59.9%	6.0%	6.6%	82.5	67.0	84.1	87.9	1.64	0.80
LIM354: Polokwane	508,277	628,999	36.0%	30.1%	59.2%	64.8%	4.9%	5.1%	69.0	54.3	86.9	92.5	3.59	2.13
LIM355: Lepele-Nkumpi	227,970	230,350	41.1%	36.0%	52.2%	56.2%	6.7%	7.8%	91.7	77.9	81.1	83.5	-0.60	0.10
DC47: Greater Sekhukhune	967,185	1,076,840	41.1%	36.0%	52.9%	57.3%	6.0%	6.7%	89.2	74.7	80.2	85.9	1.12	1.07
LIM473: Makhuduthamaga	262,005	274,358	41.9%	38.1%	51.3%	53.9%	6.8%	8.0%	94.8	85.4	76.6	79.2	-0.55	0.46
LIM474: Fetakgomo	92,598	93,795	40.8%	35.4%	52.4%	56.5%	6.8%	8.1%	91.0	77.1	79.1	82.0	-0.97	0.13
LIM475: Greater Tubatse	269,608	335,676	41.9%	34.5%	53.0%	60.4%	5.0%	5.1%	88.6	66.6	81.5	91.5	3.21	2.19

Source: Statistics South Africa, Census 2011 Municipal factsheet

In 2011 the official unemployment rates across the area were relatively high with the Makhuduthamaga Local Municipality having an official unemployment rate of 62.7% followed by the municipality of Fetagomo with an official unemployment rate of 58.9%. The Polokwane Local Municipality has the lowest official unemployment rate at 32.4%.

In respect of unemployment amongst the youth between the ages of 15 and 34 years again the municipality of Makhuduthamaga has the highest rate at 74% followed by Fetakgomo with an unemployment rate of 70.5%. Polokwane has the lowest official unemployment rate amongst the youth at 42%.

The largest percentage of the population of 20 years and over with no schooling is found in Fetakgomo at 24.3% followed by Makhuduthamaga at 23.4%. Again, indicative of a more developed area, at 6.7%, Polokwane has the lowest percentage of those 20 years and older who have no schooling and the highest sector of the population, at 29.9%, who have a matric with 16.9% of the population having a higher than matric level of education. Data pertaining to the labour market and levels of education across the study area is illustrated in **Table 3**.

Table 3: Labour market and education

Municipality	Labour Market				Education (age 20 +)					
	Unemployment Rate (official)		Youth Unemployment Rate (Official) 15-34 years		No Schooling		Matric		Higher Education	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
LIMPOPO	47.3%	38.9%	58.5%	49.4%	33.1%	17.3%	14.1%	22.6%	6.8%	9.1%
DC35: Capricorn	45.9%	37.2%	57.5%	47.4%	26.6%	13.2%	17.4%	25.2%	8.5%	12.8%
LIM354: Polokwane	41.5%	32.4%	53.2%	42.0%	15.4%	6.7%	23.3%	29.9%	11.1%	16.9%
LIM355: Lepele-Nkumpi	60.6%	48.1%	76.4%	62.4%	34.7%	18.5%	15.1%	22.4%	7.7%	10.9%
DC47: Greater Sekhukhune	60.9%	50.9%	71.7%	60.6%	42.7%	20.9%	11.2%	21.3%	4.7%	5.8%
LIM473: Makhuduthamaga	75.0%	62.7%	84.8%	74.0%	44.3%	23.4%	11.3%	20.6%	5.2%	5.5%
LIM474: Fetakgomo	68.2%	58.9%	82.2%	70.5%	45.0%	24.3%	10.2%	22.2%	5.8%	6.4%
LIM475: Greater Tubatse	61.5%	50.3%	74.5%	59.6%	40.0%	15.1%	10.0%	23.0%	4.1%	6.2%

Source: Statistics South Africa, Census 2011 Municipal factsheet

The average household size across the municipalities in the Sekhukhune district is marginally larger than those across the Capricorn district. Again indicative of a more industrialised, as opposed to a rural area, the smallest household size with an average of 3.5 persons per household is found in Polokwane with the largest, at 4.1 persons per household, being found in Fetakgomo.

Most households in Makhuduthamaga, 60.1%, are female headed with a similar trend applying to Lepele-Nkumpi, at 56% and Fetakgomo, at 55.9%. Polokwane has the lowest percentage of female headed households at 44.8%.

In respect of dwelling types the formal type of dwelling is most prevalent across the whole study area with Lepele-Nkumpi having the highest percentage of formal dwelling types, at 94.5% and at 83.2%, Greater Tubatse the lowest percentage. In respect of housing being owned or being paid off, at 71.4% of all households across the municipality, Makhuduthamaga has the highest percentage. Polokwane on the other hand has the lowest percentage of housing being owned or being paid off which is probably due to a high number of households renting their accommodation and a of employees number being provided within company housing or living in single accommodation. The data pertaining to the household dynamics as discussed above and based on Census 2011, is provided in **Table 4**.

Table 4: Household dynamics

Municipality	Household dynamics									
	Households		Average household size		Female headed households		Formal dwellings		Housing owned/paying off	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
LIMPOPO	1,117,818	1,418,102	4.3	3.8	54.2%	50.4%	72.5%	89.8%	59.2%	57.7%
DC35: Capricorn	273,083	342,838	4.1	3.7	54.7%	49.9%	82.8%	92.0%	66.1%	58.1%
LIM354: Polokwane	124,978	178,001	3.9	3.5	49.9%	44.8%	79.3%	89.4%	60.2%	56.4%
LIM355: Lepele-Nkumpi	51,245	59,682	4.4	3.9	60.7%	56.0%	88.8%	94.5%	71.7%	67.6%
DC47: Greater Sekhukhune	195,285	263,802	4.8	4.1	59.6%	52.9%	77.4%	88.7%	62.1%	58.2%
LIM473: Makhuduthamaga	52,978	65,217	4.9	4.2	64.8%	60.1%	78.7%	90.1%	62.6%	71.4%
LIM474: Fetakgomo	18,883	22,851	4.9	4.1	61.2%	55.9%	80.8%	94.2%	67.7%	56.8%
LIM475: Greater Tubatse	53,756	83,199	4.9	4.0	56.6%	46.9%	72.4%	83.2%	63.1%	53.9%

Source: Statistics South Africa, Census 2011 Municipal factsheet

Concerning the provision of household services Polokwane enjoys a higher level of service delivery in respect of flush toilets connected to the sewerage system at 41.1%, weekly refuse removal at 44.4% and piped water delivered inside the dwelling at 33.7%. Lepele-Nkumpi, at 91.9%, enjoys the highest level of electricity delivery across the study area at least for use as lighting. Apart from the delivery of electricity, all the local municipalities across the study area that fall within the Sekhukhune District Municipality are burdened with a relatively low level of household service deliver as is illustrated in **Table 5**.

Table 5: Household services

Municipality	Household services							
	Flush toilet connected to sewerage		Weekly refuse removal		Piped water inside dwelling		Electricity for lighting	
	2001	2011	2001	2011	2001	2011	2001	2011
LIMPOPO	16.6%	19.7%	15.6%	21.1%	10.3%	18.4%	63.2%	87.3%
DC35: Capricorn	19.8%	26.6%	19.7%	29.7%	13.2%	23.3%	59.0%	87.4%
LIM354: Polokwane	32.6%	41.1%	33.4%	44.4%	21.1%	33.7%	64.6%	83.0%
LIM355: Lepele-Nkumpi	16.8%	18.4%	16.6%	20.5%	12.6%	19.3%	61.1%	91.9%
DC47: Greater Sekhukhune	5.0%	6.3%	5.5%	8.2%	3.1%	9.3%	63.5%	85.9%
LIM473: Makhuduthamaga	2.0%	3.0%	0.6%	2.0%	1.2%	6.0%	62.4%	90.4%
LIM474: Fetakgomo	2.6%	1.9%	1.9%	17.8%	1.9%	5.5%	39.3%	91.5%
LIM475: Greater Tubatse	5.3%	6.3%	7.1%	7.9%	3.9%	9.5%	47.1%	75.7%

Source: Statistics South Africa, Census 2011 Municipal factsheet

Regarding the distribution of child headed households across the study area at 0.8% respectively Polokwane and Fetakgomo have the lowest percentage while, apart from across the province of Limpopo at 1.4%, Lepele-Nkumpi has the highest percentage of child headed households at 1.2%. This data is illustrated in **Table 6**.

Table 6: Distribution of child headed households

Municipality	Distribution of child headed households					
	1996		2001		2011	
LIMPOPO	24,180	2.7%	25,617	2.3%	19,668	1.4%
DC35: Capricorn	5,813	2.8%	6,590	2.4%	3,814	1.1%
LIM354: Polokwane	1,621	1.9%	2,217	0.1%	1,399	0.8%
LIM355: Lepele-Nkumpi	1,196	2.7%	1,426	0.0%	732	1.2%
DC47: Greater Sekhukhune	4,070	2.4%	3,814	2.0%	2,949	1.1%
LIM473: Makhuduthamaga	932	1.9%	917	1.0%	737	1.1%
LIM474: Fetakgomo	442	2.5%	318	0.9%	191	0.8%
LIM475: Greater Tubatse	1,119	2.6%	1,058	1.1%	758	0.9%

Source: Statistics South Africa, Census 2011 Municipal factsheet

6. Social Impacts

The 400 kV powerline will traverse a mixed agricultural and residential area consisting of a number of farms and villages. There are three route corridor alternatives that need to be considered each having a varying degree of impact on the communities through which they pass. These route alternatives have been identified as follows;

- Alternative 1 (Blue Corridor)
- Alternative 2 (Red Corridor) and
- Alternative 3 (Magenta Corridor).

An illustration of these routes is presented in **Figure 1** and a description of each route provided under section **2.2. Route corridor alternatives**.

With this in mind and based on the project description as well as considering the policy and planning issues associated with the project the following social impact variables have been identified as being associated with the project. These impacts are in accordance with Vanclay's list of social impact variables (Vanclay, 2002; Wong, 2013) clustered under the following seven main categories as follows;

Health and social well-being impacts

- Annoyance, dust and noise
- Increase in crime
- Increased risk of HIV and AIDS
- Personal safety, increased hazard exposure

Quality of the living environment (Liveability) impacts

- Disruption of daily living activities
- Perceived quality of life.

Economic and material well-being impacts

- Increase in employment opportunities
- Increased opportunities for SMMEs.

Cultural impacts

Family and community impacts

Institutional, legal, political and equity impacts

- Effect on existing infrastructure facilities and social services
- Attitude formation towards project

- Decreased level of community participation in decision making, loss of empowerment
- Compliance with municipal by-laws

Gender relations impacts

- Cultural resistance towards women
- Division of labour.

These categories are not exclusive and at times tend to overlap as certain processes may have an impact within more than one category. For instance changes to the division of labour, as discussed under the category gender relations, will also have an impact on the family and community. In much the same manner increased demand on existing infrastructure, facilities and social service, addressed under the category institutional, legal, political and equity, will have some bearing on the quality of the living environment.

With regard to similar infrastructure as the Maphutha to Witkop Project most social impacts are experienced during the construction phase, as this is when construction related activities, relating to the influx of labour and the use of heavy machinery and explosives occurs. The various social impacts under the categories listed above are addressed below as they apply across the construction and operational phases of the project.

6.1. Health and social well-being

The health and social wellbeing impacts related to the project include.

- Annoyance, dust and noise
- Increase in crime
- Increased risk of HIV and AIDS
- Personal safety, increased hazard exposure.

6.1.1. Annoyance dust and noise

Annoyance, dust and noise will be more prominent during the construction phase of the project as construction activities will result in the generation of dust and noise due to the operation of construction vehicles and equipment. These impacts will be of a temporary nature.

Annoyance, dust and noise during the operational phase of the project are likely to be minimal as it will be associated with sporadic maintenance and repair activity stretching over the lifespan of the project.

6.1.2. Increased crime

During construction there will be an influx of construction workers into the area and this may raise concerns amongst local communities who fear that crime levels will increase as a result of this influx of workers.

There is, however, a risk that actual crime levels may also rise due, not only to the influx of construction workers and job seekers, but also due to an increase in other informal enterprises attracted to the area by the opportunities and perceived opportunities generated through construction activities. Amongst the more legitimate activities certain illegitimate activities such as prostitution could arise. In this regard it has been well documented that construction activities attract prostitution (Meintjes, Bowen, & Root, 2007), particularly in areas with high poverty.

6.1.3. Increased risk of HIV and AIDS

There is an increased risk associated with the gathering of construction workers in a concentrated area and the availability of disposable income which may attract prostitution. In this regard the World Bank (Gender in Agriculture Sourcebook, 2009, pp. 367-368) indicates that there is a strong link between infrastructure projects and health as:

> *"Transport, mobility, and gender inequality increase the spread of HIV and AIDS, which along with other infectious diseases, follow transport and construction workers on transport networks and other infrastructure into rural areas, causing serious economic impacts*."

6.1.4. Personal safety and hazard exposure

The use of heavy equipment and vehicles and an increase in vehicle traffic within the vicinity of all construction sites will result in and increased risk to the personal safety of people and animals. Of particular concern are increased hazards faced by pedestrians, cyclists and motorists with emphasis being placed on vulnerable groups such as children and the elderly. There will also be an increased risk of fires brought about due to construction workers lighting fires to cook and for warmth during cold periods. During the operational phase of the

project these risks are likely to be minimal although there may be a minimal risk of fires associated with maintenance teams, particularly during the winter months.

Health related issues are also related to electromagnetic fields (EMFs) associated with both the substation and power lines during 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, 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 associated with dairy cattle and poultry farming 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 to be a risk to health and that in turn this may also cause secondary health risks brought about through high stress levels.

6.2. Quality of the living environment

The following quality of the living environment impacts are related to the project.

- Disruption of daily living activities
- Perceived quality of life.

6.2.1. Disruption of daily living activities

The construction of the powerline will result in some disruption in the vicinity of the construction sites. In this regard there is likely to be a limited disruption of daily living activities associated with construction, however, during the operational phase most activities can continue below the power lines. For instance farming activities can continue beneath the power lines as long as they conform to certain requirements such as safe working clearances, building restrictions and restriction on crop types such as large trees.

6.2.2. Perceived quality of life

With a high level of construction activities occurring within the area the perception may emerge that the quality of life associated with a rural setting may be disturbed. This may be reinforced during the construction phase of the project if communities are inconvenienced in that their movement patterns and consequently their daily living environment are disrupted.

Over the operation phase of the project there is likely to be a visual impact that will result in a change in respect of the sense of place of some areas which may in turn have an impact on tourism to the area, particularly with regard to game farms in the area.

6.3. Economic and material well-being

The positive economic and material well-being impacts associated with the project include:

- Increase in employment opportunities
- Increased opportunities for SMMEs.

6.3.1. Increased employment opportunities

The project will result in the creation of directly related jobs during both the construction and operational phases albeit that these jobs will be limited, particularly in respect of those jobs

associated with the operational phase of the project. In addition an increase in electricity capacity to the region is also likely to result in the creation of both direct and indirect jobs.

6.3.2. Increased opportunities for SMMEs

It is likely that the project will increase the number of economic opportunities available during both the construction and operational phases. Economic opportunities will range from an informal level associated with the supply of refreshments to workers to the more formal supply of goods and services to Eskom and the various contractors.

6.4. Cultural impacts

The powerline transverses a number of farms and residential areas and it is quite possible that a number of heritage and burial site may be disturbed through the project. The social consequences of this will need to be considered in accordance with the finding of the heritage study.

6.5. Family and community impacts

The workforce will be recruited from the surrounding communities, consequently the influx of construction workers is limited both in terms of numbers and duration, and any disruption to family structures and social networks is most likely to be limited. During the operational phase of the project there will be no significant influx of workers at any of the sites.

6.6. Institutional, legal, political and equity

The institutional, legal political and equity impacts associated with the project include:

- Effect on existing infrastructure facilities and social services
- Attitude formation towards the project
- Decreased level of community participation in decision making, loss of empowerment
- Compliance with municipal by-laws

6.6.1. Effect on existing infrastructure facilities and social services

With the power lines being routed through residential areas the possibility exists that the project may place existing infrastructure at risk during construction. Consequently, it is

important that Eskom identifies all existing infrastructure associated with the project and implements a plan to reduce any risk of damage to this infrastructure and to ensure that any damage that may occur to existing infrastructure is swiftly repaired. This will need to be done in association with the appropriate authorities who are the custodians of the infrastructure concerned.

6.6.2. Attitude formation towards project

Apart from expectations associated with job creation, opportunities for small businesses and the security of electricity supply to residents there is no evidence at this stage of any significant attitude being formed towards the project. There is the likelihood, however, that as the project unfolds and it becomes apparent as to the actual route of the powerline that an attitude may emerge against the project.

6.6.3. Decreased level of community participation in decision making, loss of empowerment

Although there does not seem to be any significant attitude forming towards the project it is still important for the project proponent to ensure that a communication channel is created between Eskom and the general public. Any reasonable public concerns will need to be addressed through a transparent and swift process. The Public Participation Process (PPP) provides a channel through which stakeholder can engage with the project proponents and environmental consultants to ensure that they have input in respect of decisions affecting them and needs to be carefully and thoroughly planned.

6.6.4. Compliance with municipal by-laws

It is important that the applicable municipal by-laws are understood and complied with to ensure that the environment and the public remain safe and secure. This is particularly important with regard to construction sites that are in close proximity to populated areas and in respect of;

- Control of public nuisances
- Disaster management
- Emergency services
- Environmental
- Fencing and fences
- Planning
- Municipal roads

- Noise pollution
- Refuse removal, refuse dumps and solid waste disposal.

6.7. Gender relations

Gender refers to the characteristics attributed to males and females by society and is associated with available power and resources. These characteristics, together with the associated power and resources, vary widely between cultures and tend to change over time. The gender relationships associated with the project may include.

- Cultural resistance towards women
- Division of labour

6.7.1. Cultural resistance towards women

Although equal access to employment across gender lines is a recognised right the application of this right is often executed without careful consideration of the factors that may frustrate this right amongst women in the workplace. In this regard often women are subjected to cultural factors within the workforce from both peers on the job and from management who may resist both employing and promoting women, often based on cultural prejudices. Consequently, the International Labour Organisation points out that;

> *"Societies therefore have an obligation to create conducive socioeconomic environment for all their citizens to be able to exercise their right to work, fully utilizing their human potential. Furthermore, evidence has shown that when women are employed and have their own income in their hands, there exist both direct and indirect socio-economic benefits for themselves and their households" (Otobe, 2014, p. 1).*

With the employment of women during the construction and operational phases of the project it is important to ensure that cultural factors do not hinder the process of employing women and ensuring that they enjoy equal opportunities to men in the workforce.

6.7.2. Division of labour

Following on from the above, the division of labour is a critical aspect that will also lead to various impacts during both the construction and operational phases of the project. During the construction and operational phases of the project women will be integrated into the workforce, however, this will come with various challenges. Women and men work on different tasks, have different biological, sex, gender and health needs, and have different roles within the family, all of which need to be considered in order to create a workplace,

without discrimination, that is accessible to both women and men on an equal basis (World Health Organization, 2006). In introducing women into the workforce it must be noted that women are overrepresented amongst the poorer sectors of society, particularly within the more rural communities, and underrepresented, both vertically in terms of responsibility and seniority as well as horizontally in respect of certain functional areas and job categories (Otobe, 2014, p. 22).

6.8. No-go alternative

If the project was not to proceed as planned then it is likely that;

- 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.

7. Impact Assessment

Although it not typical to rate the overall impacts at the scoping stage of the study this is done here to meet the requirements of the lead environmental consultant and is based on the findings of a number of similar projects undertaken by the author. Consequently, this assessment is preliminary and will need to be confirmed during the assessment phase, once all key stakeholders are fully aware of the project and have had an opportunity to comment on the Draft Scoping Report. With this in mind the various categories of impacts discussed above are assessed under this section of the report and presented in **Table 7** to **Table 12** with the ‘no-go option’ being assessed in **Table 13.** The assessment scale used in assessing these impacts is attached in Appendix 1.

Table 7: Health and Social Well-being Impacts

Environmental Feature	Health and Social Well-Being
Project life-cycle	Construction & operational phases

Potential Impact	Proposed Optimisation / Mitigation Measures
Annoyance, dust and noise	Apply the dust suppression reduction mitigation measures recommended by the air quality specialist.
Increase in crime	Ensure that construction workers are clearly identifiable. All workers should carry identification cards and wear identifiable clothing.
	Fence off all construction sites and control access to these sites.
	Clearly mark any hazardous areas and regularly monitor these areas to ensure that they are avoided by people and animals.
	Liaise with the South African Police Services (SAPS) and Community Policing Forums to ensure that construction sites are monitored.
	Encourage local people to report any suspicious activity associated with the construction sites.
	Prevent loitering within the vicinity of the construction camp as well as construction sites.
Increased risk of HIV and AIDS	Ensure that an onsite HIV and AIDS policy is in place and that construction workers have easy access to condoms.
Personal safety and increased hazard exposure	Ensure all construction equipment and vehicles are properly maintained at all times.
	Ensure that operators and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community. Place specific emphasis on the vulnerable sector of the population such as children and the elderly.
	Ensure that fires lit by construction staff are only ignited in designated areas and that safety precautions, such as not lighting fires in strong winds and completely extinguishing fires before leaving them unattended, are strictly adhered to.
	Ensure all construction equipment and vehicles are properly maintained at all times.
	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

Alternative 1 (Blue Corridor) inclusive of corridor adjustment

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Site	Moderate	Short term	High	24 Low Medium
After Mitigation	Negative	Site	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Site	Moderate	Long term	High	32 Medium
After Mitigation	Negative	Site	Low	Long term	High	28 Low Medium
Cumulative Impact: The construction of a powerlines across the area will heighten concerns regarding exposure to electromagnetic fields.						

Alternative 2 (Red Corridor)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Site	Moderate	Short term	High	24 Low Medium
After Mitigation	Negative	Site	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Site	Moderate	Long term	High	32 Medium
After Mitigation	Negative	Site	Low	Long term	High	28 Low Medium
Cumulative Impact: The construction of a powerlines across the area will heighten concerns regarding exposure to electromagnetic fields.						

Alternative 3 (Red Magenta)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Site	Moderate	Short term	High	24 Low Medium
After Mitigation	Negative	Site	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Site	Low	Long term	High	28 Low Medium
After Mitigation	Negative	Site	Minor	Long term	High	24 Low Medium
Cumulative Impact: The construction of a powerlines across the area will heighten concerns regarding exposure to electromagnetic fields.						

Table 8: Quality of the Living Environment Impacts

Environmental Feature	Quality of the living environment (Liveability)
Project life-cycle	Construction & operational phases
Potential Impact	**Proposed Optimisation / Mitigation Measures**
Disruption of daily living activities	Ensure that, at all times, people have access to their properties as well as to social facilities such as schools, churches, transport and shops.
	Investigate and consult local communities on the need to provide suitable access points around the construction sites for people and animals.
Perceived quality of life	Establish channels of communication between local communities and contractors to ensure that construction workers behave in a manner acceptable to the local communities.
	Put procedures and regulations in place to control loitering and the construction of informal dwellings in the vicinity of the construction sites.

Alternative 1 (Blue Corridor) inclusive of corridor adjustment

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Site	Moderate	Short term	High	24 Low Medium
After Mitigation	Negative	Site	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Site	Moderate	Long term	High	32 Medium
After Mitigation	Negative	Site	Low	Long term	High	28 Low Medium
Cumulative Impact: The construction of a powerlines across what is largely a rural area will alter the sense of place of the area.						

Alternative 2 (Red Corridor)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Site	Moderate	Short term	High	24 Low Medium
After Mitigation	Negative	Site	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Site	Moderate	Long term	High	32 Medium
After Mitigation	Negative	Site	Low	Long term	High	28 Low Medium
Cumulative Impact: The construction of a powerlines across what is largely a rural area will alter the sense of place of the area.						

Alternative 3 (Magenta Corridor)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Site	Moderate	Short term	High	24 Low Medium
After Mitigation	Negative	Site	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Site	Moderate	Long term	High	32 Medium
After Mitigation	Negative	Site	Low	Long term	High	28 Low Medium
Cumulative Impact: The construction of a powerlines across what is largely a rural area will alter the sense of place of the area.						

Table 9: Economic and Material Well-being Impacts

Environmental Feature	Economic and material well-being (positive)
Project life-cycle	Construction & operational phases
Potential Impact	**Proposed Optimisation / Mitigation Measures**
Increase in employment opportunities	Local residents should be recruited to fill semi and unskilled jobs.
	Women should be given equal employment opportunities and encouraged to apply for positions
	A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills which they can use to secure jobs elsewhere post-construction
Increased opportunities for SMMEs	A procurement policy promoting the use of local business should, where possible, be put in place to be applied throughout the construction and operational phases of the project.

Alternative 1 (Blue Corridor) inclusive of corridor adjustment

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Positive	Local	Minor	Short term	High	16 Low Medium
After Mitigation	Positive	Local	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Positive	Local	Low	Long term	High	32 Medium
After Mitigation	Positive	Local	Moderate	Long term	High	36 Medium
Cumulative Impact: During the operational phase of the project it is likely that jobs will be created due to the multiplier effect of increasing electricity supply to industry in the area.						

Alternative 2 (Red Corridor)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Positive	Local	Minor	Short term	High	16 Low Medium
After Mitigation	Positive	Local	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Positive	Local	Low	Long term	High	32 Medium
After Mitigation	Positive	Local	Moderate	Long term	High	36 Medium
Cumulative Impact: During the operational phase of the project it is likely that jobs will be created due to the multiplier effect of increasing electricity supply to industry in the area.						

Alternative 3 (Magenta Corridor)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Positive	Local	Minor	Short term	High	16 Low Medium
After Mitigation	Positive	Local	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Positive	Local	Low	Long term	High	32 Medium
After Mitigation	Positive	Local	Moderate	Long term	High	36 Medium
Cumulative Impact: During the operational phase of the project it is likely that jobs will be created due to the multiplier effect of increasing electricity supply to industry in the area.						

Table 10: Cultural Impacts

Environmental Feature	Cultural
Project life-cycle	Construction & operational phases
Potential Impact	**Proposed Optimisation / Mitigation Measures**
Heritage	Consult traditional healers, herbalists, traditional doctors and elderly people of the area to ensure that any lost access to natural resources is restored to former levels.
	Follow the mitigation measures suggested by the Heritage Specialist.
	Wherever possible reinstate access to sites of cultural importance.

Apart from noting the heritage impacts here as an important social aspect they fall outside the scope of specialisation of this report and are dealt with in more detail and assessed within the Heritage Impact Report.

Table 11: Institutional, Legal, Political and Equity Impacts

Environmental Feature	Institutional, legal, political and equity
Project life-cycle	Construction & operational phases
Potential Impact	**Proposed Optimisation / Mitigation Measures**
Effect on existing infrastructure facilities and social services	Liaise with all relevant services providers such as the district and local municipalities, South African National Roads Agency Limited (SANRAL) and the water authorities in the area 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.
	Provide a channel through which communities can route grievances or concerns regarding service disruption as a result of the project.
	Swiftly address any grievance raised concerning service disruption as a result of the project in a transparent manner.
	Regularly monitor the effect that the project has had on existing infrastructure facilities and social services within the host community.
Attitude formation towards project	Promptly deal with any raised expectations amongst communities regarding perceived benefits associated with the project, through a process of communication and consultation.
	Promptly address any concerns raised by the public in a transparent manner.
	Where necessary always provide prompt and clear feedback to communities.
	Include all relevant community members in decisions affecting them.
Compliance with municipal by-laws	Ensure that all municipal by-laws are complied with.

Alternative 1 (Blue Corridor) inclusive of corridor adjustment

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Site	Moderate	Short term	High	24 Low Medium
After Mitigation	Negative	Site	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Site	Low	Long term	High	28 Low Medium
After Mitigation	Negative	Site	Minor	Long term	High	24 Low Medium
Cumulative Impact: No cumulative impacts associated with this impact have been identified as yet						

Alternative 2 (Red Corridor)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Site	Moderate	Short term	High	24 Low Medium
After Mitigation	Negative	Site	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Site	Low	Long term	High	28 Low Medium
After Mitigation	Negative	Site	Minor	Long term	High	24 Low Medium

Cumulative Impact: No cumulative impacts associated with this impact have been identified as yet

Alternative 3 (Magenta Corridor)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Site	Moderate	Short term	High	24 Low Medium
After Mitigation	Negative	Site	Low	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Site	Low	Long term	High	28 Low Medium
After Mitigation	Negative	Site	Minor	Long term	High	24 Low Medium
Cumulative Impact: No cumulative impacts associated with this impact have been identified as yet						

Table 12: Gender Relations Impacts

Environmental Feature	Gender relations
Project life-cycle	Construction & operational phases
Potential Impact	**Proposed Optimisation / Mitigation Measures**
Cultural resistance towards women	Sensitise staff in respect of gender sensitive issues that are pertinent to the workplace.
Division of labour	Ensure gender inclusivity and equity with respect to all compensation.
	Prioritise gender inclusivity and equity in access to resources, goods, services and decision making with the aim of empowering women.
	Promote equal job opportunities for women and men during the construction and operational processes.
	Prioritise and articulate gender inclusivity and equity in the project documents by including specific strategies and guidelines for implementation.
	The project documents should also include clear mechanisms through which the actual implementation of the activities and the impact on the ground can be monitored and evaluated.
	Develop a grievance procedure to specifically address gender matters.
	Factors such as culture should be considered when planning for gender activities since they play a great role in influencing gender relations.
	Ensure that gender differences are taken into account when hiring staff.

Alternative 1 (Blue Corridor) inclusive of corridor adjustment

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Local	Low	Short term	High	24 Low Medium
After Mitigation	Negative	Local	Minor	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Local	Low	Long term	High	32 Medium
After Mitigation	Negative	Local	Minor	Long term	High	28 Low Medium

Alternative 2 (Red Corridor)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Local	Low	Short term	High	24 Low Medium
After Mitigation	Negative	Local	Minor	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Local	Low	Long term	High	32 Medium
After Mitigation	Negative	Local	Minor	Long term	High	28 Low Medium
Cumulative Impact:						

Alternative 3 (Magenta Corridor)

	Status	Extent	Magnitude	Duration	Probability	Significance
Construction Phase						
Before Mitigation	Negative	Local	Low	Short term	High	24 Low Medium
After Mitigation	Negative	Local	Minor	Short term	High	20 Low Medium
Operational Phase						
Before Mitigation	Negative	Local	Low	Long term	High	32 Medium
After Mitigation	Negative	Local	Minor	Long term	High	28 Low Medium

The impacts of the 'no project' alternative are assessed in **Table 13**.

Table 13: Assessment of the No Project Alternative

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

8. Conclusion

It is evident that there are a number of villages and settlements within the 3 km EIA zone and, being within a 3 km radius of the power line, most of these settlements are unlikely to be directly affected. The fact that this is an elevated transmission line means that, once constructed, most daily activities can continue as usual under the line and communities further from the line, considering a 55 meter servitude, are unlikely to be affected. Notwithstanding this, the possible effect of electromagnetic fields (EMFs) remains a contentious issue to be answered within the realms of physics and medicine although it does have social consequences as alluded to above under section **6.9. Health issues**.

On a general basis, the generation and distribution 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 and will need to be carefully considered in respect of this project and.

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 that has led to robust public debate on a global scale with little or no consensus seeming to have emerged (for a more detail discussion see section **6.1.4 Personal safety and hazard exposure** 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 into 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. Apart from noting public perception associated with the transmission of electricity and electromagnetic fields the technicalities of this risk are beyond the scope and expertise of the social impact assessment.

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. Again, although there are social consequences attached to this the actual assessment of any negative impact in respect of property values is a highly specialised and falls outside the area of expertise of the social impact assessor and should be undertaken by a professional property evaluator registered with the South African Council for the Property Valuers Profession (SACPVP).

Reflecting on this from a social perspective there are a number of issues that can be considered on a preliminary basis:

- At a site specific level the actual route of the line is flexible and can be adjusted to avoid most socially based obstacles.
- It is unlikely that the social will be the determining factor in route choice because of the flexibility to adjust the route in order to mitigate some social issues.
- In general terms the shorter the route the better.
- The less communities, farms, tourist attraction, businesses etc. along the route the better but they too are subject to the flexibility of the final route.
- During the operational phase most activities can continue under the line.
- The construction process is less obstructive than what may be the case in respect of other linear projects such as the construction of pipe lines, roads and railway lines, so daily living patterns can be restored within a relatively short period.
- Alternative 1, the blue route, seems to affect most people and is the socially less preferred route.
- It seems that Alternative 2, the red route, would be the socially preferred route but this can easily be overridden for either technical or environmental reasons or both. Route 3, the magenta route, is also likely to have less of a social impact.
- The technical reasons for the project seem to fit with the socio-economic requirements of the region i.e. to strengthen the power grid.

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 localised conditions. 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 route will be identified. In this regard, where applicable, it will be important for Eskom to engage with the affected parties in an effort to reach mutually acceptable arrangement on a reasonable basis.

8.1. Information required

The following project related information will be required in order to undertake and complete a social impact assessment.

Construction phase

- A project information document indicating the construction process to be followed including estimates of time sequences and deadlines;
- Type and size of vehicles required in the transportation of components and construction equipment and the routes that will be used to transport large components to the site;
- An estimate of the number of vehicle trips required and duration of each trip;
- Comments received from I&APs during the public participation process, including comments reflected in the Final Scoping Report;
- Information concerning any negotiations and agreements with affected land and property owners in respect of compensation for any damages caused as a result of the project;
- An estimation of the number of people to be employed during the construction phase;
- Breakdown of number of people employed with regard to skills levels (low skilled, semi-skilled, skilled and managerial);
- On-site skills development and training opportunities associated with the project;
- Estimation of the overall wage bill for the construction phase and breakdown in percentage in respect of the various skills categories;
- Estimate of the overall capital expenditure for construction phase;
- Indication of where construction workers will be housed and an indication of the total number of workers to be housed.

Operational phase

- Typical activities, i.e. maintenance procedures and timelines, associated with the operational phase of the project;
- The annual operating budget for the project;
- Estimated number of people to be employed over the operational phase of the project;
- Breakdown in terms of the skills levels (low skilled, semi-skilled, skilled and managerial);

- Annual wage bill;
- Information on opportunities for skills development and training;
- Information regarding the restricted activities associated with the powerline such as restriction to building and tree heights required beneath the powerlines.

8.2. Suggested approach to the study

It is suggested that a combined quantitative and qualitative methodological approach be applied during the study and that data is gathered via:

- A scan of the Draft Scoping Report;
- Various reports and responses generated in respect of the project;
- Statistics South Africa, Census 2011; Mid-year Population estimates and Quarterly Labour Force Survey.
- Field work in the form of a site visits and, where appropriate, interviews with affected parties;
- The issues and concerns raised by the Interested and Affected Parties (I&APs) and recorded in the Comments and Response Report.
- Findings of other specialist studies such as those of the heritage, tourism and agricultural economists studies where available.
- 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.

It is important that the impacts are assess and rated in accordance with a recognised environmental impact assessment methodology and rating scale. In order to maintain consistency with the other specialist reports it would be preferably that an assessment and rating scale is suggested by Nsovo Environmental Consulting and used across most specialist studies were appropriate.

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Appendix 1

Appendix 1 – Impact Assessment Rating Scale

The social impacts are rated in accordance with the following rating scale.

Extent of the impact:

The extent of the impact will be assessed according to the following parameters:

1. Limited to the site and its immediate surroundings.
2. Local/ Municipal extending only as far as the local community or urban area.
3. Provincial/Regional.
4. National i.e. South Africa.
5. Across International borders.

Duration of the impact:

The lifespan of the impact will be assessed in terms of the duration of the impact:

1. Immediate (less than 1 year).
2. Short term (1-5 years).
3. Medium term (6-15 years).
4. Long term (the impact will cease after the operational life span of the project).
5. Permanent (no mitigation measures or natural process will reduce impact after construction).

Magnitude of the impact: The magnitude or severity of the impacts will be indicated as either:

0. None (where the aspect will have no impact on the environment).
1. Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected).
2. Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected).
3. Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way).
4. High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease)
5. Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).

Probability of occurrence: The likelihood of the impact actually occurring will be indicated as:

0. None (impact will not occur).
1. Improbable (the possibility of the impact materializing is very low as a result of design, historic experience or implementation of adequate mitigation measures).
2. Low probability (there is a possibility that the impact will occur).
3. Medium probability (the impact may occur).
4. High probability (it is most likely that the impact will occur).
5. Definite / do not know (the impact will occur regardless of the implementation of any prevention or corrective actions or it the specialist does not know what the probability will be based on too little published information).

Status of the impact:

The impacts will be assessed as either having a:

- Negative effect (i.e. at a cost to the environment).
- Positive effect (i.e. at a benefit to the environment).
- Neutral effect on the environment.

Reversibility

The degree to which the impact can be reversed.

Irreplaceable loss of resources

The degree to which the impact may cause irreplaceable loss of resources.

Cumulative impact:

The impact of the development is considered together with additional developments of the same or similar nature and magnitude. The combined impacts may be:

- Negligible – i.e. the net effect is the same as the single development
- Marginal – i.e. the impact of two developments of a similar nature is less than twice the impact of a single development. This implies it is better to place the two developments in the same environment rather than in separate environments.
- Compounding – the impact of two developments is more than twice the impact of two single developments therefore it is better to split the two developments into separate environments.

Significance of the Impact:

Based on a synthesis of the information contained in the points above, the potential impacts will be assigned a significance weighting (S). The weighting is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact hence S=(E+D+M)*P.

The above process allows that the same assessment is used to assess the significance of impacts post mitigation that is, to assess whether the implementation of mitigation measures will reduce the significance weighting of a specific impact.

Average Score	Significance	Significance Score	Description
0	**Negligible**	0	There is no impact
1	**Low**	1-15	Impact is of a low order, mitigation measures are easy and simple or not required
2	**Low-Medium**	16-30	Impact is higher but with limited effect, mitigation measures are feasible and easily achieved
3	**Medium**	31-45	Impact is real but not substantial and mitigation is both feasible and fairly easily possible
4	**Medium-High**	46-60	Impact is substantial and mitigation measures are difficult, expensive and time consuming
5	**High/Fatal Flaw**	>60	Impact is of the highest order and there are few, if any, mitigation measures to offset impact