



## Eskom Holdings SOC Limited

### SOCIAL IMPACT ASSESSMENT, FOR THE PROPOSED CONTINUOUS DISPOSAL OF ASH AT THE TUTUKA POWER STATION, MPUMALANGA PROVINCE



**DEA EIA Reference Number:**

14/12/16/3/3/3/52

**And**

**NEAS Ref Number:** DEA/EIA/0001416/2012

**Date:**

June 2014

**Report Version:**

Final



**Submitted by:**  
**Lidwala Consulting Engineers (SA) (Pty) Ltd**  
1121 Hertzog Street, Villieria, Pretoria, South Africa  
P.O. Box 32497, Waverley, Pretoria, 0135

**Represented by:** Frank van der kooij

Tel: +27 11 793 5486

Cell: +27 82 890 1918

Email: [environmental@lidwala.com](mailto:environmental@lidwala.com)

Website: [www.lidwala.com](http://www.lidwala.com)



---

<i>Contents</i>	<i>Page</i>
<b>1. INTRODUCTION</b>	<b>1</b>
<b>2. DETAILED DESCRIPTION OF THE PROJECT</b>	<b>4</b>
<b>3. METHODOLOGY</b>	<b>5</b>
<b>4. GENERAL SOCIAL IMPACTS EXPECTED THROUGH PROJECT CYCLE</b>	<b>8</b>
4.1 Construction/Implementation	8
4.2 Operation	8
4.3 Decommissioning	9
<b>5. DESCRIPTION OF THE SOCIAL ENVIRONMENT</b>	<b>10</b>
5.1 Provincial demographic profile	10
5.2 District demographic profile	11
5.3 Local demographic profile	12
<b>6. SUMMARY OF THE SOCIAL ENVIRONMENT</b>	<b>14</b>
<b>7. SOCIAL IMPACTS ENVISAGED</b>	<b>15</b>
<b>8. ALTERNATIVE PREFERENCE RATING FROM A SOCIAL POINT OF VIEW</b>	<b>17</b>
<b>9. RECOMMENDED MITIGATION MEASURES</b>	<b>19</b>
<b>10. CONCLUSION</b>	<b>20</b>

## **1. INTRODUCTION**

Tutuka Power Station, located in Mpumalanga (approximately 25 km north-north-east (NNE) of Standerton), is a 3 654MW installed capacity base load coal fired power station, consisting of six units. The power station is a major stabilising link to the KwaZulu-Natal network and produce  $\pm 9\%$  of South Africa's electricity supply. Sixty percent of the coal used for the generation is supplied by the New Denmark underground coal mine and the remaining 40% by road from 14 different mines.

The power station employs 929 permanent Eskom workers,  $\pm 200$  shift workers and  $\pm 822$  contract workers. The majority (95%) of workers reside in Standerton, with the remaining 5% living in Secunda, Bethal and Morgenzon.

Ash is generated as a by-product due to the combustion of coal for electricity generation from the power station. Tutuka Power Station currently disposes of ash (produced from the combustion of coal) in a dry format by means of conveyors, a spreader and a stacker system from the station terrace to the existing ash disposal site. Eskom Holdings SOC Ltd (Eskom) requires an ash disposal facility with an area of 759ha in order to ash for the remainder of Tutuka Power Station's life. Ideally, Tutuka Power Station envisages the continuation of dry ash disposal from the existing ash disposal facility and over the remaining portion of Eskom-owned land. Such land was purchased before the commencement of environmental laws, in particular the Environment Conservation Act (i.e. prior to 1989). As part of its planning processes, Eskom developed designs which were approved internally. With the promulgation of the environmental laws, and the National Environmental Management Waste Act, 2008 (Act 59 of 2008), in particular, Eskom would like to pro-actively align its continued ashing activities with the requirements of the waste licensing processes.

A Social Impact Assessment (desktop study) was undertaken during the Scoping and site visits conducted as part of the public participation process in the Environmental Impact Assessment (EIA) phases of the application for environmental authorisation. 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 an ash disposal facility, which would not otherwise have occurred. The development is perceived as not positive, as an ash disposal facility is a waste facility and waste has negative social impacts if not managed properly.

An 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 the case of the proposed continuous Tutuka ash disposal facility, no large communities are affected in a different way than they already are affected by the existing ash disposal facility over many years. What this in essence means is that no measurable change or social impact is expected when Eskom simply continues its proposed ash disposal operations as normal to accommodate for ash disposal for the remaining life of the power station.

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 on the social side with the continued extension of the ash disposal facility. 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 – an existing ash disposal facility with its current impact over the years. On a micro level individuals may be impacted directly and long term impacts may continue.

It should be emphasised that no impact assessment – whether environmental or social – can supply wholly accurate results. This is due to the fact that the causes and effects of environmental and social 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 judgement. 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.

Some direct, unavoidable impacts on the farm land, by extending the dam on agricultural land (as would be the case for the alternative sites), will most definitely occur and will have an impact on farmers adjacent to the site. Environmental impacts that will have an impact on the social environment may include water pollution and air emissions.

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

- **Bongi Mhlanga and Nicolene Venter** – public participation, site visits and information input to process;
- **Moseketsi Mochesane** – research of social data and report compilation;
- **Hilda Bezuidenhout** – report compilation; and
- **Frank van der Kooy** – report compilation, site visit and social verification process.

## 2. DETAILED DESCRIPTION OF THE PROJECT

The project involves the proposed continuous ash disposal for the Tutuka Power Station in Mpumalanga Province.

The coal-fired power generation process results in large quantities of ash, which are disposed of, by means of dry ash disposal, in an ash disposal facility. This process involves ash being transported from the power station by conveyors and disposed of at an ash disposal facility by means of a stacker (Figure 1).



**Figure 1:** Stacker being used to dispose of ash at the Tutuka Power Station

The development has the following specifications:

- Capacity of airspace of 353,1 million m<sup>3</sup> (Existing and remaining); and
- Ground footprint of 2 500 Ha (Existing & Remaining ash disposal facility & pollution control canals)

This proposed continuous ash disposal facility will be able to accommodate the ashing requirements of the power station for the next 44 years, from 2012 to 2055, which is the life of the station. Three alternative sites were identified during the scoping phase of the EIA process. The ash disposal facility will continue from the existing ash facility, all on Eskom's land, within the originally planned ashing area.

### 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. 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. 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 and settlements that may be directly affected by physical proximity to the proposed project;
- Communities and settlements 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 ash disposal facility and associated infrastructure.

The SIA drew on information obtained during the public participation process. Consultation with stakeholders in particular enabled the project team to identify potential issues, expectations and perceptions regarding the proposed development. 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 also included the Lekwa Local Municipality (LLM) Integrated Development Plan (IDP), the Gert Sibande District Municipality (GSDM) IDP, the Census 2011 Municipal Report for Mpumalanga, locality maps, aerial photographs and the EIA Scoping Report.

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

Information from these sources was used to determine what possible social impacts an extension of ashing facilities of this magnitude may have on the social environment.

- *Social baseline assessment*

The objective of this phase was to determine the social variables and characteristics that were likely to result in the project impacting on the lives of people. 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, future aspirations of individuals, 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 was made to proceed with the project and environmental authorisation was granted after the completion of an EIA. For typical construction projects this involves clearing land, building access roads, developing construction camps, etc.

Resettlement and relocation of people, if necessary, typically 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 schools, health facilities, housing and other social services. Further stresses may be created by resentment between newcomers and long-time residents, by sudden increases in the prices for housing and local services, competing for employment opportunities 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. Due to the nature of this project none of the above is relevant in this case. Construction, operation and rehabilitation will run more or less parallel, as the facility advances. No additional staff will be employed, so no strain on any community will arise from a so-called influx of migrant workers.

### **4.2 Operation**

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 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.

In this case the power station will continue its operations as normal. No changes will occur in communities due to the continuation of Tutuka ash disposal operations. It might, however, have an impact on farm workers due to the loss of land for agricultural processes. Due to the

fact that the land is owned by Eskom no significant impact is expected. This issue also was never discussed or questioned during the public participation process.

### **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, for example. In the case of the ash disposal activity rehabilitation takes place as the facility advances.

The impacts during decommissioning vary depending on the nature of the project. The impacts of the decommissioning of a power line, for example, will not be of the same magnitude as the impacts of decommissioning of larger developments such as power stations. The closure, as mentioned above, occurs concurrently with the construction and operational phases, as the facility advances. The social impact of the power station closure is dealt with at another level and the closure of the final ash disposal facility will form part of the overall closure planning of the power station.

The above mentioned impacts are general impacts that are expected for a new development, the project specific impacts are discussed in section 7 of this report.

## 5. DESCRIPTION OF THE SOCIAL ENVIRONMENT

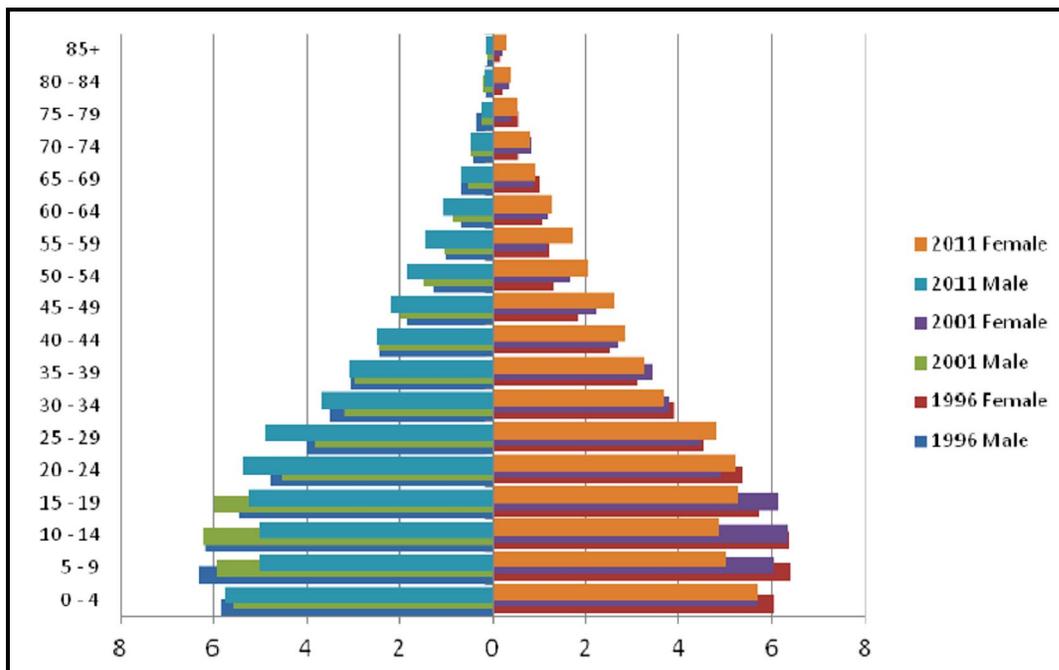
Demographic information of the area was obtained from the sources discussed in the section on Methodology in this report (Section 3).

The proposed extension of the ashing facility will take place within the Lekwa Local Municipality (LLM) which is located in the south western part of the Gert Sibande District Municipality (GSDM), in Mpumalanga Province ([www.lekwalm.gov.za](http://www.lekwalm.gov.za)).

### 5.1 Provincial demographic profile

Mpumalanga Province has a population of 4 039 939 (Census 2011 Municipal Report – Mpumalanga). The province’s unemployment rate is listed in the Census 2011 results as 31.9%, substantially higher than the most recent national unemployment rate of 25.6%.

Most residents of the province (both males and females) fall within the age group 0-29 years. In the last 10 years (2001 to 2011) the population has aged to some extent, with numbers of female residents slightly decreasing in the age group 5-19 years and slightly increasing in the age group 45-59 years. Male residents’ numbers also decreased slightly in the age group 5-19 years, but increased most in the age groups 20-29 years old (Census 2011 Municipal Report – Mpumalanga).



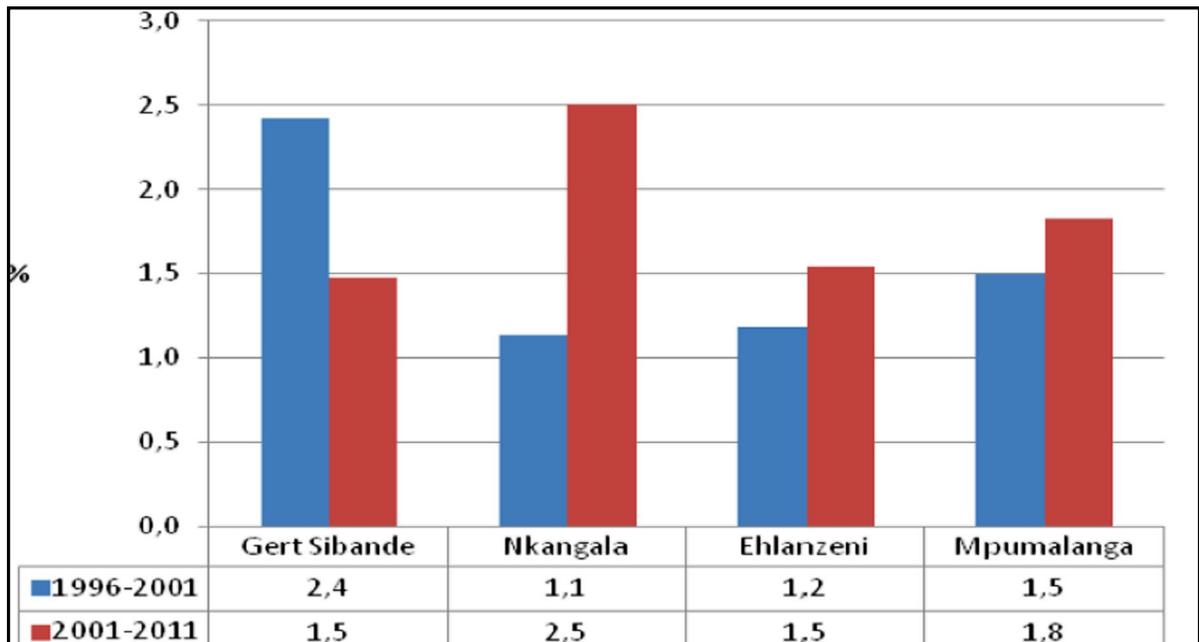
Source: Census 2011 Municipal Report – Mpumalanga

**Figure 2:** Distribution of population by age and sex, Mpumalanga – 1996, 2001 and 2011

An almost identical distribution of age and sex applies to the Gert Sibande District Municipality in the province for the years 2001 and 2011 (Census 2011 Municipal Report – Mpumalanga).

## 5.2 District demographic profile

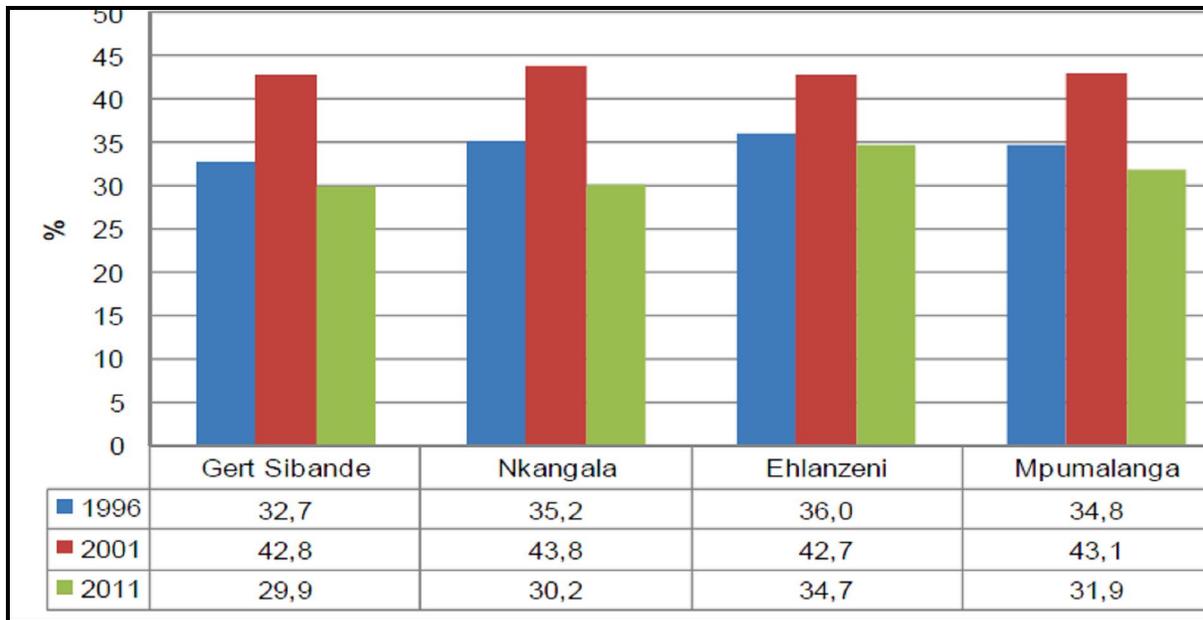
Gert Sibande District Municipality has a population of 1 043 194 and accounts for approximately 27% of Mpumalanga’s population. The district has experienced a drastic decline in population growth between 1996 and 2011, as indicated in Figure 3. This district municipality was the only one in the province to show a decline in growth.



Source: Census 2011 Municipal Report – Mpumalanga

**Figure 3:** Population growth rates by district municipality – 1996, 2001 and 2011

Unemployment rates peaked in 2001 at 42.8% for the GSDM, but fell again to 29.9% in 2011. This is slightly lower than the provincial unemployment rate of 31.9% but still higher than the national unemployment rate of 25.6%.



Source: Census 2011 Municipal Report – Mpumalanga

**Figure 4: Unemployment rate by district municipality – 1996, 2001 and 2011**

The majority of residents in the GSDM are Black/African (88.8%), followed by White (9.1%), Indian/Asian (1.1%) and Coloured (1%) (Census 2011 Municipal Report – Mpumalanga). This is consistent with provincial and national figures.

According to data on the district municipality’s website, the district is sparsely populated when compared to the rest of the province and the country as a whole. More than half of the district’s population (52.8%) and almost two thirds of households (62%) live in urbanised areas. Nearly a third of households (29.7%) reside on farmland, which has placed a lot of pressure on local municipalities in the region to collaborate with farmers in providing land ([www.gsibande.gov.za](http://www.gsibande.gov.za)).

### 5.3 Local demographic profile

The largest town within the Lekwa Local Municipality (LLM) is Standerton. Other towns include Morgenon, Sakhile, Rooikoppen, Sivukile, Azalea, Thuthukani, Meyerville, Stanfield Hill, Holmdene, Platrand and the outlying areas of rural Lekwa. The LLM spans over an area of 4 603km<sup>2</sup> which equates to 14% of the surface area of Gert Sibande District (±31 970km<sup>2</sup>). The area primarily consists of urban residential settlements, significant farmland communities and industrial communities in towns across the LLM. Approximately 85% of the population is settled in urban areas (LLM IDP: [www.lekwalm.gov.za](http://www.lekwalm.gov.za)).



Source: Gert Sibande District Municipality, 2012

**Figure 5: Lekwa Local Municipality within the context of Gert Sibande District Municipality**

The LLM lies on large open plains of the Highveld region that is characterized by tall grass and the Vaal River which flows in a western direction, traversing it. The municipality is named after the Vaal River which is commonly known as Lekwa, the Sotho name for Vaal River (LLM IDP: [www.lekwalm.gov.za](http://www.lekwalm.gov.za)).

According to Census 2011, the population of LLM is 115 663 and comprises 57 648 females and 58 013 males. The LLM's population represents approximately 12% of the total population of the Gert Sibande District. It comprises about 11 communities and approximately 32 241 households. The average density of the region is 26 persons per km<sup>2</sup>.

Standerton and Sakhile represent a combined total of 49% of the total population. The Municipality has an almost equal distribution of female (49.4%) and male (50.6%) inhabitants.

The age distribution in the LLM is as follows: 40.2% of the population is younger than 20 years old and 59% of the population is younger than 30 years old. Only 10.6% of the population is above the age of 50 years. Age related analyses assists in identifying and addressing development areas across generations. The high representation of individuals younger than 20 years old necessitates the creation of opportunities that will absorb the youth early enough so that there will be a significant reduction in dependency on grants and single household income earners.

An estimated 42 687 people in the municipality live in poverty. The estimated number of indigent households is expected to be more than 7 000, with coverage of between 25 000 to 40 000 people as beneficiaries. This makes the municipality economically vulnerable, as less than 35% of the population earns income that subsidises services to the larger population of the municipality. More than 11% of the population earns below R1 000 per month and 23% of the total population earns below R1 500 per month (LLM IDP: [www.lekwalm.gov.za](http://www.lekwalm.gov.za)).

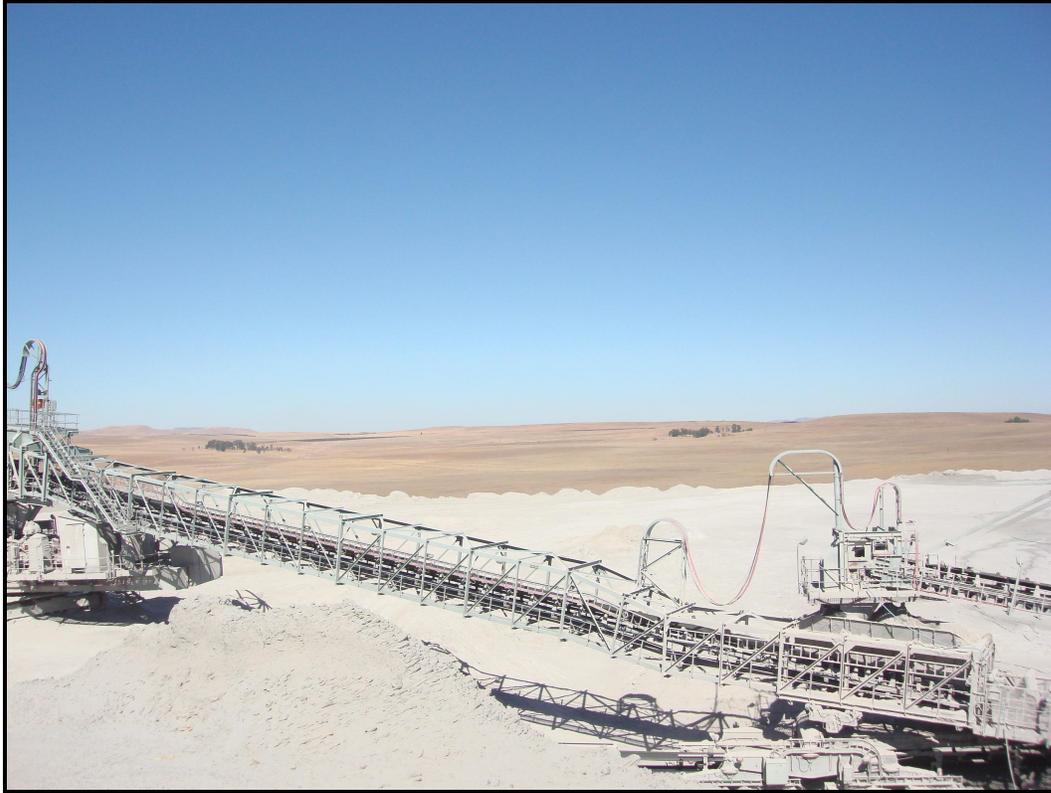
Blacks/Africans represent the largest population group in the municipality at 97 363, in comparison to the smallest population group, which is Indians/Asians at 1 395. About 35,7% of households in the municipality are headed by females and about 0,3% are headed by children.

Standerton provides services for the surrounding mining, agriculture, electricity generation and tourism industries. Agriculture, mining and power generation are the key economic contributors towards the economy of the area. Mining accounts for the largest percentage share of all sectors within the LLM at 21.9%, followed by community services at 17.7% and agriculture at 17.6% (LLM IDP: [www.lekwalm.gov.za](http://www.lekwalm.gov.za)).

## **6. SUMMARY OF THE SOCIAL ENVIRONMENT**

- The Lekwa Local Municipality (LLM) has an almost equal distribution of female (49.4%) and male (50.6%) inhabitants.
- Approximately 85% of the population of the LLM is settled in urban areas.
- 59% of the population in the LLM is younger than 30 years old. The high representation of individuals younger than 20 years old necessitates the creation of opportunities that will absorb the youth early enough so that there will be a significant reduction in dependency on grants and single household income earners.
- The unemployment rate in the district municipality is 29.9%. This is slightly lower than the provincial unemployment rate of 31.9%, but still higher than the national unemployment rate of 25.2%.
- An estimated 42 687 people in the municipality live in poverty. More than 11% of the population earns below R1 000 per month and 23% of the total population earns below R1 500 per month.
- Agriculture, mining and power generation are the key economic contributors towards the economy of the area.

## 7. SOCIAL IMPACTS ENVISAGED



**Figure 6:** Tutuka current dry ashing disposal facility

In 1999 the coal-based power generation industry in South Africa produced approximately 22 Mt of ash each year, most of which is consigned to land disposal (*more recent figures could not be obtained, but it can be accepted that this must have increased significantly, as the electricity demands have increased significantly since 1999*). These coarse and fly ashes and other wastes generated during coal mining and subsequent processing, contain leachable components, which may constitute an environmental risk if they remain mobile and bioavailable (Hansen, Y., Notten, P.J. and Petrie, G.: 2002).

Should there be environmental impacts (such as air and/or water pollution) as a result of the ash disposal facility, this will result in social impacts, and the main one being impacts on health of residents in the vicinity of the facility.

Although it is claimed by some that fly ash is not toxic or poisonous, it is widely disputed. Exposure to fly ash through skin contact, inhalation of fine particle dust and drinking water may present health risks ([http://en.wikipedia.org/wiki/Fly\\_ash](http://en.wikipedia.org/wiki/Fly_ash) ; [http://earthjustice.org/our\\_work/campaigns/coal-ash-contaminates-our-lives](http://earthjustice.org/our_work/campaigns/coal-ash-contaminates-our-lives) ).

The following diseases are considered to be linked to coal ash disposal facilities: increased risk of cancer, neurological disorders, reproductive failure, birth defects, respiratory illness, heart damage, kidney disease, gastrointestinal illness, impaired bone growth in children, learning disabilities, developmental problems, behavioral problems (<http://www.psr.org/assets/pdfs/coal-ash-hazardous-to-human-health> <http://www.blacksmithinstitute.org> )

The toxic pollution from coal ash can build up in exposed animals and plants, causing the pollution to make its way up the food chain when they are consumed (<http://content.sierradub.org/coal/disposal-ash-waste> ).

Potential negative attitudes towards the power station, including the expansion of the ash disposal facility, may prevail. There may also be economic losses if crops in the surrounding areas are affected.

On the positive side, the expansion of the ash disposal facility will enable the power plant to continue functioning, which will in turn ensure a more reliable supply of electricity to the country.

As this project entails the continuation of an existing ash disposal facility, social impacts such as the following will not be considerable, as these impacts would have occurred during the initial construction of the power plant and associated ash facility, if at all: influx of job seekers, bad conduct of construction workers and the impact on surrounding communities, loss of sense of place and decrease in property values.

Social Impacts identified for the project:

- Dust
- Health Impacts as a result of exposure to ash
- Possible relocation (alternative B depending on the distance of the ash disposal facility to settlements in and around alternative B)

## 8. ALTERNATIVE PREFERENCE RATING FROM A SOCIAL POINT OF VIEW

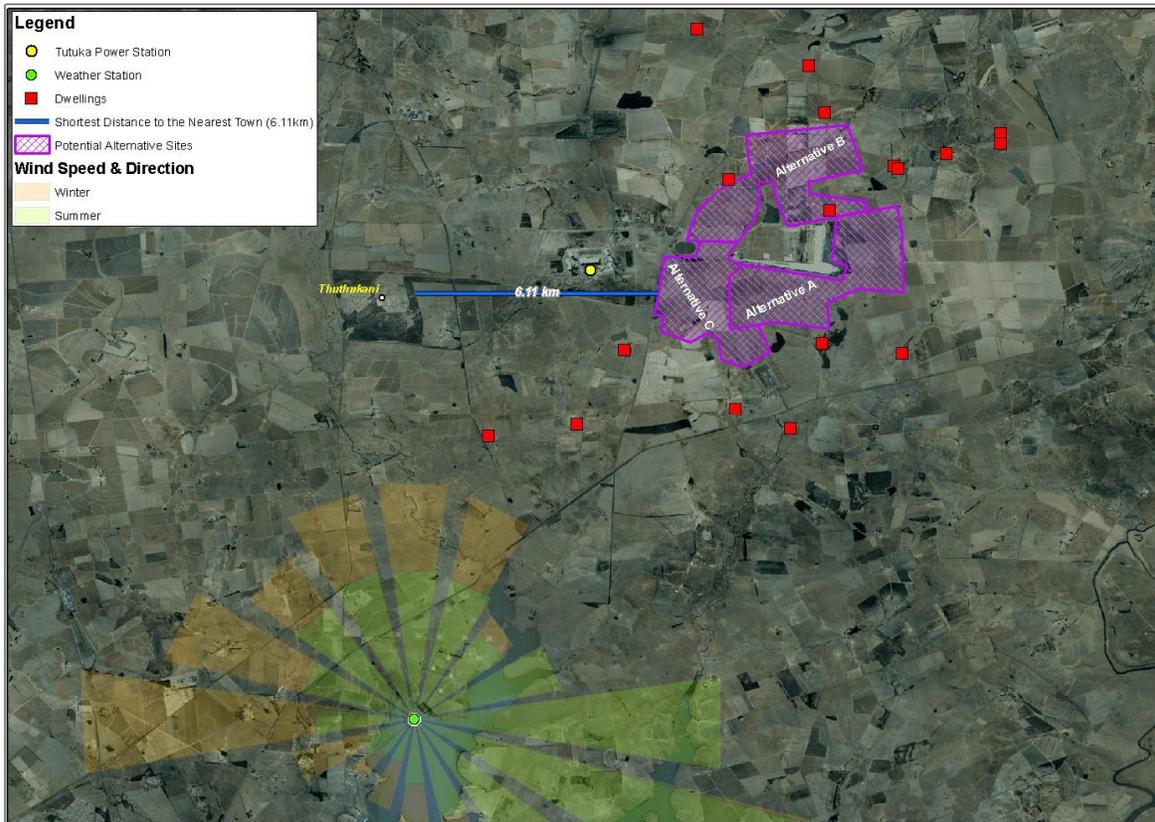
The following factors were identified as relevant to the site preference rating exercise:

- The proximity of communities and farm homesteads to the identified alternative sites, due to potential health impacts relating to receptors in close proximity to the sites;
- The extent of people movement in the proximity of the identified alternative sites;
- Proximity of the source (Tutuka Power Station); and
- Prevailing wind direction in the region of the identified alternative sites.

The criteria listed in Table 1 below were established.

**Table 1:** Site preference criteria

Site preference rating	Criteria
Preferred (4)	<ul style="list-style-type: none"> <li>• No community within 1,5 km;</li> <li>• With the minimum farm houses and labour accommodation;</li> <li>• No communities closer than 3 to 5 km in prevailing wind direction;</li> <li>• Minimum total of people movement close to site;</li> <li>• Close to the source and existing ash disposal facility.</li> </ul>
Acceptable (3)	<ul style="list-style-type: none"> <li>• Communities not closer than 3 to 4 km in prevailing wind direction;</li> <li>• On the borders of sparsely populated areas;</li> <li>• Minimum total of people movement;</li> <li>• Distance between source and existing ash disposal facilities (site needs be close to source).</li> </ul>
Not preferred (2)	<ul style="list-style-type: none"> <li>• On the borders of densely populated areas, closer than 1,5 km;</li> <li>• High density farming activities and total people movement;</li> <li>• Far from the source and existing ash disposal facility.</li> </ul>
No-go (1)	<ul style="list-style-type: none"> <li>• Dense populations where resettlement may be necessary;</li> <li>• High farming population, labourers accommodation;</li> <li>• High total of people movement close to the site.</li> </ul>



**Figure 7:** Tutuka alternatives with farmsteads and distance to Thuthukani

**Alternative A** is on the southern and eastern side of the existing facility and furthest away from the community of Thuthukani. There is one farmstead a few metres away from the border of this alternative site. If the site is chosen it will lead to resettlement of the farmer and that is considered a negative social impact. This site is rated *acceptable* on the basis that there is only one farm house that will be affected as compared to the number of homesteads that will be affected at *Alternative B*.

**Alternative B** is on the northern side of the existing ash disposal facility and there is more than five farmsteads and farm labourer accommodation units, thus more people will be affected by the dust from the facility. The site is rated *not preferred*.

**Alternative C** is on the western side of the existing facility and is closest to the community of Thuthukani. However, the distance between the community and the site is 6.11km, which makes the distance from the site acceptable as per the rating criteria. This site is also closest to the source and therefore this site rated *acceptable*.

**Table 2:** Site preference rating

<b>Study</b>	<b>Alt A</b>	<b>Alt B</b>	<b>Alt C</b>
<b>Social</b>	3	2	3

## 9. RECOMMENDED MITIGATION MEASURES

The following mitigation measures are recommended:

- Because any health and/or social impacts that occur will be as a result of negative environmental impacts (water pollution and/or air pollution), all potential environmental impacts need to be mitigated to prevent any of these environmental impacts from occurring.
- Measures to prevent risks to people, animals and land must be put in place and adhered to, e.g. a liner to prevent chemicals and heavy metals from reaching ground water sources (which in some communities is the source of drinking water) and measures for the suppression of dust.
- Water quality from boreholes is important to adjacent farmers and precautions should be taken to keep the quality to an acceptable standard.
- A zero liquid effluent discharge policy, in place, must be complied with.
- Adequate safeguards must be in place to prevent air pollution.
- Low nuisance dust levels must be maintained by means of dust suppression.
- The ash disposal facility should not be within 1.5km of any people living in the area.
- Re-vegetation of the slopes and wind breakers must be done.
- Employees must use appropriate protective clothing and/or equipment.
- All mitigation measures in EMP must be adhered to.

## **10. CONCLUSION**

The proposed ash disposal facility may result in water and air pollution, which in turn will have impacts on the health of humans, animals and crops. The ash facility needs to be 1.5km away from any settlements, and 3 to 5km away in the prevailing wind direction. Impacts on animals and crops would lead to negative economic impacts. It will, however, also have a positive impact on meeting electricity demands.

The impacts are already present in this case and the social impact process determined whether anything substantial will change on the social side with the continued extension of the ash disposal facility.

Although there are not many potential social impacts that can occur as a result of the project (as this is a proposed continuation of an already existing waste facility), the impacts, if they do occur, will not be severe. It is, however, still imperative that mitigation measures are implemented to prevent any negative impacts from occurring.

Site alternatives A and C were rated *acceptable* for the continuation of the ash disposal facility.

## REFERENCES

CENTRE FOR ENVIRONMENTAL EDUCATION (INDIA) AND BLACKSMITH INSTITUTE (NEW YORK), 2007. Health Impact Assessment and Remediation Strategies for fly ash on the affected population in Kampur, India. Online [Accessed 31 July 2013]: <http://www.blacksmithinstitute.org/files/FileUpload/files/PCRs/Flyash%20culmination%20report.pdf>.

EARTHJUSTICE (SA). Coal Ash Report. Online [Accessed on 14 July 2013]: [http://earthjustice.org/our\\_work/campaigns/coal-ash-contaminates-our-lives](http://earthjustice.org/our_work/campaigns/coal-ash-contaminates-our-lives).

EBOOKS (SA). Recoal Handbook. Online [Accessed on 14 July 2013]: <http://ebookbrowse.com/ha/handbook-of-coal&ie=UTF8&oe=UTF8&channel=browser>.

GERT SIBANDE DISTRICT MUNICIPALITY, 2013. Gert Sibande District Municipality's Demographics. Online [Accessed on 20/05/2013]: [http://www.gsibande.gov.za/index.php?option=com\\_content&view=article&id=5&Itemid=8](http://www.gsibande.gov.za/index.php?option=com_content&view=article&id=5&Itemid=8).

HANSEN, Y., NOTTEN, P.J. AND PETRIE, G. 2002. Coal-based power generation - A life cycle impact assessment indicator for ash management in coal-based power generation. In: The Journal of the South African Institute of Mining and Metallurgy, July/August 2002 (299).

LEKWA LOCAL MUNICIPALITY, 2012. Five-year Integrated Development Plan 2012-2016. Online [Accessed on 20/05/2013]: [http://www.lekwalm.gov.za/index.php?option=com\\_content&view=article&id=53&Itemid=61](http://www.lekwalm.gov.za/index.php?option=com_content&view=article&id=53&Itemid=61).

PHYSICIANS FOR SOCIAL RESPONSIBILITY. Coal ash: Hazardous to human health. Online: <http://www.psr.org/assets/pdfs/coal-ash-hazardous-to-human-health.pdf> [Accessed on 31 July 2013].

SIERRA CLUB, 2013. Disposal: Ash Waste. Online [Accessed on 20/05/2013]: <http://content.sierraclub.org/coal/disposal-ash-waste>.

STATISTICS SOUTH AFRICA, 2011, Census 2011: Municipal Report – Mpumalanga. Online: [http://www.statssa.gov.za/Census2011/Products/MP\\_Municipal\\_Report.pdf](http://www.statssa.gov.za/Census2011/Products/MP_Municipal_Report.pdf) [Accessed on 20/05/2013].

STATISTICS SOUTH AFRICA, 2011. Statistical Release – P0301.4. Pretoria: Statistics South Africa.

THE BATELEURS, 2013. Coal-fired Power Stations and Fly-ash Hazards. Online: <http://www.bateleurs.co.za/missions-flown/2011-missions/293-coal-fired-power-stations-and-fly-ash-hazards.html> [Accessed on 20/05/2013].