Eskom Holdings SOC Limited

SOCIAL IMPACT ASSESSMENT, FOR THE PROPOSED CONSTRUCTION OF THE WESKUSFLEUR SUBSTATION, WESTERN CAPE PROVINCE

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ABBREVIATIONS

AIS	Air Insulated Substation
CCTMM	City of Cape Town Metropolitan Municipality
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GIS	Gas Insulated Substation
IDP	Integrated Development Plan
KNPS	Koeberg Nuclear Power Station
SIA	Social Impact Assessment
SOC	State Owned Company
SOE	State Owned Enterprise

1. INTRODUCTION

The Conversion Act, 2001 (Act No. 13 of 2001) establishes Eskom Holdings SOC Limited (Eskom) as a State Owned Enterprise (SOE), with the Government of South Africa as the only shareholder, represented by the Minister of Public Enterprises. The main objective of Eskom is to "provide energy and related services including the generation, transmission, distribution and supply of electricity, and to hold interests in other entities".

Electricity cannot easily be stored in large quantities and in general must be used as it is generated. Therefore, electricity is generated in accordance with supply-demand requirements. Eskom is responsible for the provision of reliable and affordable electrical power to South Africa. Eskom's core business is the generation, transmission (transport), trading and retail of electricity. Eskom currently generates approximately 95% of the electricity used in South Africa. In terms of the Energy Policy of South Africa "energy is the life-blood of development". The reliable provision of electricity is critical for industrial development and related employment and sustainable development in South Africa.

Eskom initiated a study to investigate possible alternatives and solutions to address the long term reliability and improvement of the existing 400kV Gas Insulated Substation (GIS) at Koeberg Nuclear Power Station (KNPS) in the Western Grid. The study also included the future long term 400/132kV transformation requirements at Koeberg substation.

Koeberg Nuclear Power Station (KPNS) is the only nuclear power station in Africa. It boasts the largest turbine generators in the Southern Hemisphere and is the most southerly-situated nuclear power station in the world. Being a nuclear power station, it is vital that the reliability of the electrical infrastructure associated with this power station is never compromised. The station is also critical for grid stability in the Cape.

KNPS is located in the City of Cape Town Metropolitan Municipality (CCTMM) in Ward 32 on the farm Duinefontein.

The proposed substation will be constructed within the CCTMM which is located on the west coast in the Western Province of South Africa. This is an important tourist destination as well as an entry point to South Africa by means of air and sea. .

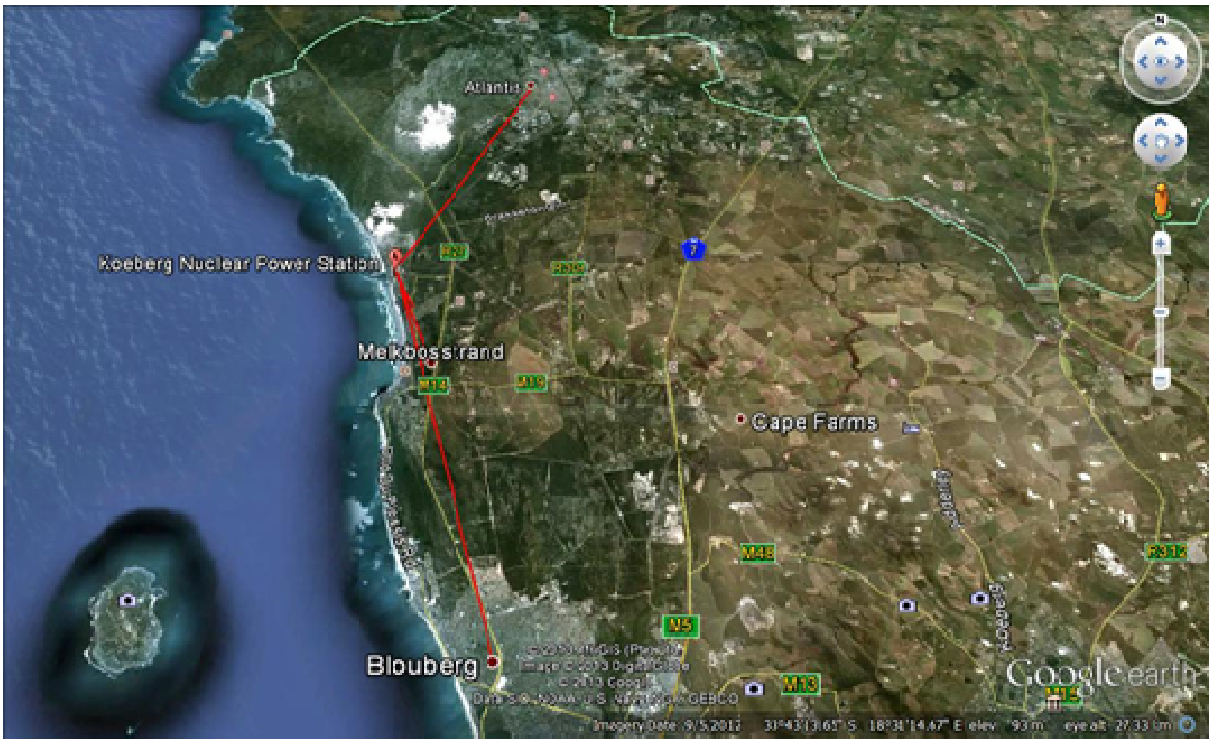

Figure 1: Approximate Community distance from Koeberg Power Station: Blouberg = 17,2km, Atlantis = 12,6km, Melkbosstrand = 5,5km and Duinefontein = 2,2.

A Social Impact Assessment (SIA) (desktop study) was undertaken during the Scoping and Assessment phases of the EIA process. Site visits were conducted as part of the public participation process which in turn forms part of the Environmental Impact Assessment (EIA) process. A Social Impact Assessment (SIA) can be described as the systematic appraisal, before the project commences, of the potential impacts on the day-to-day quality of life of persons and communities when the environment is affected by a development. Seen from this viewpoint, social impacts include all the significant changes in the social environment that take place because of the actions of a development or project, in this case a new substation, which would not otherwise have occurred. The development is perceived positive, as the new substation replaces the old one and therefore will enhance the reliability of power supply exported from KNPS. There will thus be no changes during the operational phase of the new substations as normally the case with new projects and developments. This substation is a replacement and the impact will mainly occur during the construction phase. Depending on the outcome and the site preferred will impacts during the operational phase be determined. .

A SIA should identify all potential positive and negative impacts, including undesirable and irreversible consequences. Specific attention should normally be given to vulnerable groups in the affected population(s), such as the poor, the elderly, women and the unemployed.

In most cases, the assessment of social impacts is carried out **before** the impacts actually occur. The impacts are already present in this case and the social impact process must determine if anything substantial will change with the added new substation and the decommissioning of the old substation on the social and in this case also on possible tourism. This means that an SIA is normally anticipatory and not empirical. It attempts to assist the planning process of a proposed development or decision by identifying the likely impacts before they take place. Being anticipatory, however, also entails estimating the likely future impacts based on the existing empirical knowledge of the impacts of similar actions in the past. In this case the future on a macro scale was already experienced – KNPS and its substations with its current impact over many years, from 1984/5 up until 2013. On a micro level individuals might be impacted positive or negative directly and long term impacts continued.

In the case of the proposed construction of the Weskusfleur substation no large communities are affected in a different way than they are already affected by the existing KNPS and substations over many years. What this in essence means is that no measurable or significant change or social impact might be happening when Eskom simply continues its operations as normal and expand temporarily its substation or build a new one, and decommission the old substation.

The social fabric of the existing environment was built around the Power Stations and Duinefontein was Eskom's property to house the workers necessary to construct Koeberg Power station. Melkbosstrand and Blouberg are further away from the Power Station and are mainly residential for commuters working in and around Cape Town with a high percentage of holiday homes used during school holidays.

These areas do not have a great diversified economy. Other towns or residential areas such as Atlantis were years back identified as a growth point and industrialisation was stimulated. The impact of this project will most probably not have much influence, irrespective of the alternatives identified at this stage on the social fabric of the communities. Reliability of power supply for the Western Cape might be impacted if this project cannot go ahead and the electricity reliability compromised on technical grounds.

Lastly, it should be emphasised that no impact assessment – whether environmental or social – can supply accurate results. This is due to the fact that the causes and effects of environmental and socio-economic changes are complex, and also because such an assessment deals with future uncertainties. An SIA is neither a technical nor an economical exercise; the focus rather falls on **concerns in and impacts on the social environment.** In addition, regardless of how good the data and the understanding of the affected environment are, an SIA (and an EIA, for that matter) always involves an element of subjective judgment. As a planning tool, the SIA can assist project management in understanding, implementing and managing a project in such a way that negative impacts are avoided or mitigated, and positive impacts are optimised.

The following persons gave input to the social impact assessment process:

- **Bongi Mhlanga and Lionel Skeffers** – public participation, site visits and information input to process;
- **Moseketsi Mochesane** and **Bongi Mhlanga** – research of social data and report compilation;
- **Frank van der Kooy** – report evaluation,, site visits, social and tourism verification process.

2. DESCRIPTION OF THE PROJECT

The proposed project entails the construction of a new 400/132kV substation (Weskusfleur Substation) in the vicinity of the Koeberg Power Station to:

- Improve the existing 132/400kV reliability;
- Cater for load growth on the 132 kV network for the 20-year horizon;
- Prevent overloading of existing 400kV busbar;
- Replace 30 year old technology/equipment – new substation.

The required area size for the substation location will be approximately 10 – 42ha depending on the final location and the type of technology used (Gas Insulated, GIS or Air Insulated, AIS) as per the outcomes of EIA process. The substation will need to account for the current and future needs/plans. The length of the diversion of the power lines will also be determined by the final substation's location. It was decided as part of the outcome of the scoping phase that only site 1, close to the KNPS, and site 4 on the Eastern side of the R27, will go through to the EIA phase. The comparison will be between an air insulated (AIS) for site 4 and a gas insulated (GIS) substation for site 1 that will be evaluated to determine the site with the least negative impact.

The full scope of work includes:

- Build a new 2x250MVA; 400/132kV substation
- Construct the new 400kV busbar with space capability of 3x250MVA, 400/132kV transformation;
- Equip new 2x250MVA, 400/132kV transformers;
- Re-route the Gen transformers to the new 400kV busbar;
- Re-route the outgoing 400kV feeders; as follows-
  - Reroute Acacia-Koeberg 400kV Line 1
  - Reroute Acacia-Koeberg 400kV Line 2
  - Reroute Ankerlig-Koeberg 400kV Line 1
  - Reroute Ankerlig-Koeberg 400kV Line 2
  - Reroute Koeberg-Muldersvlei 400kV Line 1
  - Reroute Koeberg-Stikland 400kV Line 1
- Re-route the outgoing 132kV feeders; as follows-
  - Reroute Ankerlig-Koeberg 132kV Line 1 to accommodate new 2x500kV line servitudes of 45m each
  - Reroute Blaauwberg-Koeberg 132kV Line 1
  - Reroute Dassenberg-Koeberg 132kV Line 1
  - Reroute Dassenberg-Koeberg 132kV Line 2
  - Reroute Duine-Koeberg 132kV Line 1
- Divert the 400kV Ankerlig Sterrekus line around the yard's position to minimize line crossings;
- Temporary storage of large volumes of transformer oil on site to be deposited into transformers;

- Temporary storage of any hazardous chemical substances to be used during the construction phase;
- The clearance of vegetation as a result of the construction of the substation and associated infrastructure;
- Decommissioning some of the existing substation infrastructure and lines.

The proposed substation is a 2x250MVA; 400/132kV either an air insulated (AIS) for site 4 or a gas insulated substation (GIS) for site 1. The system will be operated at 400kV and 132kV, however the 400kV yard will be insulated at 550kV and the 132kV yard will be insulated at 275kV levels.

3. METHODOLOGY

The purpose of the Social Impact Assessment was to conduct a systematic analysis, in advance, of the likely impacts that the project will have on the day-to-day life of individuals and communities within the study area and compare the two alternatives, site 1 with site 4, on the possible difference in social impacts. The assessment serves to identify issues that will need to be addressed by avoidance or mitigation, as well as social impacts that cannot be resolved. It will also determine the difference on impacts for the two alternatives and rate them accordingly. Recommendations regarding mitigation measures are developed for inclusion in the Environmental Management Plan (EMP). The social assessment also highlights potential positive impacts of the project, so that these impacts may be enhanced.

The study area for the SIA included:

- Communities that may be directly affected by physical proximity to the proposed project;
- Communities that may be affected by associated infrastructure;
- Individuals, communities and institutions that may be indirectly affected as a result of the economic repercussions of the project; and
- Land resources and people who may be affected by construction of the substation and associated infrastructure.

The steps followed for the SIA are outlined below.

- *Initial problem analysis*

The first phase of the Social Impact Assessment entailed conducting a literature review with the objective of gaining a thorough understanding of the following:

  - The *project*, including its background, design parameters, construction activities and schedules, reasonable alternatives, etc.;
  - The *social context* of the project, including the national and regional economy; and
  - The *policy context* of the project, including the content and level of rigour required of the social impact.

Sources for the literature review included project background reports and studies and relevant legislation. Documentation/publications used during the desktop study included the City of Cape Town Metropolitan Municipality (CCTMM) Integrated Development Plan (IDP), the Census 2011, and Municipal Report

Western Cape, Locality Maps, CCTMM stats and Aerial Photographs and the EIA scoping report. The EIA for Nuclear 1 as well as the Pebble bed nuclear reactor (PBNR)

In addition, site visits and Public Participation were undertaken and consultation with stakeholders enabled the project team to identify some important needs, expectations and perceptions regarding the proposed development.

Information from these sources was used to determine what possible social impacts a substation of this magnitude may have on the social environment and what alternative will have the least negative impact on the social as well as on tourism in the area.

- *Social baseline assessment*

The objective of this phase, baseline information, was to determine the social variables and characteristics that were likely to result in the project impacting on the lives of people. The project team was also fortunate to be able to compare the information used in the Nuclear 1 and the PBNP EIA process with the current or recent situation. Issues addressed in this baseline assessment included:

  - *Demographic profiles* of the study area (including population size, economic activities, employment rate, livelihoods, access to services, etc.);
  - Current and planned *development activities* in the study area;
  - *Social characteristics* of potentially affected communities (e.g. community structures, social capital and cohesion, attitudes towards the project, , etc.);
  - *Relationships* between potentially affected communities and the environment (including sense of place, historical or cultural ties, etc.)
  - *Assets* and *amenities* that may be lost and activities that may be affected by the project;
  - *Public health status* (including communicable and sexually transmitted diseases); and
  - Current authority and capacity of *institutions* that may be involved in management and monitoring of the project's effects.

- *Scoping study*

The objective of the scoping study was to form a preliminary assessment of the likely social impacts of the project.

- *Projection and estimation of impacts*

This phase concentrated on the anticipated impacts associated with the project during the scoping study:

- *Conceptualising social impacts.* This entailed assessing the differences between (a) predicted conditions *without* the development (extrapolated from the baseline projection) and (b) predicted conditions *with* the development.
- *Predicting responses to impacts.* This entailed determining the significance that affected individuals, communities and institutions attached to the identified social impacts.
- *Indirect and cumulative impacts.* This entailed estimating likely consequences and ripple effects of direct impacts. These might result from the incremental impacts of an action added to other past, present and reasonably foreseeable future projects.
- *Rating impacts* in terms of their nature, extent, duration, intensity, probability, overall significance were excluded due to the nature of the social demographic information and the lack of real criteria used in normal circumstances in evaluating sites in relation to receptors such as communities. This will be discussed further in this document.

- *Development of mitigation measures*

This phase involved the formulation of some mitigation measures containing the following:

- Description of relevant *mitigation measures*; and
- Description of *monitoring requirements;* this component proposes detailed arrangements required for monitoring impacts and the implementation of mitigation measures.

4. GENERAL SOCIAL IMPACTS EXPECTED THROUGH PROJECT CYCLE

4.1 Construction/Implementation

The construction/implementation stage begins once a decision is made to proceed with the project and an environmental Authorisation is granted after the completion of an EIA. For typical construction projects, this involves clearing land, construction of access roads, developing construction camps, etc.

Displacement/Resettlement and relocation of people, if necessary, occurs during this phase. Depending on the scale of the project, the build-up of a migrant construction work force may also occur. If significant immigration occurs, the new residents may create a strain on community infrastructure, as well as creating social stresses due to changing patterns of social interaction. Communities may have difficulties in responding to the increased demands on school, health facilities, housing and other social services. Further stresses may be created by resentments between newcomers and long-time residents, by sudden increases in the prices for housing and local services, and even by increased uncertainty about the future. When new projects are implemented, local economies and organizations may change, and old behaviour is replaced with new ways of relating to the environment and its resources.

4.2 Operation / Maintenance

The operation stage occurs after construction is complete and the project becomes fully operational. In many cases this stage will require fewer workers than the construction/implementation phase. If operations continue at a relatively stable level for an extended period of time, effects during this stage can often be more beneficial than those at any other stage. Communities seeking industrial development (and the accompanying opportunities for employment that arise) will often focus on this stage because of the long-term economic benefits that may follow from a development. It is also during this stage that the communities can adapt to new social and economic conditions and the expectations of positive effects, such as a stable population, a good quality infrastructure and employment opportunities can be realized.

In this case the Eskom depot might need to increase their maintenance staff due to the size of the substation.

4.3 Decommissioning

Decommissioning begins when the proposal is made that the project and associated activity will cease at some time in the future. As in the planning stage, the social impacts of decommissioning begin when the

intent to close down is announced and the community or region must again adapt, but this time to the loss of the project. At other times, the disruptions to the local community may be lessened or at least altered if one type of worker is replaced by another but employment has actually increased as environmental clean-up and/or rehabilitation specialists have been hired to help deal with re-vegetation.

The above mentioned impacts in all three phases are general impacts that are expected for a new development.

5. DESCRIPTION OF THE SOCIAL ENVIRONMENT

Demographic information of the area was obtained from the sources discussed in the section on Methodology in this report (Section 3).

As mentioned in the introduction the proposed substation will be constructed within the CCTMM which is located in the west coast in the Western Province of South Africa which is an entry point to South Africa from the rest of the world. The study area falls between the towns Blouberg and Atlantis (**figure 1 above**). The CCTMM main administrative office is in Cape Town. The Municipality is made up of 28 suburbs and townships which are Atlantis, Bellville, Blue Downs, Blouberg, Bracken fell, Cape Town, Crossroads, Durbanville, Eerste Rivier, Elsie's, Elsie's River, Fish Hoek, Goodwood, Gordon's Bay, Guguletu, Hout Bay, Khayelitsha, Kraaifontein, Kuils River, Langa, Melkbosstrand, Mfuleni, Milnerton, Mitchell's Plain, Noordhoek, Nyanga, Parow, Simon's Town, Somerset West Strand. The municipal area is 2,461 km² in size and is categorised as an Urban Municipality with a density of 67 persons per km².

Figure 1: City of Cape Town location in the Western Cape Province (source: http://en.wikipedia.org/wiki/City_of_Cape_Town)

5.1 Provincial demographic profile

According to Statistics 2011, the population of CCTMM is 3 740 025 growing at about 2, 6% per annum. The local population has a youthful age structure and the immediate significance of this young age structure is that the population will grow rapidly in future and this implies a future high growth rate in the labour force. There are 1 068 572 households in the Municipal area.

There are three main types of dwellings within the CCTMM, which are Traditional, formal and the informal. There was an increase in the number of informal dwellings from 18.8 in 2001 to 20.5 in 2011, and a slight drop in the number of formal dwellings from 78.9% in 2001 to 78.4% in 2011; some of these houses (informal dwellings most affected) fall below the Reconstruction and Development Programme (RDP) standard. Current housing backlogs are being worsened by the increase in population within the municipality. There was however a decrease in the number of traditional dwellings, from 1.9% in 2001 to 0.4% in 2011 and a minor increase in the number of informal dwellings, from 18.8% in 2001 to 20.5% in 2011.

Table 1: Compare census between 1996, 2001 and 2011.

Census 1996	Census 2001	Census 2011
3 956 875	4 524 335	5 822 734
	15% (3% pa)	27% (2,7% pa)

5.2 Unemployment

Unemployment rates are high due to urbanisation. The unemployment rate in the economic active group is approximately 37% to 40%. Community service, Trade and Agriculture respectively, were the biggest employers in the CCTMM.

Table 2: Unemployment Rate (%)

Race group	Population	Number of unemployed	Unemployment rate
Black	1 024 871	233 126	34.54%
Coloured	1 078 456	150 263	22.67%
White	409 264	14 173	4.71%
Asian	38 443	2 350	9.91%

Source: census, 2011

Table 3: compare 2 census figures on employment:

People (16 – 64 years)	2001	2011
Employed	937 794	1 294 239
Unemployed	386 680	405 990

5.3 Economic activities

CCTMM is located on a macro scale on the west coast which is a point of entry to South Africa from the entire world. Approximately 3 740 025(2011 census) people currently live in City of Cape Town which is classified as a Urban Municipality with a density of 67 persons/km². The Municipality's spatial strategies and land use management decisions are based on the spatial trends, analysis and the land use management scheme. The following spatial issues was looked at as well to complete the picture: Land use, Engineering services and Transportation.

The City's economy does not operate within municipal boundaries. Cape Town's economy is interdependent with that of the province, and more specifically, the cities and towns that are within a 50 km radius of Cape Town. A review conducted in 2008 by the Organisation for Economic Co-operation and Development (OECD) defines a broad area (including Saldanha, Malmesbury, Paarl, Stellenbosch and Hermanus) as the city's functional region. Key regional economic interdependencies include a commuting labour force, shared consumer catchment area, transport infrastructure, and a second port located at Saldanha, as well as the agricultural and tourism areas surrounding the city.
As the regional market is relatively small in global terms, linkages to national and international markets are important for city firms. These connections and the efficiency of the port, airport and other city logistics systems are thus critical for economic growth. External freight movement is dominated by land-based freight to and from Gauteng. Approximately ten times more freight enters or leaves the city along the N1 corridor than along the N2 or N7 corridors.

The other major regional infrastructure in Cape Town includes Cape Town International Airport (CTIA). As the airport becomes busier and expands its capacity, the demand it places on infrastructural land-side support systems is increasing, and its environmental health implications for surrounding land uses may become cause for concern.

Some important economic drivers

- Tourism and hospitality;
- Business and financial services;

- Media, film and knowledge industries;
- Warehousing, distribution, freight logistics;
- Trade (wholesale and retail);
- Food and agro-processing;
- Industrial/manufacturing;
- Retail.

5.4 Tourism

Cape Town has a rapid growing tourism industry and has a lot of natural, historical and cultural resources. Cape Town has a history of many intertwining threads and layers both shady and bright, from the city's cosmopolitan trade roots under Dutch, and then British with the oldest building being the castle of good hope. There is also a cultural and historical and technology museums in and around the city. There are botanical gardens such as Kirstenbosch which attracts huge numbers of tourists. Robin Island used in the past as a prison for political prisoners has also become a major tourist attraction. Cape Town is number 2 on the Lonely Planet's list of 10 Best Beach Cities of 2011(http://tourismcapetown.co.za/leisure-travel/region/cape-town. [Accessed 26-06-2013]).

The following are some of the key existing natural and cultural resources that need to be preserved, promoted and developed into Tourism attraction sites from a District level:

- Table Mountain;
- The Cape Fynbos, one of the richest veld types in the world (The world is roughly divided into 6 floristic kingdoms and the Cape Fynbos is the richest in biodiversity). It is however also the most threatened.
- Robben island – heritage;
- The Good Hope Castle – heritage;
- Kirstenbosch National Botanical Garden – Cape Fynbos;
- Two oceans Aquarium – oceanographic;
- District Six – heritage;
- Iziko South African Museum;
- Seal Island, South Africa – natural;
- Cape Point Vineyards – wine and culture.

Table 1: Number of arrivals and departures of South African residents by mode of travel and place of arrival or departure, 2011 in Cape Town (stats 2011)

Mode of travel and place of arrival or departure	**arrivals**	**departures**
Cape Town International Airport	234 263	240 198

Cape Town Harbour	8 868	6 348

Table 2: Number of foreign arrivals and departures by mode of travel and place of arrival or departure, 2011(stats 2011)

Mode of travel and place of arrival or departure	arrivals	departures
Cape Town International Airport	509 016	494 266
Cape Town Harbour	19 706	15 342

4.4 Access to services:

5.4.1 Electricity, water and Sanitation

According to the CCTMM city stats about 3.7%households within the municipality do not receive electricity for lighting.7.9 % households do not have access to drinking water and 8.8% has no access to proper sanitation.

5.4.2 Educational facilities and libraries

Primary and secondary schools occur throughout the Municipality. There is also colleges and universities. The level of highest level of education post matric for people aged 20 and above is 18.8 %. There are 103 libraries in the CCTTM.

5.4.3 Health

The prevalence of HIV in the CCTMM as per the survey done in 2010 showed that it is 19.1% of the people are living with the disease and there is 28,658 cases of TB reported every year in the CCTMM.

Some conclusions:

- e CCTMM area is under pressure due to all sorts of developments and proposed developments. Population increase is extremely high and therefore pressure on natural resources seems unavoidable;
- From an tourism point of view the CCTMM is highly ranked worldwide and specific attributes are highly valued as part of the tourism industry;
- The Cape Fynbos is seen as very important to many tourist groups and more specialist nature groups. Due to the high impact already experienced all available natural pieces of land still present in the lower areas, coastal and plains, are seen as important conservation areas. Reference can be made to the Plattekloof first registered Natural Conservation site in the early 1990's by Frank van der Kooy (Pr Sci Nat). The land under the power lines certain rare species were found and therefore

the management practices changed to encourage the Fynbos to re-establish and those species protected. (*Serruria aemula*, Strawberry Spiderhead, critically endangered).

- Plattekloof powerlines between Monte Vista and Edgemead. Good example of how urban conservation can happen in co-existence of some development.

6. SUMMARY OF THE SOCIAL ENVIRONMENT:

7. GENERAL IMPACTS ENVISAGED

- Influx of job seekers, mainly unskilled labour, from communities around the substations site having job expectations;
- Health impacts from construction sites and camps as a result of exposure to sewage waste, infectious diseases such as measles, TB and HIV/AIDS ;
- Conduct of construction workforce; bad relationships between community members/ Eskom workers and Eskom Construction workers can result in issues such as sexual misconduct and the spread of diseases;
- Theft of material from camps and construction sites;
- Negative attitudes towards the project and the formation of community groups, NGO's, in response to the project;
- Land owners denying contractors access to their properties ;
- Loss of land leading to economic losses;
- Security concerns as a result of the presence of workers on properties and communities during construction and during the operational phase for maintenance;
- Safety of community members/farm workers/animals during construction and maintenance;
- Loss of sense of place/income on – Tourists want to see the Coastal Fynbos be protected on the site;
- Decrease in property values due to the visual impacts of substation and power lines as well as the perceived impacts of electromagnetic fields on humans and animals;

Positive Impacts

- Increase in the voltage stability;
- An assurance of a reliable electricity supply (positive);
- No more backlogs in electricity connections (positive);
- The inadequate provision of electricity to services such as health facilities will cease (positive);

- Job opportunities created during construction and operational phases.

Social Impacts identified for the project:

- *Tourism*
  - The clearing of vegetation to provide for the construction of the substation, thereby creating a scar effect in the landscape;
  - Cumulative impacts with regard to expanding the corridors of existing power lines to accommodate the additional power lines connecting the substation to the power station;
  - Possible effect of the construction of the substation on sensitive viewers, particularly:
    - Travellers on the R27, especially tourists;
    - Tourist areas, impact on visitors to Koeberg and negative image created;
    - Scenic spots.
- *Social*
  - Perceptions and fears associated with the proposed substation and power lines;
  - Local, site-specific issues (during construction and operation phases);
  - Job seekers and opportunities for theft;
  - Security issues;
  - Loss of sense of place; and
  - Spread of deseases.

8. ALTERNATIVE PREFERENCE RATING FROM A SOCIAL POINT OF VIEW

Figure 2: Weskusfleur substation **-** The two sites (Alternative 1 and Alternative 4) that were considered in this study – site 1 is the GIS small full colour blue block and site 4 is the AIS brown full colour block. The blue rectangular bock at site one not coloured in is to show if an AIS was to be considered at site one with the purple

Alternative 1 - Located at the north-east corner of the KNPS for the 400kV yard, and the southern part of the parking area south of the incoming 400kVlines for the 132kV yard. Land use in this site is utility as it is close to the KNPS. The site is the border of the Koeberg Nature reserve and may cause social impact in the sense of visual aspects. On this site the social impact will be mainly to the Eskom's employees as the parking lot and security gates will have to be moved. Due to the sites close proximity to the ocean the pollution to is extremely high.

Alternative 4 - Offsite option to the east of the R27 on the Farm Brakkefontein 32. The site may have social impacts on the farmers (land owners) living in the area.

8.1 Substation Technology Alternative

Apart from site alternatives the proposed project also looks at different substation technology. There are several technologies that can be used in a substation development, although for certain of the site alternatives only one technology type is currently investigated. A variety or combination of designs is also likely to be utilised for construction of the substation, depending on the characteristics and needs of the land and communities concerned. The final substation design will be decided based on the selected site.

8.1.1 Gas Insulated Substation/Switchgear (GIS)

Gas Insulated Substation uses sulphur hexafluoride (SF6) gas which has superior dielectric properties used at moderate pressure for phase to phase and phase to ground insulation. In GIS the high-voltage conductors, circuit breaker interrupters, switches, current transformers, voltage transformers and lightning arresters are encapsulated in SF6 gas inside grounded metal enclosures

The (GIS) contains the same compartments as in the conventional outdoor substations. All the live parts are enclosed in metal housings filled with SF6 gas. The live parts are supported on cast resin insulators. Some of the insulators are designed as barriers between neighbouring modules such that the gas does not pass through them. The entire installation is sub divided into compartments which are gas tight with respect to each other. Thereby the gas monitoring system of each compartment can be independent and simpler.

Figure 8.3: Gas insulated Substation (*Source: http://kiran111.hubpages.com/hub/Gas-Insulated-Substation 24-06-2013)*

Advantages of GIS

- Occupies less space ;
- Is preferable in area where space is an issue e.g. cities;
- It has less fault outages;
- Reduced impact on Nature .e.g. construction size dimensions will be minimised and thus less impact;
- Less noisy as all the equipment is enclosed and the SF_6 is an efficient noise absorber;
- Electric fields are negligible in the immediate vicinity of the substation due to the shielding effect of the earthed enclosure;
- Less seismic vulnerable

Limitations of GIS

- Not easily expandable;
- Not easily accessible for repairs, a compartment needs to be completely broken to reach the faulty part;
- All parts are manufactured by the same manufacturer, thus they have an equal life expectancy.

Locations where Gas Insulated Substation is preferred:

- Large cities and towns
- Under ground stations
- Highly polluted and saline environment Indoor GIS occupies very little space
- Substations and power stations located Off shore
- Mountains and valley regions

8.1.2 Air Insulated Substation (AIS)

AIS is a conventional open space substation that is constructed according to standardized minimal distances (clearance) between phase and earth. Normally used for outdoor substations and in very few cases used for indoor substations. The substation is based on single power system equipment's and thus replacement of single equipment by equipment's from other manufacturers is possible. The substation is easily accessible and expandable.

Figure 8.4: Air Insulated Substation *(Source: http://www.foxitsoftware.com)*

Advantages of AIS

- Air is used as a dielectric;
- Easily expandable;
- Excellent overview, simple handling;
- Easy access for repair,
- Life of station is longer, the older parts can be easily replaced. Not all parts of the station age at the same time

Limitations of AIS

- Circuit breakers cause a high level of momentary noise when operated;
- Large construction dimensions due to statutory clearances thus more impact on Nature;
- Insulation deterioration with ambient conditions and susceptibility to pollutants;
- Electric field levels inside the substation fence are more or less the same intensity as the electric fields associated with outgoing and incoming transmission lines;
- Seismic instable, more vulnerable to damage by earthquakes;
- Regular station maintenance required;
- Uses a large area/space;
- Life of steel structures degrades

8.2 ALTERNATIVE SITES COMPARISON

ALTERNATIVE 1	ALTERNATIVE 4
Alternative 1 is located at the North east corner of the KNPS for the 400kV yard and the southern part of the parking area south of the incoming 400kV lines for the 132kV yard. • Located approximately 250 m from the Koeberg Power Station and a part of the site is partially transformed. This site is the closest to Koeberg power station with an existing HV yard, thus line deviations will be shorter; • All lines will come from one side, thus lines will stay almost completely within the Koeberg security area; • No crossing of transmission lines will be necessary; • Utilises a large portion of the existing lines which has known reliability; • 400KV and 132KV substations split AIS configuration as well as GIS combined configuration. ***Disadvantages*** • Limited space for future lines and narrow servitude means taller structures; • Little useable land left for future expansion (especially because of close proximity to ocean which blocks lines on west side); • Space constraints are increased because it is not allowed to construct underneath existing lines: Construction underneath the existing lines is not viable because the current vertical clearance underneath the 400kV lines is 8.1m as per SABS 10280 specification. The height of the 500kV gantries proposed for the AIS will infringe the phase-to-earth clearances causing flashovers. Picking up AIS equipment with cranes or truck-mounted cranes will also infringe on the required phase-to-earth	Alternative 4 is located on private property that has been intensively invaded by alien vegetation. Is the offset option to the east of the R27 on the farm Brakke Fontein 32. • 400KV and 132KV substations combined AIS with existing GIS combination or 400KV and 132KV with AIS only; • Very few transmission line crossings are needed but there is a lot more space to accommodate this; • Further from the R27, thus less visual impact; • Sufficient space; • Provides possibility of keeping existing GIS after integration with the new AIS and swap between the AIS and GIS if there is a problem with one; • Suitable overhead line route for the connection from the Gen Transformers to the new 400kV yard. (New lines might be required due to the 400kV insulation level requirement); • Existing 400kV lines can be used for the connection from the Station Transformers to the new 132kV yard; • The AIS only options without the existing GIS will allow for the removal of a few lines after completion of the project when the new yard has proven reliability; • Within the 5km restriction zone of Koeberg and allowed since it supports the operation of Koeberg. ***Disadvantages*** • Longer distance from Koeberg means longer lines from generation transformers to the new yard (two new lines need to be built at 500kV level to accommodate construction outage requirements

clearances and will lead to serious injury or death of the workers. Similarly construction of buildings (for housing the GIS) underneath the lines will infringe on the clearance requirements. The following also have reference in terms of this disadvantage: A GIS alternative in the parking area has been proposed by the City of Cape Town. Contrary to the initial perception, as raised during the Focus Group meeting on 13 August 2013, construction of the GIS on the parking area is not an option as the existing power lines cross the entire parking area and an equally large area to the north of the parking area; • Marine pollution and heavy corrosion; • The 400kV AIS yard, as well as the combined 400kV and 132kV GIS yards, enters the sand dune area; • The large 400kV AIS yard enters the sand dune area extensively; hence a buffer would have to be designed in order to prevent the sand from covering the yard stone in the Substation; • The area surrounding Koeberg has high levels of ground water; • The 400kV AIS yard extends over the proposed Nuclear 1 site and has a very large footprint <u>Pre-requirements</u> • Move of existing parking lot, security gates and buildings etc; • Connection space for overhead connection to generators is limited and the connection type should be checked for acceptance from the NNR; • Outage requirements will be at least one week per out-going line for swap over during construction as well as a month per generator transformer for the swap over to the cable/overhead gantry connections;	as well as the move of the 132kV dedicated supply line); • Longer deviations from existing lines to the South; • The GIL ducts to substation will be too long; • New Lines might be required for the Gen Transformer connections due to the 400kV insulation requirements; • Only AIS is viable. <u>Pre-requirements</u> • 132kV Koeberg-Ankerlig line will have to be shifted North of current position to accommodate 2 (or 3 for future reactor) 500kV line servitudes of 45m each. This will have to be done before construction of the other lines start as this will be the dedicated supply line. The dedicated supply line will have to feed into the new HV yard and can thus be a temporary line until it is turned into the new yard. The last piece of the dedicated line will be cable where it crosses underneath the generator and station transformer lines; • The 400kV Ankerlig Sterrekus line will have to be deviated around the yard's position to minimize line crossings. In its current position it will cross underneath 14 lines and after deviation will cross underneath only 3 lines. This might be possible before the line construction starts; • The connection of the generator transformers via overhead lines will have to be further investigated with an accurate survey to avoid the use of 400kV cables as far as possible; • 132kV double circuit Koeberg-Dassenberg line will have to be deviated around site; • Outage requirements will be at least one week per out-going line for swap over during construction as well as a month per generator transformer for the swap over to the

• The AIS alternative will have massive implications during constructability phase on security at Koeberg, cost implications due to move of parking lot, entrance gates etc. and is therefore not viable due to constructability concerns; • The GIS alternative is a viable alternative due to the small size and deviation of lines which is constructible.	cable/overhead gantry connections.

8.3 Impact Assessment Methodology

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise as a result of the proposed Weskusfleur substation and associated infrastructure and compare this between the 2 sites. The process of assessing the impacts of the project encompasses the following four activities:

- Identification and assessment of potential impacts;
- Prediction of the nature, magnitude, extent and duration of potentially significant impacts;
- Identification of mitigation measures that could be implemented to reduce the severity or significance of the impacts of the activity; and
- Evaluation of the significance of the impact after the mitigation measures have been implemented i.e. the significance of the residual impact.

The possible impacts associated with the project were primarily identified in the Scoping Phase through on-site and desktop study and public consultation. In the Impact Assessment Phase, additional impacts will be identified through the more in-depth specialist investigations to be undertaken and through the ongoing consultation process with interested and affected parties.

In accordance with Government Notice R.543, promulgated in terms of section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), specialists will be required to assess the significance of potential impacts in terms of the following criteria:

- Cumulative impacts;
- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Impact non-reversibility;

- Impact on irreplaceable resources; and
- Confidence level.

Issues will be assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected and how it will be affected;
- The physical **extent**, wherein it is indicated whether:
  - 1 - the impact will be limited to the site;
  - 2 - the impact will be limited to the local area;
  - 3 - the impact will be limited to the region;
  - 4 - the impact will be national; or
  - 5 - the impact will be international;
- The **duration**, wherein it is indicated whether the lifetime of the impact will be:
  - 1 - of a very short duration (0–1 years);
  - 2 - of a short duration (2-5 years);
  - 3 - medium-term (5–15 years);
  - 4 - long term (> 15 years); or
  - 5 - permanent;
- The **magnitude of impact on ecological processes**, quantified on a scale from 0-10, where a score is assigned:
  - 0 - small and will have no effect on the environment;
  - 2 - minor and will not result in an impact on processes;
  - 4 - low and will cause a slight impact on processes;
  - 6 - moderate and will result in processes continuing but in a modified way;
  - 8 - high (processes are altered to the extent that they temporarily cease); or
  - 10 - very high and results in complete destruction of patterns and permanent cessation of processes;
- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale where:
  - 1 - very improbable (probably will not happen;
  - 2 - improbable (some possibility, but low likelihood);
  - 3 - probable (distinct possibility);
  - 4 - highly probable (most likely); or
  - 5 - definite (impact will occur regardless of any prevention measures);
- the **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- the **status**, which is described as either positive, negative or neutral;
- the degree to which the impact can be reversed;
- the degree to which the impact may cause irreplaceable loss of resources; and

- the degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M)*P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- **30 - 60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

Phase	Impact	Alternative 1		Alternative 4		Alternative 4 Power Line Corridor	
		With Mitigation	Without Mitigation	With Mitigation	Without Mitigation	With Mitigation	Without Mitigation
Construction	Influx of job seekers	8	14	30	60	35	55
	Health Impacts	10	12	35	50	26	30
	Conduct of construction workforce	3	5	30	45	18	25
	Theft of construction material	2	3	29	36	10	15
	Negative attitudes towards the project	2	4	40	70	31	65
	Land owners denying contractors access to their properties	1	1	45	80	35	75
	Loss of land leading to economic losses	2	3	40	65	37	62
	Security concerns for neighbouring land/farm owners	5	10	25	33	25	33

	Safety of community members/farm workers/and animals	4	6	31	48	31	48
	Decrease in property values due to the visual impacts of substation and power lines	2	2	44	64	30	61
Operation	Influx of job seekers	6	7	20	50		
	Conduct of maintainance workforce	2	4	15	33	22	50
	Negative attitudes towards the project	2	2	30	43	25	37
	Land owners denying contractors access to their properties	1	1	14	28	26	32
	Security concerns for neighbouring land/farm owners	3	5	29	32	26	38
	Safety of community members/farm workers/and animals	2	4	30	44	30	50
	Increase in the voltage stability		80		80		75
	An assurance of a reliable electricity supply		70		70		65
	No more backlogs in electricity Connections		65		65		63
	The provision of electricity to services such as health facilities will cease		85		85		80
Decommissioning	Influx of job seekers	4	5	10	13	2	4
	Health Impacts	8	16	20	31	12	28
	Conduct of workers	2	4	12	31	10	26
	Theft of material	14	28	26	38	6	10
	Security concerns for neighbouring land/farm owners	2	2	14	30	12	25
	Safety of community members/farm workers/and animals	2	4	26	31	10	30
Cumulative	Loss of land leading to economic losses	2	2	45	75	32	63
	Decrease in property values due to the visual impacts of substation and power lines	2	2	36	68	31	62
	Increase in the voltage stability		85		85		80

Impacts in summary:

Alternative 1 – GIS:

- Occupies less space ;
- Reduced impact on nature (smaller footprint);
- Less visual impact (construction to be within the existing KNPS)

- Less noisy, as all the equipment is enclosed;
- Eskom owned land
- Shorter construction time – **30 months**
- Fewer people to be employed during construction phase - **110 Total (civil works only)**

Alternative 4 – AIS:

- Occupies greater space – footprint;
- Increased impact on nature area perception or sense of place(larger footprint);
- More visual impact (construction to be close to the national route R27 - impact on tourism)
- Exposed, more noisy
- Private owned land
- Longer construction time – **42 months**
- More people to be employed during construction phase - **160 Total (civil works only);**
- Greater possibility for job seekers – they see new construction is taking place.

8.4 Site selection methodology and outcome:

The evaluation and nomination of a preferred site involves a highly interdisciplinary approach. The approach undertaken has involved a number of specialist studies which examine a number of different issues. In order to evaluate sites and determine a preferred site, the studies need to be comparative and therefore a site rating matrix was developed. The site preference rating system is applied to each discipline, and the rating of each site is conducted according to the following system:

1 = Not suitable for development / No-Go (impact of very high significance - negative)
2 = not preferred (impact of high significance - negative)
3 = acceptable (impact of moderate significance - negative)
4 = Preferred (impact of low or negligible significance - negative)

While each specialist study is required to have the Site Preference as an outcome, how it is evaluated each site will vary from discipline to discipline and the description of the specific approaches are outlined in each specialist report.

Site preference Rating	Criteria
Preferred (4)	• No community within 1,5 km; • With the minimum farm houses and labour accommodation; • Minimum total of people movement close to site; • Close to the source and KNPS.
Acceptable (3)	• on the borders of sparsely populated areas; • minimum total of people movement. • distance between source and existing KNPS
Not Preferred (2)	• on the borders of densely populated areas, closer than 1,5 km; • high density farming activities and total people movement; • Far from the source and existing KNPS
No-Go (1)	• dense populations where relocation may be necessary; • high farming population, labourers and accommodation • high total of people movement close to the site

Outcome:

Study	Alternative 1	Alternative 4
Social	**4**	**2**

Site alternative 1 fulfils all the important criteria – no community, no private land or farm houses and close to KNPS within the high security area.

9. RECOMMENDED MITIGATION MEASURES

The following mitigation measures are recommended as a response to the environmental impacts envisaged:

- Influx of job seekers, mainly unskilled labour, from the communities around the power line route having job expectations.
    - Identify all labour requirements before construction starts;
    - Identify possibilities and creation of a liaison desk 4 months before construction starts;
    - Communication strategy well in advance of project start.
    - Ensure that there is a Community liaison officer from affected communities and together with them study possibilities of jobs for community members e.g vegetation clearing, food vendors in line with the current practices at KNPS;
    - Where the jobs have been identified, these must also be formalised through issuing of permits to avoid conflicts within the community and to avoid loitering;
    - Where possible, ensure that all interested community members get an opportunity to work on the project during construction e.g for vegetation clearing, each community member

can be allocated a period of working and when this period elapses, other community members should be given an opportunity to also work and generate some impact.
- Have clear rules and regulations for access to the camp / site office to control loitering. Consult with the local SAPS to establish standard operating procedures for the control and/or removal of loiterers at the construction site
- Ensure that community members are aware of the possible results of loitering before construction starts

- Health impacts from construction sites and camps as a result of.
  - ***Exposure to sewage***;
  - Construction workers are prohibited from using their surroundings to relieve themselves
  - Pit latrines are prohibited on the construction camps or sites. Only mobile or portable toilets shall be used and these must be sufficient for all workers at a ratio of 1 toilet to 15 persons and provided with toilet paper;
  - The toilets shall be emptied and cleaned regularly and the contractor shall ensure that waste is not spilled. This can be done through measures such as covering the ground with a water proof material;
  - The toilets and their tanks shall be serviced on a regular basis and where necessary replaced;
  - Construction workers are required to be treated for worms;

  - ***Waste***
  - Littering on site should be prohibited and the ECO should inspect this;
  - Fines could be implemented for littering;
  - Waste shall be collected at regular intervals in sealed containers that will be removed from site and camps before overflowing. The containers will then be disposed of at recognized facilities. The waste shall be separated before removal from the site and any reusable or recyclable waste identified;

  - ***HIV/AIDS***
  - An intense HIV/AIDS and STI awareness campaign should be launched. These should be directed at all construction workers and communities as well.

  - **Other diseases e.g. TB, measles**
  - All construction workers should be treated for these and proof of this should be retained.

- Conduct of construction workforce; Good relationships between community members/ farm workers and Eskom Construction workers can result in issues such as sexual misconduct and the spread of diseases;
  - In the Environmental Management Plan (EMP) ,state that no unauthorised personnel are to enter the site without permission from the site officer/ Environmental Control Officer (ECO);
  - An Environmental Control Officer (ECO) must be appointed to ensure contractors conduct themselves in an appropriate way. A fining system for non-compliance must be set in place

- Conduct of construction workforce; Bad relationships between community members/farm workers and Eskom Construction workers leading to violence due to possible perceived stock theft etc.;
  - In the Environmental Management Plan (EMP) ,state that no unauthorised personnel are to enter the site without permission from the site officer/Environmental Control Officer (ECO);
  - An Environmental Control Officer (ECO) must be appointed to ensure contractors conduct themselves in an appropriate way. A fining system for non-compliance must be set in place;
  - Liaising with the local police and having security personnel on the site will ensure that any possible eruption of violence can be avoided

- Theft of material from camps and along construction sites
  - Fencing shall be erected around the construction camp and access shall be controlled through a lockable gate and security personnel in the case if site 4 is preffered The fence shall be constructed of high quality material bearing the SABS mark. Furthermore, the fence shall be inspected on a daily basis and any damages should be fixed as soon as it is practicable. To increase security, shade cloth can be attached to the fence and similar to the fence, shall be inspected daily and fixed as soon as it is practicable. Storage facilities shall be lockable;
  - In addition to the above, all persons or vehicles entering or leaving the construction camp shall be subjected to a search;
  - At each site, ensure that there is security personnel

- Negative attitudes towards the project and the formation of community groups, NGO's, in response to the project
  - Ensure that there is on-going communication with the affected parties and provide contact details of persons that they can contact should they have queries or comments about the project;
  - Highlight the benefits of the project

- Loss of land leading to economic losses;
  - Where possible, power line towers should be located along the boundary of the farm to lessen the loss of land;
  - Loss of some land may be temporary and will only be during the construction phase as some activities such as grazing can still occur below the power line after construction has ended; in addition after construction, land will be rehabilitated to as close as possible to its original status;

- Impacts on farming activities such as sowing, harvesting, and fire management programmes leading to economic losses;
  - Construction should not take place during seasons when there is likely to be high activity on farms e.g. In the case of sowing, construction can occur before this happens, and in the case of harvesting, construction can occur after this has taken place.

- Security as a result of the presence of workers on properties and communities during construction and during the operational phase for maintenance
  - Advice landowners and community members about construction and maintenance dates;
  - Advice landowners and community members about the number of workers expected;
  - Upon arriving in a community or farm, workers must inform the community leader and farm owners or managers respectively;
  - Ensure that construction workers are easily identifiable by construction uniform with logos and identification cards with logos and a photograph of the worker. Construction vehicles must also be marked;
  - Construction workers should also carry their Identity documents with them and the land owner should be allowed to inspect these;
  - The landowner should be allowed to check the identification cards and note the names of construction workers present on site;
  - Provide the landowners and community members should be provided with contact details of Eskom and the local SAPS to report any suspicious behaviour on their property as well as the presence of what seem to be unauthorised

- Safety of community members/farm workers/animals during construction and maintenance;
  - ➢ Ensure that the construction sites and camps are fenced off and signage, in local languages, placed in a conspicuous place near the construction sites;
  - ➢ Liase with community leaders/farm owners to ensure that they warn community members/farm employees of the possible dangers of moving close to the construction sites;
  - ➢ Ensure that animals are secured during construction for their safety as well as that of construction workers

- Perceived electromagnetic fields impacts on humans and animals during the operational phase
  - ➢ Inform communities and landowners about the perceived impacts of power lines;
  - ➢ Ensure that there are no developments below the power line so that although;
  - ➢ adverse impacts are uncertain, communities are not paces at risk;
  - ➢ On farms ensure that no buildings either for human or animal habitation are placed below power lines

- Decrease in property values due to the visual impacts of the substation and power lines as well as the perceived impacts of electromagnetic fields on humans and animals
  - ➢ Vegetation can be used to screen the power lines;
  - ➢ Other measures can be discussed with Visual Impact Specialist

- All mitigation measures in EMPr must be adhered to

10. CONCLUSION

PREFERRED SITE

ALTERNATIVE 1 – GIS:

- Social impacts on communities low – either positive/negative;
- Mainly already disturbed land;
- No additional site staff;
- Smaller footprint and thus small impact on visitors/tourists;
- Remain status quo during operation – due to the close proximity to KNPS;
- Tourism – visual close to KNPS thus no new visual disturbance;
- Nature Reserve and sense of place not disturbed;

In summary:

Social and tourism impact mainly indirect especially for site 1 due to the fact that it is situated in the high security area next to KNPS.

In general grid stability and power supply is in national interest.

Tourism – visual and development areas: development for site 1 is mainly combined with existing development and thus does not create fragmentation.

Direct social and tourism impact insignificant in this site alternative.

ALTERNATIVE 2 – AIS:

- Social impacts on communities low – either positive/negative;
- Additional site staff – security as well as maintenance;

- Large footprint and visually intrusive (6,1 hectares with lines included);
- New office, maintenance as well as security on site;
- Tourism – impact on landscape and proliferation of development areas;
- Direct social impact on land owners – lines will necessitate removals and relocating the landowners.

Social impacts are more direct with alternative site 4 in that certain landowners will directly be affected. From the R27 a new visual impact will be highly dominant due to the type of structures used in the AIS design. Also the mere size will dominate the surroundings that will influence social and tourism negatively.

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