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SPECIALIST REPORT:

Social Impact Assessment for the Proposed Medupi Power Station Flue Gas Desulphurisation Retrofit Project and the Existing Medupi Power Station Ash Disposal Facility, Lephalale, Limpopo Province, South Africa

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NGT takes full liability for its specialists working on the project for all the social impact assessment related matters. We will not take any liability for any other environmental related issues or challenges for the project other than those services appointed for - these are the liability of the client.

This report has been compiled by NGT on behalf of Zitholele and Eskom. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision-making process for the project.

EXECUTIVE SUMMARY

NGT was appointed by Zitholele Consulting to undertake a Social Impact Assessment (SIA) study for the proposed Medupi Flue Gas Desulphurisation retrofit project (FGD-RP) and the associated ancillary infrastructure. The associated ancillary infrastructure includes the use of the existing Ash Disposal Facility (ADF) for gypsum disposal and the railway yard for lime and gypsum off-loading (Annexure 10). The aim of the FGD is to reduce sulphur dioxide (SO_2). The role of the ADF is for the final disposal of ash (conventional by-product of coal fired station) and gypsum (by-product of the FGD). According to Eskom, the proposed FGD will reduce SO_2 emissions from Medupi Power Station by 93% from worst case coal. Water allocation and demand for operation of the Medupi Power Station with and without the implementation of the FGD is interrogated

The objectives of this SIA study include:

- The assessment of social impacts of the proposed Medupi Power Station Flue Gas Desulphurisation retrofit project;
- The assessment of potential social impacts of the FGD retrofit (**Annexure 9 – FGD Retrofit layout**), the existing ash disposal facility (ADF) and the prosed railway yard The impact assessment will focus on the social benefits of the proposed FGD on the surrounding communities and industries as well as impacts on the ecosystem such as the biosphere and its natural resources like water and ecology. With regards to water, the SIA looks at the current allocation and future demand for optimal operation of Medupi Power Station (MPS) and the potential pollution resulting from the project. Water is considered one of the ecological services under threat from the project.
- The study aims to make conclusions on the nature of identified social impacts resulting from the associated with the implementation of the FGD (e.g. with water demand flagged as key important issues to consider with the operationalisation of the FGD), the potential environmental threats associated with the AFD (e.g. surface overflow and spillages to the surrounding which has happened more recently). It also make conclusion on impacts associated with the development of the railway siding and the disposal of the FGD by-products such as gypsum, salts and sludge.
- To make recommendations on strategies that should be implemented to enhance the significance of positive social benefits that result with the implementation of the FGD, the associated ADF and

railway siding while reducing the negative impacts. In line with the proposed recommendations, it is acknowledged that the information and the output of this SIA should assist with problem solving solutions rather than only mentioning the negative effects of the project. It also acknowledges that the recommendations made should be acceptable and practical for the project proponent to implement for the achievement of sustainable development goals.

The assessments are based on four stages of the project, from planning, construction, operation to decommissioning phase. Based on the various impact assessment and impact rating processes, the following conclusion and recommendations are made about the proposed Medupi FGD, the existing ADF and the proposed railway siding.

Conclusions:

- It is concluded that the significance of positive social impacts generally exceeds the significance of negative social impacts in the implementation of the FGD, the ADF and the railway siding throughout all four stages of the project.
- It is also concluded that implementation of the proposed FGD technology at Medupi will result in reduced levels of SO_2 in the medium and long term in the region and South Africa. It will also contribute to reduction of global SO_2 atmospheric levels. As the result of this, the significance of health risks associated with the SO_2 emissions will be minimized on a long-term basis.
- The results will be an improved biosphere in the region and South Africa, this will translate to improved quality of life for the citizens of Lephalale and the communities located south and southwest of the study area who are also affected by pollutants containing SO_2.
- Based on issues raised by some of the affected communities during the SIA fieldwork, it is concluded that one of the most pressing issues identified during the survey relates to stakeholder relations and project communication.
- The above issue was put forward for the attention of the project proponent; a meeting was scheduled between the project proponent representatives in Lephalale dealing with environmental and social issues on the ground. The aim was to come up with solution on how to best address the communication impasse. Through this meeting and the information made available to the SIA team, it has been determined that Eskom and its stakeholders have done a

significant amount of work in dealing with concerns of the various interested and affected parties on the ground. They have contributed to the establishment structures entrusted with the management of stakeholder relations and communication as part of the Medupi project. A committee has been established to deal with such issues; for example, the Medupi Environmental Monitoring Committee (EMC) as well as the Stakeholder Relations Office in the region. It is therefore concluded that necessary strategies and measures have been put in place to deal with and manage stakeholder relations and communication.

- In terms of ecosystem services, the study assessed how the Medupi FGD, its by-products, the existing AFD and the proposed railway siding would negatively impact on the ecosystems and how such negative impacts will influence ecosystem services that support the health and wellbeing of the affected communities i.e. municipality, other industries, the farmers and households in the regions. In this assessment, the SIA team considered the following (*Table 11 and recommendation section of this report*):
    - **Direct drivers of the ecosystem change**: e.g. change in local land use and cover; resources consumption; pollution; increase in population
    - **Indirect drivers of the ecosystem change**: e.g. demographic change; economic change; socio- political change; cultural and religious change; scientific and technological change.
    - **The wellbeing of ecosystem services beneficiaries**: e.g. these included among others, change in demand for ecosystem service for basic material for good life; change in demand for ecosystem service for health; change in demand for ecosystem service or security; change in demand for ecosystem service for good social relations.
- Taking into consideration of ecosystem services beneficiaries and drivers; we assessed the potential impacts of the proposed railway siding for lime off-taking. The land on which the proposed siding is to be constructed is already reformed or altered. It is therefore, concluded that the railway siding will not have any adverse negative social and economic impacts in terms of increase in traffic volumes and possible road carnage resulting from trucks transporting lime to Medupi.
- In terms of the existing ADF facility (and other infrastructure on site such as slime dams, coal stockpiles etc.), necessary measures have been put in place to mitigate any possible leakage to groundwater resulting in ground water contamination. Approximately 21 boreholes have been

drilled to compile data that would assist the project proponent to assess sulphates levels in the ground water with the aim of mitigating areas where there is groundwater contamination.

- The water issue is concluded to be the biggest threat in the project lifespan, the current allocation to Medupi will be able to operate the six generation units at Medupi. Water for the other 3 of the FGD absorber units are expected to come from MCWAP Phase. The current raw water abstraction from Mokolo Dam of which the Lephalale LM is also dependent on for clear water to support its domestic and farming communities' poses is a biggest socio-economic threat in terms of ecosystems support services.
- From a social impact assessment perspective; it is concluded that the FGD technology retrofit project, the use of the existing ADF to dispose of ash and excess gypsum and the development of the railway siding should proceed as planned provided that the following recommendations are implemented and adhered to:

Recommendations

Below is the list of recommendation proposed to the project proponent to mitigate against any negative impacts and improve the positive benefits of the proposed project:

- Mitigation measures in this report must be included in the Environmental Management Programme (EMPr), which will be approved as condition of environmental authorisation.
- The specialist responsible for compiling the EMPr must consult and consider the findings and the recommendations of the SIA.
- The issue of communication was flagged by some of the communities as a pressing issue. Through engagement with project proponent representatives it has been determined that necessary measures have been put in place to mitigate issues pertaining to stakeholder engagement in the broader Lephalale area.
    - Although Eskom has done a lot to address this concern, it is recommended that the EMC should further strengthen its multi-stakeholder engagement strategy or adopt new forms of communication that resonate with the interests of I & APs in the region.
    - This should be done in a manner that does not polarise relations between existing stakeholders. One way of addressing this issue is to develop a sub-committee for the EMC.

- The sub-committee should include a representative from each of the affected communities. This should be in addition to those communities' representatives already listed in the EMC Terms of Reference (ToR).
- Community representatives from Steenbokpan (Leseding) and the farms (farming community) should form part of the EMC sub-committee due to the fact that they feel excluded in programmes and workshops that deal with issues arising from Medupi construction and the associated infrastructure and technology such as the FGD.
- In addition to EMC public meetings and workshops, the sub-committee will ensure that all community concerns and grievances are deliberated on and addressed directly by the EMC and outside the EMC public meetings. The EMC ToR allows for the election of alternates. Therefore, this recommendation for EMC sub-committee is in line with EMC ToR.

- In projects of similar nature to Medupi, a grievance mechanism committee is often established and communicated to the community in line with best practice. The Medupi EMC is a sufficient structure to handle all issues relating to the environment, monitoring and auditing. However, without increasing bureaucracy, Eskom should consider appointing an independent company/specialist that specialises in the management of Social Risks. The task of the appointee would be to advise and strengthen the following:
  - Working with the Eskom Community Liaison Officer (Stakeholder Engagement Representative) to independently advise on the facilitation of relations between the various project stakeholders such as the appointed contractors, the EMC, the Environmental Control Officer (ECO), the affected community and community organisations such as NGOs, local labourers, local Small Medium Enterprises (SMMEs) as well as big industries.
  - The Social Risk company or specialist should be experienced in multi-stakeholder management, conflict resolution, labour relations, and negotiation of contracts, skills audits, and training and facilitation of skills transfer programmes.
  - If there is already an existing contract for an independent Social Risk company/specialist for the construction of Medupi Power Station – Eskom should consider extending such a contract since the company/specialist will already be familiar with issues on the ground and be well acquainted with community and government structures in Lephalale.

- There will be no need for additional infrastructure for this specialist or company; she/he can use the existing stakeholder relations office and its satellite offices.

This is important because the construction activities at Medupi have on many occasions been subject to disruption due to labour unrest and protest by locals who demand job opportunities. This is something that came out strongly during the public consultation for the proposed FGD project. Some locals who claimed that they were overlooked in the Medupi projects and that they will be overlooked in the current project too disrupted one of the Public Participation (PP) meetings. The inclusion of a social risk company or specialist in the EMC will ensure that the EMC has enough capacity and skills to deal with and address social and socio-economic issues without overly relying on Eskom Communication, CSI and Stakeholder Relations Departments. Furthermore, it will play a key role in reporting, monitoring and auditing of Eskom commitments to addressing social issues in line with ToR of the EMC. The social risk company will work hand in hand with the appointed Environmental Control Officer responsible for the implementation of the EMPr.

Both the SIA impact assessment analysis and stakeholder engagement concluded that the proposed Medupi FGD-RP will result in positive biospheric and social benefits in the receiving environment and the improvement of the quality of life for the affected communities in terms of reduced number of health incidents that result from exposure to high levels of SO_2. There are however disagreements on how the FGD-RP should be implemented; some argue it should be built into the Medupi Units before their synchronisation while the project proponent proposes to retrofit the technology. Those in favour of constructing the FGD with Medupi Units argue that the coming in of Medupi units will results to further increase in SO_2 levels in the region and will compromise the health of citizens who are already suffering from SO_2 health related challenges such as high prevalence of respiratory diseases.

From a SIA perspective, it is recommended that Eskom should prioritise retrofitting and synchronising the FGD technology to Unit 6, 5 and 4 which have been completed and have been operational since 2016 (unit 5) and early in 2017 (Unit 6). These will allay the fears of those in favour of constructing the FGD with the unit stacks and will also increase Eskom compliance levels in terms of reducing SO_2 and increasing atmospheric and air quality. Technically, this will assist them understand the challenges and opportunities of the technology prior to its retrofitting to Units 1, 2 and 3.

In terms of material transport to and from site for the construction of the FGD and to transport gypsum, salts and sludge which are by-products of the FGD; it is recommended that Eskom should speed up the construction of the proposed railway siding and prioritise the railway as the preferred construction material transport mode as well as for the off-take of the FGD by-products to appropriate licensed disposal facilities specially for salts and sludge. This will help mitigate environmental risks associated with the use of public roads to transport these hazardous materials. It will also assist alleviate possible increase in traffic volumes associated with the FGD construction material transportation.

In terms of FGD by-products it is recommended that Eskom should consider tendering the offtake of gypsum for commercial purposes instead of its combined disposal with the ash.

Eskom is highly commended for its zero liquid disposal strategy at Medupi which encourages water recycling and circulation within the footprint. However, this will only assist in meeting the current water demand on site and is not sufficient enough to meet and address the demand with the implementation of the FGD. Water and water allocation however falls outside the statutory mandate of Eskom, but the responsibility of the National Department of Water and Sanitation (DWS). Through the various bargaining platforms available to Eskom and the surrounding industries such as mines and Sasol – it is recommended that Eskom should lobby (together with other industries) DWS to speed up the implementation of Phase 2 MCWAP. This will guarantee Eskom and other industries in Lephalale appropriate water allocation to support the FGD and the growing industries around it such as expanded coal mining due to coal reserves in the Waterberg region. The speeding up of the Phase 2 MCWAP by DWS would also assist mitigate the potential water risk to Lephalale associated with the abstraction of raw water by industries from Mokolo Dam of which the municipality and its constituencies is also directly dependent on for potable water.

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LIST OF ABBREVIATIONS

Acronyms	Description
ALADF	Appropriately Licensed Waste Disposal Facility
DWA	Department of Water Affairs
DWS	Department of Water and Sanitation
CPC	Community Participation Consultant
DEAT	Department of Environmental Affairs and Tourism
EIA	Environmental Impact Assessment
FGD	Flue Gas Desulphurisation
IAR	Impact Assessment Report
IDPs	Integrated Development Plans
IEA	Integrated Environmental Assessment
IFC	International Finance Corporation
MW	Megawatts
MCWAP	Mokolo Crocodile (West) Water Argumentation Project
Medupi EMC	Medupi Environmental Monitoring Committee
NO_2	Nitrogen Oxide
O_3	Ozone
PM	Particulate Matter

SDBIPs	Service Delivery and Budget Implementation Plans
SMMEs	Small Medium Enterprises
SIA	Social Impact Assessment
SO_2	Sulphur dioxide
SRMC	Social Risk Management Company
ADF	Waste Disposal Facility
WHO	World Health Organisation
WMA	Water Management Area

1.INTRODUCTION

1.1.Project Description and Background

The current study is a Social Impact Assessment (SIA) for the proposed Medupi Power Station FGD-RP, the operation of the existing Medupi Power Station ADF and the proposed railway siding (south-west of Medupi six units and south of conveyor transport Medupi FGD-RP waste materials). The study also assesses the issue of water usage within Medupi footprint and water demand for current and future operation of Medupi Power Station with the FGD. How these activities positively and negatively impact on the environmental and social fabric of communities of Lephalale and the Waterberg District Municipality is assessed.

The project is located in Lephalale Local Municipality, within Waterberg District, Limpopo Province, South Africa (*Figure 1*). Medupi Power Station (hereafter referred to as Medupi) is one of two South African mega power generation projects under construction, with other being Kusile Power Station in Mpumalanga Province. Medupi, like Kusile Power Station, is a coal fired power station in its completion stages located on an Eskom owned property, Farm Naauw Ontkomen 509 LQ, in Lephalale Local Municipality. The power station (Medupi) consists of six units with a total power generation capacity of 4800 Megawatts (MW) (Eskom, 2006). The first of the six units came online on mid-2015.

Coal fired power stations are known to emit pollutants such as sulphur dioxide (SO_2). SO_2 is one of the most harmful gases produced through combustion of solid fossil fuel such as coal (World Health Organisation, 2014). Coal is the main solid fossil fuel that will be used in Medupi to generate electricity through combustion. Like with combustion of fossil fuel, there are other emissions that are produced throughout the coal life cycle such as nitrogen oxide (NO_2), ozone (O_3) and particulate matter (PM) of various sizes (World Health Organisation, 2014).

Electricity and access to electricity are essential to improved human quality. The South African Bill of Rights puts electricity as one of the three pillars of social service resource, others being water and sanitation (Constitution of the Republic of South Africa, 1996). However, this essential social service comes at a detrimental cost to both human health and the wellbeing the environment affecting biodiversity and aquatic life particularly in the economies that are highly dependent on coal as a source of energy for their power generation. South Africa is one such economy whose energy mix is 80% dependent on coal fired power stations. The legislated government department responsible for energy in South Africa is the Department of Energy. In its website, the department asserts that, "*access to electricity in 1994 was at lower percentage. Since 1994 the Department of Energy (through INEP) make it possible to electrify 6.954 million households using grid technology and over 103 000 households from off-grid technology to connect houses in SA which resemble 90% access to electricity*" (Department of Energy, 2017). The generation, transmission and distribution of power are however the responsibility of Eskom, a State-Owned Enterprise (SOE) which generates approximately 95% of the electricity used in South Africa and approximately 45% of the electricity used in Africa.

Medupi Power Station is built in an area with an existing coal fired power station, Matimba Power Station, located approximately 4.5km north-east of Medupi Power Station and south-west of the town of Marapong (see *Figure 2)*. During the feasibility phase, various impact assessment studies were carried out to determine environmental and social impacts of the project locally, regional and globally. These included air quality studies and the social impacts of Matimba Power Station. Among the gases detected were high levels of SO_2 and exposure to particulate matter (PM) from Matimba and Grootegeluk mine.

One of the planning objectives for the Medupi project is to reduce the high levels of SO_2 in the receiving environment and to comply with South Africa's Air Quality Minimum Emission Standards. In order for the Medupi Power Station to comply with its Air Emissions License targets for SO_2 reduction, it is proposed the Wet FGD technology be retrofitted to the power station. Based on the engineering feasibility studies (please reference the conceptual design report) the proposed FGD technology will reduce SO_2 emission levels by 93% at worst case coal scenario. The social impacts of SO_2 will be discussed at length in the report; the discussion will also include the mechanism by which SO_2 negatively impacts on environmental and public health.

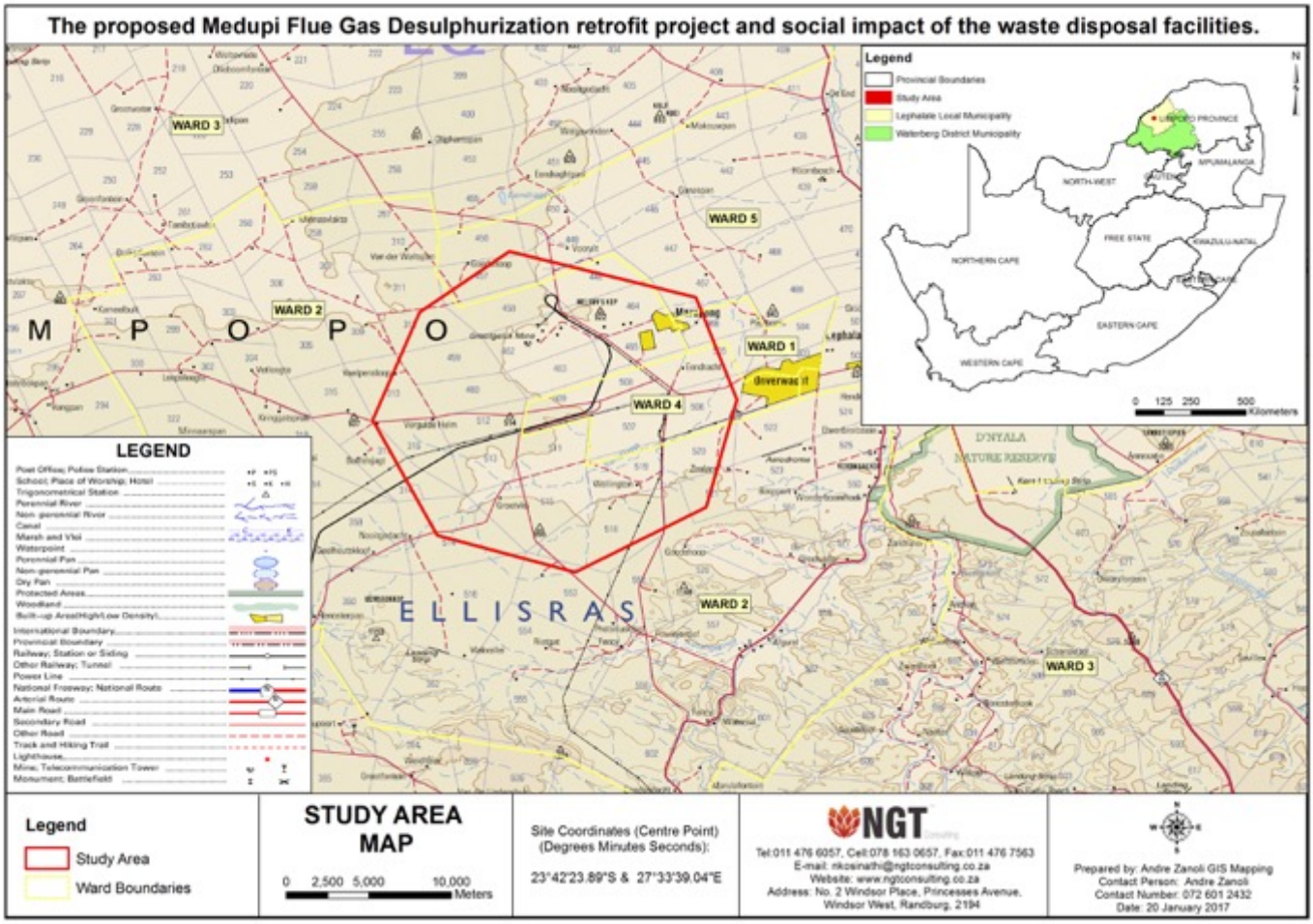


Figure 1– Location of the project area in Lephalale Local Municipality within Waterberg District Municipality, Limpopo Province, South Africa.

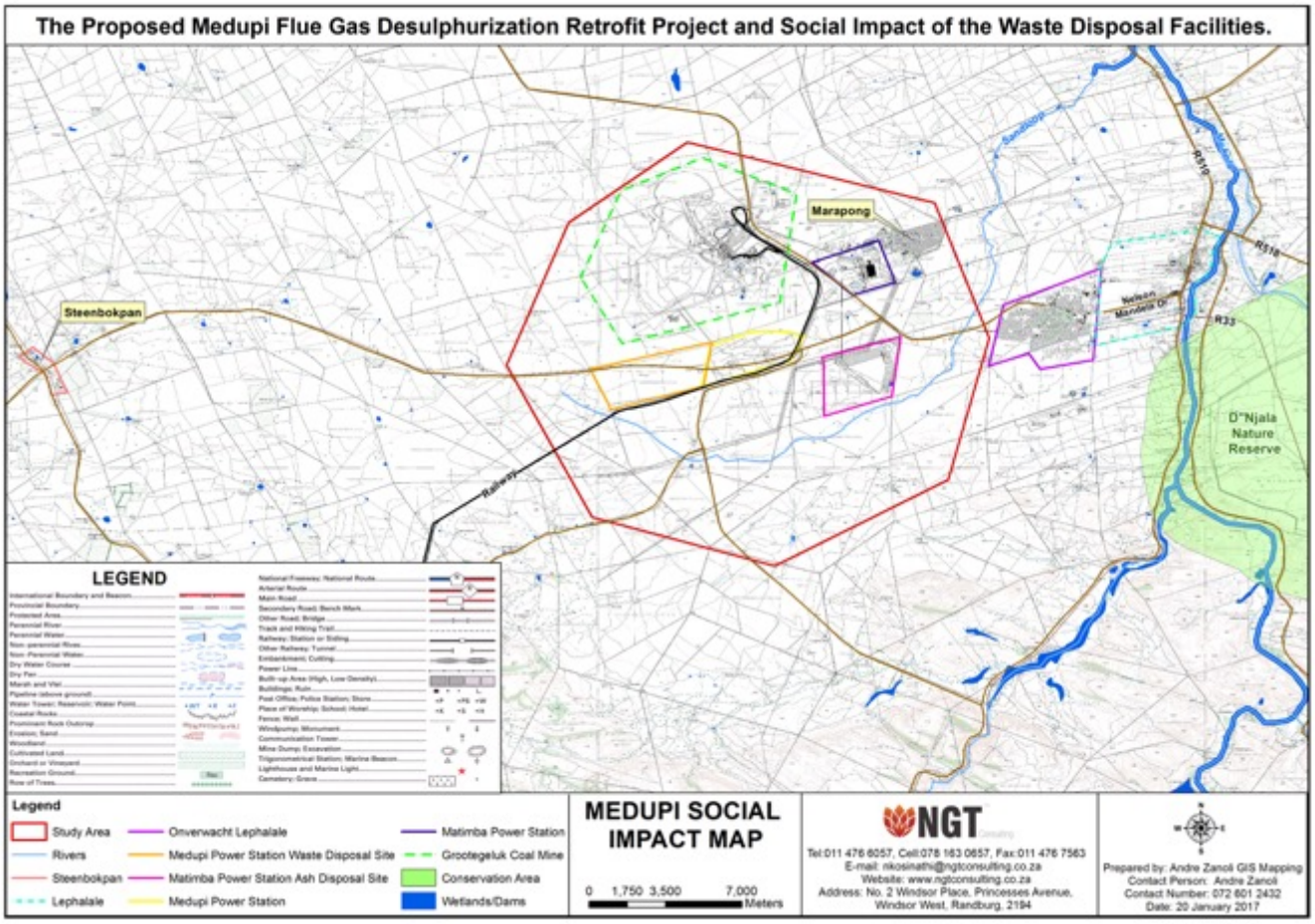


Figure 2- Social Impact Assessment map showing zones of influence for the SIA study

In 2015 Zitholele Consulting commissioned Jones & Wagner, on behalf of Eskom, to undertake waste assessment of ash and FGD waste for Medupi Power Station in order to characterise the different waste streams that will be produced as by-product by the FGD and to advise of the type of required landfill sites to store or dispose of the various wastes. The result of the study was the characterisation of the waste into three waste streams. Medupi and Matimba will both use coal with the same characteristics from Grootegeluk mine (Jones & Wagener 2015). FGD processes result in ash and gypsum, which require disposal as no end market has yet been identified for these by-products.

Based on the assessment of Matimba Power Station ash, Medupi ash was characterised to Type 3 waste requiring disposal on a Class C landfill. Gypsum was also classified as a Type 3 waste requiring disposal on

a Class C landfill, showing very similar characteristics to the Medupi ash (Jones & Wagener 2015). Sludge was classified as either Type 1 or 2, which requires disposal "…in a Class A or Class B landfill for material using 96% of calcium carbonate and 85% of calcium carbonate" (Jones & Wagener 2015). The chemical salts will require disposal in a Class A landfill site because they were classified as "…Type 1 waste due to likely leachable TDS concentration as a result of high concentration of sodium chloride in the solid material..." (Jones & Wagener 2015). According to Jones & Wagener (2015), the Class A landfill offers the highest level of environmental protection of landfill barrier in South Africa and [would be the most suitable landfill for both sludge and salts produced at Medupi Power Station].

The ash and gypsum that will be produced from Medupi (retrofitted FGD) will be disposed in the existing Class C facility on an Eskom owned property on Farm Eenzaamheid 687 LQ (*Figure 3 & Figure 4 (3 D model of the ADF)*).

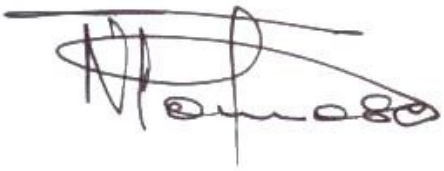
Other by-products of the FGD processes include chemical salts and sludge. The chemical salts and sludge will be disposed at an appropriately licensed waste disposal facility (ALADF). A decision on the ALADF is still to be made by Eskom in consultation with its stakeholders, but the facility should be a Class A facility as per Jones & Wagener (2015) recommendations.

The FGD technology and the operation of the ADF for disposing of Medupi ash and the gypsum require high levels of water usage in a region with scarce water resources. This SIA report, therefore also assesses the social impacts associated with the water requirements of the FGD technology in Medupi and the existing ADF in a region known to be experiencing water constraints.

Zitholele Consulting was appointed by Eskom to manage the Environmental Assessment process (and the associated specialists' impact assessment studies) for the proposed Medupi Flue Gas Desulphurisation (FGD) retrofit project and for the existing waste disposal facility (*Annexure 5*). Zitholele Consulting, in turn, sub-contracted NGT to conduct a Social Impact Assessment (SIA) to inform the impact assessment phase of the IEA for the FGD and the ADF for ash and gypsum.

1.2. Declaration of independence

I, Nkosinathi Godfrey Tomose, confirm that I have no conflicting interests in the undertaking of the proposed activity, that I am independent and conduct my work in an objective manner, that this report complies with the requirements for specialist reports as contained in Appendix 6 of the EIA Regulations published in December 2014, that I have the necessary expertise to conduct studies of this nature and that I will disclose any information I have that I may deem necessary and relevant to the proposed project.



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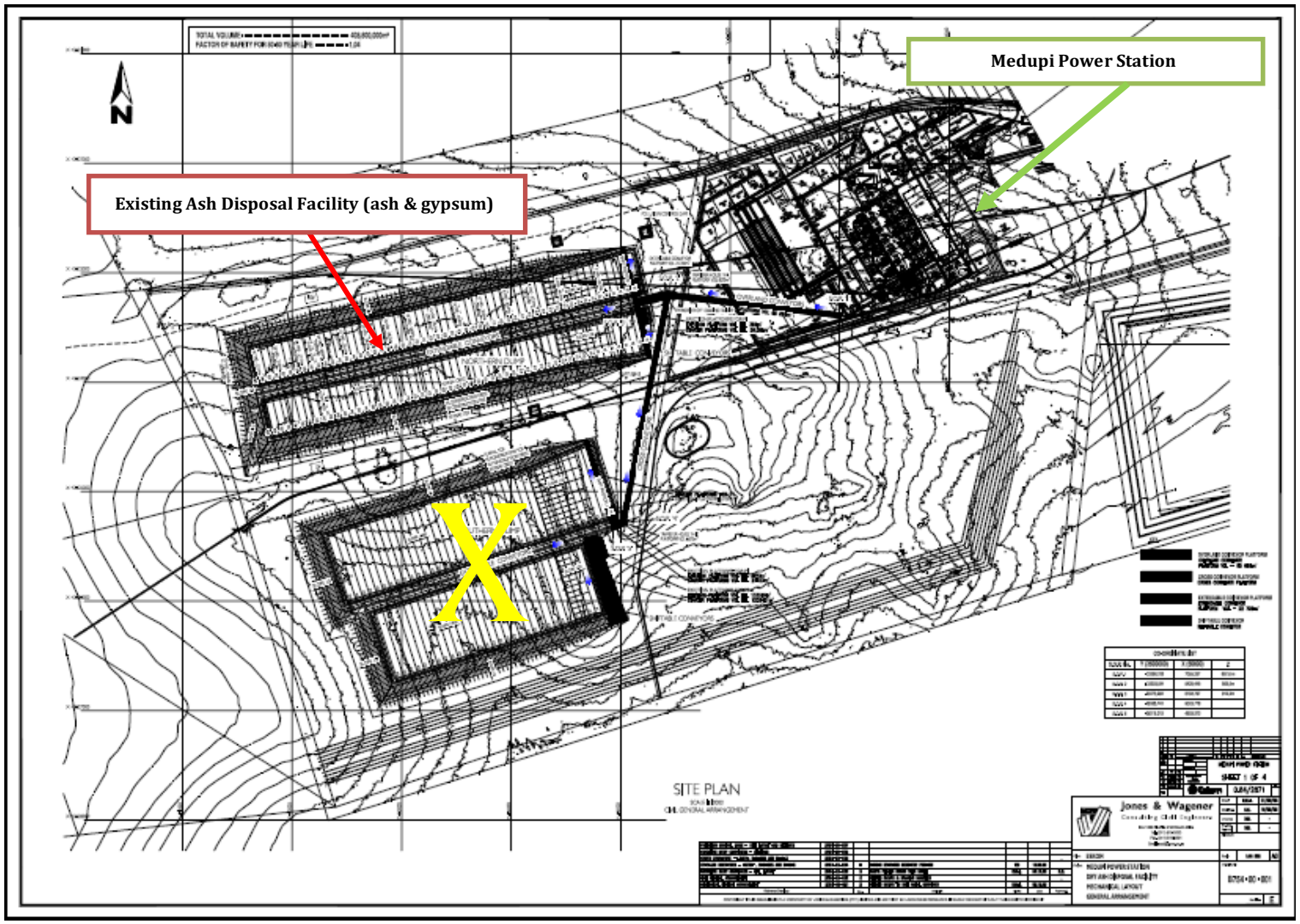

Figure 3- Layout of the Medupi ADF in relation to Medupi Power Station (x is excluded in current study) (Source: Zitholele Consulting, 2015)

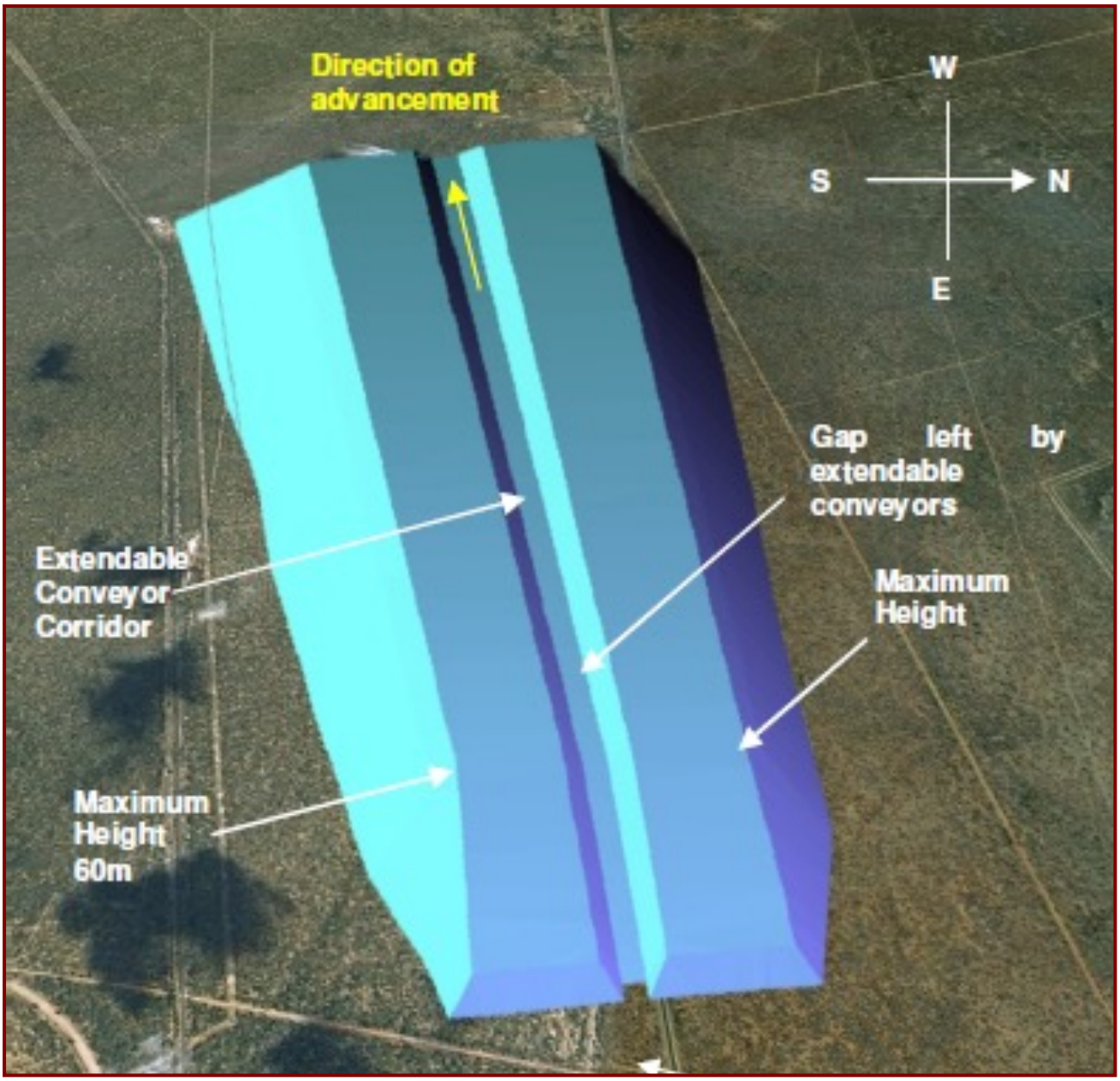

Figure 4- 3D model of the existing ash ADF (Source: Jones & Wagener, 2013)

1.3. Terms of Reference and Scope of Work

This SIA forms part of the project scope deliverables for the study, (EIA) for the proposed Medupi Power Station FGD retrofit project Impact Assessment (IA) Phase (inclusive of waste management licensing and water licensing). This SIA involves:

- The assessment of social impacts of the proposed Medupi Power Station FGD-RP (and the associated infrastructure like the proposed railway yard), with specific focus on how the project will positively or negatively impact on the environment and the social fabric of the Lephalale and the Waterberg District communities and the available ecosystem services.
- Assessment of potential social impacts associated with the operation and decommissioning of the existing and authorised waste multi disposal facility for ash and gypsum disposal.
- Provision of specialist opinion on the potential social impacts for the proposed trucking of sludge and salts to an authorised waste disposal facility outside of the study area. A separate process for the disposal of salt and sludge will be undertaken separately from the current application (Zitholele BID – Annexure 6)
- Discussion of the ratings and integrate the assessment for the purpose of the EIA.
- To compile a Social Impact Assessment (SIA) documenting the findings.
- To make recommendations and conclusions on how the positive social impacts should be enhanced for societal benefits while minimising the project negative social impacts.
- Public participation meetings were held in Lephalale, Limpopo Province as part of the EIA (with Zitholele) and the SIA process (NGT and I & APs including the project proponent); the results of these meetings are utilised to inform the discussions, conclusions and recommendation made about the Medupi FGD-RP.

1.4. Assumptions and Limitations

The following assumptions and limitations are applicable to this study:

- In order to understand the social environment and to predict impacts, complex systems have to be reduced to simple representations of reality (DEAT, 2002a). The experience of impacts is subjective on what one person may see as a negative impact may not be perceived as such by another person.

- The study was based on information available to the author during the assessment process and at the time of compilation of this report.

- In addition to the various drafts of the SIA for the FGD-RP report compiled by NGT, information on stakeholders and comments received during the various public participation meetings for the project was utilised, as is usually the case with SIAs that form part of the Environmental Impact Assessment (EIA) process. SIAs normally draw heavily from information gathered during public participation (identified stakeholders as well as comments received).

- No economic modelling or analysis was done as part of the SIA. Any data relating to the economic profile of the area was obtained from municipal sources, such as municipality/provincial websites, Integrated Development Plans (IDPs), Service Delivery and Budget Implementation Plans (SDBIPs) and census data.

- This report only applies to the Medupi Power Station FGD-RP, the existing authorised ADF, the proposed railway yard with its associated infrastructure and it will not necessarily be accurate for and applicable to similar activities at other sites.

1.5. Study Method and Report Format

The following steps were followed during the process of conducting the SIA:

- Literature review and information gathering;
- Social baseline compilation;
- Sensitivity analysis (scoping);
- Stakeholder identification;
- Field work preparation and arrangements;
- Undertaking of field work;
- Data analysis and interpretation;
- Project, site and route description;
- Impact description and analysis;
- Identification of mitigation measures; and
- Report compilation.

These steps loosely form the basis of the format of the report, which is as follows:

- INTRODUCTION:
    - Project description and background
    - Declaration of independence
    - Terms of reference and scope of work
    - Assumptions and limitations
    - Study method and report format
- LEGAL FRAMEWORK AND GUIDELINES
    - Legal mandate to address social issues in EIA
    - Guideline documents consulted and adhered to
- BASELINE STUDY: Provincial, District and Local Municipal levels
- STAKEHOLDER IDENTIFICATION AND FIELD WORK
- ASSESSMENT METHODOLOGY
- SENSITIVITY ANALYSIS
- IMPACT ASSESSMENT AND RATING
- MITIGATION
- RECOMMENDATIONS
- BIBLIOGRAPHY

Fieldwork for the project was carried out on two occasions:

- Fieldwork that solely focused on the social impacts of the FGD-RP which involved setting up meeting at key zones of influences such as Marapong, Steenbokpan, Onverwacht and Lephalale. This included site meeting with Eskom environmental management team (*Table 1*). The dates for this field work were as follows (*Refer to Annexure 1-4: FGD project notices; notice of proposed public meetings; site notices placed at various venues and photos of the meetings. Results have been summarised in Table 10, Chapter 4 of this SIA)*:

Table 1- Meeting dates, venues and time

Date of issue	Meeting Date	Venue	Time
07 March 2015	18 March 2015	Marapong Library	09:00am to 2:00pm
07 March 2015	19 March 2015	Mogol Club	1:00pm to 3:00pm
07 March 2015	19 March 2015	Steenbokpan Leseding Community Hall	09:00am to 12:00pm
Meeting proposal 12 January 2018	16 January 2018	Eskom Environmental Management Office, Medupi Power Station	11:00am to 3:30pm (meeting inclusive of site walk-about)

- Fieldwork that looked at the waste disposal facility for ash and gypsum which are by-products of Medupi Power Station as well as attendance of the public participation meeting with Zitholele Consulting Public Participation team: in February 2016
- Meeting with farmers and other property owners: in February 2016
- Fieldwork for the waste disposal facility was conducted by Mr Nkosinathi Tomose and Miss Zanele Tomose to verify the site and current conditions: on Friday 25 November 2016.
- The field survey of the proposed railway siding as well as the Medupi construction sites and existing stockpiles and dams was conducted by Nkosinathi Tomose (NGT) and Miss Taryn Aspeling (NGT) in company of Mr Emile Marell (Eskom) and Mr Dovhani Mudzielwana (Eskom) on Tuesday the 16th of January 2018.

SIA is not as seasonal as biodiversity assessments as the human population affected by the project are resident throughout the year/constant throughout the year.

2. LEGAL FRAMEWORK AND GUIDELINES

2.1. Legal Mandate to Address Social Issues in Environmental Imapct Assessment

Constitution of the Republic of South Africa

Aucamp (2009a) writes that there is a clear mandate in the Constitution of the Republic of South Africa (Act 108 of 1996) to include social issues in the EIA process. The Bill of Rights in the Constitution states: Everyone has the right –

(a) to an environment that is not harmful to their health and wellbeing; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –

(i) prevent pollution;

(ii) promote conservation; and

(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management Act

The National Environmental Management Act (Act 107 of 1998) (NEMA) states that, whereas many inhabitants of South Africa live in an environment that is harmful to their health and well-being, the following (relating to the social environment) are acknowledged.

- Everyone has the right to an environment that is not harmful to his or her health or well-being.
- The State must respect, protect, promote and fulfil the *social*, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities.
- Inequality in the distribution of wealth and resources, and the resultant poverty, are among the important causes as well as the results of environmentally harmful practices.

- Sustainable development requires the integration of *social*, economic and environmental factors in the planning, implementation and evaluation of decisions to ensure that development serves present and future generations.

- Everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -

    - prevent pollution and ecological degradation;

    - promote conservation; and

    - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and *social* development.

Aucamp (2009b) lists environmental principles that must be adhered to in all Acts pertaining to the environment. The following NEMA principles listed refer directly to the human/social environment.

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.

- Development must be socially, environmentally and economically sustainable.

- Environmental justice must be pursued as to not unfairly discriminate unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.

- Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing must be pursued.

- Decisions must take into account the interests, needs and values of all interested and affected parties, including all forms of traditional and ordinary knowledge.

- The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.

Section 24 of NEMA states that the potential impact on the environment, *socio-economic conditions* and cultural heritage of activities that require authorisation must be considered, investigated and assessed prior to implementation, in order to give effect to the general objectives of integrated environmental management.

Environmental Impact Assessment Regulations

According to Regulation 10 (c) of the Environmental Impact Assessment (EIA) Regulations that were passed in terms of Chapter 5 of NEMA in December 2014 the competent (decision-making) authority is entitled to all information that has or may have the potential of influencing any decision with regard to an application. It can be argued that, since social impacts have the potential of influencing the authority's decision, as much information on potential social impacts as practicably possible should be supplied to the decision-making authority as part of the application (Bezuidenhout, 2009).

The EIA Regulations also prescribe the content of Basic Assessment Reports, Scoping Reports and Environmental Impact Assessment Reports and include features applicable to social impacts, including: A full description of the process followed to reach the proposed preferred alternative (BAR) / activity, site and location (SR) / development footprint (EIR) within the site, including:

- (iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, ***social***, economic, heritage and cultural aspects; and
- (vii) positive and negative impacts that the proposed activity and alternatives will have on the environment ***and on the community that may be affected*** focusing on the geographical, physical, biological, ***social***, economic, heritage and cultural aspects.

(Content of Basic Assessment Reports: Appendix 1(3)(1)(h), Scoping Reports: Appendix 2(2)(h) and Environmental Impact Assessment Reports: Appendix 3(3)(h)).

It is clear from the above that, although there are no explicit requirements for conducting comprehensive SIAs in NEMA or the EIA Regulations, environmental and social interests should be considered equally important.

National Environmental Management Air Quality Act No. 39 of 2004

This Act sets norms and standards for regulating air quality in South Africa in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development. To also regulate air quality monitoring, management and control, for both specific air quality measures and matters incidental thereof. It promulgation is triggered by the fact that the quality of ambient air in many areas of the country are not conducive to a healthy environment for the people living in those areas let alone promoting their social and economic advancement. This is true in the case of the Waterberg which has been declared as one of South Africa's priority areas in terms of pollution. The application of this Act in terms of the SIA is important considering the fact that the burden of health impacts associated with polluted ambient air falls most heavily on the poor, whereas air pollution carries a high social, economic and environmental cost that is seldom borne by the polluter.

National Environmental Waste Management Act (No.59 of 1998)

In terms of Section 44 of the National Environmental Waste Management Act (NEWMA) No. 59 of 1999 all listed waste management activities must be licensed and in terms of the Act. The Act makes provisions that the licensing procedure must be integrated with the environmental impact assessment (EIA) process. The FGD proposed at Medupi Power Station will result to production of hazardous waste materials such as chemical salts and sludge as well as gypsum and ash. All these by-products of the FGD required application in terms of the NEWMA. The current SIA evaluates the provisions made in the Act for the protection of human health and their ecology through provision of reasonable measures for the prevention of pollution and damage to human environment. This is important in the case of the proposed Medupi FGD which will produce by-products such as chemical salts, sludge, ash and gypsum. All these by-products require special licensing at certified landfill sites. The process of disposing and storing these by-products of the FGD have direct consequence to potential negative or positive impacts of the project to human health and the environment in which they live in.

The Occupational and Safety Act, No. 85 of 1993

The nature of activities associated with the proposed FGD retrofit project have health and safety dimension to them and this triggered provisions of Occupational Health and Safety Act (OHSA), No. 85 of 1993. The objective of this Act is to provide for health and safety of persons at work and for the health and safety of persons in connection with the use of plant and Machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work. It also aims to establish an advisory council for occupational health and safety; and to provide for matters connected therewith. Section 12 of the OHSA is particularly relevant to this SIA because it stipulates that every employer whose employees undertake listed work or are liable to be exposed to the hazards emanating from listed work shall:

- Identify the hazards and evaluate the risks associated with such work constituting a hazard to the health and safety of such employees and take the necessary steps to avoid such risks
- Prevent the exposure of such employees from such hazards as far as reasonably possible.

2.2. Guideline and other documents consulted and adhered to

The following international and local guidelines and standards were adhered to during the process of conducting the SIA:

- Inter-organisational Committee on Guidelines and Principles for SIA (2003);
- Social Impact Assessment: Guidance for assessing and managing the social impacts (Vanclay F. E., 2015);
- EIA Regulations, 2014: Appendix 6 – Specialist reports;
- Department of Environmental Affairs and Tourism, Information Series 4: Specialist studies;
- Department of Environmental Affairs and Tourism, Information Series 22: Socio-Economic Impact Assessment;
- IFC Performance Standards on Environmental and Social Sustainability Effective January 2012
- International Principles for Social Impact Assessment
- International Association for Public Participation (http://www.iap2.org/)

In addition, a PhD thesis titled "Social Impact Assessment as a tool for social development in South Africa: An exploratory study" by Aucamp (2015) was used. This thesis investigated whether SIA can be used effectively as a tool for social development in South Africa; to what extent the SIA methodology currently practiced in South Africa reflects social development, and whether guidelines for SIA can assist SIA practitioners with achieving social development outcomes.

Lastly, two lists of social variables as identified by Vanclay (cited in DEAT, 2006) and the Inter-organisational Committee on Guidelines and Principles for SIA (2003) respectively were used to ensure that all potential social impacts of the development were identified and assessed for all four the project stages. The two table below lists categories of social variable (*Table 2*) and list of social variable (*Table 3*).

Table 2-Categories of social variables

Health and social well-being	Death; nutrition; actual health and fertility; perceived health; mental health; aspirations for future; autonomy; stigmatization; feelings in relation to the project
Quality of the living environment	Physical quality – exposure to noise, dust, risk, odour, etc.; leisure and recreation opportunities; aesthetic quality; availability of housing; quality of housing; physical and social infrastructure; personal safety and hazard exposure; crime and violence
Economic impacts and material well-being	Workload; standard of living; economic prosperity and resilience; income; property values; employment; replacement cost of environmental functions; economic dependency
Cultural impacts	Change in cultural values; violation of culture; experience of being culturally marginalized; commercial exploitation of culture; loss of local language; loss of natural and cultural heritage
Family and community impacts	Alterations in family structure; obligations to family/ancestors; family violence; social networks – interaction with others in community; community connection – sense of belonging; community cohesion; social differentiation and inequity; social tension and violence
Institutional, legal, political and equity impacts	Capacity of government agency to handle workload generated by project; integrity of government agencies – absence of corruption and competence of agency; legal rights; human rights; participation in decision making; access to legal advice; fairness of distribution of impacts across community
Gender relations	Women's physical integrity – can decide about own body; personal autonomy of women – independence in all aspects; gendered division of labour – income, household, childbearing and rearing of children; access to resources and facilities; political emancipation of women

Source: Vanclay, cited in DEAT, 2006

Table 3 -ICGP lists of social variables

Population change	Population size, density and change; influx and outflow of temporary workers; presence of seasonal (leisure) residents; relocation of individuals or families; racial and ethnic composition and distribution
Community/ Institutional arrangements	Voluntary associations; interest group activity; size and structure of local government; industrial/commercial diversification; employment/income characteristics; local/regional/ national linkages; employment equity of disadvantaged groups; historical experience of change
Political and social resources	Distribution of power and authority; inter-organisational cooperation; conflict between newcomers and long term residents; identification of stakeholders; interested and affected parties; leadership capability and characteristics
Individual and family level impacts	Displacement/relocation concerns; trust in political and social institutions; residential stability; family and friendship networks; density of acquaintanceships; perceptions of risk, health and safety; attitudes towards the proposed action; concerns about social well-being
Community resources	Change in community infrastructure; indigenous populations; changing land use patterns; family and friendship networks; effects on known cultural, historical, sacred and archaeological resources

Source: ICGP, 2003

3. BASELINE STUDY

The most common source of quantitative data in SIA is census data, which is used to produce demographic profiles. It is commonly used to provide baseline information. Other sources include Integrated Development Plans (IDPs), Spatial Development Frameworks (SDFs), Service Delivery and Budget Implementation Plans (SDBIPs) and Employment, Growth and Development Plans (EGDPs).

Baseline conditions are the existing conditions and past trends associated with the human environment in which the proposed activity is to take place (DEAT, 2006).

Establishing the baseline conditions is essential for describing the receiving environment, the *status quo* and for identifying and predicting potential impacts. "A prediction of change can only be as effective as the baseline information from which it is derived. It is thus important that the specialist puts the proposed project in perspective by comparing the current state with the potential future state" (DEAT, 2002a).

3.1. Affected Environment and Description

Medupi Power Station is located west of Lephalale in Limpopo Province a little east of the South African border with Botswana, in Lephalale Local Municipality of Waterberg District (*Figure 5*). The SIA covered a 30km radius from Medupi in order to include all the human settlement areas such as Steenbokpan and villages north of Lephalale Town.

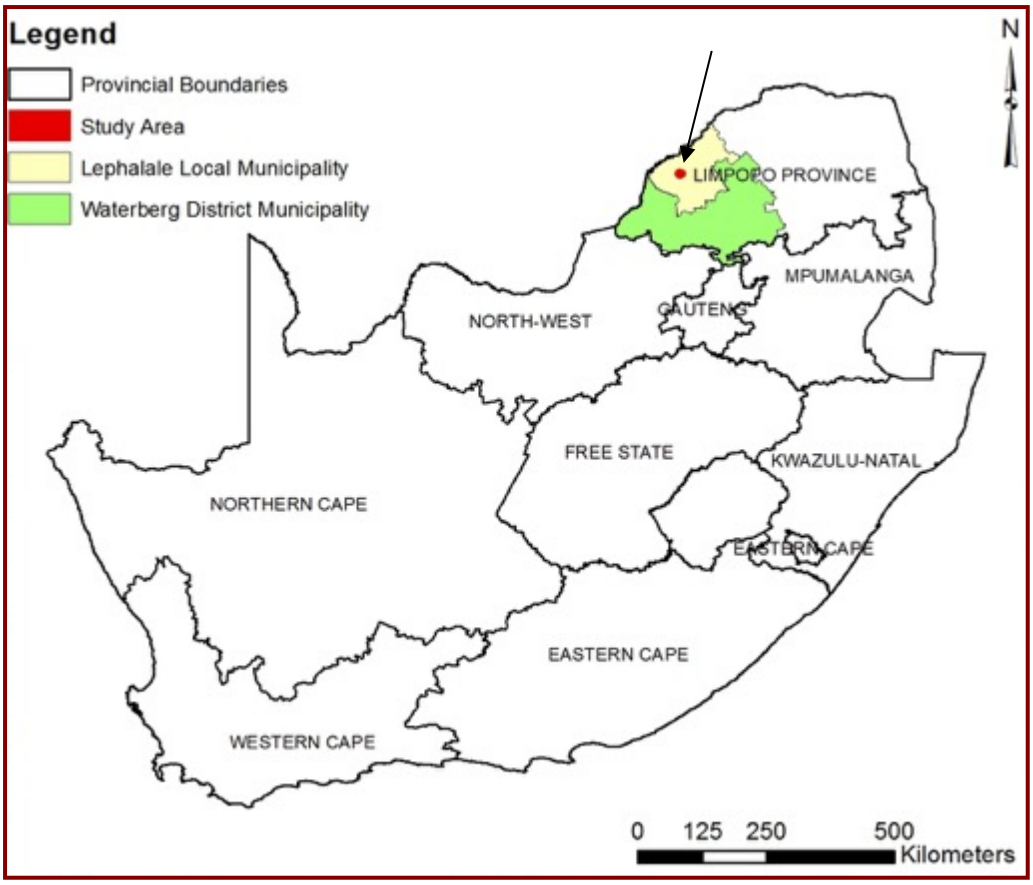

Figure 5- Location of the study area in relation to Lephalale Local Municipality of Waterberg District

Lephalale LM is characterised by a mix of human settlements which vary from formal to informal in townships. A mix of formal and informal dwellings is found in Marapong and the hamlet of Steenbokpan. The suburbs of Onverwacht and Lephalale Town provide formal dwellings in the municipality (*Figure 6*). A number of villages and farms also define the landscape of Lephalale LM. Heavy industries include the newly built Medupi Power Station, the existing Matimba Power Station, Grootegeluk coal mine, Sasol and these are all located west of the town of Lephalale within close proximity to Marapong. A number of new mines are in the planning stages and some have already started operating, mining coal and platinum among other resources. Coal presents the dominant resources currently being mined in Lephalale due to fact that the Waterberg coal reserves represent 40% of South African coal reserves and are mined to support two coal fired power stations in the area and the Sasol coal-to-liquid petrochemical industry. A third power station is planned in the area and is currently undergoing the approval process.

Land uses of Lephalale LM can therefore be described as a mix of agricultural activities, game farming, cattle ranching, industrial activities such as mining, power generation, domestic and industrial water supply. These activities make up 87% of the total land use of Lephalale LM. Lephalale LM and the Waterberg District are characterised by a number of game farms and conservation areas, with the Waterberg Mountains boasting a national conservation status. Within Lephalale LM only one declared conservation area is found and it is situated south-east of the town of Lephalale i.e. D"Njala Nature Reserve (*Figure 6*).

The study area is characterised by a number of secondary roads, with Nelson Mandela Drive cutting across the Town of Lephalale, past Onverwacht towards Medupi Power Station (*Figure 6*). In the east, it joins the R510 (linking Lephalale to Thabazimbi in the south) west of Mokolo River. Other secondary roads that are linked to the R510 which provide access to Lephalale include the R518 and R33. A railway line from Grootegeluk mine passes east and south of Medupi Power Station and extends westwards south of the existing ADF, then south towards Thabazimbi. This is the only documented railway line within the study area.

Marapong is the closest human settlement to Medupi Power Station. It is located approximately 8.6km north-east of the power station and falls within the 10km radius determined as the key priority area/zone of influence. The second closest location is Onverwacht at approximately 10.5km east of the power station. It falls outside the 10km buffer zone defined as the priority area. Lephalale Town is third human settlement situated in close proximity to the power station; it is located approximately 12.6km east of Medupi and east of Onverwacht. It also falls outside the 10km priority area. All these three human settlements are located north and east of Medupi and the existing ADF with prevailing winds blowing north-south and north-east to south-west towards Thabazimbi and the village of Steenbokpan (located some 27km west of Medupi). This means that Marapong, Onverwacht and Lephalale will not be directly significantly affected by emissions from Medupi as determined by the direction of winds and its variables.

The following landmark features can be observed in Figure 6 below:

- Mokolo River is situated east of the Town of Lephalale and adjoin by a small tributary called Sandloop which extends south to west of Medupi Power Station and the ADF.
- A number of pans and wetlands are found throughout Lephalale LM with a large number of wetlands found along Mokolo River and southwest of D"Njala Nature Reserve.
- In close proximity to the study area, three wetlands have been recorded near the Matimba ADF, east of Matimba Power Station and south of Grootegeluk coal mine.

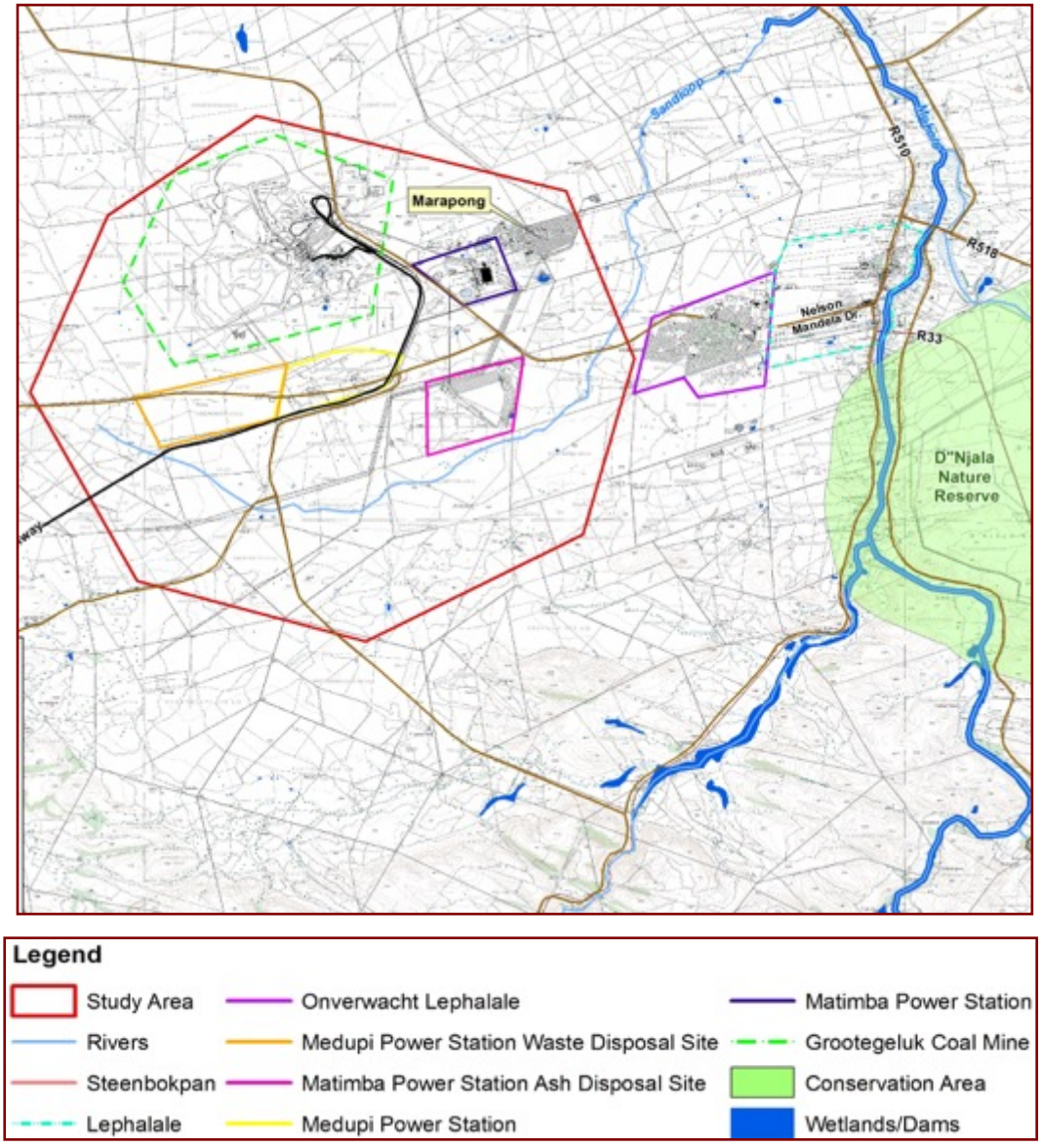

Figure 6- Map showing aspects of Matimba, Grootegeluk, Medupi and settlement areas and water bodies

3.2. Population Dynamics in Lephalale LM

The Local Economic Development Strategy for Lephalale LM show that the population in Lephalale has increased by 45% between 2001 and 2014 (from 85,155 to 123,869) (*Figure 7*) (LM IDP, 2016-2017). Population growth in the Lephalale town node is among the highest in the Limpopo Province. The surge in population is also experienced south of Lephalale LM; for example, Thabazimbi has experienced a population increase of 35%, Mookgopong an increase of 13%, Modimolle an increase of 11%, Bela-Bela an increase of 36% and Mogalakwena recorded an increase 11% in the same period (*Figure 8*). In Lephalale LM the influx can be directly attributed to the construction of the Medupi built coal fired power station project and associated ancillary infrastructure. An assumption was also made that the overall increase in population in the region could be as a result of projected future projects associated with the Waterberg coal fields e.g. the expansion of the mining industry as well as coal-to-liquid petrochemical industry project such as Sasol Mafutha 1 in Lephalale.

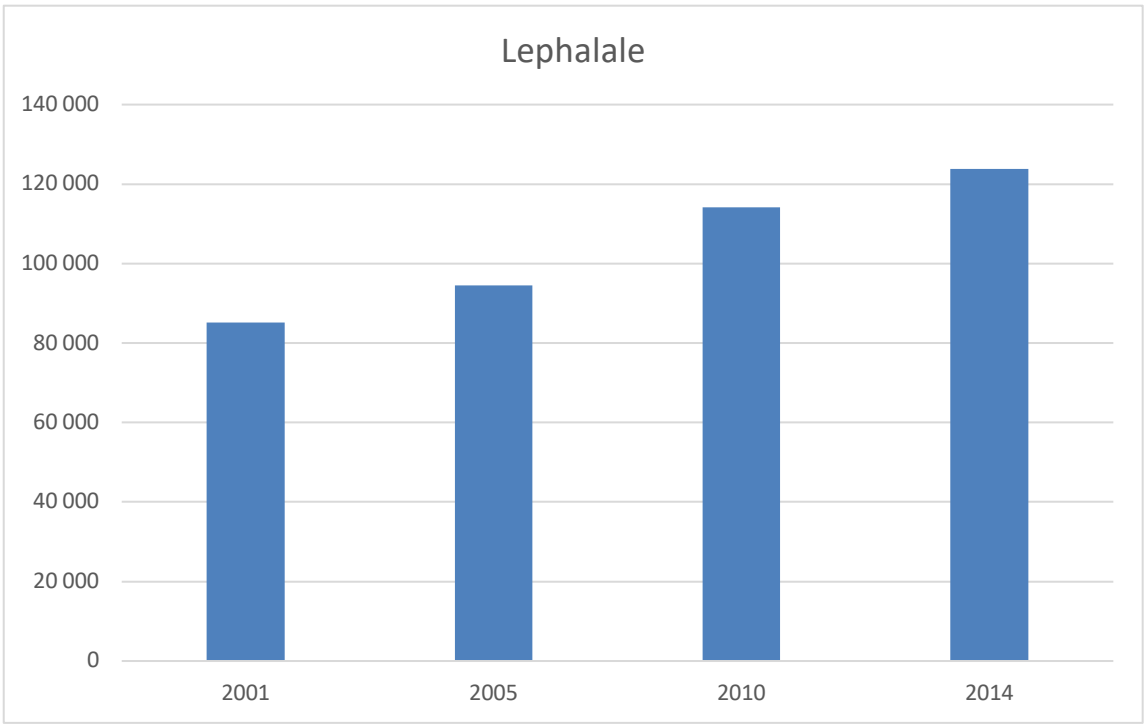

Figure 7 - Total Population of LLM 2001-2014

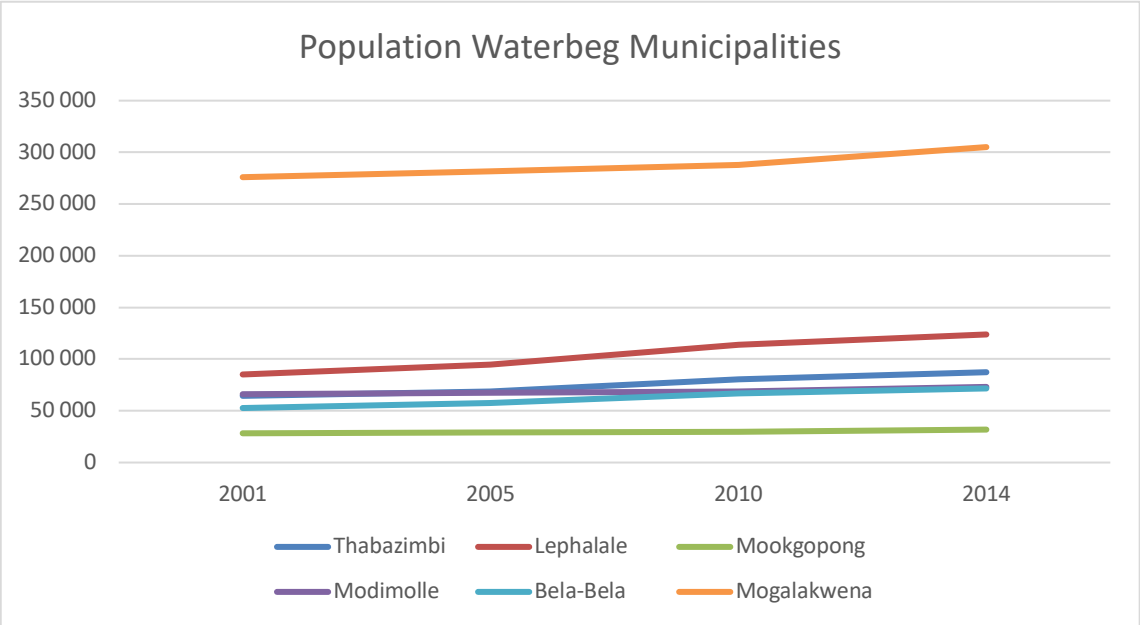

Figure 8 - Total Population of Waterberg Municipalities 2001 – 2014

According to Lephalale LM IDP (2015-2016), 83% of the population migration into Lephalale LM came from within the Limpopo Province, 11% from other South African provinces and 6% from outside South Africa borders (*Figure 9*).

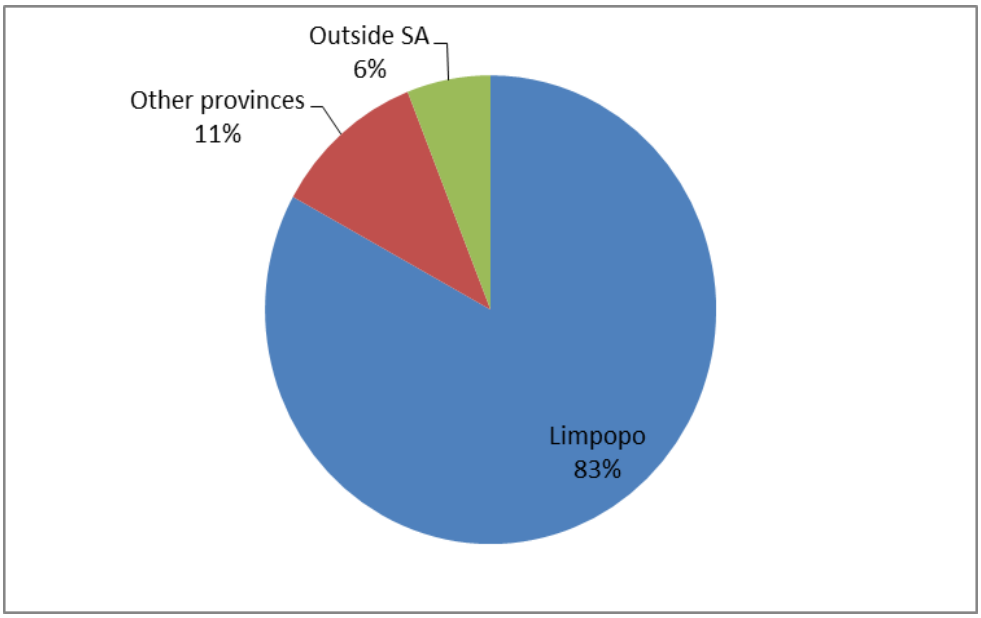

Figure 9 : Source of Migration into Lephalale LM

Based on the above figures, it can be concluded that Lephalale LM is the fastest growing South African LM. Other major influencers are projected projects in the region associated with the Waterberg coal fields such as the expansion of the coal mining industry (new mines), the developing coal to liquid petrochemical industry such as Sasol Mafutha 1, the expansion of Grootegeluk coal mine as well as associated infrastructure built industry such as road construction, water and sanitation built infrastructure, property and housing development.

Section 3.5 below discusses the various economic activities in the LM, it is preceded by the discussion of education and skills levels section (3.3) and health and wellbeing of people in Lephalale LM (section 3.4). Both section 3.3 and 3.4 are seen as important indirect drivers of the economy.

3.3. Education and Skills Levels in Lephalale LM

Lephalale LM has a total of 94 various educational facilities spread throughout the municipality. According to the LM's IDP report (2015-2016), more than 95% of the population is within 30 minutes walking distance to the nearest education facility. Accessibility to schools in the rural areas is relatively good particularly for primary schools. This is not the case with regards to secondary schools as there are still students who stay more than 10km away from the nearest education facility. Access to secondary education has resulted in low numbers of pupils proceeding to tertiary education. The assumption is made that this could be as the result of learners being despondent of traveling long distance to go to school and the cost of public transport resulting in absenteeism and poor learner performance at the end of the year prohibiting them to proceed further with their education.

However, there could be other social and socio-economic influencers to the situation such as the availability of reading materials, qualified teachers and poor school infrastructure. One of the challenges that the municipality has listed is that most of the secondary schools in the rural areas do not have enough teachers to offer mathematics and science subjects, and a lack of technical high schools limits career paths for students.

In terms of overall performance, the LM seems to be slightly higher than the Waterberg and Limpopo in terms of education levels but not sufficient to respond to the needs of the growing economy such as the Lephalale one. Research from Quantec Regional Database and PD Consulting found that 75% of the Lephalale population has schooling below Grade 12 levels (some secondary, complete primary, some primary, and no schooling at all) (*Figure 10*).

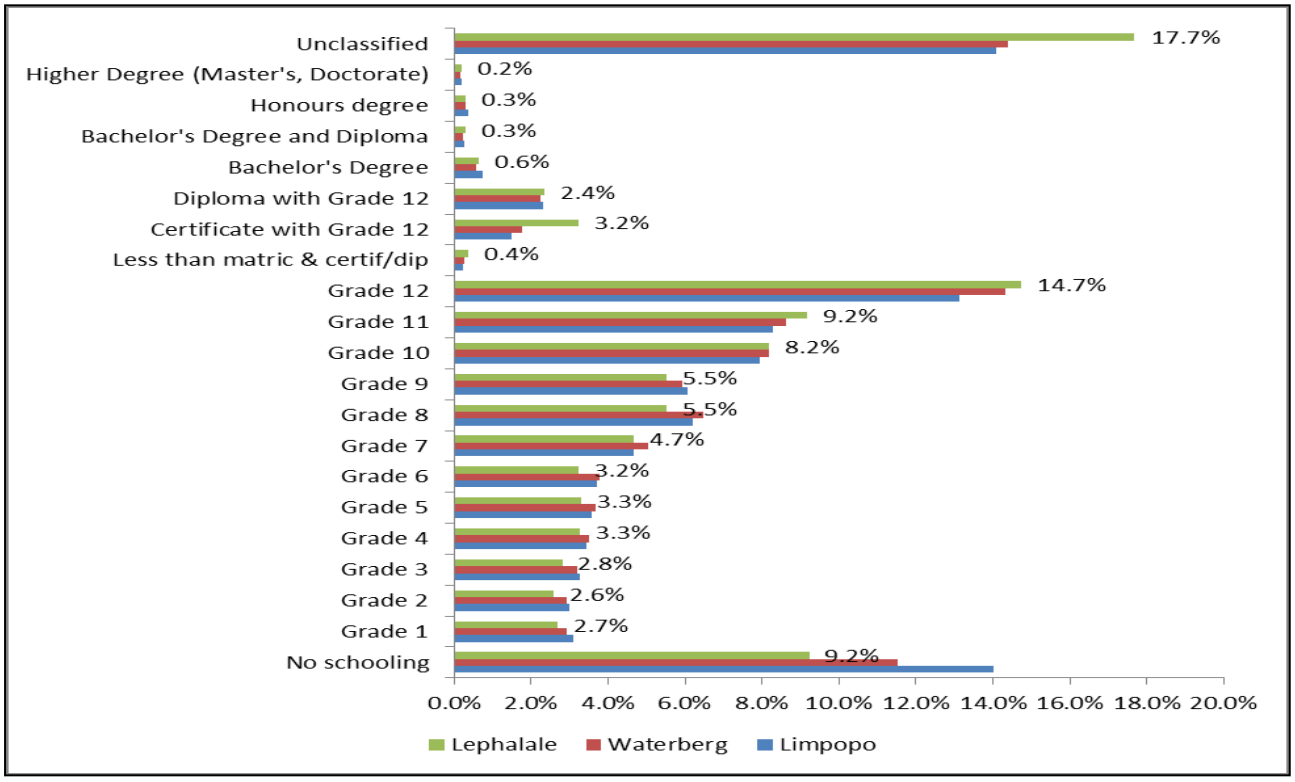

Figure 10 : Education Levels

It has to be noted that not all of Lephalale citizens are below Grade 12 in terms of their educational achievements. There are those who have proceeded beyond Grade 12 and who have obtained post-Grade 12 qualifications such as Diplomas, Degrees and Post-Graduates, but the numbers are very low (*Figure 8*). This fast-growing economic hub only has one FET College, located in Onverwacht with the other campus in Modimolle. The FET College offers a wide range of vocational and diploma courses (http://www.careersportal.co.za/colleges/fet-colleges-public/881-lephalale-fet-college.html /22 January 2017).

Among the listed admission requirements are NSC (Grade 12) or NC (V) level 4 - (NQF Level 4) and this is a challenge in an area with a high number of people without Grade 12. Based on the available data it can be concluded that the average education levels of Lephalale citizens is very low to respond to requirements of the fast-growing economy like that of Lephalale LM. This is evident when one assesses the available skill pool against required skillset in the area to see the variation or gaps that that exist (*Table 4*). Only a few would be able to respond to technologically intense projects such as the FGD and the technical requirements required to work in industries such as heavy chemical processing and recycling industry.

Table 4- Scarce Skills within the Lephalale Municipality

Number of scarce skills				
Sector	Scarce Skill	Baseline	Required	Variance
Mining	Artisan (mining, electricity	79	101	22
	Technician (electrical & Mechanical)	74	98	24
	Machine Operators	106	127	21
	Engineering manager	6	7	1
Tourism	Tourism marketing	2	20	18
	Tour guides	0	200	200
	Tourism information presenters	0	135	135
Agriculture	Agriculture engineering	4	10	6
	Veterinary medicines	6	9	3
	Meat inspectors	1	10	9

3.4. Community Health and Wellness in Lephalale LM

The World Health Organisation (WHO) in 2012 reported that one in eight deaths in the world is due to air pollution. The pollution is either ambient (outdoor) or indoor. WHO further concluded that 88% of premature deaths in middle and low income countries whose economy is coal based to ambient pollution. South Africa is one of such countries whose economy is coal based economy. To understand the community health and wellness in Lephalale and the type of health challenges faced by those affected, one has to understand the various types of polluters and the types of pollutants emitted and how these negatively impact on human health.

Four main polluters have been identified in the study area and they include:

- Eskom through combustion of coal in its Matimba Power Station and the currently built Medupi without the retrofitted FGD technology (Unit 6 was synchronised into the grid in 2015), and disposal of ash from Matimba and Medupi;
- Grootegeluk coal mine through coal extraction and processing, fossil fuel combustion;
- Domestic fossil fuel combustion; and
- Fossil fuel combustion to support the thriving commercial and agricultural industries in the study area.

In South Africa, like in many other parts of the world, there are three main anthropogenic polluters: industrial combustion of fossil fuels, domestic burning of fossil fuels, and exhaust fuel from motor vehicles and trucks. There are also sporadic veld fires, which contribute to the combustion of organic matter and solid fossil fuel materials. Combustion of fossil fuel contributes to pollution of ambient and domestic air. In Lephalale, coal is the main source of pollution throughout its life cycle: from extraction, combustion through to disposal. It contributes to pollution of both ambient and domestic air through a wide range of pollutants such as PM (particulates/dust), SO_2 (Sulphur dioxide), NO_2 (Nitrous oxide), O_3 (Ozone) (Itzkin, 2015). Liquid fossil fuel burnt/used by cars contributes to carbon monoxide (CO), while other known general pollutants include lead and volatile organic compounds.

Exposure to some of the aforementioned pollutants, namely PM (i.e. PM_{10} and PM $_{2.5}$ µm), SO_2, NO_2, O_3 can result to great harm to human health and wellbeing (WHO, 2014). The harm to human health as the result of exposure to these pollutants is directly dependent on their spatial distribution and concentration (McGranaham & Murray 20003). Most of the identified pollutants are a local phenomenon, with concentration at a particular location dependent on the rate of emissions, geography, climate combination and meteorological dispersion factors.

From a human health perspective, a number of illnesses or diseases are associated with the identified pollutants, mostly produced throughout the coal life cycle, and these are mostly respiratory related or cardiovascular in nature or cancer. Abnormal neurological development such as poor fetus growth is known to occur in in children as the result of some of the pollutants, especially those that are coal based.

SO_2 contributes a great deal to respiratory effects as the airways and lungs become damaged by exposure to SO_2 leading to inflammation, cytotoxicity and cell death. PM varies in size between 10 and 2.5 µm and is known to cause asthma, decrease in lung function in children and also causes pulmonary disease. A higher number of patients with lung cancer is often reported in areas with a higher concentration of particular matter (PM) over a long period (Burt, Orris & Buchanon, 2013). SO_2 is known to result in increased severity and incidents of respiratory illnesses in communities that are exposed to high concentrations. The gas is also known to cause inflammation and hyper-responsiveness of airways, aggravate bronchitis and decrease lung function (ibid). There is a strong association between high levels of exposure in a community and hospitalization as the result of SO_2, including those with other respiratory conditions (ibid). According to Burt, Orris and Buchanon, those highly susceptible to health risks associated with high levels concentration of SO_2 include people older than 60 years, children and asthmatic patients. Low concentrations of the gas can also lead to death as the result of heart and lung disease in susceptible patients.

Adel Itzkin (2015) Master of Science Thesis titled “Health in the Waterberg, Up in Smokes?” provides a good insight into amount of pollution experienced by the people in the Waterberg as the result of the

combustion of coal. The two graphs below provide a good example of the type of illness and disease associated with some of the above mentioned gases and PM resulting from combustion of coal in power generation efforts (*Figure 11 & 12*). The two graphs show that there is a correlation between illnesses and disease associated with the combustion of coal and disease and illnesses experienced by the people of Lephalale LM.

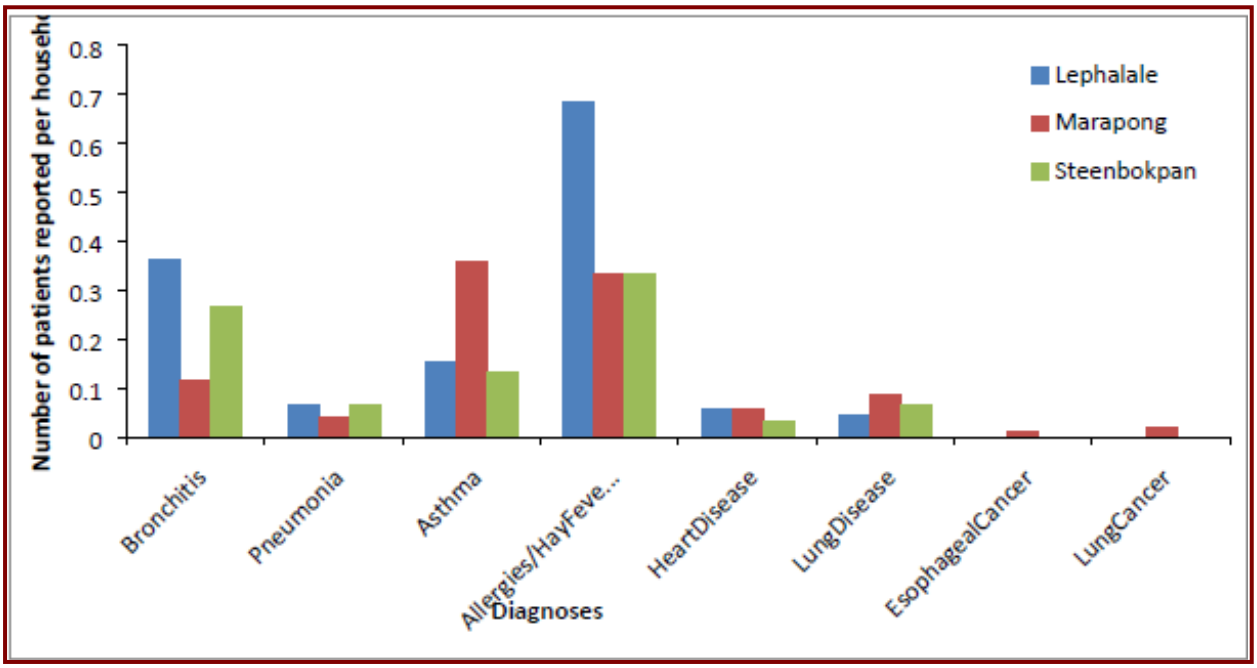

Figure 11- Diagnoses of those who went to seek medical assistance for Lephalale, Marapong and Steenbokpan (represented as average number per household) (Itzkin, 2015)

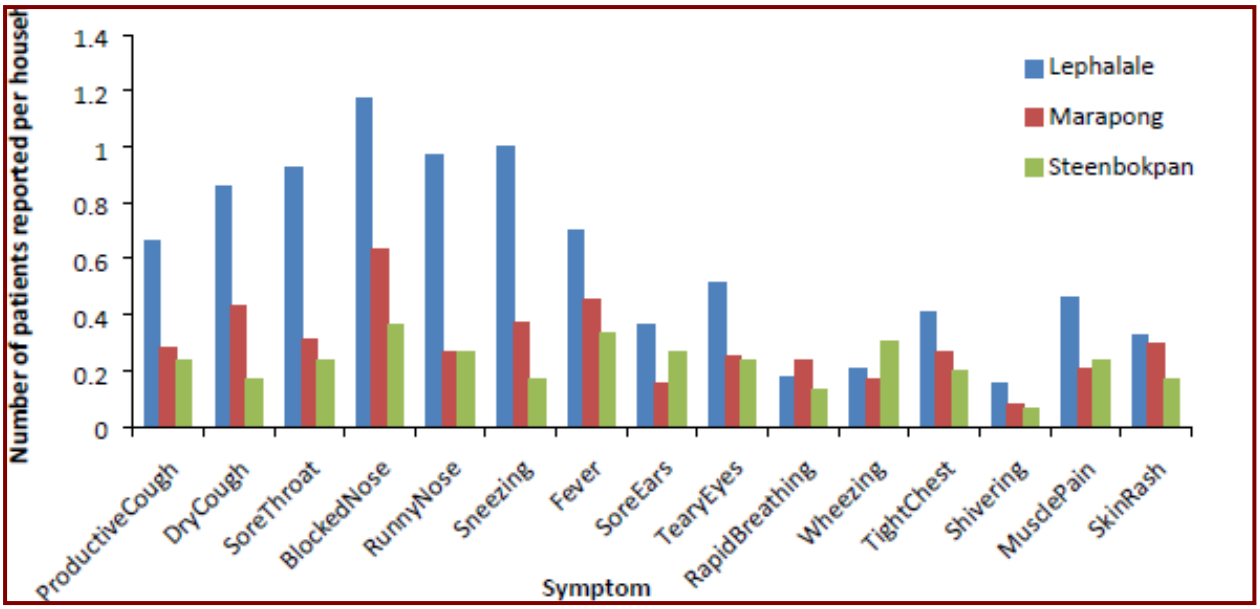

Figure 12- This graph presents the number of people with respiratory problems who experienced each of the symptoms listed. These are measured as average per household for Lephalale, Marapong and Steenbokpan (Itzkin, 2015)

Other diseases and illnesses known in Lephalale are tabled in Table 5 and Table 6 below. Some of these illnesses are accelerated as the result of high exposure to SO_2 and PM. Although not directly linked to emissions, deaths from HIV/AIDS related illness such as pneumonia, tuberculosis and many more may be accelerated due to high levels of exposure to harmful gases such as SO_2 and PM which both contribute to lung disease. As can be seen in Table 6, HIV prevalence in Lephalale is almost double that of the province and the district and AIDS infections are almost 20% higher. Another challenge is that patients seek medical attention when they are at an advanced stage of ailment and this results in high mortality rates amongst children and adults (Lephalale Local Municipality, 2014).

Table 5 : Chronicle of Health Conditions within the Lephalale Municipality

Chronical health condition	***In thousands***	
Tuberculosis	Male	10
	Female	10
	Total	20
Heart attack	Male	5
	Female	8
	Total	13
Stroke	Male	5
	Female	4
	Total	9
Asthma	Male	27
	Female	38
	Total	65
Diabetics	Male	33
	Female	44
	Total	76
Cancer	Male	*
	Female	6
	Total	7

Table 6- HIV Prevalence by District, Municipality and province

Geography	Years	2001	2007	2011	2013	2007 -2013 Percentage Increase
Limpopo	**HIV+ estimates**	211,106	339,034	371,439	379,718	12%
	AIDS estimates	6,433	14,868	19,587	21,559	45%
Waterberg	**HIV + estimates**	28,362	49,114	54,327	55,164	12%
	AIDS estimates	885	2,201	2,921	3,191	45%
Lephalale	**HIV + estimates**	4,335	8,203	9,901	10,309	26%
	AIDS estimates	136	367	529	590	61%

3.5.Economic Activities in Lephalale LM

The 2013 Quantec regional database on economic activities in Lephalale LM shows that mining is the biggest contributor to the municipality GDP, with a total of 34% contribution (*Figure 11*). It is followed by electricity which contributes 23% to the LM GDP. Community services are the next biggest contributor at 16% and Trade at 9% respectively (*Figure 11*).

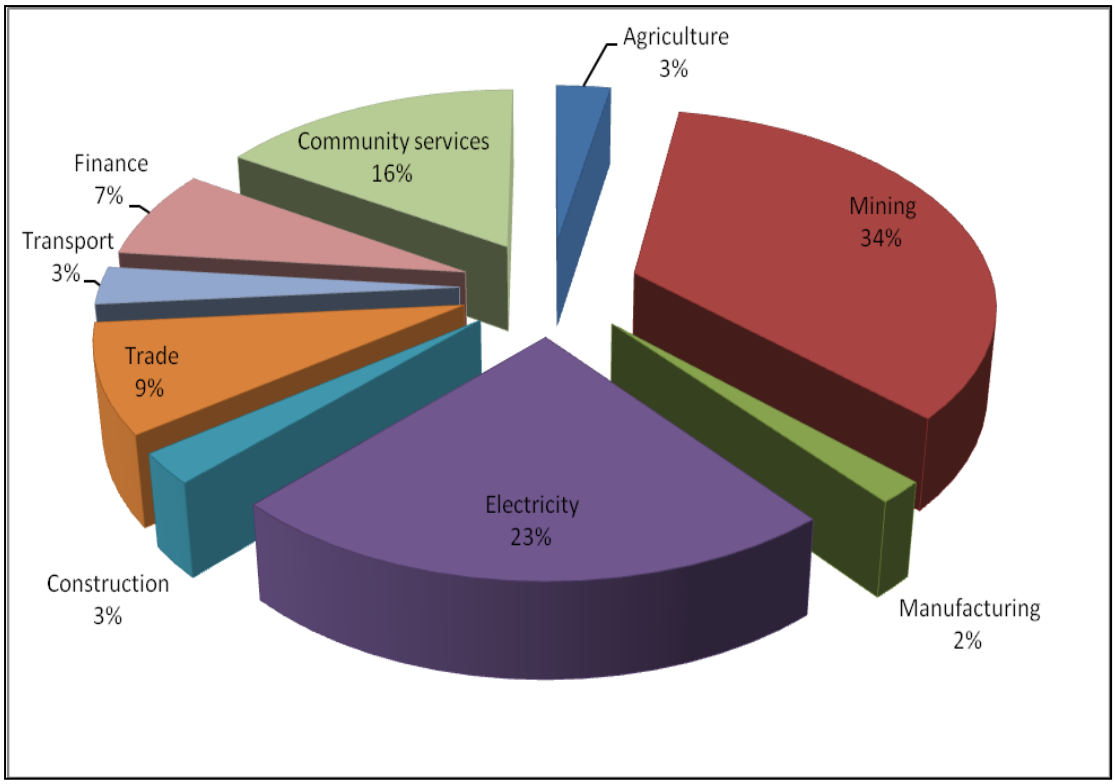

Figure 13- Sector Contribution to GDP

The LM boasts up to 40% of the country's coal reserves. This made the LM the perfect place for the construction of the Medupi power plant, which transformed the face of the Lephalale economy. Based on this and the figures shown in Figure 13 above, the mining and energy sector are the biggest players in the economy of Lephalale LM and that of the Waterberg District. According to an IOL business report article – The town of Lephalale's gross domestic product has increased by about 95 percent a year as a result of the power station's construction (Cox, 2015).

Wayne Derksen, the president of the Lephalale Chamber of Commerce said in a business report article that that in the informal sector; many catering, laundry, transport and labour camp accommodation businesses have boomed (Faku, 2013). He further stated that "Lephalale council's income from revenue including rates and taxes has more than doubled to R212 268 for the 2013/14 financial year from R83 789 in the 2007/8 financial year as a result of Medupi". Eskom has stated that it needs to increase electricity generation from 40 000MW in 2008 to 80 000MW in 2026. Half of this energy supply will be from coal

fired power stations, (Lephalale municipality, IDP: 2013-2016). The implication of this is that 20 000MW is needed from coal. Like Kusile power station, Medupi is expected to generate 4, 800MW of electricity. This means that at least another 10 400 MW of generation capacity is required from coal before 2026. With an estimated resource of 50 billion tons of coal, the Waterberg Coal Field is the most likely source of coal for this purpose. The likelihood that the municipality can host three more coal fired power stations is apparent, (Lephalale municipality, IDP: 2013-2016).

The municipality is currently in the second stage of considerable public sector investment which is estimated at R140 billion over six years. With the anticipated Eskom developments, Coal miners are planning developments to meet the increased demand for coal. One such is the Grootegeluk coal mine owned by Exxaro. As part of its mining expansion programme, Exxaro has announced that it will be constructing a new coalmine named Thabametsi. Exxaro is also targeting the development of a 1,200MW independent power plant to be attached to the new mine.

The new coal mines and power stations could lead to a six-fold increase in households in and around Lephalale. This will create a significant demand for building materials and will have positive implications for retail, service and small industry development. Based on all the above, Wayne Derksen, the president of the Lephalale Chamber of Commerce predicts the life expectancy of the economic boom is 30 years due to another power station and all the mining activity. However, Steph Beyers, a director for development at Moolman Group, which built the R170m Lephalale Mall, cautioned that the town's economic "bubble will burst" once the construction of Medupi was complete. He said there would be a "slowdown" once Medupi construction neared completion and the construction workers and consultants left town. He further said "*We, however, believe there are and will be enough other capital projects commissioned in the near future. For example, new mines, the expanding of existing mines, independent power stations, and the upgrade of council infrastructure and so on that will again put and keep the town of Lephalale on a growth path*" (Business Report- Companies, 14 October 2013).

The Limpopo Province is heavily reliant on mining as the major contributor – that a slowdown in this industry even for a few years will have devastating consequences. One way to alleviate the sting of a

slowdown is to diversify the economy. Increasingly, the Lephalale development forum is looking to the under-developed tourism industry. The focus is likely to be on hunting and ecotourism industries, but could also be linked to any expansion of the industrial operations and the related business tourism (Lephalale LM IDP, 2016-2017). The Limpopo Province offers a variety of indigenous cultures, game farms, nature reserves, national parks, a biosphere reserve and trans-frontier conservation areas (Limpopo Provincial Government, 2009). As a result, the province has high tourist potential. Similarly, the Waterberg District has a number of cultural, historical and natural resources with tourism potential (IDP, 2010a). Major tourist attractions in the Waterberg District include the Waterberg Biosphere Reserve, the Makapan Caves, the Nylsvley Wetland and Bela-Bela (formerly Warmbaths). The number of tourists visiting Limpopo Province has increased from ~370 000 people in 2002 to ~750 000 in 2007, and the province increased its ranking in terms of its contribution to the national tourism industry from eighth to fifth during the same period (Limpopo Provincial Government, 2009). However, this tourism has largely been as a result of business tourism and will likely mirror the peaks and flows of the petro-chemical industry.

Tourism results in an influx of financial resources into a region (or country) thereby stimulating demand for local goods and services. The contribution of tourism to GDP is expressed as a component of demand for goods and services in the secondary (and to a lesser extent tertiary) sector of the economy; and is comparatively small when compared to the mining and agricultural sectors in Limpopo Province. Nevertheless, tourism is labour intensive and is therefore already a highly strategic and important sector given the socio-economic challenges which face the province. Because of the dominance of the primary sector in the provincial economy and high rates of return on investment in the manufacturing sector in terms of employment creation, promotion of the tourism industry by encouraging the participation of local inhabitants represents an opportunity to diversify the economy and stimulate provincial employment and therefore social development. There exists a tension between the mining and electricity production activities that will drive economic growth but possibly negatively impact the environment and the possible future lucrative tourism revenues.

These industries have also stimulated the growth in other sectors of the economy such as property and property development. For example, over the past three-and-a-half years, new property worth R2 billion has been developed in Lephalale, among them, 25 000 houses and a R170-million shopping mall.

3.6. Employment Rate and Occupation in Lephalale LM

The rate of unemployment in Lephalale is at 22.2%, which is well below the provincial average of 32.4% as per the 2011 national census. Unemployment amongst the youth currently stands at 27%, also below the Limpopo provincial average of 42%. This is due in large measure to local developments associated with Medupi power station and the expansion of coal production from the mines which can be taken to have absorbed a lot of the latent labour force.

Using data from Statistics South Africa that covered Waterberg district municipality, it was found that the municipality of Lephalale' s unemployment rate had been rising steadily in the ten-year period from 2001 to 2011. In 2001 the unemployment rate stood at 18.5 % and in 2011 was at 22.2 %. The Youth unemployment rate stood at 24.0% in 2001 and at 26.9%, (StatsSA, 2011 census). At a District Municipality level, the overall unemployment rate in the Waterberg DM was at 31.7% in 2001 and youth unemployment rate was at 41.1% in the same period. In 2011 the Waterberg DM unemployment rate was at 28.1% and in and youth unemployment rate was at 35.5%. This increase in unemployment in Lephalale but a decrease in the Waterberg DM could be because of an influx of labourers who were unable to secure job opportunities and increased the population and local unemployment rate. For example, Figure 14 below shows that between the years 1996 – 2009 there was a decrease in employment in all skills category. This trend reversed between 2009-2013, which can be attributed to the construction of Medupi power station and also the discovery of coal deposits. The highest increase in employment is with the informal, semi and unskilled employees. Figure 15 shows that the while Agriculture is still the major employer in the municipality, its contribution to employment has decreased from 52% (14631) in 1995 to 25% (7644) in 2013. Wholesale and retail trade is the second largest employer. It has increased from 13% (3676) to 20% (6349). Mining contribution to employment grew from 6% (1663) in 1995 to 17% (5278) in 2013. Community, social and personal services, the fourth largest employer, contributes 13% (4057) to employment (*Figure 15*) (Quantec Regional Economic Database, 2013).

The rate of employment or employability of the people of Lephalale is directly linked to their education and skills levels. The health and wellbeing of a society also influences to response of its citizens to available employment opportunities as these are some of the social dynamics that should also be considered in the assessment of employment rate at a given society (*Figure 14*).

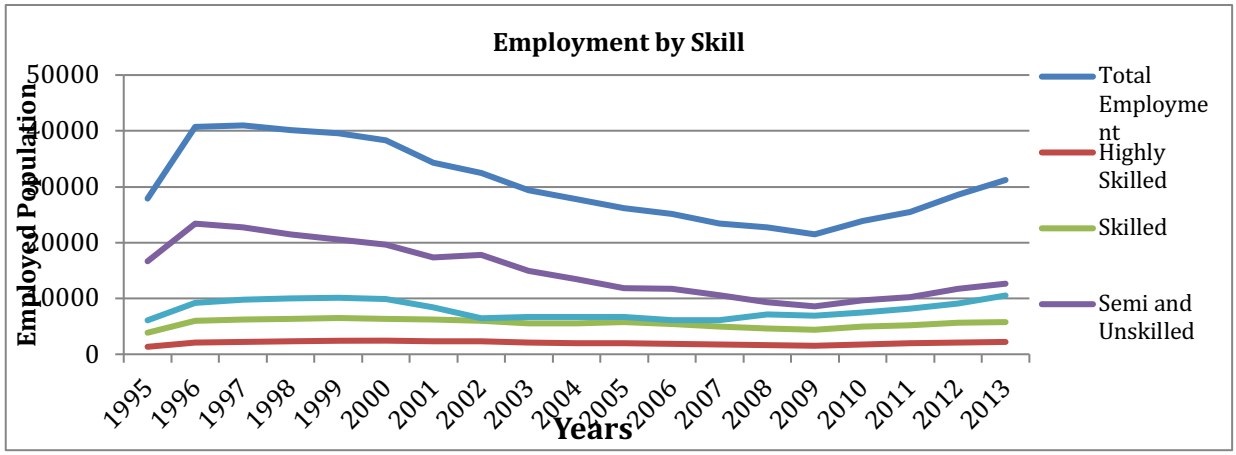

Figure 14 -Employment by Skill Level

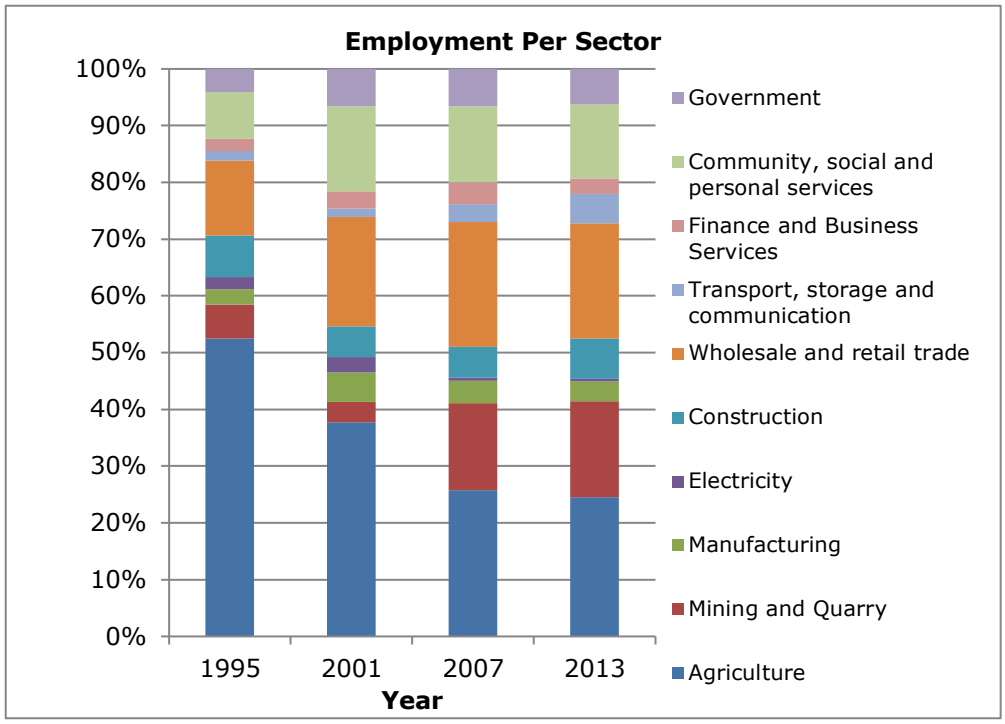

Figure 15 : Sector Employment within LLM

3.7. Income Distribution in Lephalale LM

This income section looks at how Lephalale LM total income is distributed amongst its citizens. Income in Lephalale varies between state contribution through social grants, to income earned through employment opportunities. There is currently approximately 45% of the *economically active* [1] population who are not earning an income through employment opportunities and are dependent on state grants, ie almost half of the population of Lephalale LM is dependent on social grants. The low income earners make up the second group and mostly earn betweeen R500.00 and R3,500.00 per month and the third category is of middle income earners between R3,500.00 and R12,800.00 per month (*Figure 16*). Based on the education levels of Lephalale LM citizens, it is more likely that people who fall within R3,500.00 and R12,800.00 income bracket per month are those who are skilled and semiskilled employees and the almost 45% being those with no higher education who cannot be absorbed in the job market. Due to the technical skills requirements from industries such as the Medupi build there has been a increase people

[1] These are people between ages 16 and 65 and should form part of the labour force.

earning between R 3,500.00 and R 12,800.00 per month in the period 2001 to 2011 and this by grew at 17.42% per annum. This could also be attributed to inward migration of people with higher skills levels. During the same period there has been a steady decline in those earning less than R3, 500.00 per month of 0.69% per annum. The disparities in income distribution is evident when one assesses access to social services such as housing, health, electricity among other social service resources. For income earned to translate to the affordability rate of citizens, the more income earned by individuals per households the more disposable money available per household to afford basic social services such as better housing, electric connection, etc.

For example, a 2013 Financial Mail article asserts that there is very little flow of money to Marapong Township. The article goes further to describe the bad environmental situation in Marapong which when compared to Lephalale Town paints a bad picture about the socio-economic conditions of those who live in townships such as Marapong. For example, four shopping malls have been built in Lephalale Town and are tenanted by large chain stores like Mr Price, Checkers and Game.

The disparities in income distribution have resulted in some labour representatives complaining that the township and the workers are not getting a good deal from the new money that flows into Lephalale. However, there seems be a misunderstanding of what causes these disparities such as low levels of available skills and qualifications. This has on many occasions resulted in volatile labour relations in the area. The assessment also shows low levels of saving by the locals with high consumption rate (*Figure 16*).

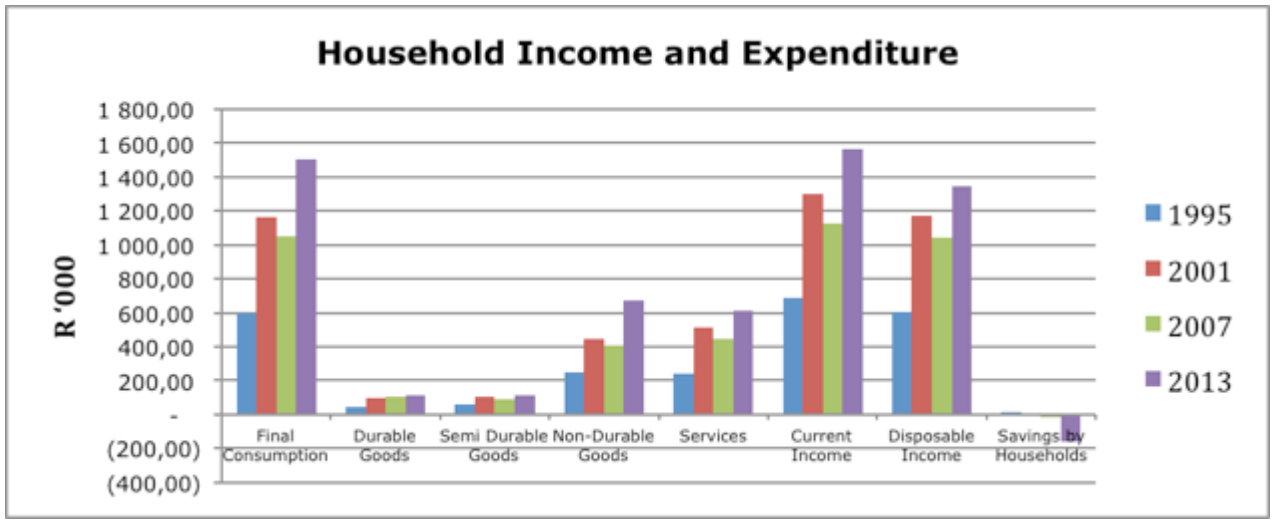

Figure 16 - Household Income and Expenditure in Lephalale

3.8. Housing and Human Settlements in Lephalale LM

Lephalale LM is a host to a number of current and future coal mines and coal fired power station with one nearing completion (Medupi Power Station). A number of human settlements are located in close proximity to some of the known industries (such as coal fired power stations) and the mines. The close proximity of human settlements to heavy industries such as mines and power station is important when evaluating and assessing the social impacts of the FGD technology at Medupi and the impacts of the existing ADF. The various types of human settlements and their conditions also play an important role in understanding the social dynamics of the kind of communities that will be positively and negatively affected by the proposed Medupi Power Station FGD technology retrofit project and operations of the existing ADF for ash and gypsum.

The discovery of coal and its subsequent mining at Grootegeluk coal mine resulted in the establishment of Lephalale (previously known as Ellisras) (Itzkin, 2015). Most of the published literature still refers to Ellisras as a mining town in the Waterberg region. The town of Lephalale has also grown significantly accommodating an influx of job seekers in the LM. There are four main human settlements considered in the current SIA study, namely Marapong Township, Onverwacht Township (suburb), Lephalale Town and

Steenbokpan village (with rapidly growing informal settlements) (*Figure 17*). The location and the social dynamic of each of the four human settlement areas are briefly described below:

Figure 17- Location of Medupi in relation to Steenbokpan, Marapong, Onverwacht and Lephalale

- **Marapong Township:**
  - The township is very close to Matimba Power Station and north-east of Medupi Power Station and ADF.
  - It is situated east of Grootegeluk coal mine, south-west of the newly planned coal mine in the region and north of Matimba ADF (ash disposal facility).
  - It is characterised by a mix of formal, semi-formal and informal housing.
  - With construction of Medupi, Marapong became home to a number of semi-skilled and unskilled labourers working at Medupi, some of whom have found permanent residence in the township.

- The formal houses include Eskom compound for Eskom employees and houses which accommodated Grootegeluk mine and Eskom employees.
- Semi-formal houses include extensions to old houses and recently built backrooms to house either extended members of the family or for rental purpose triggered by the development of Medupi Power Station and associated ancillary infrastructure.
- Shacks have been built within the formalized stands (for rental purposes) and some have encroached informally on public space (most likely from those who do not want to rent).

- **Steenbokpan Village:**
  - A former village located south-west of Grootegeluk coal mine, Matimba Power Station and Matimba AFD.
  - It is situated south-west of newly Medupi Power Station and the associated the ADF for ash and gypsum.
  - Currently, a host to a number of informal settlements with dwellings predominately characterised by shacks and crudely built houses without access to electricity, water and sanitation.
  - People still use a combination of pit latrines and bucket system.

- **Onverwacht Township:**
  - A suburb located immediate west of the Town of Lephalale characterised by a formal housing scheme with all the social services required.
  - It is for the middle and upper income earning citizens of Lephalale Town.
- **Lephalale Town:**
  - The main business hub of Lephalale LM.
  - Characterised by formal houses occupied by middle to upper income earning citizens of Lephalale.
  - Has the necessary town or central business district support infrastructure.
  - Together with Onverwacht, the town is situated further east of Matimba Power Station, Medupi Power Station and the associated ADF.

- These two suburbs (Onverwacht and Lephalale town) are far (approx. 10km) from the mining area of Grootegeluk coal mine and other heavy industries (approx. 5-10km) located in the west.
- They are further north of Matimba AFD.
- Like Marapong and Steenbokpan, Lephalale Town and Onverwacht are also growing at a rapid rate mostly triggered by the construction of Medupi and projected future projects within Lephalale LM.

Current and projected future projects in Lephalale LM have resulted in a population increase and housing shortage and demand. According to a January 2015 Mail and Guardian article – property prices in formal suburbs/ areas in Lephalale have increased significantly. According to a 2014 Q3 Pay Prop Rental Index Mail and Guardian article, "*Residential properties in Lephalale formal suburbs command some of the highest rental prices in South Africa. The average monthly house rental in the suburbs was R19, 986.00. By comparison, the weighted average rental in the up-market Johannesburg suburb of Bryanston was R19, 016. The demand for living space far outstrips supply because there are numerous obstacles to the construction of new homes: there is not enough water, the sewerage system is inadequate and there is a power shortage*" (GEDYE, 2015). This has led to a boom in guest houses and B&B's particularly in the suburbs. Before 2007, there were only a handful of guesthouses and bed-and-breakfasts; now there are more than 3 000. According to Wayne Derksen, the president of the local chamber of commerce, 2 500 new houses were built between 2009 and 2010, and more than 1000 new flats were constructed in the past two years. However, this is not enough to support the massive increase in population. Figure 18 shows the number of households by dwelling type in the Lephalale region (Quantec Regional Economic Database, 2013). The biggest percentage increase in dwelling type is in Informal dwelling/shack in backyard which increased by 381%. This is followed by apartments in a block of flats that increased by 292% and Informal dwelling not in backyard e.g. informal settlement which increased by 142%. House or brick structure on a separate stand or yard grew by a significant 127%, while town and cluster houses grew by 75%. In total, informal dwellings increased by 214% whereas formal housing grew by 99% in total. The growth in informal housing demonstrates that demand for housing far outstrips supply. Another telling statistic is the decrease in traditional huts which speaks to the growing urbanization of Lephalale and the decline of rural development.

Human Settlements	1995	2013	Percentage Increase
House or brick structure on a separate stand or yard (out of graph as the high number compared to the rest of the data it throws out scale of graph.	10328	23410	127%

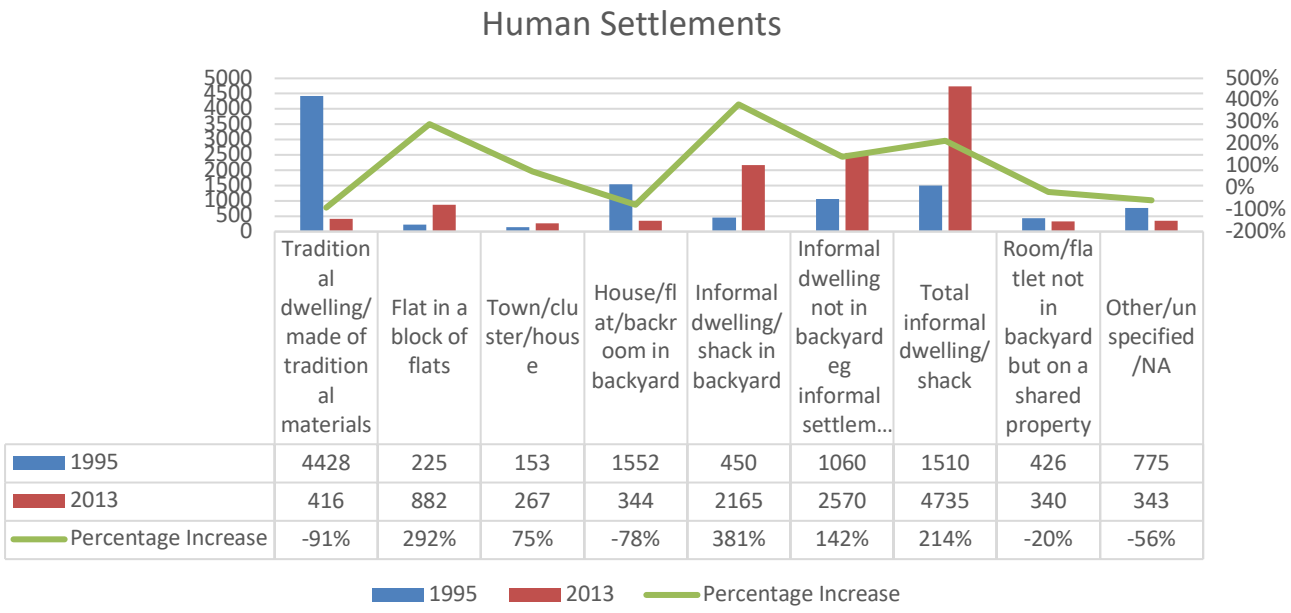

Figure 18-Human Settlements in LLM 1995 – 2013

The housing shortage is so severe, that even the informal dwellings do not come cheap. In Marapong, the township that houses mainly employees of Medupi and the Grootegeluk mine, the price for accommodation is steep. A back room could cost up to R1 200 per month, while a shack costs R600/month to rent according to Lephalale municipality executive director for strategy, Khoroshi Motebele. The Lephalale municipality had been inundated with requests from residents to transform their homes into guest houses. Margie Geyser, from the property company Remax, said demand for accommodation in Lephalale peaked in 2012 and 2013, when there was a zero percent vacancy rate. But 2014 had seen the demand drop off. She said there was a 5% vacancy rate in 2015 and demand was expected to drop off

significantly in 2016. Abrie van Vuuren, who provides accommodation to Medupi contractors, said a 100% occupancy rate in 2012 and 2013 had dropped to 70% for 2014.

Substantial areas have been cleared for new residential development which may impact on the sense of place older inhabitants have of the area. The provincial government has also allocated 1.2 billion on a three-year basis for the establishment of 500 Erven in Altoodstyd Farm; Altoostyd 506-LQ is located west of Onverwacht and east of Medupi power station. The project is expected to provide housing for middle income and other designated groups, which forms natural extension of the existing housing scheme. The scattered nature of the township development area has prompted the local municipality to follow an infill approach for integrated human settlement (Lephalale Municipality, IDP 2013/16). As regards to the area on the urban periphery, it is noted that development tends to take on a minimum intervention mode. This is due to the fact that rural areas have low growth potential. Challenges around housing are focused on questions about the lack of well located, developed land for housing, as most of the land which is well located and well suited is privately owned and insufficient for housing subsidies. There is also a question of a high number of people with RDP housing needs. Other issues include the fact that the municipality does not own the land around provincial growth point areas, illegal occupation of land (informal settlers) and traditional leaders allocating residential sites without consultation with the municipality, (Lephalale Municipality, IDP 2013/16).

3.9.Water and Sanitation

3.9.1. Water Availability and Water Allocation in Lephalale LM

Water is one the scarce resources in the Waterberg DM and South Africa. Its availability plays a critical role in the planning and the implementation of mega infrastructure projects such as the current construction of Medupi Power Station FGD retrofit project and the associated ancillary infrastructure like the ADF for ash and gypsum. The availability of water is also important in stimulating investment in some sectors of the economy such as the mining sector which uses significant amounts of water. The success of the agricultural and food sector is directly linked to water and useable water availability. Water is also

an essential resource for various domestic uses in our daily lives and the most critical one is the availability of drinkable water for both human and animal consumption.

South Africa, like most developing economies, is on a fast industrialization and urbanization trajectory and this requires access to energy to support such growth which has both positive and negative impacts to human and natural environment. Water is an essential resource to support both industrialization and urbanization. In Lephalale LM key water users include Eskom (for power generation), independent power producers (IPPs), coal mining (for power), other mining activities, fuel-liquid gas industry and for domestic and commercial uses by the municipality (Nemai Consulting, 2010). The question is where do all these water stakeholders receive their water from and whether it is sufficient to meet their future water demands?

A Department of Water Affairs (2009) (now Department of Water & Sanitation) report (P RSA A000/00/9209) states that Lephalale receives its water from the Mokolo Dam constructed on the Mokolo River catchment which forms part of the Limpopo Management Area. The river flows from Modimolle, south-east of Lephalale, to the Limpopo River in the north. Mokolo Dam is a large dam that was constructed in the late 1970s and completed in July 1980 (DWS, 2009). The aim of the dam was to supply water to Matimba Power Station, Grootegeluk coal mine, Lephalale LM for irrigation purposes downstream of the dam (agricultural activities) (DWS, 2009). Therefore, it can be argued that before 2008 Lephalale LM solely depended on the Mokolo Dam for its water.

On the question of future water demand by the various stakeholders with interest in water, in 2008 the South African custodian of water, the Department of Water and Sanitation (DWS) (previously referred to as Department of Water Affair or Department of Water Affair and Forestry), commissioned a number of due diligence studies to look at future water options for the Waterberg and the growing industries as well as rapid urbanizing Lephalale. One of known catalysts of such growth are the Waterberg coal field known to contain approximately 40% of South Africa's mineable coal that can be used to support future energy needs of the country such as power generation and extraction of other fossil fuel such as coal to liquid and coal for domestic international needs. Based on this premised growth trajectory of the area and the

available water infrastructure, DWS determined that the water availability and water use in Lephalale allowed for limited spare yield but could not support the future allocations (DWA, 2009). In summary, what this says is that between 2008 and 2009 Mokolo Dam alone could not support the industrialisation and growth of Lephalale. The future development associated with the Waterberg coal fields meant that there would be additional requirements of water in Lephalale LM.

Due to limited water availability in Lephalale, mostly triggered by the need to achieve developmental goals such as the establishment of industries that would support South African Economy; more water infrastructure was required. In 2008 the DWS (then DWA) commissioned the Mokolo Crocodile (West) Water Argumentation Project (MCWAP) to meet future water demands in Lephalale LM. The options included augmentation of existing water supplies from Mokolo Dam and Mokolo River catchment within Limpopo WMA in Lephalale LM. This is high quality water suitable for domestic consumption. This included transferring the surplus effluent[2] return flow from the Crocodile River (West) / Marico WMA to Lephalale and the area around Steenbokpan (DWA, 2009). This is low quality water that is suitable for industries and not for domestic use - a positive strategic position by the DWS. This undertaking by the DWA to plan and lead the implementation of such a mega water augmentation project was a positive one by the Department which is the primary custodian of water in South Africa. MCWAP was staged into two phases, namely Phase 1 and Phase 2.

Phase 1 (augmentation of existing water supplies) aimed at providing drinking quality water to industries and municipality and Phase 2 (transferring the surplus effluent return flow from the Crocodile River (West) / Marico WMA) aimed at providing low quality water to industries. Among the known stakeholders who participated in the project and who require water in the area for current and future needs are (also see *Table 7*):

- The Lephalale LM;
- Eskom;
- IPPs;

[2] "Liquid waste that is sent out from factories or places where sewage is dealt with, usually flowing into rivers, lakes, or the sea" (http://dictionary.cambridge.org/dictionary/english/effluent/2017/Januray/20)

- Grootegeluk Mine (coal mining);
- Exxaro Projects;
- Sasol (Mafutha 1).

Table 7 – List of companies that participated in the water argumentation projection process (then DWA, 2009)

No.	Proponent	Details
1	Eskom	Matimba, Medupi + 4 coal fired power stations power stations
2	Independent Power Producers (IPPs)	Equivalent of 1 Eskom power station
3	Exxaro	Matimba coal supply + further projects
4	Coal mining	Allowance for 4 additional coal mines each supplying a power station
5	Sasol	Mafutha 1 Coal to Liquid Fuel (CTL) plant and associated coal mine
6	Municipality	Estimate based on projected growth in households for construction and permanent workforce

The projected volumes and rate of requirements per use based on Scenario 9 planning in 2010 show that the municipality required more water from the MCWAP in the period 2009 and 2014 than most of the other water users, while in the projected period 2015 to 2030 Sasol required more water that most industries and the municipality (*Table 8*). The projected water requirements for the local municipality were derived using the existing number of households in Lephalale and adding the projected growth in households as a result of the establishment of new mines, power stations and coal-to-liquid fuel facilities (Nemai, 2010). A planning horizon for the period 2009 to 2030 was considered.

Table 8- Projection of required water by key water users in Lephalale LM based on Scenario 9 of the DWS (then DWA, 2009)

Year	2009	2010	2011	2012	2013	2014	2015	2020	2025	2030
Eskom	4.3	4.3	4.9	6.8	9.3	10.9	14.3	50.9	77.6	77.6
IPP's	-	0.4	0.9	0.9	1.5	4.4	13.2	15.6	15.6	15.6
Coal Mining (Power)	-	-	1.1	2.7	4.4	5.3	6.8	14.1	20.0	20
Exxaro Projects	3.0	3.2	3.7	4.7	6.6	9.2	10.8	16.9	16.2	19.2
Sasol (Mafutha 1)	-	-	0.4	6.1	6.6	9.9	25.2	43.5	43.5	44.0
Municipality	5.6	5.9	7.7	10.4	12.0	13.6	14.5	20.4	21.2	21.6
Total	12.9	13.8	18.7	31.7	40.4	53.4	84.8	161.4	194.1	198.0
Irrigation + Mokolo River	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Total + Irrigation	23.3	24.2	29.1	42.1	50.8	63.8	95.2	171.8	204.5	208.4

Other than the MCWAP project as the predominant source of water in Lephalale LM, Lephalale is known to contain good ground water which has the potential for exploitation particularly for domestic and agricultural consumption. The area is known to contain good aquifers although retention of surface water due to sandy nature of geomorphology is not very good.

A total of 8 main dams, 138 boreholes and 15 wetlands have been recorded in Lephalale LM. The LM also plays an important role in managing and conserving its water resources. Lephalale LM is known to be the best performing municipality in the Waterberg DM in terms of providing quality drinking water to its citizens. Its Blue drop status is at 92.84% and better than that of the Waterberg DM which is at 64.38% (Lephalale LM, 2014).

Based on the available data on water in the LM, it seems that the existing Mokolo Dam water scheme mostly services the needs of the urban area and the nearby industries. The rural areas in Lephalale LM

are highly dependent on borehole water for sustenance. According to the Municipality IDP (2014) 85% of Lephalale LM water comes from boreholes and only 15% from well-field-type boreholes in the riverbed alluvium which are all owned and operated by the Municipality (Lephalale LM, 2014). The rural areas include farms, conservation areas and rural villages.

In terms of water allocation and water distribution within Lephalale LM, the Municipality is designated as both the Water Service Authority and Water Service Provider in Lephalale, but the primary water custodian is the DWA. Exxaro and Eskom play an important role in the provision of the water service through their investments in Water Treatment Plants. For example,

- Exxaro's Zeeland Water Treatment Works, situated south of the town of Lephalale, has a total capacity of 3Ml/d (1.095 Million m/a)
- Matimba Power Station supplies water to Marapong via the Marapong Treatment Works which has a capacity of 6.0 Ml/d (2.19 Million m3/a).

According to Nemai (2010), both Exxaro and Eskom are the main suppliers of quality water to the municipality.

It should be noted, though, that ninety two (92%) percent of water infrastructure in the Municipality is over 20 years old. Sixteen percent (16%) of the water service system has been identified as being in poor to very poor condition. These are some of the challenges that are faced around water infrastructure (Lephalale Municipality, IDP 2013/14):

- Poor borehole yields in rural areas.
- Bulk water services in urban areas have reached full utilization.
- Illegal connections in rural areas.
- Lack of accountability to water losses.
- Limited availability of ground water in rural areas.
- Low quality of drinking water in rural areas.

These issues provide challenges in terms of social impacts in the receiving environment with the planned FGD technology to be retrofitted at Medupi and the existing ADF which both require large volumes of water for their operations and sustenance.

In meeting these challenges, some of the envisaged water supply projects include:

- Booster pump station for Onverwacht 10ML reservoir.
- Witpoort water treatment plant Relocation.
- Determination of suitable pipelines for water allocation depending of the various stakeholder water requirements. Currently these are the envisaged pipelines based on current and immediate water requirements:
    - New 6ML reservoir for HangKlip industrial area;
    - New 400mm diameter pipe taking treated effluent;
    - New 300mm diameter bulk pipeline to supply Altoostyd reservoir.
- There is also an analysis of capacity of existing reservoirs to handle upgrading of existing water supply from standpipe (ongoing).

3.9.2. Sanitation

Sanitation[3] is another social service that is directly linked to the availability of water resources. Therefore, the availability of water infrastructure such as water treatment plants directly talks to sanitation. Equally important is the use of effluent water derived from sanitary programmes for industrial stimulation and other initiatives such as farming. The question is what is the state of Lephalale LM sanitary infrastructure and how is it integrated to Phase 2 MCWAP to supplement the available water for industrial use in the Municipality?

[3] "The systems for taking dirty water and other waste products away from buildings in order to protect people's health" (http://dictionary.cambridge.org/dictionary/english/sanitation?q=Sanitation+/January/20/2017)

The assessment of this infrastructure within the project area around Medupi power station has found that 94% of waterborne sanitation infrastructure in the municipality is over 20 years old. About 15% of the sanitation network had been identified as being in very poor condition. The assets have experienced significant deterioration and may be experience impairment in functionality and will require renewal and upgrading (Lephalale Local Municipality, 2014). Problems noted around the question of sanitation are that there is a need to redesign the existing sewer networks in Lephalale Town and Onverwacht to reduce the number of pump stations. Further, the area does not have sufficient water resources and infrastructure to accommodate a waterborne sanitation system for all households. More than 50% of households in the municipality are without hygienic toilets (*Table 9*). Sanitation backlog is estimated to be 14,250 units, mostly in the farms and rural village. Other than what will be distributed by the Phase 2 MCWAP, there is no clear indication on what percentage of low quality (effluent) water will be derived from the existing Lephalale LM sanitary infrastructure.

Table 9-Sanitation within the LLM

Type of Toilet	**1995**		**2001**		**2007**		**2013**	
	No of household	%	No of household	%	No of household	%	No of household	%
Flush or chemical toilet	6,367	33%	9,190	45%	12,119	44%	13,784	45%
Pit latrine	9,647	50%	11,240	54%	12,723	46%	14,435	47%
Below RDP	3,384	17%	207	1%	2,835	10%	2,518	8%
Total	**19,397**	**100%**	**20,638**	**100%**	**27,677**	**100%**	**30,737**	**100%**

3.10. Access to electricity

This section of the SIA looks at the current accessibility to electricity within Lephalale LM as an essential social service resource as enshrined in the South African Bill of Rights (1996). According to Stats SA, out of the total number of households in Lephalale LM which is standing at 27 950, only 21 846 households

have access to electricity (*e.g. Figure 19*). Matimba has not been able to meet the need for electricity in Lephalale. It is assumed that Medupi will relieve the constraints on the supply of electricity to the area and assist supply an adequate reliable supply of electricity to the country

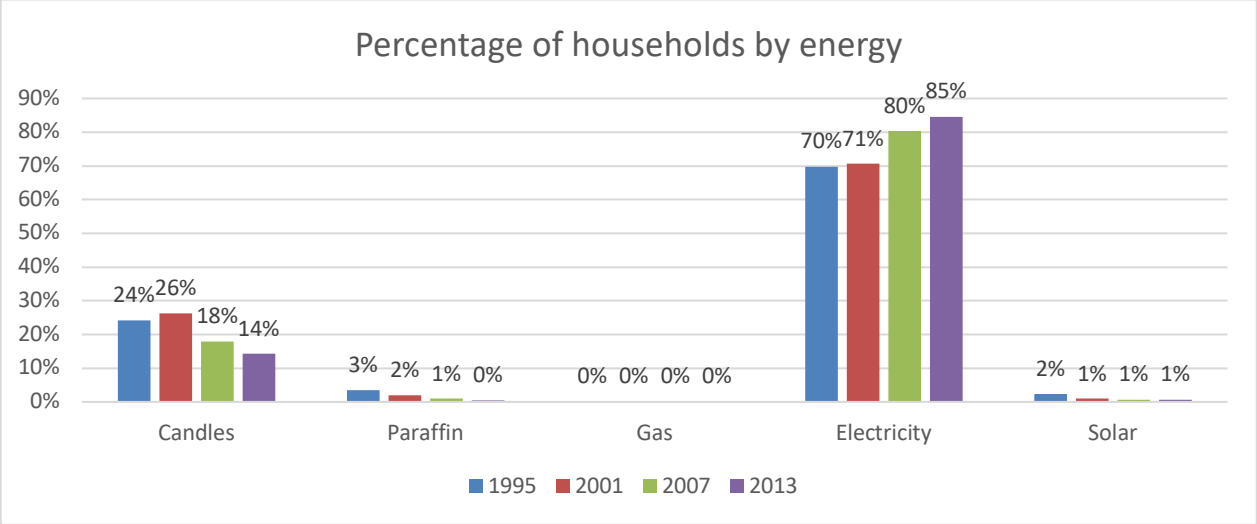

Figure 19 : Access to electricity within LLM

3.11. Road Infrastructure and Access to Transportion

Lephalale LM is situated in an area with no national roads passing through it. There are two major national roads some distance away, viz the N1 linking Tshwane and Polokwane in the east, and the N4 linking Tshwane and Rustenburg in the south. From these two national roads, three provincial arterial roads can be used to access Lephalale and these include the R518 and the R517 that both adjoin the N1 in the east and the R510 to the south. The N11 is another national road that could be used to access Lephalale via provincial arterial road R572, especially by those coming from the northern Highveld coal fields. Within Lephalale the Nelson Mandela Drive is the main road linking Lephalale and the power stations and coal mines.

According to the 2012 Integrated Transport plan the majority of people in Lephalale walk to work (37%) and hitchhikers make up a total 11% (*Figure 20*). Vehicle drivers make up 8% and those who use public transport to work such as mini bus taxis make up 11% and buses make up 6% (Waterberg District Municipality, 2012). The high incidence of people commuting as passengers in private vehicles could be evidence of hitch-hiking because the number of people who own cars is very low in Lephalale LM. Most commuters depend on public transport, and taxis emerged as the most used public transport service in the Waterberg District Municipality.

According to the 2014 – 2016 IDP, the current economic development in Lephalale has brought about an increase in demand for public transport. There is a total of seven taxi ranks in Lephalale to date of which:

- Four are formal
- Three are informal.
- Four of the seven ranks have no ablution facilities.
- There is one bus rank and bus shelters provided by the Lephalale LM at some of the villages can only accommodate 5 people.

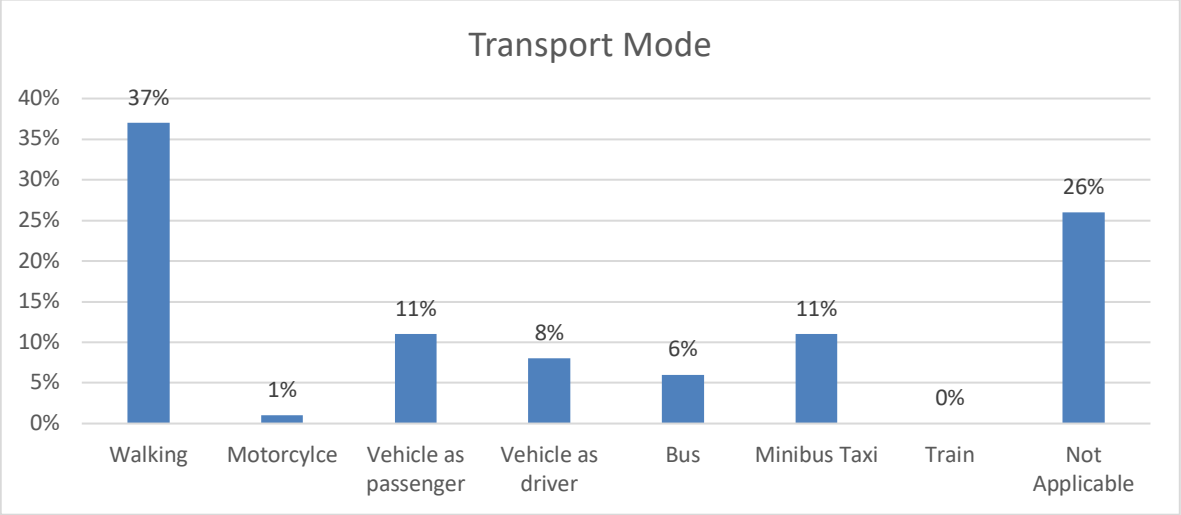

Figure 20 - Transport services LLM

There are several factors determining the nature, distance and utilisation of routes for transportation in Lephalale. Lephalale Economic Development Forum (LEDF) shows influencers as:

- There are 38 rural villages in Lephalale LM, many of them located 40 km or more from the CBD of Lephalale.
- The geographical location of the villages and work opportunities in Lephalale are the determining factors in transport demand, specifically.
- Relatively short distances between Marapong, Town, the mine and power stations – commuters in these areas typically cover distances of less than 25 km, and taxis operating on these routes are able to make 2 to 3 trips per peak time period
- The CBD and town are located close to the coal mines and power stations, whereas the villages developed historically along Lephalale River.

The above factors contribute to the following transport challenges

- Public transport has a poor level of service as a result of distance between the economic activities, the location of towns, villages and area of employment.
- Bus stop shelters do not provide enough under-roof protection against rain; and long queues of passengers are exposed to the sun or rain.
- No ablution facilities are provided at taxi ranks. Commuters must pay R2 for the service at some locations (close to filing stations).
- Road safety conditions along Nelson Mandela and other Municipal roads have deteriorated, mainly because there are inadequate road shoulders and/or pedestrian walkways and taxi layby areas.
- Increased number of abnormal load vehicles creating bottlenecks on the main access routes through town to the mine and power station.

3.12. Conclusions of the Baseline Assessment

The study area is characterized by the following:

- Low levels of education
- Few opportunities for skills development

- Inadequate water and sanitation infrastructure
- Road network in reasonable condition but challenges with public transport
- Settlement areas within prevailing winds from power stations and coal mine/s

4. STAKEHOLDER IDENTIFICATION AND FIELD WORK

This chapter describes the various processes followed in discussion the project with interested and affected parties (I &APs) and summarises the findings of such engagements.

4.1. Legal requirements for Public Participation in this SIA

Section 24 of the National Environmental Management Act, No 107 of 1998 sets prescripts for the management of the cultural environment. This section of the Act puts emphasis on integrated management of the environment and encourages a multi-stakeholder engagement from social aspects such as Public Participation or engagement to the management of heritage resources. The public participation process is defined in terms of the environmental impact assessment application for environmental authorisation, as a "process by which potential interested and affected parties are given the opportunity to comment on, or raise issues relevant to, the application of the environmental process" (Section 4 (1), 2014 EIA Regulation). The objective of this process is to ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment. The NGT (Department: NGT Socio-Economic Studies) team followed prescripts of Section 24 of the NEMA in conducting its public participation process for the Socio-Economic Impact Assessment (SEIA) and this process involved:

- The identification of key stakeholders;
- Development of a stakeholders or Interested and Affected Parties (I&APs) database;
- Communicating with I&APs – telephonic, e-mails, and legal notices;
- Setting up meetings and stakeholder interface forums or public meetings (*e.g. Annexures 1 to 4*);
- Requesting comments and submissions from I&APs
- Holding public meetings for stakeholder engagement.

4.2.The meetings were held with the following stakeholders between February and May 2015 (*Annexures 1 -4, see also Annexure 5*).

- Zitholele Consulting –Zitholele Consulting, Waterfall Business Park, Midrand, Gauteng Province;
- The Waterberg Environmental Justice – Mokolo Hall, Lephalale, Waterberg District, Limpopo Province;
- Lephalale Development Forum – Mokolo Hall, Lephalale, Waterberg District, Limpopo Province;
- Eskom in Eskom Megawatt Park, Sunninghill, Gauteng Province;
- Marapong community in Marapong Library, Marapong Township, Lephalale, Waterberg District, Limpopo Province;
- Leseding Community in Leseding Hall, Lesedi (Steenbokpan), Lephalale, Waterberg District, Limpopo Province;
- Mokolo Hall, Onverwacht, Lephalale, Waterberg District, Limpopo Province
- Medupi Power Station with Eskom environmental management team on site. Location Lephalale, Waterberg District, Limpopo Province.

4.3. Summary of Key Issues Raised in the Meetings and Public Participation Forum Relating to the Proposed Medupi FGD Technology

The interested and affected parties (I&APs) were predominantly well informed about the proposed Medupi FGD technology proposed at Medupi. In total four meetings were held in Lephalale, two meetings in Mokolo Hall in Onverwacht, one meeting in Marapong Library and one meeting in Leseding Community.

Below are issues and concerns raised by communities of Marapong and other interested and affected parties such as the Waterberg Environmental Justice, SANCO and the Lephalale Development Forum. It excluded comments and inputs given by the Leseding community which will be attached as an annexure to the report. Key issues of interest were raised in all the public forums and these included among others:

- Gas and particulate emissions – resulting in risk to health.
- Water Allocation.
- Waste Management.
- Increased population size, service delivery and land allocation.
- Disturbance in the pattern of life.
- Economy: employment and labour relations.
- Cultural Heritage- burial grounds and graves.

- Communication: Public Participation and Consultation.

In recommendations made in the public forums it is concluded that the most fundamental recommendation made to the developer (Eskom) regarding the FGD technology in Medupi is that it should not be retrofitted but included in the actual construction of the remaining 4 Units since Medupi lost an opportunity to include the FGD technology in the construction of Unit 6 (completed) and Unit 5 which is on the verge of being completed.

Table 10 – Identified Social Parameters during Stakeholder Engagement Forums for the Social Impact Assessment in Lephalale in 2015

SOCIO-ECONOMIC PARAMETER IDENTIFIED BY INTERESTED AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
1. SO_2– resulting to risk to human health.	**Issues Relating to Health:** • According to the community, the developer is adding more coal fired stations in Lephalale – Medupi Power Station is just one of the few stations planned in the area. There is also a third coal fired station planned in the area called Coal 3 Power Station. • The concern is that the proposed Medupi Flue Gas Desulphurisation (FGD) technology is retrofitted instead of being built in with the units. This means that during the retrofitting there will be significant additions to the already high levels of pollutants in the atmosphere within Lephalale (incl. Marapong) resulting from Matimba Power Station another Eskom coal fired station. • Gases emitted from Matimba Power Station are argued to have had a great negative impact to the community of Marapong. It is argued that many members of the community are suffering from respiratory related illnesses such as: Tuberculosis (TB), Asthma. Some have been diagnosed with unknown disease such as continuous dry eyes and headaches etc. • A major concern is that, regarding Matimba the developer of Medupi Power Station has mostly focus educating the community about Carbon Dioxide (CO_2) as the most dangerous gas emission hiding the effects of Sulphur Dioxide (SO_2). They have filtered Matimba with electrostatic precipitators or pulse jet fabric filters to remove particulate matter and to reduce the amounts of particulates and CO_2 in the atmosphere. The community would like to know why is that only Medupi Power Station is retrofitted with the FGD and not Matimba too since they both use the same fossil fuel which is coal?	**Proposed Mitigations:** • To mitigate emissions from Medupi Power Station, particularly SO_2, the community is proposing that the proposed Medupi FGD technology should be built in with the 6 Units instead of being retrofitted later. • They argue that the developer has missed the opportunity with 2 of the 6 Units, with Unit 6 already completed and synchronised the 2 March 2015. Unit 5 is about to be completed soon too. • Therefore, the argument is that the remaining 4 Units should be built with the FGD technology to curb the levels of SO_2 in the atmosphere while Unit 6 and 5 are operational. • To curb emissions at Matimba which is not directly related to the current study but has socio-economic implication to the health and wellbeing of the people of Marapong, the community argues that the developer should also consider retrofitting Matimba with the FGD technology.

SOCIO-ECONOMIC PARAMETER IDENTIFIED BY INTERESTED AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
SO_2– resulting to risk to human health (Continue).	• Based on the known prevailing winds direction in the Lephalale, most winds flow north-south meaning that many of the emissions will flow south affected more the communities that are in the south. The community of Marapong felt strong that the brothers and sisters in Lesedi formally known as Steenbokpan should also be considered as they are mostly likely to be affected by Medupi emission during the retrofitting process and are more likely to suffer from health related problems resulting from SO_2 and other gases. • Based on the existing documents published by the developer and its consultants, the Marapong community argues that the pollutants or emissions from Medupi Power Station will cross the South African border to the neighbouring country of Botswana – there is therefore an interest on whether or not has the Socio-Economic Impact Assessment (SEIA) and Environmental Impact Assessment (EIA) Public Participation Process (PPP) been extended to Botswana since the Medupi emissions will also affect the health of the people in Botswana particularly those who are neighbouring South Africa? **Other questions relating to the project included:** The World Bank and the Development Bank of Southern Africa (DBSA), investors in the project, approved Medupi on the premise that it will have an FGD technology with it; what is their take on it.	The community make an assertion that the developer of Medupi argues that to retrofit FGD technology at Matimba will be expensive and the community argues that should not be at the "expenses of the life and health".

SOCIO-ECONOMIC PARAMETER IDENTIFIED BY INTERESTED AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
SO_2– resulting to risk to human health (Continue).	**Issues Relating to Health:**	
	• FGD being retrofitted? • What measures are going to be implemented to protect communities while the FGD technology is being retrofitted yet some of the Units like Unit 6 have been synchronized?	
	Summary: • The Medupi Power Station is seen as a threat to health by Marapong Community, the Waterberg Environmental Justice, SANCO and the Lephalale Development Forum. • These interested and affected parties (I&APs) are arguing that if the FGD technology is retrofitted it might contribute negatively to highly levels of emissions in the areas since the retrofitted technology will only start operating 6 years from the completion of Medupi Power Station. • They argue that by the time the retrofitted technology becomes operational many communities will have already been affected by SO_2 and gases such as CO_2 as is in the case of Matimba and surrounding Exxaro and the newly established Boikarabelo Coal Mine.	**Summary:** • There is a general feeling that the FGD technology at Medupi should be built with each of the remaining units since Eskom has missed the opportunity with Units 6 and 5.

SOCIO-ECONOMIC PARAMETER IDENTIFIED BY INTERESTED AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
2.Water Allocation.	**Issues Relating to Water:** • According to the community of Marapong Community, sections of Marapong and the township as a whole are already experiencing water outages. They have also heard of water outages in areas such as Onverwacht. When water comes back it is argued that it is often dirty, contaminated and not pleasant for consumption. • One of the challenges is that Lephalale does not have sufficient water and this is seen as a major challenge for the community and the surrounding industries such as farms, Eskom and the mines. With the proposed FGD technology at Medupi future water outages are predicted and it is asserted that they will be the norm of the day. • According to Marapong Community, the Waterberg Environmental Justice, SANCO and the Lephalale Development Forum there is a number of newly proposed mines in the area and some are being built and this will lead to even more water stress in Lephalale. Among the newly built mines is Boikarabelo Mine in the west of Medupi power station and south-west of Grootegeluk Mine. • The question that the above-mentioned I&APs have is what plans are put in place to ensure that there will be adequate water allocation to Marapong and the surrounding communities (incl. Farming communities), Medupi, Boikarabelo Mine, Grootegeluk Mine and the proposed Coal 3 Eskom Power Station in the future? [Response from NGT Socio-Economic Solutions: the Medupi power station has a number of offset projects in the area and these include the Mokolo-Crocodile Water Argumentation Project). • The I&APs argue that the Mokolo-Crocodile Water Argumentation Project will not be sufficient to address the water allocation in Lephalale supplying the existing and growing industries, the farming community and for domestic usage.	**Proposed Mitigations:** • According to community and other I&APs the Mokolo-Crocodile Water Argumentation Project phase 1 is not sufficient for water allocation in Lephalale with the FGD coming up. To mitigate the water challenge these stakeholders, argue that phase 2 of the project urgently needs to be implemented. • The first phase included the construction of dams at Mokolo River and transporting the water to Lephalale. However, some of the water is being transferred/distributed to mines such Boikarabelo Mine in the area west of Medupi. • The Crocodile River dams are still under construction and these dams and pipelines should be completed prior the construction of the FGD technology at Medupi to mitigate the water shortages and outages in Lephalale and surrounding communities. •

SOCIO-ECONOMIC PARAMETER IDENTIFIED BY INTERESTED AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
Water Allocation (continues)	The other contributing factor to the implementation of phase 2 of this water argumentation scheme is that companies or stakeholders steering the project do not even agree on what needs to happen to effectively implement the scheme.	• Even so, this water argumentation scheme is not seen sufficient enough to cater for the needs of the ever growing Lephalale and the community argues that more efforts should be considered to address the water shortage in the future and there is a proposition that other water scheme projects should be considered in the near future.
	Summary: • There is a growing concern about future water shortages in the area and that the current Mokolo-Crocodile Water Argumentation Scheme is not sufficient to accommodate the ever growing municipality and associated industries. • Secondly, the current water shortages/cuts are associated with unclean and contaminated water in Lephalale.	**Summary:** • It is proposed that the developer and associated stakeholders such as the local, district, provincial and national government as well as companies involved in the Mokolo-Crocodile Water Argumentation Project should first implement phase 2 of the scheme before considering the implementation of the FGD or its operation.

SOCIO-ECONOMIC PARAMETER IDENTIFIED BY INTERESTED AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
3. Waste Management.	**Issues Relating to Waste Management:** • There is a major concern regarding the management of by-products of the proposed FGD technology and these are some of the by-products considered as high on the agenda: gypsum and effluent water. • According to the community, from the discussions about the FGD technology that they have attended at Medupi there has been limited discussion around the issues of waste disposal of the FGD technology by-products. There is therefore a strong demand to know the location of the treatment plants for the effluent water and storage sites for the gypsum.	**Proposed Mitigations:** • The community suggested that they will need to be consulted during the site selection process for the gypsum storage and effluent water treatment plants.
	Summary: • There is concern that the by-products of the FGD technology will also have negative impact in the community and they need to know where they will be located.	**Summary:** • Community and other I&APs feel the need to be consulted during site selection process.

SOCIO-ECONOMIC PARAMETER IDENTIFIED BY INTERESTED AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
4. Increased population size, service deliver and land allocation.	**Issues Relating to Growing Population Size and Land Demand:** • According to the community since the inception of Medupi power project there has been an increase in population size in Marapong and surrounding communities. There is a high demand for housing to accommodate Medupi labourers. • Eskom contractor village has not been able to accommodate all its contractors and many of these contractors have had to find accommodation in Marapong. As a result, there is now an increase in the number of squatter dwellers. • It is argued that the number of squatters and insufficient provision of services to the people of Marapong mean that the local government does not have enough resources to cater for all its people and the new comers providing them with housing, water, electricity among others. As such it is deemed important that Eskom devise a plan to accommodate its contractors. • The proposed FGD technology construction phase is seen as having a potential to threaten the already insufficient resources in Lephalale and Marapong specifically such as housing, water, available land to the local communities and electricity. • The community is concerned about most of the land in and around Marapong and Lephalale at large being owned by the two entities: Eskom and Exxaro whom they define as major polluters in the area.	**Proposed Mitigations:** • They argue that if Eskom and Exxaro (whom they define as major polluters) own so much land in and around Lephalale, they should consider allocating more land to the community of Marapong to accommodate their employees and allow for the growth of Marapong Township. • They further argue that if Eskom, Exxaro and the Municipality plan to expand more industries near Marapong in the near future which will threaten their health and social structure maybe the three parties should consider allocating land for the establishment of new township elsewhere where they will accommodate the people of Marapong.
	Issues Relating to Growing Population Size and Land Demand: • Another concern for the community of Marapong is that not only do they have to share their resources with Eskom labourers coming from other province and areas within Limpopo Province; Eskom has in the past deliberately excluded them in the provision of its resources by establishing its contractors camp with all the necessary resources such as clean water and electricity. For the Medupi plant there is a dedicated village that has been developed to house Medupi employees and contractors.	

SOCIO-ECONOMIC PARAMETEI IDENTIFIED BY INTERESTEI AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
Increased population size service deliver and lan allocation (continues)	• Therefore, the community feels that the influx of labourer for the construction of the FGD technology at Medupi will further lead to threat to the already stretched resources within their community. The community seek a plan from the developer on how the developer will protect the land of the Locals because currently the developer is only taking care of its workers from the villages it built for Medupi i.e. the Medupi contractor's village?	
	Summary: • The increase in population size in the area as a result of Medupi construction is seen as a challenge by the community and threat to their already limited resources. • The community also feel strong about the fact that they will eventual be absorbed in an industrial zone of Lephalale where their health and social structure/wellbeing will be compromised.	**Summary:** • Some community members are considering relocation from their current location more towards Lephalale central business district (CBD) or past Onverwacht where they argue they will be less susceptible to pollutions

SOCIO-ECONOMIC PARAMETEI IDENTIFIED BY INTERESTEI AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
5. Disturbance in the pattern of life	**Issues to Population Growth and Change in the Local Pattern of Life**: • The community of Marapong argue that since the establishment of Medupi there the community has experienced a significant growth and this has brought about many changes in the pattern of life in the community, surrounding communities and Lephalale as a whole. Among issues that are of concern to them is the increase in number of liquor outlets, increase number of accidents and deaths. • A new economic phenomenon or culture that many male community members raised is the introduction of prostitution in the community which they feel is something not endemic to the province and Lephalale. • Some of the members argued that Medupi has hired more male figures than females and now their women are being poached by the Medupi labourers who have more resources at their disposal to afford the newly acquired lifestyle by women in the townships and they are also taking their wives.	**Proposed Mitigations:** • The issue seems contentious and some community members recommended that all male Eskom construction workers should be accommodated in camps away from the township of Marapong. • Others recommended that Eskom should be more vocal on HIV/Aids on its new contractors for the FGD technology installation.
	Issues to Population Growth and Change in the Local Pattern of Life: **Summary:** • The increase in population is seen as a catalyst to the change in the pattern of life in Marapong and the surrounding communities, resulting to social ills such as prostitution, alcohol abuses (alcohol is readily available), high accidents rates, murder etc.	**Summary:** • The recommendation is that more HIV/Aids related campaigns should be developed by the developer educating its contractors and these should be extending to Marapong.
	Issues to Population Growth and Change in the Local Pattern of Life: Prostitution and the newly developed intimate relationships between what is called Medupi labourers or contractor is linked by some of the community members to HIV/Aids scourge that is current facing Marapong and Lephalale Local Municipality. This, however, seem to be gender biased as more blame for prostitution and promiscuity is linked to women in the township.	

SOCIO-ECONOMIC PARAMETE IDENTIFIED BY INTERESTED AN AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
Disturbance in the pattern of life (continues)	**Summary:** • There is a strong sentiment that in many occasions consultants working in Lephalale do not properly engage and consult inclusively in their PPP and consultation process. The result is the elimination of community views and concerns regarding projects. There is also a strong belief that community inputs are often regarded as anti-developmental in nature and not important – which are particularly when addressing issues that affect or have the potential to directly affect them.	**Summary:** • More inclusive public engagement is recommended.
6. Economy: employment and labour relations.	**Issues Relating to Employment and Labour Relations:** • According to the community during the Medupi power station EIA and its associated SEIA and PPP the developer made a number of promises to communities about the socio-economic benefits of the project to the local economy and direct benefits to the people of Marapong. • They, however, share a strong sentiment that these benefits have not been derived by the people of Marapong. The benefits are derived by those with political connection to the Local Municipality and Medupi. Secondly the benefits of Medupi are derived by labourers from outside Lephalale and Limpopo Province. There is a strong shared sentiment that provinces such as the Eastern Cape and KwaZulu-Natal are the beneficiaries of the Medupi plant and they will continue to benefit from the construction of the FGD technology at Medupi. For example, they argue that "almost everyone in Medupi, new residents of Marapong and the Eskom contractor's village speaks IsiZulu or IsiXhosa. We have also seen streets dominated by these culture groups – yards that are like eMzini Wezinsizwa - a local sitcom]". • The community requires more commitment by the developer to grow the Economic of Locals and benefit local people in its development of the FGD technology at Medupi.	**Proposed Mitigations:** • Community members are arguing that the developer should apart the community of Marapong with necessary skills so that they can be able to compete with outside job seekers and be readily available skilled when the construction phase commences

SOCIO-ECONOMIC PARAMETER IDENTIFIED BY INTERESTED AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
employment and labour relations (continues)	**Issues Relating to Employment and Labour Relations:** **Summary:** Outsiders or migrant job seekers are seen as a threat to the local labourers and people from two of South African provinces are seen as being given preferential retreatment when it comes to job opportunities by the local industries operating in and around Marapong.	**Summary:** • Skills transfer is seen as the most basic and fundamental tool of empowering the people of Marapong in order to participate in the economy and Eskom plants.
7. Cultural Heritage- burial grounds and graves.	**Issues Relating to Cultural Heritage:** • The community feels that their ancestral graves were not properly handled during the construction of Medupi and they are not pleased with how the process has been dealt with. They argue that some of the community graves were relocated without any of the community concerns and some of the graves were fenced off from the construction without them being consulted. Furthermore, they are restricted from visiting their ancestral graves within Medupi precinct – "Eskom is refusing us access to visit our ancestral graves located within its property". • One of the resident knows only four of Molwantwa graves were removed and few of Mokoena were taken to Pretoria without their consent and they require a way forward on how to deal with the issue.	**Proposed Mitigations:** • The developer should send its newly appointed heritage consultant to consult with the people of Marapong and this should be in a public platform rather than individual families
	Summary: • There is general sense of disquiet around the issue of graves and their handling as well as access to graves located within Eskom precinct.	**Summary:** The community want the issue of graves addressed and require a consultative process so that they can give inputs in the process.

SOCIO-ECONOMIC PARAMETEI IDENTIFIED BY INTERESTEI AND AFFECTED PARTIES	ISSUES AND QUESTIONS RAISED REGARDING THE IDENTIFIED SOCIO-ECONOMIC PARAMTERS	MITIGATORY MEASURES PROPOSED BY AFFECTED COMMUNITIES/STAKEHOLDERS/I&APS
8. Communication: Public Participation and Consultation	**Issues Relating to The Public Participation Process & Consultation**: • There is consensus among members of the Marapong Community, the Waterberg Environmental Justice, SANCO and the Lephalale Development Forum that Lephalale and Waterberg people and associated organisations are not against development taking place in their district and municipality. The challenge is eminent with many development taking place within their region is that stakeholder are not always consulted and public participation processes are not always inclusive; they are often limited to communities such as Lephalale (CBD) and Onverwacht. • This, they suggest, poses a great challenge to many developments that are now taking place within Lephalale because local communities often feel excluded from process.	**Proposed Mitigations:** • It is recommended that consultants should not only limit their notices to site notices and newspaper notice, but should also engage community leaders such as councillors, tribal and traditional leaders.
	Summary: • There is a strong sentiment that in many occasions consultants working in Lephalale do not properly engage and consult inclusively in their PPP and consultation process. The result is the elimination of community views and concerns regard projects. There is also a strong belief that community inputs are often regarded as anti-developmental in nature and not important – which are particularly when addressing issues that affect or have the potential to directly affect them.	**Summary:** • More inclusive public engagement is recommended.

Summary of Eskom Interview and site survey

Table 11- Key Issues Discussed with Eskom EMC representatives

Issues	Comment on Issues
Water use and water allocation as part of the Medupi project	**1.Water Supply** • The current water source in Lephalale to support industry and municipal needs is Mokolo Dam. Industries such as Eskom (Medupi and Matimba Power Station) and the mines such as Grootegeluk abstract raw water from this dam. • The raw water is supplied to the new water reservoir from the existing pipeline from Wolvenfontein Reservoir which is supplied from the Mokolo dam. • This pipeline currently supplies Matimba Power Station, the Grootegeluk Mine and local Municipality – this supply forms part of the Phase 1 Mokolo Crocodile Water Augmentation Project (MCWAP) • Provision for future supply of raw water from Crocodile West will also be made available once the DWS has completed the Phase 2 MCWAP. Two pipelines are proposed to be constructed in parallel to the new raw water reservoir and pipeline within a 12m servitude. • The current supply is based on the water allocation that Eskom has been granted following its Water Use License Application (WULA). • The allocated water is sufficient enough to operate Medupi units 1 to 6. For other auxiliary programmes on site such as dust suppression Eskom uses water that has been captured within the Eskom water catchment. It cleans and circulates this water to complement the water that it receives from Mokolo Dam on approximately 80% (Mokolo raw water)/ 20% (captured and circulated water)

	2. Water Demand • With the construction of the FGD, there will be not enough water to operate both the Medupi Units and the FGD and as such the Phase 2 MCWAP would need to be urgently implemented by the DWS. • Eskom would continue to use raw water from this scheme with clean water allocated to municipality and the farming communities. • Even if Eskom captures, clean and circulate its storm water within the Water Catchment it will not be enough to aid the current raw water supply from Mokolo Dam. **3. Water Pollution** • Eskom has design and implement a storm water management systems and a created water catchment for the that will ensure that it lives up to water philosophy of Zero Liquid Discharge (e.g. **Annexure 8**). o It collects, clean and circulate surface and dirty water. Effluent water is collected and directed to Waste Water Treatment Plant and recirculated to complement the raw water from Mokolo Dam. This assist mitigates any pollution to nearby waterbodies such as the wetland west of Medupi Precinct. o East of Medupi Power Station clean and dirty water dams have been constructed. o The coal stock piles, **the existing ADF** have all been designed with a liner to ensure that they do not contaminate ground water which some of the farmers are reliant on. Furthermore, a storm water management plan has been designed around the existing ADF (**Annexure 7**). o In terms of the assessment of potential pollution/contamination of ground water, Eskom has drilled approximately 21 boreholes to collect baseline data that will assist analyse the levels of phosphates and other contaminants in the ground water.

Stakeholder Engagement	• According to the Eskom environmental team, the Eskom Medupi stakeholders include: Non-Governmental Organizations (NGO's), Non-Profit Organizations (NPO's), Lephalale Local Municipality and local communities (Marapong and Ga-Seleka,). • With regard to the issue of consultation which was flagged by some communities during the SIA public meetings, Eskom argues that it has conducted stakeholder meetings throughout the project life of Medupi. The aim has been to listen to peoples interests in the project and has given platform to all I & APs to give inputs on the project. However, it also believes that the interest in the project have been mostly limited to issues relating to jobs and job opportunity. With limited interest in the environment wellbeing which also have direct effect on the health and social wellbeing of the affected communities – the Waterberg Environment Justice Forum (WEJF) has been complemented as a very assisting stakeholder giving constructive inputs. • In terms of Stakeholder database, all stakeholders are said to be kept on Environmental Control Officers (ECO's) list and attend meetings that inform on the project process of the Medupi Power Station. Among other organisations that Eskom EMC consider to be I & APs in the project are: o Greenpeace o Earth350.org o Earth Africa o WEJF
Social and Economic Impacts	**1.Employment Created** In total, the Medupi Power Station project has created over 14 000 jobs and has contributed to vast infrastructure development. Eskom Procurement Centre ensured that preference be given to local persons and businesses, whereby 30%

	of the workforce is allocated to local people only. Local builders, cleaners, caterers and general workers have been hired. Alongside, Eskom partnered with the local taxi association to provide shuttle services for on-site purposes. Local persons and local business (small-to-medium-enterprises) were trained through the Skill Development Programme (SDP) set up by Eskom to provide local communities with the required skills and training needed for the project. In addition, Eskom SDP also ensured that a vast percentage of females are trained in the year programme and employed by the Medupi Power Station project. Through partnership with Department of Water and Sanitation (DWS), Department of Environmental Affairs (DEA), Department of Public Works (DPW) and Department of Agriculture and Rural Development (DARD), Eskom has aided in the establishment of local farmers providing goods and services through to the local workforce. This also ensure that there is direct procurements of products from local farmers to support among other things food products to catering companies that provide meals to contractors on site. **2. Layoff of Labour post Medupi Construction Phase** Eskom has made provision for an exit plan at the end of the Medupi Power Station project construction phase. This exist plan makes use of both an internal and external plan. In term of the stability of the project, Eskom has introduced upskilling initiative. This initiative is set up to train current employees of the Medupi project in other relevant fields so that they can maintain the level of employment in the area of Lephalale. Another initiative called the Medupi Leadership Initiative(MLI) forms part of this exit plan whereby a local entrepreneurship programme has been created to provide locals and local businesses, specifically Black youth and women; the training focuses on business and financial training in order to educate and expand local businesses capabilities beyond the Medupi project and ensure that they become self-sustainable. In addition to MLI, Eskom has invested R14 million to construction of a facility for training electrical engineers and welders to develop skilled staff for future employment opportunities within the Medupi project and beyond.

Environmental and Social Awareness	Awareness programmes amongst current employees (mainly contractors) and local community have been constructed to create environmental and sustainability awareness. The EMC currently used as a platform to inform and educate local populations. EMC members are sent out to communities to conduct environmental and social awareness programmes through public meetings and workshops with the aim of educating the locals on environmental issues, such as water quality, air quality, land degradation, waste management and monitoring and reporting on environmental impacts. The EMC has also developed outreach programmes aimed at local schools and the FET Colleges (Further Education and Training Colleges). The objective of all these awareness, education and outreach programmes is to educate and provide a direct link between the public and the environment. It is also asserted that I&APs such as Greenpeace, Earth3050.org and Earth Africa are invited to these community programmes (or forums) to give inputs on key environmental and social issues. Other milestone that Eskom prides itself on achieving is the development of a contractor village which took a different approach from the old/historic hostel dwelling associated with the old South Africa mining and industry approach top housing labours. It is asserted that the Eskom village is more inclusive and more family based or family oriented: "In order to ensure the safety of our contractors, we did not build a contractor village that is typical of the old hostel dwelling. We created a village that encourages closeness between workers and their families, preventing families being broken up, alcoholism, depression, Sexually Transmitted Diseases (STD's), potential spread of HIV/AIDS. Workers are transported to and from their homes and families, on a daily basis. Specialised personnel have been contracted to provide medical services, laundry services, a bar, and a soccer pitch to sub-contractors" (Emile Marell, pers.com, 16 January, 2018).

Table 12- Ecosystems change drivers associated with the project

Type of ecosystem change drivers		**Ecosystem change drivers likely to be associated with the project: Yes; No; Not sure**	**Supporting information**
Direct drivers of ecosystem change	Change in local land use and cover	Yes	• The project has and will continue to impact on the land use and cover.
	Harvest and resources consumption	Yes	• The abstraction of water from Mokolo Dam which the municipality, the farmers and the domestic use is also reliant on will also result to change in the ecosystem change. • Medupi currently abstracts its water from Mokolo Dam to support its facility functionality.
	Pollution	Yes	• For the first 5 years of Medupi Power Station operation and before the implementation of the FGD the project will contribute to air quality pollution and degradation • Within the Medupi precinct there is various machinery and plant that is fuel based operated, some of it which may result to oil leakage and spills.

Indirect drivers of ecosystem change	Demographic change	Yes	• Due to job expectations there has been an increase in population in Lephalale and the surround since the commencement of the Medupi Construction Programme (MCP). • Furthermore, the infrastructure that has been developed to offset the MCP such as upgraded and newly constructed roads has also resulted to accessibility of Lephalale thus the increase in population size.
	Economic change	Yes	• On the positive side, the municipality and local businesses have benefited significantly from increase in economic activities related to the MCP and will continue to benefit with the construction of the FGD.
	Socio-political change	Yes	• There has also, however, been a downside of increase in political stakes in the region where different stakeholders have different expectation and bargaining powers on who should benefit and who should not.
	Cultural change	Not sure	• The Medupi Power Station has contributed to cultural change through the destruction of burial grounds and graves; however, the current project will not result to cultural change. • This being said there is a separate heritage management process underway to identify and map cultural areas that were previous impacted. • Therefore, there is no certainty that the area where the FGD technology is proposed will not form part of the map.

	Scientific and technological change	Yes	The FGD will result to an improvement to science and technology for the reduction of SO2 levels in the atmosphere. The data collected post the introduction of the FGD will also inform future technology developments for the coal fired power stations in the country.
Wellbeing of ecosystem services beneficiaries	Change in demand for ecosystem service for basic material for good life	No	• The FGD technology and the associated proposed infrastructure are highly technical and there will be very few jobs for the locals in the implementation of the FGD. • The FGD is a technology that will require highly skilled labour, thus the limited jobs for the locals in the implementation of the FGD.
	Change in demand for ecosystem service for health	Yes	• The implementation of the FGD will result to improved atmosphere and reduced pollution levels that will result to improved quality of life for the locals.
	Change in demand for ecosystem service or security	No	• The FGD will not result to large number of labour polls in Lephalale like it has been the case with the construction of Medupi six units. As such, there will be no demand for ecosystem services for security.
	Change in demand for ecosystem service for good social relations	Not sure	• There high technical nature of the project and the fact that the project will absorb less of local labour in its implementation may result to contestation for job opportunities and challenges of social relations between the developer.

5. SIGNIFICANCE ASSESSMENT METHODOLOGY

The assessment methodology used was taken from Zitholele Consulting recommended methodology for the EIA and it has been adapted to suit the needs of the current SIA study. A number of criteria are used to determine the significance of an impact. These criteria and their ratings are listed below.

5.1. Nature of the impact

Each impact should be described in terms of the features and qualities of the impact. A detailed description of the impact will allow for contextualisation of the assessment.

5.2. Extent of the impact

Extent intends to assess the footprint of the impact. The larger the footprint, the higher the impact rating will be. The table below provides the descriptors and criteria for assessment (*Table 13*).

Table 13- Criteria for the assessment of the extent of the impact.

Extent Descriptor	Definition	Rating
Site	Impact footprint remains within the boundary of the site.	1
Local	Impact footprint extends beyond the boundary of the site to the adjacent surrounding areas.	2
Regional	Impact footprint includes the greater surrounds and may include an entire municipal or provincial jurisdiction.	3
National	The scale of the impact is applicable to the Republic of South Africa.	4
Global	The impact has global implications	5

5.3. Duration of the impact

The duration of the impact is the period of time that the impact will manifest on the receiving environment. Importantly, the concept of reversibility is reflected in the duration rating. The longer the impact endures, the less likely it is to be reversible. Refer to Table 14 for criteria for rating duration of impacts.

Table 14- Criteria for the rating of the duration of an impact.

Duration Descriptor	Definition	Rating
Construction / Decommissioning phase only	The impact endures for only as long as the construction or the decommissioning period of the project activity. This implies that the impact is fully reversible.	1
Short term	The impact continues to manifest for a period of between 3 and 5 years beyond construction or decommissioning. The impact is still reversible.	2
Medium term	The impact continues between 6 and 15 years beyond the construction or decommissioning phase. The impact is still reversible with relevant and applicable mitigation and management actions.	3
Long term	The impact continues for a period in excess of 15 years beyond construction or decommissioning. The impact is only reversible with considerable effort in implementation of rigorous mitigation actions.	4
Permanent	The impact will continue indefinitely and is not reversible.	5

5.4. Potential intensity of the impact

The concept of the potential intensity of an impact is the acknowledgement at the outset of the project of the potential significance of the impact on the receiving environment. For example, SO_2 emissions have the potential to result in significant adverse human health effects, and this potential intensity must be accommodated within the significance rating. The importance of the potential intensity must be emphasised within the rating methodology to indicate that, for an adverse impact to human health, even a limited extent and duration will still yield a significant impact.

Within potential intensity, the concept of irreplaceable loss is taken into account. Irreplaceable loss may relate to losses of entire faunal or floral species at an extent greater than regional, or the permanent loss of significant environmental resources. Potential intensity provides a measure for comparing significance across different specialist assessments. This is possible by aligning specialist ratings with the potential intensity rating provided here. This allows for better integration of specialist studies into the environmental impact assessment. See Table 15 and Table 16 below.

Table 15- Criteria for impact rating of potential intensity of a negative impact.

Potential Intensity Descriptor	**Definition of negative impact**	**Rating**
High	Significant impact to human health linked to mortality/loss of a species/endemic habitat.	16
Moderate-High	Significant impact to faunal or floral populations/loss of livelihoods/individual economic loss.	8
Moderate	Reduction in environmental quality/loss of habitat/loss of heritage/loss of welfare amenity	4
Moderate-Low	Nuisance impact	2
Low	Negative change with no associated consequences.	1

Table 16-Criteria for the impact rating of potential intensity of a positive impact.

Potential Intensity Descriptor	Definition of positive impact	Rating
Moderate-High	Net improvement in human welfare	8
Moderate	Improved environmental quality/improved individual livelihoods.	4
Moderate-Low	Economic development	2
Low	Positive change with no other consequences.	1

It must be noted that there is no HIGH rating for positive impacts under potential intensity, as it must be understood that no positive spinoff of an activity can possibly raise a similar significance rating to a negative impact that affects human health or causes the irreplaceable loss of a species.

5.5. Likelihood of the impact

This is the likelihood of the impact potential intensity manifesting. This is not the likelihood of the activity occurring. If an impact is unlikely to manifest, then the likelihood rating will reduce the overall significance. Table 17 provides the rating methodology for likelihood.

The rating for likelihood is provided in fractions in order to provide an indication of percentage probability, although it is noted that mathematical connotation cannot be implied to numbers utilised for ratings.

Table 17- Criteria for the rating of the likelihood of the impact occurring

Likelihood Descriptor	Definition	Rating
Improbable	The possibility of the impact occurring is negligible and only under exceptional circumstances.	0.1
Unlikely	The possibility of the impact occurring is low with a less than 10% chance of occurring. The impact has not occurred before.	0.2
Probable	The impact has a 10% to 40% chance of occurring. Only likely to happen once in every 3 years or more.	0.5
Highly Probable	It is most likely that the impact will occur and there is a 41% to 75% chance of occurrence.	0.75
Definite	More than a 75% chance of occurrence. The impact will occur regularly.	1

5.6. Cumulative Impacts

Cumulative impacts are reflected in the in the potential intensity of the rating system. In order to assess any impact on the environment, cumulative impacts must be considered in order to determine an accurate significance. Impacts cannot be assessed in isolation. An integrated approach requires that cumulative impacts be included in the assessment of individual impacts. The nature of the impact should be described in such a way as to detail the potential cumulative impact of the activity.

5.7. Significance Assessment

The significance assessment assigns numbers to rate impacts in order to provide a more quantitative description of impacts for purposes of decision making. Significance is an expression of the risk of damage to the environment, should the proposed activity be authorised.

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, which takes cognisance of extent, duration, potential intensity and likelihood.

Impact Significance = (extent + duration + potential intensity) x likelihood

Table 18 provides the resulting significance rating of the impact as defined by the equation as above.

Table 18- Significance rating formulas.

Score	Rating	Implications for Decision-making
< 3	Low	Project can be authorised with low risk of environmental degradation
3 – 9	Moderate	Project can be authorised but with conditions and routine inspections. Mitigation measures must be implemented.
10 – 20	High	Project can be authorised but with strict conditions and high levels of compliance and enforcement. Monitoring and mitigation are essential.
21 – 26	Fatally Flawed	Project cannot be authorized

An example of how this rating scale is applied is shown below in Table 19.

Table 19- Example of Rating Scale based on impacts associated with preconstruction of the FGD

Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
Publication of FGD project	Direct Impact:	Existing	3	2	2	0.75	5 - MOD	Advertise the type of available jobs and the required skillset	Lephalale has high rate of unemployment
	Employment expectations and influx of migrant labour.	Cumulative	4	3	8	0.75	11 - HIGH		Job seekers will increase levels of unemployment in the area if not employed in the FGD.
		Residual	1	2	1	0.5	2 - LOW		With mitigation the number of job seekers will be reduced to those with necessary skills and qualifications to take up advertised job opportunities.

6. IMPACT IDENTIFICATION AND DESCRIPTION

As per the EIA Regulations, 2014 – Appendix 6 (adapted to be applicable to SIA), the anticipated impacts of the proposed Medupi Ash Disposal Facility (MADF) on the social environment are described. These include initial impacts, cumulative impacts and residual impacts, both positive and negative, during all the phases of the project. The two lists of variables described in Table 2 (Categories of social variables) and Table 3 (ICGP list of social variables) were used during the impact identification process. It is important to consider that the goal of all projects should be sustainable social development and that no development should hamper that. Human Rights should also under no circumstances be compromised or infringed upon.

IMPACT ASSESSMENT AND RATING

Two positive impacts were identified and rated for the preconstruction phase of the FGD. These were both positive impacts associated with the project.

6.1. Impact Rating: Project Planning /Pre-Construction Phase

PRE-CONSTRUCTION PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likelihood**	**Rating**	**Mitigation**	**Interpretation**
Publication of the FGD project	Indirect Impact: Developing spin off businesses to support FGD construction phase (B&Bs). (PI)	Existing	2	3	8	1	13 – HIGH	Two mitigation measures are proposed: – There could be initiatives developed to contribute towards educating and developing necessary skills for the locals to take advantage of opportunities associated with the FGD construction and operation. – Local businesses could be incubated and developed to be able to take opportunities in the FGD BID.	The area is in need of employment opportunities
		Cumulative	2	3	8	1	13 – HIGH		There will be increase in economic development.
		Residual	2	2	8	1	12 – HIGH		There will be growth in the Lephalale LM GDP.
	Indirect Impact: Employment expectations and influx of migrant labour. (NI)	Existing	3	2	2	0.75	5 – MOD	Re-employ existing workforce who are currently working at the station.	Lephalale has high rate of unemployment
		Cumulative	4	3	8	0.75	11 – HIGH		Unqualified job seekers will increase levels of unemployment in the area if not all employed in the FGD.
		Residual	1	2	1	0.5	2 – LOW		With mitigation the number of job seekers will be reduced to those with necessary skills and qualifications to take up advertised job opportunities.

6.2. Impact Rating: Project Construction Phase

CONSTRUCTION PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likelihood**	**Rating**	**Mitigation**	**Interpretation**
Construction of the FGD.	Direct Impact:	Existing	1	1	1	1	3 - MOD	Skills development initiative to prepare locals to have necessary skills to take up employment opportunities with the FGD.	Lephalale currently has low levels of education and high number of unskilled people who are unemployed.
	Employment of skilled, semi-skilled and unskilled labours in the construction of the FGD. (PI)	Cumulative	2	1	4	1	7 - MOD		The number of unskilled and unemployed is likely to remain high without mitigation.
		Residual	2	1	1	0.5	2 - LOW		With mitigation more locals will be employable in the construction of the FGD.
	Direct Impact:	Existing	2	1	1	1	4 - MOD	Local businesses should be incubated and developed to be able to take opportunities in the FGD BID.	Lephalale local businesses
	Development of tenders and contract opportunities for local businesses in construction of the FGD and ancillary infrastructure (PI)	Cumulative	2	1	2	1	5 - MOD		Current local business involvement is limited mostly to unskilled labour services which are short term based.
		Residual	2	1	1	1	4 - MOD		Without mitigation local businesses involvement/participation will remain low in construction of the FGD and ancillary infrastructure.

CONSTRUCTION PHASE									
Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
Construction of the FGD.	<u>Indirect Impact:</u>	Existing	2	4	1	1	7 - MOD	Mitigation for FGD will benefit other road users.	There are high volumes of traffic and limited traffic control mechanism put in place to control traffic in the area of Medupi.
	Improvement in local road conditions with the construction of the FGD, such as the development urban type road infrastructure with traffic lights and speed humps aimed at mitigating risk of uncontrolled traffic during and off peak hours of the construction phase. (PI). The traffic impact assessment shows that the road infrastructure is already stressed.	Cumulative	2	1	1	1	4 - MOD		With increase in traffic volumes as a result of prolonged construction at Medupi will result to further congestion.
		Residual	2	2	1	0.5	3 - MOD		With mitigation there will be improved traffic management and easy flow of traffic.
	<u>Direct Impact:</u>	Existing	1	5	1	1	7 - MOD	Construction activities for the FGD should be restricted within the existing Medupi footprint	Construction activities at Medupi have already altered the receiving environment.
	Change in local land use in the affected area for the development of the FGD and operations of the ADF. (NI)	Cumulative	1	5	1	0.75	5 - MOD		Construction activities of the FGD, the railway siding will be limited within the existing footprint.
		Residual	1	1	1	0.5	2 - LOW		With mitigation construction activities will be restricted to the Medupi footprint. There is therefore no change in landuse as the development is taking place within the already disturbed area.

CONSTRUCTION PHASE									
Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
	Direct Impact:	Existing	1	1	1	1	3 - MOD	Prioritising local business or contractors in some of the contracts associated with the construction of the FGD.	The Medupi built project construction activities are benefit Lephalale LM economy.
	Extension of the construction phase currently underway in Medupi resulting to prolonged contractor activity in Lephalale which benefit local businesses (PI).	Cumulative	2	1	2	1	5 - MOD		There will be extension of economic benefits to the municipality with extension of construction activities at Medupi.
		Residual	1	1	2	0.5	2 - LOW		With mitigation and prioritisation of local business positive spinoff of the extended construction at Medupi can be increased
	Indirect Impact:	Existing	2	1	1	1	4 - MOD	Traffic management systems should be developed to manage traffic during pick hours and off pick hours especially for construction trucks during the construction phase of the FGD retrofit project. This should include installation of traffic lights and traffic circles at major intersections such as D1675, Afguns and Nelson Mandela Drive near Medupi and Matimba Power Station (Hatch Goba, 2016).	The area of Medupi current does not have traffic management systems in place causing congestion.
	Increase in traffic volumes resulting from a combination of existing road users such as mine trucks, buses and mini bus/taxis, private car owners, Matimba trucks and an increase in construction vehicles/trucks transporting materials to and from Medupi for the construction of the FGD. (NI)	Cumulative	2	1	1	0.75	3 - MOD		There will be increased in traffic volumes with the construction of the FGD.
		Residual	2	1	1	0.5	2 - LOW		Traffic volume will remain high but with controlled management system there will be flow in traffic.

CONSTRUCTION PHASE									
Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
	Indirect Impact:	Existing	2	1	1	0.5	2 - LOW	Installation of traffic lights and traffic circles at major intersections such as D1675, Afguns and Nelson Mandela Drive near Medupi and Matimba Power Station (Hatch Goba, 2016). The other proposition is that a four way stop should be considered as an alternative to traffic lights at the above mentioned intersections. Appropriate traffic calming devices should be implemented	The absence of traffic management systems near Medupi are causing health and safety risk for drivers to and from Medupi.
	Increase in occupation health and safety risks resulting from increase in traffic volumes associated with construction vehicles/trucks working on the FGD as well risks associated with the actual prolonged construction phase at Medupi. (NI)	Cumulative	2	1	1	0.75	3 - MOD		With construction of the FGD and increase in traffic volumes the risk will increase.
		Residual	2	1	1	0.2	1 - LOW		Installation of traffic lights, speed humps and circles will reduce the risk. Appropriate traffic calming devices should be implemented
	Indirect Impact:	Existing	2	2	2	0.5	3 - MOD	The Department of Water and Sanitation (DWS), the custodian of water in the country, should ensure that implements both Phase 1 and Phase 2 of MCWAP with coming live of Medupi and FGD. Eskom should explore other alternatives water sources in its water use licenses to minimise the risk of overly depending to MCWAP Phase 2 for the implementation of the FGD. Both Eskom and DWS should align their project schedule and ensure that there are no delays in implementing the MCWAP Phase 2	Lephalale is currently under a lot of water constraint
	Increase in pressure for water demand and allocation to support the construction of the FGD, the ADF, and existing industries and for domestic uses. (NI)	Cumulative	3	2	4	0.75	7 - MOD		Construction of the FGD will increase water demand in the area.
		Residual	3	3	8	1	14 - HIGH		With mitigation more water allocation alternatives will be considered and water demand met.

CONSTRUCTION PHASE									
Activity	Nature of Impact	Impact type	Extent	Duration	Potential Intensity	Likelihood	Rating	Mitigation	Interpretation
	Indirect Impact: Improvement in local road conditions with the construction of the FGD and ADF, such as the development urban type road infrastructure with traffic lights and speed humps aimed at mitigating risk of uncontrolled traffic during and off peak hours of the construction phase. (PI)	Existing	2	4	1	0.5	4 - MOD	With FGD and ancillary infrastructure there will be net improvements in infrastructure in the receiving environment.	The Medupi built project has contributed to improved infrastructure.
		Cumulative	2	4	1	0.75	5 - MOD		There will be further improved infrastructure as the result of the FGD and ADF.
		Residual	2	4	1	0.75	5 - MOD		With mitigation there will be improved infrastructure and improved economic development and investment as the result FGD and the ADF.
	Indirect Impact: Increase in negative public sentiments about the project FGD if the FGD is delayed and not implemented urgently (NI)	Existing	2	1	1	0.75	3 - MOD	To improve project public participation and communication strategies in order to strengthen multi-stakeholder engagement and participation in the planning and implementation of the FGD retrofit project and associated ancillary infrastructure such as the ADF ash and gypsum. The environmental Affairs also need to grant Eskom to implement the FGD	The Medupi built project has contributed to economic growth in Lephalale LM.
		Cumulative	2	1	1	0.75	3 - MOD		There will be increase in economic development in Lephalale LM.
		Residual	2	1	1	0.5	2 - LOW		With right intervention there will be more sustainable economic growth and positive net growth of its GDP. There will also be improved health in the region with the implementation of the technology.

6.3. Impact Rating: Project Operational Phase

OPERATIONAL PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likelihood**	**Rating**	**Mitigation**	**Interpretation**
Synchronisation and operation of the FGD technology to Medupi PS six units.	Direct Impact:	Existing	2	4	8	1	14 - HIGH	Eskom should prioritize the tender for construction of the FGD and prioritize retrofitting the FGD within time and budget to ensure compliance with AEL timeframes for SO2 reduction targets.	There are currently high levels of SO2 gas in the atmosphere
	Synchronisation and operation of the FGD technology at Medupi will result to reduction in SO2 levels in the atmosphere resulting to improved ambient air quality and improved human health as the result of the FGD.(PI)	Cumulative	4	4	8	1	16 - HIGH		The FGD will contribute to reduction of the SO2
		Residual	5	4	8	0.1	2 - LOW		There will be 93% reduction in the SO2 levels in Lephalale and reduction in global stats of SO2 levels
	Direct Impact:	Existing	2	2	8	1	12 - HIGH	Urgent implementation of the FGD technology in Medupi	There is existence of illnesses that are resulting from high levels of SO2.
	Reduction is respiratory related diseases such as asthma, bronchitis, lung cancer, eye irritations, pneumonia and cardiovascular disease resulting from emission such as SO2. The result is overall improvements to human health and quality of life for the locals and labourers through improved ambient air quality in the receiving environment as the result of implementing the FGD. (PI)	Cumulative	2	2	4	0.75	6 - MOD		The implementation of the FGD will reduce respiratory diseases
		Residual	2	1	8	0.1	1 – LOW		There will be net improvement in health and quality of life by human in Lephalale.

OPERATIONAL PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likelihood**	**Rating**	**Mitigation**	**Interpretation**
	<u>Indirect Impact:</u>	Existing	4	2	2	1	8 - MOD	Implementing the FGD on time will result to avoidance of potential labour unrest which may hamper the supply of power.	Medupi construction has often resulted to labour unrest.
	Stabilization of the National Grid and improved electric supply to support the growing economy and achievement of social imperative such as provision of power for domestic use throughout the country. (PI)	Cumulative	4	2	2	0.75	6 - MOD		The FGD will contribute to success full implementation operation of the power station
		Residual	4	4	2	0.1	1 - LOW		With mitigation the FGD will contribute to positive supply in power grid
	<u>Direct Impact:</u>	Existing	1	1	2	1	4 - MOD	Local businesses should be incubated and equipped with necessary skills to be able to develop the secondary industry associated with commercial viable gypsum industry. A programme can be initiated to assist local users to obtain the necessary waste management licenses for utilization of gypsum.	The area has low skills and education to allow for the development of secondary gypsum industry.
	Development of the secondary industries as the result of implementation of the FGD through sales of its commercial suitable gypsum to the farming industry- locally, regional, nationally and possibly internationally (if well packaged). Or secondary industry such as manufacturing of construction materials like the gypsum boards for ceilings and partitions. (PI)	Cumulative	1	1	2	0.75	3 - MOD		With implementation of the FGD
		Residual	1	1	2	0.5	2 - LOW		With mitigation the locals will be able to develop the secondary industry.

6.4. Impact Rating: Project Decommissioning Phase

DECCOMMISSIONING PHASE									
Activity	**Nature of Impact**	**Impact type**	**Extent**	**Duration**	**Potential Intensity**	**Likelihood**	**Rating**	**Mitigation**	**Interpretation**
Decommission of the FGD technology and the ADF in 50 years	<u>Indirect Impact:</u>	Existing	1	3	1	0.5	3 – MOD	With interventions in skills development, there will be will be necessary skills and employment opportunities for the locals. Eskom	The area has low education and skills levels among the locals and this had negatively impacted on them in the Medupi built project.
	Employment opportunities in disassembling and recycling of recyclable materials from the FGD and the ADF. (PI)	Cumulative	2	1	2	1	5 – MOD		Unemployment by the locals will remain high with decommissioning of the FGD and ADF (highly technical projects) without mitigating the situation.
		Residual	2	1	8	1	11 – HIGH		With mitigation there will be improved employment opportunities for the locals in the decommissioning of the FGD and the ADF.

7. CONCLUSIONS

Conclusions:

- It is concluded that the significance of positive social impacts generally exceeds the significance of negative social impacts in the implementation of the FGD, the ADF and the railway siding throughout all four stages of the project.
- It is also concluded that implementation of the proposed FGD technology at Medupi will result in reduced levels of SO_2 in the medium and long term in the region and South Africa. It will also contribute to reduction of global SO_2 atmospheric levels. As the result of this, the significance of health risks associated with the SO_2 emissions will be minimized on a long-term basis.
- The results will be an improved biosphere in the region and South Africa, this will translate to improved quality of life for the citizens of Lephalale and the communities located south and southwest of the study area who are also affected by pollutants containing SO_2.
- Based on issues raised by some of the affected communities during the SIA fieldwork, it is concluded that one of the most pressing issues identified during the survey relates to stakeholder relations and project communication.
- The above issue was put forward for the attention of the project proponent; a meeting was scheduled between the project proponent representatives in Lephalale dealing with environmental and social issues on the ground. The aim was to come up with solution on how to best address the communication impasse. Through this meeting and the information made available to the SIA team, it has been determined that Eskom and its stakeholders have done a significant amount of work in dealing with concerns of the various interested and affected parties on the ground. They have contributed to the establishment structures entrusted with the management of stakeholder relations and communication as part of the Medupi project. A committee has been established to deal with such issues; for example, the Medupi Environmental Monitoring Committee (EMC) as well as the Stakeholder Relations Office in the region. It is therefore concluded that necessary strategies and measures have been put in place to deal with and manage stakeholder relations and communication.
- In terms of ecosystem services, the study assessed how the Medupi FGD, its by-products, the existing AFD and the proposed railway siding would negatively impact on the ecosystems and how such negative impacts will influence ecosystem services that support the health and wellbeing of

the affected communities i.e. municipality, other industries, the farmers and households in the regions. In this assessment, the SIA team considered the following (*Table 11 and recommendation section of this report*):

- **Direct drivers of the ecosystem change**: e.g. change in local land use and cover; resources consumption; pollution; increase in population
- **Indirect drivers of the ecosystem change**: e.g. demographic change; economic change; socio- political change; cultural and religious change; scientific and technological change.
- **The wellbeing of ecosystem services beneficiaries**: e.g. these included among others, change in demand for ecosystem service for basic material for good life; change in demand for ecosystem service for health; change in demand for ecosystem service or security; change in demand for ecosystem service for good social relations.

- Taking into consideration of ecosystem services beneficiaries and drivers; we assessed the potential impacts of the proposed railway siding for lime off-taking. The land on which the proposed siding is to be constructed is already reformed or altered. It is therefore, concluded that the railway siding will not have any adverse negative social and economic impacts in terms of increase in traffic volumes and possible road carnage resulting from trucks transporting lime to Medupi.
- In terms of the existing ADF facility (and other infrastructure on site such as slime dams, coal stockpiles etc.), necessary measures have been put in place to mitigate any possible leakage to groundwater resulting in ground water contamination. Approximately 21 boreholes have been drilled to compile data that would assist the project proponent to assess sulphates levels in the ground water with the aim of mitigating areas where there is groundwater contamination.
- The water issue is concluded to be the biggest threat in the project lifespan, the current allocation to Medupi will be able to operate the six generation units at Medupi. Water for the other 3 of the FGD absorber units are expected to come from MCWAP Phase. The current raw water abstraction from Mokolo Dam of which the Lephalale LM is also dependent on for clear water to support its domestic and farming communities' poses is a biggest socio-economic threat in terms of ecosystems support services.
- From a social impact assessment perspective; it is concluded that the FGD technology retrofit project, the use of the existing ADF to dispose of ash and excess gypsum and the development of

the railway siding should proceed as planned provided that the following recommendations are implemented and adhered to:

8. RECOMMENDATIONS

Below is the list of recommendation proposed to the project proponent to mitigate against any negative impacts and improve the positive benefits of the proposed project:

- Mitigation measures in this report must be included in the Environmental Management Programme (EMPr), which will be approved as condition of environmental authorisation.
- The specialist responsible for compiling the EMPr must consult and consider the findings and the recommendations of the SIA.
- The issue of communication was flagged by some of the communities as a pressing issue. Through engagement with project proponent representatives it has been determined that necessary measures have been put in place to mitigate issues pertaining to stakeholder engagement in the broader Lephalale area.
    - Although Eskom has done a lot to address this concern, it is recommended that the EMC should further strengthen its multi-stakeholder engagement strategy or adopt new forms of communication that resonate with the interests of I & APs in the region.
    - This should be done in a manner that does not polarise relations between existing stakeholders. One way of addressing this issue is to develop a sub-committee for the EMC.
    - The sub-committee should include a representative from each of the affected communities. This should be in addition to those communities' representatives already listed in the EMC Terms of Reference (ToR).
    - Community representatives from Steenbokpan (Leseding) and the farms (farming community) should form part of the EMC sub-committee due to the fact that they feel excluded in programmes and workshops that deal with issues arising from Medupi construction and the associated infrastructure and technology such as the FGD.
    - In addition to EMC public meetings and workshops, the sub-committee will ensure that all community concerns and grievances are deliberated on and addressed directly by the EMC and outside the EMC public meetings. The EMC ToR allows for the election of alternates. Therefore, this recommendation for EMC sub-committee is in line with EMC ToR.

- In projects of similar nature to Medupi, a grievance mechanism committee is often established and communicated to the community in line with best practice. The Medupi EMC is a sufficient structure to handle all issues relating to the environment, monitoring and auditing. However, without increasing bureaucracy, Eskom should consider appointing an independent company/specialist that specialises in the management of Social Risks. The task of the appointee would be to advise and strengthen the following:
    - Working with the Eskom Community Liaison Officer (Stakeholder Engagement Representative) to independently advise on the facilitation of relations between the various project stakeholders such as the appointed contractors, the EMC, the Environmental Control Officer (ECO), the affected community and community organisations such as NGOs, local labourers, local Small Medium Enterprises (SMMEs) as well as big industries.
    - The Social Risk company or specialist should be experienced in multi-stakeholder management, conflict resolution, labour relations, and negotiation of contracts, skills audits, and training and facilitation of skills transfer programmes.
    - If there is already an existing contract for an independent Social Risk company/specialist for the construction of Medupi Power Station – Eskom should consider extending such a contract since the company/specialist will already be familiar with issues on the ground and be well acquainted with community and government structures in Lephalale.
    - There will be no need for additional infrastructure for this specialist or company; she/he can use the existing stakeholder relations office and its satellite offices.

This is important because the construction activities at Medupi have on many occasions been subject to disruption due to labour unrest and protest by locals who demand job opportunities. This is something that came out strongly during the public consultation for the proposed FGD project. Some locals who claimed that they were overlooked in the Medupi projects and that they will be overlooked in the current project too disrupted one of the Public Participation (PP) meetings. The inclusion of a social risk company or specialist in the EMC will ensure that the EMC has enough capacity and skills to deal with and address social and socio-economic issues without overly relying on Eskom Communication, CSI and Stakeholder Relations Departments. Furthermore, it will play a key role in reporting, monitoring and auditing of Eskom commitments to addressing social issues in line with ToR of the EMC. The social risk company will work

hand in hand with the appointed Environmental Control Officer responsible for the implementation of the EMPr.

Both the SIA impact assessment analysis and stakeholder engagement concluded that the proposed Medupi FGD-RP will result in positive biospheric and social benefits in the receiving environment and the improvement of the quality of life for the affected communities in terms of reduced number of health incidents that result from exposure to high levels of SO_2. There are however disagreements on how the FGD-RP should be implemented; some argue it should be built into the Medupi Units before their synchronisation while the project proponent proposes to retrofit the technology. Those in favour of constructing the FGD with Medupi Units argue that the coming in of Medupi units will results to further increase in SO_2 levels in the region and will compromise the health of citizens who are already suffering from SO_2 health related challenges such as high prevalence of respiratory diseases.

From a SIA perspective, it is recommended that Eskom should prioritise retrofitting and synchronising the FGD technology to Unit 6, 5 and 4 which have been completed and have been operational since 2016 (unit 5) and early in 2017 (Unit 6). These will allay the fears of those in favour of constructing the FGD with the unit stacks and will also increase Eskom compliance levels in terms of reducing SO_2 and increasing atmospheric and air quality. Technically, this will assist them understand the challenges and opportunities of the technology prior to its retrofitting to Units 1, 2 and 3.

In terms of material transport to and from site for the construction of the FGD and to transport gypsum, salts and sludge which are by-products of the FGD; it is recommended that Eskom should speed up the construction of the proposed railway siding and prioritise the railway as the preferred construction material transport mode as well as for the off-take of the FGD by-products to appropriate licensed disposal facilities specially for salts and sludge. This will help mitigate environmental risks associated with the use of public roads to transport these hazardous materials. It will also assist alleviate possible increase in traffic volumes associated with the FGD construction material transportation.

In terms of FGD by-products it is recommended that Eskom should consider tendering the offtake of gypsum for commercial purposes instead of its combined disposal with the ash.

Eskom is highly commended for its zero liquid disposal strategy at Medupi which encourages water recycling and circulation within the footprint. However, this will only assist in meeting the current water demand on site and is not sufficient enough to meet and address the demand with the implementation of the FGD. Water and water allocation however falls outside the statutory mandate of Eskom, but the responsibility of the National Department of Water and Sanitation (DWS). Through the various bargaining platforms available to Eskom and the surrounding industries such as mines and Sasol – it is recommended that Eskom should lobby (together with other industries) DWS to speed up the implementation of Phase 2 MCWAP. This will guarantee Eskom and other industries in Lephalale appropriate water allocation to support the FGD and the growing industries around it such as expanded coal mining due to coal reserves in the Waterberg region. The speeding up of the Phase 2 MCWAP by DWS would also assist mitigate the potential water risk to Lephalale associated with the abstraction of raw water by industries from Mokolo Dam of which the municipality and its constituencies is also directly dependent on for potable water.

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8. ANNEXURES

ANNEXURE 1- NOTICE OF THE FGD PROJECT TO INTERESTED AND AFFECTED PARTIES

No. 2 Windsor Place
Princesses Avenue
Windsor West
Randburg
2194

Department:
NGT Socio-Economic Solutions

Tel: 011 476 0657
Fax: 086 273 6562
Cell: 078 163 0657
www.ngtgroup.co.za

NOTICE FOR SOCIO-ECONOMIC PUBLIC PARTICIPATION

ATTENTION: INTERESTED & AFFECTED PARTIES

RE: PROPOSED ESKOM MEDUPI POWER PLANT FLUE GAS DESULPHURISATION RETROFIT PROJECT

Dear Interested and Affected Party

This letter serves as a notice for a Consultative Process for a Socio-Economic Study for the proposed Medupi Flue Gas Desulphurisation (FGD) Plan proposed within the Medupi Power Development Precinct (MPDP) to mitigate gas emissions (e.g. Sulphur Dioxide) that will result from combustion of the Medupi coal powered station. This consultative process is hereby conducted according to the National Environmental Management Laws Amendment Act No. 25 of 2014; National Water Amendment Act No.27 of 2014; National Environmental Management: Waste Amendment Act No. 26 of 2014 and; Policies that govern the Socio-Economy of South Africa.

NGT Projects & Heritage Consultants is appointed by Zitholele Consulting as independent Socio-Economic consultant to conduct a Socio-Economic Impact Assessment study for the proposed Medupi Power Station FGD technology retrofitting.

The coal that Medupi Power Station burns to generate electricity results in ash and flue gases generated as the main by-products. The purpose of the FGD is to remove the sulphur dioxide from the exhaust flue gases. The proposed project entails the following:

- Storage, handling and disposal of wastes
- Treatment of waste water within a Zero Liquid Discharge (ZLD) system;
- A conveyor belt for the transportation of waste to the ash disposal site;
- Services including electricity and water supply in the form of power lines, pipelines, and associated infrastructure; and
- Access and maintenance roads to the ash disposal facility (ADF).

Based on the used socio-economic receptors at a Desktop level, we have determined that the affected communities include: Ward 2 (Marapong), 3, 4 (Overwacht) and Ward 5 (Lephalale) due to their close proximity with the Medupi power station. Ward 1 & 5 may also be affected on the spatial extent of the

impact. Ward 2, located just south of the Farm Zongezien and north east of existing Matimba Power Station. Ward 4 and 5, are located to the southeast and east of the existing Matimba power station. There are also farm homesteads scattered around the area with livestock farming (mainly game and cattle ranching).

Among the determined social services canters we have considered the following: schools and clinics include Ellisras School, Clinic and Hospital located in Ward 4; Lekhureng primary School in Ward 1 and Weltevrede Montoma School in Ward 5 (Census 2001).

As such, I&APs are invited to contact us if they have any queries or inputs regarding the project (i.e. Socio-Economic component). A public meeting can be arranged upon request. Interested candidates are urged to make contact within 40 days upon receipt of this letter to the undersigned:

Carli Terreblanche	carli@ngtgroup.co.za	**Tel:** 011 476 6057 **Fax:** 011 476 7563 No. 02 Windsor Place, Princesses Avenue, Windsor West, Randburg, 2194
Themba Nyauza	themba@ngtgroup.co.za	

Yours Sincerely

Carli Terreblanche

Socio-Economic Consultant

ANNEXURE 2- NOTICES FOR PUBLIC MEETING TO DISCUSS THE PROPOSED MEDUPI FGD RETROFIT PROJECT IN LEPHALALE LOCAL MUNICIPALITY

NGT Projects & Heritage Consultants (Pty) Ltd

Division: NGT Socio-Economic Solutions

Site Notice: Proposed Environmental Impact Assessment and Waste Management License Application for the proposed Medupi Power Station Flue Gas Desulphurisation

Date of issue: 07 March 2015
Proposed Date of the Meetings: 18/03/2015
Venue: Morapong Library
Times: 09:00am to 2:00pm

The following project is conducted according to the National Environmental Management Act (NEMA), No 107 of 1998 and the EIA Regulations, 2010; National Environmental Management Waste Act (NEM: WA), No 59 of 2008 as amended; National Water Act, No 36 of 1998 as amended and; Policies that govern the Socio-economy of South Africa.

Eskom have appointed Zitholele Consulting to undertake and Environmental Impact Assessment for the proposed Medupi Power Station Flue Gas Desulphurisation Retrofit Project. The coal that Medupi Power Station burns to generate electricity results in ash and flue gases generated as the main by-products. The purpose of the FGD is to remove the sulphur dioxide from the exhaust flue gases.

The project entails:

- Storage, handling and disposal of wastes
- Treatment of waste water within a Zero Liquid Discharge (ZLD) system;
- A conveyor belt for the transportation of waste to the ash disposal site;
- Services including electricity and water supply in the form of power lines, pipelines, and associated infrastructure; and
- Access and maintenance roads to the ash disposal facility (ADF).

Locality:

Medupi Power Station is located approximately 13 km west of the town of Lephalale in the Limpopo Province, Waterberg District Municipality.

Any interested and Affected Party who wishes to comment on the socio-economic aspect of the project are invited to do so in writing to:

NGT Projects and Heritage Consultants

Division: NGT Socio-Economic Solutions

No. 02 Windsor Place, Princesses Avenue, Windsor West, Randburg, 2194;

Fax: 011 476 7563; E-mail: nkosinathi@ngtgroup.co.za

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NGT Projects & Heritage Consultants (Pty) Ltd

Division: NGT Socio-Economic Solutions

Site Notice: Proposed Environmental Impact Assessment and Waste Management License Application for the proposed Medupi Power Station Flue Gas Desulphurisation

Date of issue: 07 March 2015
Proposed Date of the Meetings: 19/03/2015
Venue: Steenbokpan Leseding Community Hall
Times: 09:00am to 12:00pm

The following project is conducted according to the National Environmental Management Act (NEMA), No 107 of 1998 and the EIA Regulations, 2010; National Environmental Management Waste Act (NEM: WA), No 59 of 2008 as amended; National Water Act, No 36 of 1998 as amended and; Policies that govern the Socio-economy of South Africa.

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The project entails:

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- Treatment of waste water within a Zero Liquid Discharge (ZLD) system;
- A conveyor belt for the transportation of waste to the ash disposal site;
- Services including electricity and water supply in the form of power lines, pipelines, and associated infrastructure; and
- Access and maintenance roads to the ash disposal facility (ADF).

Locality:

Medupi Power Station is located approximately 13 km west of the town of Lephalale in the Limpopo Province, Waterberg District Municipality.

Any interested and Affected Party who wishes to comment on the socio-economic aspect of the project are invited to do so in writing to:

NGT Projects and Heritage Consultants

Division: NGT Socio-Economic Solutions

No. 02 Windsor Place, Princesses Avenue, Windsor West, Randburg, 2194;

Fax: 011 476 7563; E-mail: nkosinathi@ngtgroup.co.za

NGT Projects & Heritage Consultants (Pty) Ltd

Division: NGT Socio-Economic Solutions

Site Notice: Proposed Environmental Impact Assessment and Waste Management License Application for the proposed Medupi Power Station Flue Gas Desulphurisation

Date of issue: 07 March 2015
Proposed Date of the Meetings: 19/03/2015
Venue: Mogol Club
Times: 1:00pm to 3:00pm

The following project is conducted according to the National Environmental Management Act (NEMA), No 107 of 1998 and the EIA Regulations, 2010; National Environmental Management Waste Act (NEM: WA), No 59 of 2008 as amended; National Water Act, No 36 of 1998 as amended and; Policies that govern the Socio-economy of South Africa.

Eskom have appointed Zitholele Consulting to undertake and Environmental Impact Assessment for the proposed Medupi Power Station Flue Gas Desulphurisation Retrofit Project. The coal that Medupi Power Station burns to generate electricity results in ash and flue gases generated as the main by-products. The purpose of the FGD is to remove the sulphur dioxide from the exhaust flue gases.

The project entails:

- Storage, handling and disposal of wastes
- Treatment of waste water within a Zero Liquid Discharge (ZLD) system;
- A conveyor belt for the transportation of waste to the ash disposal site;
- Services including electricity and water supply in the form of power lines, pipelines, and associated infrastructure; and
- Access and maintenance roads to the ash disposal facility (ADF).

Locality:

Medupi Power Station is located approximately 13 km west of the town of Lephalale in the Limpopo Province, Waterberg District Municipality.

Any Interested and Affected Party who wishes to comment on the socio-economic aspect of the project are invited to do so in writing to:

NGT Projects and Heritage Consultants

Division: NGT Socio-Economic Solutions

No. 02 Windsor Place, Princesses Avenue, Windsor West, Randburg, 2194;

Fax: 011 476 7563; E-mail: nkosinathi@ngtgroup.co.za

NGT Projects & Heritage Consultants (Pty) Ltd

Division: NGT Socio-Economic Solutions

Kennisgewing: Voorgestelde Omgewingsimpakstudie en Afvalbestuurslisensie Aansoek vir die Voorgestelde Medupi Kragstasie Rookgas Ontswawelings Projek

Datum van Uitreiking: 05 Maart 2015

Voorgestelde Datum van Vergadering: 07/03/2015

Voorgestelde Plek: Mogol Club (Corner Nelson Mandela and George Wells)

Tyd: Vanaf 10:00 tot 12:00

Die volgende project is onderneem volgens die Wet op Nasionale Omgewingsbestuur, Wet 107 van 1998 en die Olieregulasies van 2010; Die Nasionale Omgewingsbestuur: Afvalbestuur Wet, 59 van 2008, soos gewysig; Die Nasionale Waterwet, Wet 36 van 1998, soos gewysig; Sosio-Ekonomiese Beleid van Suid-Afrika.

Eskom het Zitholele Consulting aangwys om die Omgewings Impakstudie vir die voorgestelde Eskom Medupi Kragstasie Rookgas Ontswawelings Projek te onderneem. Die steenkool wat deur die Medupi Kragstasie verbrand word om elektrisiteit te genereer, ontaard in as en rookgas as die hoof by-produkte. Die doel van die projek is om die swaweldioksied te te verwyder van die uitgelate rookgas.

Die projek behels:

- berging, hantering en verwydering van afval;
- behandeling van afvalwater binne 'n Zero Liquid Discharge (ZLD) stelsel;
- 'n vervoerband vir die vervoer van afval na die storting terrein;
- dienste wat elektrisiteit en watertoevoer in die vorm van kraglyne , pypleidings en verwante infrastruktuur insluit; en
- toegang en instandhouding van paaie na die storting fasiliteit

Ligging

Die Medupi Kragstasie is ongeveer 13 km wes van die dorp Lephalale in die Limpopo Provinsie, Waterberg-distriksmunisipaliteit gelee.

Enige belanghebbende en geaffekteerde partye wat kommentaar wil lewer op die sosio-ekonomiese aspek van die projek word uitgenooi om 'n skrywe te rig aan:

NGT Projects and Heritage Consultants

Division: NGT Socio-Economic Solutions

No. 02 Windsor Place, Princesses Avenue, Windsor West, Randburg, 2194;

Fax: 011 476 7563; E-pos: nkosinathi@ngtgroup.co.za

ANNEXURE 3 – EXAMPLE OF SITE NOTICES PLACED AT VARIOUS VENUES AND PHOTOS TAKEN DURING PUBLIC MEETINGS THAT TOOK PLACE AS PART OF THE SIA CONSULTATIVE PROCESS

Figure 21- Site notice at Lephalale FM

Figure 22- Site notice at the entrance of one of the local Zion church

Figure 23-Site Notice at a local Spaza Shop Marapong

Figure 24- Site notice at Marapong Clinic

Figure 25- Site notice near one of the Spaza Shops in Marapong

Figure 26- Site notice at Marapong Library

Figure 27- Site notice at Spar Onverwacht

Figure 28- Notice at Steenbokpan community hall (first row) and local Spaza shop (second row)

Figure 29- Site notice at a Sasol donated facility in Steenbokpan

Figure 30- Site notice at Lephalale FET and Ellisras District Hospital

Figure 31 – Picture showing attendents and the meeting proceeding at Marpong Library on the 16 April 2015

Figure 32 – Meeting proceeding at Leseding Community (Steenbokpan)

ANNEXURE 4- GENERAL SITE CONDITION OF THE EXISTING MEDUPI ADF

Figure 33-Signage at the Medupi Ash Disposal Facility entrance point

Figure 34- Available land that has been cleared for the growth of the Ash Disposal Facility (AFD). Image taken from the west facing east

Figure 35- The width of the facility facing Medupi from the west end of the ADF

Figure 36 – The western end on the AFD

Figure 37- Northern end of the AFD

Figure 38- Northern dam associated with the AFD

Figure 39- Current ash heap at the facility

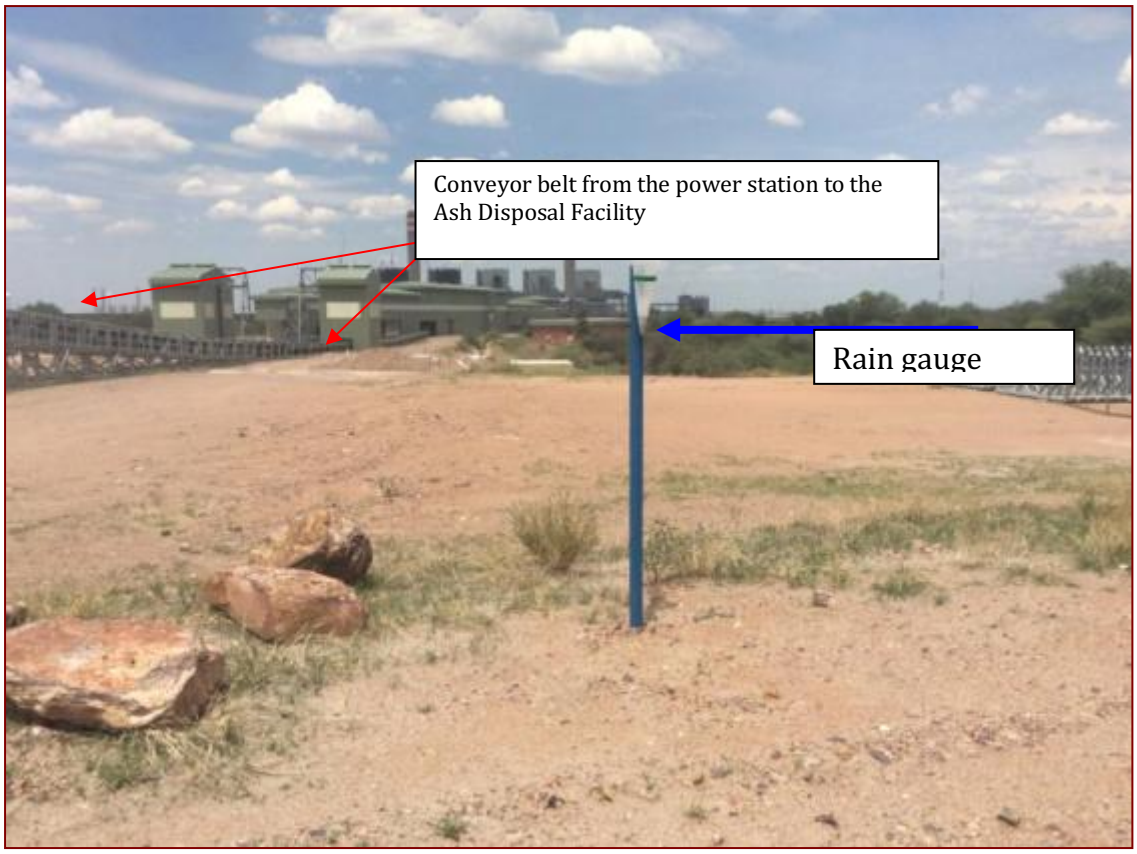


Figure 40- Conveyor belt system associated with the AFD

Figure 41- Land dedicated to the facility. Taken south of the facility facing north

Figure 42- Image of the land dedicated to the facility and ash heap from Medupi power station. Taken from the south facing north-east

Figure 43- Two dams associated with the facility located south-west of the current ash heap

Figure 44- Fence line demarcating the facility with the southern property and the railway line

Figure 45- Machine that loads ash onto the facility from conveyor belt

Figure 46- Sprinkler system developed to suppress dust

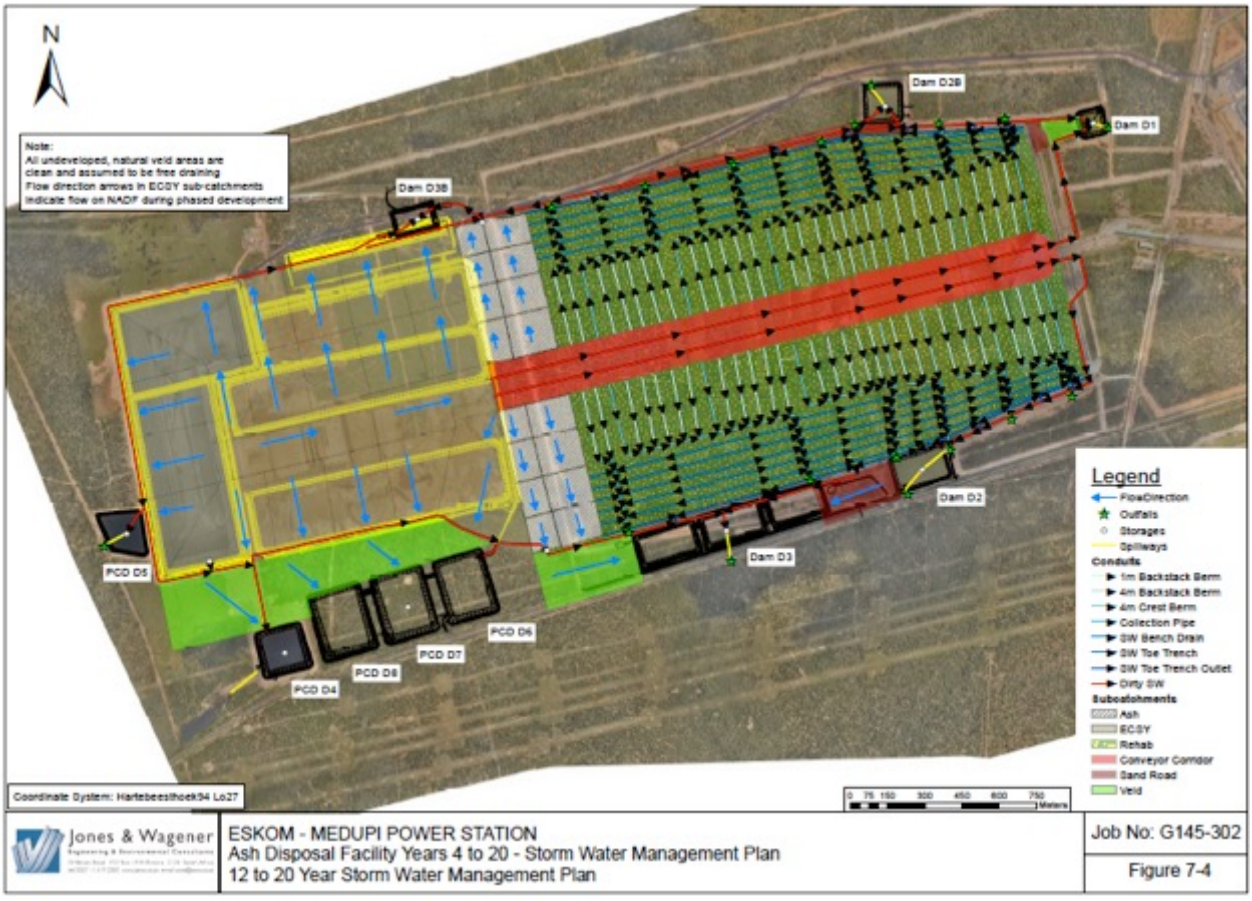
ANNEXURE 5 – EXAMPLE OF A PUBLIC MEETING WHERE THERE WAS A NEED FOR PUBLIC ENFORCEMENT

The meeting was held in 2016 and was disrupted by angry disgruntled youth who threatened violence if the meeting was not disbanded or they were engaged by senior Eskom representatives. Chants of "iAgenda yama Capitalists asiyifuni, we want jobs" which loosely translated means "We do not support capitalist agenda's, we want jobs". The youth spoke at length about the scourge of unemployment and lack of consideration for the locals in Medupi construction activities currently underway at Medupi.

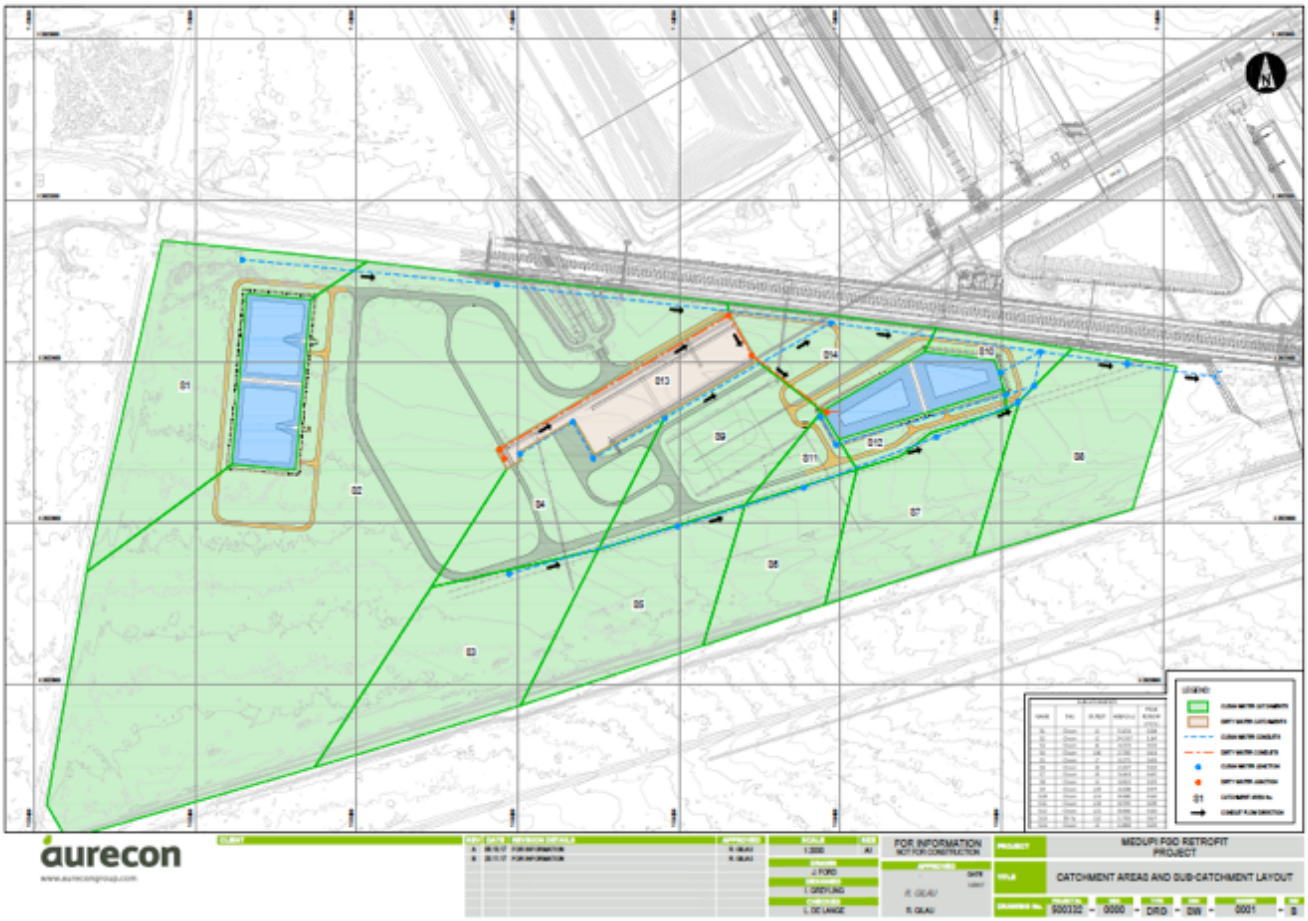

POLICE

ANNEXURE 6 – UPDATES TO PROJECT SCOPE 2017-2018

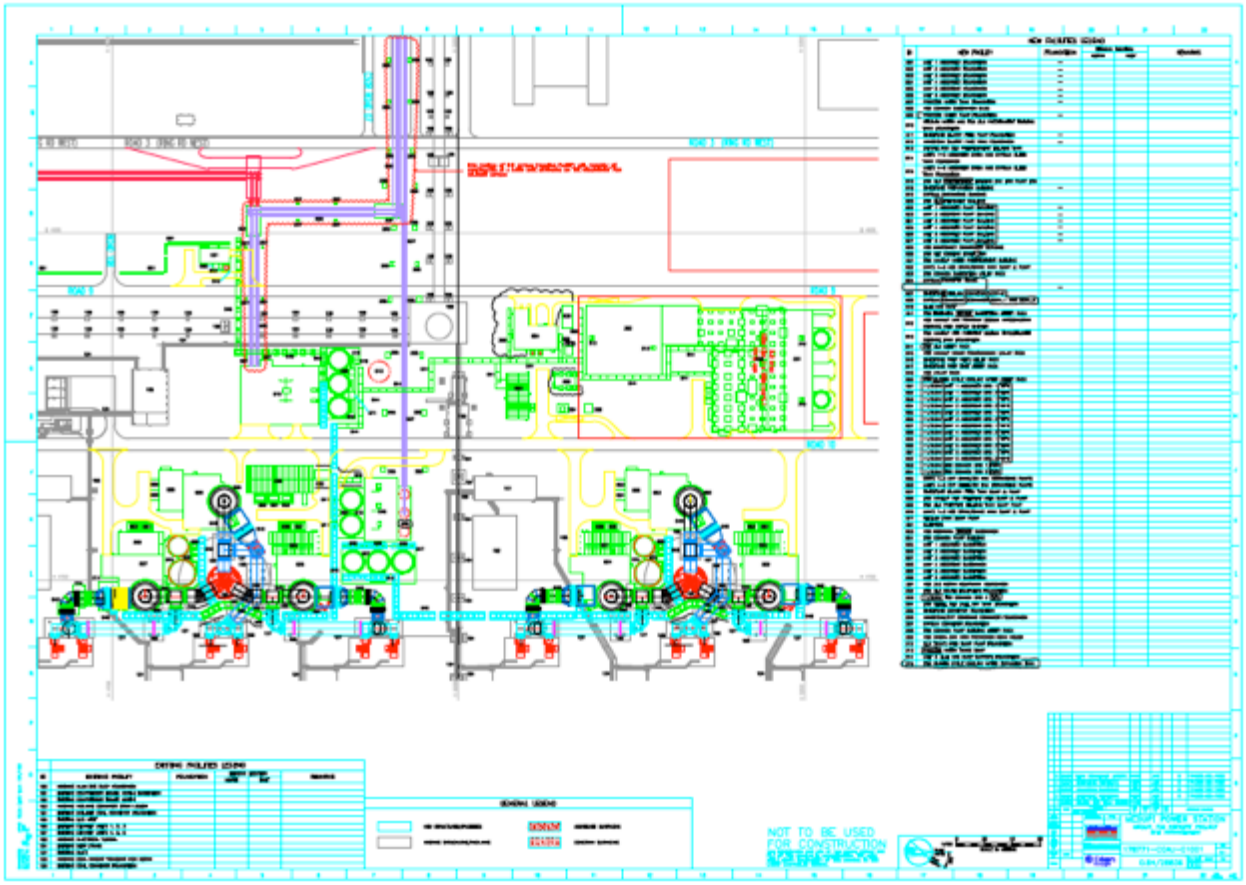
ANNEXTURE 7: ESKOM MEDUPI POWER STATION ASH DISPOSAL FACILITY 4 TO 2O YEARS STORM WATER MANAGEMENT PLAN



ANNEXTURE 8: MEDUPI PGD RETROFIT PROJECT CATCHMENT AREAS AND SUB-CATHCMENT LAYOUT



ANNEXTURE 9: ESKOM MEDUPI POWER STATION FGD RETROFIT PROJECT SITE ARRANGMENT



ANNEXTURE 10: ESKOM MEDUPI POWER STATION RAILWAY YARD LAYOUT