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DRAFT SCOPING REPORT ON

DEA REF: 14/12/16/3/3/3/110

Integrated Environmental Authorisation Process for the Medupi Power Station Flue Gas Desulphurisation (FGD) Retrofit Project

Report No :

12949-46-Rep-001-DSR-Rev3

Submitted to:

Eskom Holdings (SOC)
Megawatt Park
Sunninghill

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October 2014 12949

Disclaimer: Please note that all information provided within this report is sourced from technical documents that are still in preliminary phase. Therefore, the information presented in this Draft Scoping Report is a best indication of the project activities, but is subject to change.

EXECUTIVE SUMMARY

Introduction and context

Eskom Holdings SOC Limited (referred to hereafter as Eskom) is the foremost South African utility that generates, transmits and distributes electricity. Eskom was established in 1923 by the South African government and today supplies approximately 95% of the country's electricity, as well as about 45% of the electricity used in Africa. The utility is the largest producer of electricity in Africa, is among the top seven utilities in the world in terms of generation capacity and among the top nine in terms of sales. Eskom plays a major role in accelerating growth in the South African economy by providing a high-quality and reliable supply of electricity.

Medupi Power Station is an element of the Eskom "capacity build" initiative and is the largest construction project in the southern hemisphere. Medupi Power Station has an design lifespan of 50 years. Stringent air quality regulations have been implemented worldwide to combat the emissions of SO_2. Since the major emission of SO_2 is by coal-fired power stations, removing sulphur from the flue gas is a common technique for reducing these emissions (US EPA website; 2014).

The six units at Medupi Power Station have been designed and constructed to accommodate the installation of wet limestone Flue Gas Desulphurisation technology (SO_2 abatement technology). Flue-gas desulfurization (FGD) is a set of technologies used to remove sulphur dioxide (SO_2) from exhaust flue gases of fossil-fuel power plants, and from the emissions of other sulphur oxide emitting processes.

The current integrated environmental authorisation process aims at describing the Flue Gas Desulphurisation retrofit process, identifying potential impacts of this process and providing management and mitigation recommendations.

Project Description

Chapter 2 of this report discusses the project description and all activities related to the FGD retrofit project. This information is taken directly from the Basic Design Report (Harris, 2014). The activity detail is extremely technical. However, the FGD technology can be compared to the operation of a wet vacuum cleaner. Water and limestone ($CaCO_3$) are used to create a reaction with the flue gas to extract the SO_2 as gypsum ($CaSO_4$) and water. Salts are produced through the reaction. The gypsum is captured in the dirty water and is removed for separation and treatment. Dewatered gypsum is separated for disposal or resale, depending on the quality. The water is treated and recycled within the system. The cleaner flue gas is emitted from the chimney. Inputs to the process are water and limestone. Wastes from the process are gypsum, salts and sludge.

Receiving Environment

The Medupi FGD retrofit will take place predominantly within the existing impacted footprint of the Medupi Power Station. For this reason, the receiving environment description has been taken from the Medupi Power Station original EIA Report (Bohlweki, 2006). Due to the recent clearing of the site for the Power Station, there is very little natural environment remaining that will be impacted upon by the FGD. It is anticipated that the FGD retrofit will not generate significant additional impacts to aspects such as visual, noise, traffic, soils, land capability and land use, etc.

However, additional specialist studies are being carried out to investigate and describe the socio-economic and air quality receiving environments, as these are aspects that may experience significant change due to the FGD retrofit. In addition, should any activities occur outside of the Medupi Power Station footprint, appropriate specialist studies will possibly be required to described the receiving environment and inform impact assessment.

At this stage, the receiving environment is limited to the Medupi Power Station footprint, with the addition of the rail yard, which is directly adjacent to the Medupi footprint. The rail yard area will be investigated by an ecological specialist to ensure that no significant impacts to biodiversity may be generated by this activity.

Potentially Significant Impacts

Several potentially significant impacts have been identified for further investigation during the EIA Phase:

Waste handling and disposal will constitute an activity which may generate potentially significant impacts to the environment. For this reason, a waste classification study is being carried out to investigate the types of wastes generated by the FGD process and to identify the required class of waste facility for disposal of independent or mixed waste streams. In addition, should a waste disposal facility be required in addition to the existing ADF, then site selection and impact assessment of these additional facilities will be informed by additional specialist studies, including at least geohydrology and geotechnical assessments.

Socio-economic impacts may be significant in terms of:

- Human health and welfare;
- Employment opportunities;
- Improved, sustainable electricity supply;
- Public perception around water allocation and supply for local agriculture, industry and domestic use in relation to the MCWAP allocation of water to Medupi Power Station;
- Economic development.

Air quality will be impacted positively due to the reduction of SO_2 emissions from the Medupi Power Station. The FGD will reduce the SO_2 emissions to levels within the DEA minimum emissions

standards and in compliance with the Eskom Air Quality Strategy standards. The FGD is designed to reduce the SO_2 emissions by 94% to below 400mg/Nm^3. This FGD retrofit is anticipated to have a positive impact on emissions from the power station, for the duration of the power station operation (50 years).

Water allocation and usage is identified as an issue for further investigation. The significant impact is water consumption. Eskom has been working closely with DWS to identify sources of water for the project. The MCWAP-2 has been identified as the source to supply the FGD plant. Eskom will undertake a Water Use License Application as part of the current environmental authorisation process for the water allocation for the FGD operation.

Plan of Study for EIA

The Plan of Study for EIA is available within this Scoping Report and described the process and the methodology that is planned for the EIA Phase. This section of the report discusses the way forward and presents the activities to be carried out for both technical assessment and public participation.

Public participation

Public participation has been carried out for the project notification phase and Scoping Phase in accordance with:

- the National Environmental Management Act (NEMA) (Act 107 of 1998, Chapter 1);
- the NEMA Section 24 (5), Regulation 54-57 of GNR 543;
- Integrated Environmental Management Guideline Series (Guideline 7) – Public Participation in the Environmental Impact Assessment Process, GN234, promulgated 10 October 2012); and
- The National Water Act (NWA) (Act 36 of 1998).

This report provides the location and contact details of the venues where the report will be made available for public review. The period for public review is also indicated. All stakeholders registered on the database will be notified in writing of the availability of the Draft Scoping Report. In addition, advertisements will be placed in appropriate written publications to notify the general public of the public review period and details of the report availability.

Way forward

The Draft Scoping report will be made available for public review and comment for a period of 40 days. A key stakeholder meeting and two public meetings will be held in Lephalale and Marapong during early November 2014. All comments received will be captured and documented within the Comments and Response Report version 2. Comments will be responded to by the EAP and the project team. The Draft Scoping Report will be amended as appropriate to address any issues that have been raised through public review. The Final Scoping Report and supporting documentation will be submitted to the commenting authority, DEA, for acceptance.

Once the Final Scoping Report has been accepted, the Impact Assessment Phase will be initiated.

YOUR COMMENT ON THE DRAFT SCOPING REPORT

The Draft Scoping Report (DSR) is available for comment from **Monday 27 October 2014 to Friday 5 December 2014** . This DSR has been distributed to the authorities, and copies thereof are available at strategic public places in the project area (see below).

VENUE	CONTACT DETAILS
Printed Copies	
Lephalale Local Municipality, Civic Centre Overwacht, cnr Joe Slovo & Douwater Road.	Mr MC Lekaka Tel.: 014 762 1409 Email: riekie.coetzee@lephalale.gov.za
Marapong Community Library 143 Chris Hani Street Marapong 1453	Mr Sophonia Petja Tel.: 014 768 3977 Email: sophoniapetja@gmail.com
Agri Lephalale / Farmers Association NTK Building 1 Jan Louis Botha Avenue Lephalale 0555	Mr Francois van den Berg Tel.: 014 763 1888
ELECTRONIC COPIES	
Zitholele Consulting Website	http://www.zitholele.co.za/eia-for-medupi-fgd
Nicolene Venter / Bongani Dhlamini	Available on CD on request via email Tel.: 011 207 2060 E-mail: publicprocess@zitholele.co.za

The Draft scoping report is also available electronically from the Public Participation office or on the Zitholele website: www.zitholele.co.za

You may comment on the Draft Scoping Report by:

- Completing the comment sheet;
- Writing a letter, or producing additional written submissions; and
- Emailing or calling the public participation office.

DUE DATE FOR COMMENT ON THE DRAFT SCOPING REPORT IS 5 December 2014

SEND YOUR COMMENTS TO THE PUBLIC PARTICIPATION OFFICE:

Nicolene Venter/Bongani Dhlamini
Public Participation Office
Zitholele Consulting
P O Box 6002, Halfway House, 1685
Tel: (011) 207 2060
Fax: 086 676 9950
Email: publicprocess@zitholele.co.za

AN EIA CONSISTS OF SEVERAL PHASES

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Glossary of terms

TERM USED IN REPORT	DEFINITION OF TERM
400V power system	Electricity system powered by the 400 Volts supply required as auxiliary power to the FGD system.
Absorber	Where the limestone reagent reacts with the SO_2 and water to remove the SO_2 from the flue gas.
Blowdown	Blowdown is the water that is drained from cooling equipment to remove mineral build-up.
Clarifier	Clarifiers are settling tanks with a mechanism for continuous removal of solids that are deposited by sedimentation.
Closed cycle cooling tower	Cooling towers provide evaporative cooling of systems. The closed circuit cooling towers operate so that the heat load to be rejected is transferred from the process liquid to the ambient air through a heat exchange coil.
Condensate	The liquid produced by the condensation of steam.
Delta-wye transformer	Electrical transformer equipment with the delta windings configuration on the primary side and the wye windings configuration on the secondary side.
Dewatered solids (from waste water treatment)	Solids from the wastewater treatment system that have been removed from the wastewater through physical or chemical process.
Dry-type transformers	Electrical transformers designed not to use transformer oil as insulation medium, with resin impregnated windings
Feeder breakers	Electrical switching equipment supplying power to equipment or clients
Filter cake	Filter cake is formed by substances that are retained on a filter.
Flue Gas	Gas generated from burning of coal in the power station boilers and released via the stacks
Flue Gas Desulphurisation	Chemical Removal of sulphur from the flue gas
Flue Gas Duct System	Pipework that directs the flue gas through the FGD absorber and then to the chimney.
Heat rejection	Heat rejection is the excess heat from a cooling system that is removed by the condenser or the cooling tower.
Hydrocyclone	A device to classify, separate or sort particles in a liquid suspension on the ratio of their centripetal force to fluid resistance.
Induced Draft Fans	These fans add draft in order to overcome resistance within the system.

Low voltage	In electrical systems low voltage commonly refers to mains voltage as used by lighting and portable appliances.
MCWAP	Mokolo and Crocodile River (West) Water Augmentation Project – the Medupi Power Station will be supplied with water from this scheme. Medupi already has been allocated a water supply in phase 1 of MCWAP.
Makeup water	Top up water for maintenance of the water balance.
Reagent preparation	Preparation of the limestone for use in the FGD reactors as a sulphur removing agents.
Salts	Salts are a waste product from the FGD process. They are ionic compounds that result from the neutralization reaction of an acid and a base. The salts expected from the FGD process will predominantly include $CaSO_4$ and $CaSO_3$ and chlorides.
Sludge	Sludge refers to the residual, semi-solid material left from industrial wastewater.
Slurry	A mixture of solids within a liquid.
Switchgear	Electrical equipment used for switching electricity on and off to the consumer or to a plant.
Switchgear buses	Electrical equipment used inside the switchgear to distribute power to multiple users as a tapping point of common voltage.
Three-phase power	Electricity power supplied through a three phase voltage system with the voltage phase shifts distributed at 120° angles.
Tiebreakers	Electrical equipment designed to join two adjacent bus bars.
Transformers	Electrical equipment designed to step down or step up the electrical power voltage supplied from the system.
Zero Liquid Discharge (ZLD)	This is the specific waste water treatment plant that will be operated for the FGD that treats water for reuse within the system without requiring the discharge of any effluent or dirty water to the environment.

Abbreviations

ABBREVIATION	TERM
AC	Alternative current
ADF	Ash Disposal facility
BOP	Balance of Plant
$CaCl_2$	Calcium chloride
CaF_2	Calcium fluoride
$CaCO_3$	Calcium carbonate
$CaSO_3$	Calcium sulphite
$CaSO_4$	Calcium sulphate
$CaSO_4 \cdot 2H_2O$	Calcium sulphate dehydrate
CCCW	Closed Cycle Cooling Water
CPP	Condensate Polisher Plant
DC	Direct Current
DEIR	Draft Environmental Impact Report
DSR	Draft Scoping Report
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme Report
FGD	Flue Gas Desulphurisation
IAP	Interested and Affected Party
ID fans	Induced Draft Fans
Km	Kilometre
kV	Kilovolt
LV	Low voltage
MCWAP	Mokolo and Crocodile River (West) Water Augmentation Project
mg/Nm^3	Concentration of miligrams per normal cubic metre
$MgSO_4$	Magnesium sulphate
MW	Megawatt
MWh	Megawatt hour
PP	Public Participation
PPP	Public Participation Process
ppm	Parts per million
SO_2	Sulphur dioxide
SO_3	Sulphur trioxide
V	Volt
ZLD	Zero Liquid Discharge

1. INTRODUCTION

1.1 Project Background

1.1.1 Medupi Power Station

Medupi is a green field coal powered power station that forms part of the Eskom capital expansion programme. The word Medupi means "rain that soaks parch lands, giving economic relief" in Sepedi. Medupi Power Station is the fourth dry-cooled based-load power station in South Africa, following Kendal, Majuba and Matimba. Medupi Power Station is located about 15km west of the town of Lephalale in the Limpopo Province. The Power Station is situated on 883 hectares that was historically operated as a game and livestock farm (Bohlweki, 2005).

Medupi Power Station has 6 x 800 MW units and utilises a super critical boiler and turbines technology designed to operate at higher temperatures and pressures. This allows for maximum efficiency of the power station. The dry-cooling technology is efficient for operation in areas of water shortage, such as Lephalale, and utilises approximately 0.2 litres of water per kilowatt hour of electricity produced.

Medupi is the largest construction project in the southern hemisphere. Medupi Power Station has an design lifespan of 50 years.

The six units at Medupi Power Station have been designed and constructed to accommodate the installation of wet limestone Flue Gas Desulphurisation technology (SO_2 abatement technology). Subsequent to the initial design and current construction of the Medupi Power Station, Eskom has now initiated the relevant process required for the future retrofit of the FGD (Bohlweki, 2005).

1.1.2 Medupi FGD Retrofit

The Medupi Power Station has received environmental authorisation and relevant licensing. The current integrated environmental authorisation process aims at describing the Flue Gas Desulphurisation retrofit process, identifying potential impacts of this process and providing management and mitigation recommendations. Throughout the EIA and Waste Management License Application Process, information on the design, activities and impacts will be investigated and documented to inform public comment and authority decision making. The integrated environmental authorisation process is being carried out in three phases:

- The project inception;
- Scoping Phase;
- Impact Assessment Phase.

The process is currently in the Scoping Phase, the objective of which is to describe the proposed activity, describe the receiving environment, discuss the alternatives considered, and identify any potentially significant impacts generated on the environment by the activity.

It must be noted that the Air Emissions License for the Medupi FGD Technology Retrofit is being managed as a separate and independent process.

1.1.3 Generation of SO_2 in the coal-fired power station

Electricity is generated in coal-fired power stations by the combustion of the mineral coal. Coal is composed primarily of carbon along with variable quantities of other elements, chiefly hydrogen, sulphur, oxygen, and nitrogen. When coal is burned, the sulphur combines with oxygen to form sulphur oxides (SO_x) including sulphur dioxide (SO_2) and sulphur trioxide (SO_3) (COP17 fact sheet; 2014).

Sulphur dioxide contributes to the formation of acid rain, which damages forests, crops, and buildings, and acidifies lakes, streams, and rivers, making them unsuitable for aquatic plant and animal life. In addition, inhalation of high concentrations of sulphur dioxide irritates the nose, throat, and airways to cause coughing, wheezing, shortness of breath, or a tight feeling around the chest.

Stringent air quality regulations have been implemented worldwide to combat the emissions of SO_x. Since the major emission of SO_x is by coal-fired power stations, removing sulphur from the flue gas is a common technique for reducing these emissions (US EPA website; 2014).

1.1.4 Flue gas desulphurisation

Flue-gas desulfurization (FGD) is a set of technologies used to remove sulphur dioxide (SO_2) from exhaust flue gases of fossil-fuel power plants, and from the emissions of other sulphur oxide emitting processes. Commonly-used methods include: wet scrubbing using a slurry of alkaline sorbent, spray-dry scrubbing using similar sorbent slurries, wet sulphuric acid process and dry sorbent injection systems.

In wet scrubbing systems, the flue gas normally passes first through a fly ash removal device, either an electrostatic precipitator or a wet scrubber, and then into the SO_2-absorber. An important design consideration associated with wet FGD systems is that the flue gas exiting the absorber is saturated with water and still contains some SO_2. These gases are highly corrosive to any downstream equipment such as fans, ducts, and stacks. Two methods that may minimize corrosion are: (1) reheating the gases to above their dew point, or (2) using materials of construction and designs that allow equipment to withstand the corrosive conditions.

SO_2 is an acid gas, and, therefore, the typical sorbent slurries or other materials used to remove the SO_2 from the flue gases are alkaline. The slurries include $CaCO_3$ (limestone), $Ca(OH)_2$ (lime) slurry, $Mg(OH)_2$ (magnesium hydroxide) slurry and seawater (Harris; 2014[1]).

1.1.5 Wet scrubber designs

To promote maximum gas-liquid surface area and residence time, a number of wet scrubber designs have been used, including spray towers, venturis, plate towers, and mobile packed beds. Because of scale build-up, plugging, or erosion, which affect FGD dependability and absorber efficiency, the trend is to use simple scrubbers such as spray towers instead of more complicated ones. The configuration of the tower may be vertical or horizontal, and flue gas can flow concurrently, counter-currently, or cross-currently with respect to the liquid. The chief drawback of spray towers is that they require a higher liquid-to-gas ratio requirement for equivalent SO_2 removal than other absorber designs.

Approximately 85% of the flue gas desulfurization units installed in the United States (US) are wet scrubbers, 12% are spray dry systems, and 3% are dry injection systems. The highest SO_2 removal efficiencies (greater than 90%) are achieved by wet scrubbers (Harris; 2014).

1.2 Proponent

Eskom Holdings SOC Limited (referred to hereafter as Eskom) is the foremost South African utility that generates, transmits and distributes electricity. Eskom was established in 1923 by the South African government and today supplies approximately 95% of the country's electricity, as well as about 45% of the electricity used in Africa. The utility is the largest producer of electricity in Africa, is among the top seven utilities in the world in terms of generation capacity and among the top nine in terms of sales. Eskom plays a major role in accelerating growth in the South African economy by providing a high-quality and reliable supply of electricity.

In order to meet the growing demands for electricity in South Africa, Eskom has re-commissioned three moth-balled power stations, upgraded existing facilities and built new infrastructure, including transmission lines and two renewable energy plants.

Additionally, Eskom initiated the building of additional power stations, including Medupi Power Station, Kusile Power Station and the Ingula pumped storage plant, as part of the new build programme in order to cater for the anticipated future electricity demands. The Eskom capacity expansion budget was estimated at R385 billion up to 2013 and is expected to grow to more than a trillion rand by 2026. Through the capacity expansion programme Eskom will double its capacity to 80 000MW by 2026.

1.3 Details of Environmental Assessment Practitioner

Eskom appointed Zitholele Consulting (Pty) Ltd. to undertake the regulatory Environmental Authorisation, Waste Management License Application and Water Use License Application Processes for the proposed Medupi FGD Retrofit Project. Zitholele Consulting (Pty) Ltd. is an empowerment company formed to provide specialist consulting services primarily to the public sector in the fields of Water Engineering, Integrated Water Resource Management, Environmental and Waste Services, Communication (public participation and awareness creation) and Livelihoods and Economic Development. Zitholele Consulting (Pty) Ltd has no vested interest in the proposed project and hereby declares its independence as required by the EIA Regulations.

Table 1: Details of the Environmental Assessment Practitioner.

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER	
Name and Surname	Sharon Meyer-Douglas
Company Represented	Zitholele Consulting (Pty) Ltd.
Physical Address	Building 1, Maxwell Office Park, Magwa Crescent West, Corner Allendale Road and Maxwell Drive, Waterfall City, Midrand
Postal Address	P O Box 6002, Halfway House, 1685
Contact Number	011 207 2073
Facsimile	086 676 9950
E-mail	sharonm@zitholele.co.za

1.3.1 Expertise of Environmental Assessment Practitioner – Project Manager

Sharon Meyer-Douglas has over 14 years of experience within the field of Environmental Assessment and Impact Management. Ms Meyer-Douglas has a BSc Honours in Geography and Environmental Science and an MSc in Zoology and Biological Control. Ms Meyer-Douglas is a long-time member of the International Association for Impact Assessments (IAIA) and is a registered professional natural scientist (*Pr. Sci. Nat.)* in the field of environmental management with the South African Council for Natural Scientific Professionals since 2005.

Ms Meyer-Douglas has been involved in electricity generation, transmission and distribution projects and their potential impacts on the environment since the start of her career. Sharon has vast experience in managing integrated environmental authorisation processes. She has successfully managed large projects through the phases of EIA for the purposes of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and National Environmental Management Waste Act, 2008 (Act No. 59 of 2008). Ms Meyer-Douglas has also been involved in Water Use Licensing as a component of integrated authorisation processes.

Sharon has a comprehensive understanding and working knowledge of the relevant environmental legislation and works intimately with specialist consultants to ensure that potential impacts are accurately identified, assessed and mitigated. With her experience in similar projects, Ms Meyer-Douglas is ideally positioned to manage this environmental authorisation process with integrity and independence, while advising the client toward alternatives that have less potential for environmental impact.

2. PROJECT DESCRIPTION

Please note that all information on project activities and facilities is taken directly from the "Medupi FGD Basic Design Report" (Harris; 2014[3]). The Medupi FGD Basic Design Report, at the time of this scoping report, was still in the final stages of finalization and may still be subject to change, either as part of the basic design finalization or during the Impact Assessment Phase to follow.

2.1 Project activities/facilities

The Medupi FGD Retrofit Project is aimed at the addition of FGD systems to six (6) x 800 megawatt coal fired steam electric generating units. The project will encompass several activities and facilities that are necessary for the installation and operation of the Flue Gas Desulphurisation system. These activities are discussed within this chapter. **Figure 1** provides a locality map indicating the position of the Medupi Power Station within the Lephalale Municipal area. The FGD technology retrofit aims at significantly reducing the power station emissions of SO_2, thereby complying to the National Environmental Management: Air Quality Act (Act 39 of 2004) minimum emissions standards. Additionally, the reduction in SO_2 emissions will meet one of the conditions in the World Bank Loan Agreement, which is essential for funding of the Medupi Power Station.

2.1.1 Existing facilities

The Medupi Power Station units have been designed, and constructed, with provisions incorporated into the space and equipment design to accommodate the installation of the wet limestone FGD system. Each of the six generating units of the Power Station operates independently, common facilities are provided for electricity, water, coal supply and coal combustion waste disposal. Each unit is constructed with fabric filters and ID fans. The fabric filters remove most of the particulates from the coal combustion process and the ID fans provide necessary draft to overcome system resistance. The ID fans were designed to accommodate additional system resistance expected due to the installation of the FGD equipment.

The ID fans currently discharge directly to the chimney flue at each unit. The FGD system will include additional dampers and ductwork to divert the flue gas to the FGD absorbers and then return it to the chimney. The chimney flues are lined with corrosion-resistant liners to handle saturated flue gas expected from the operation of the FGD systems.

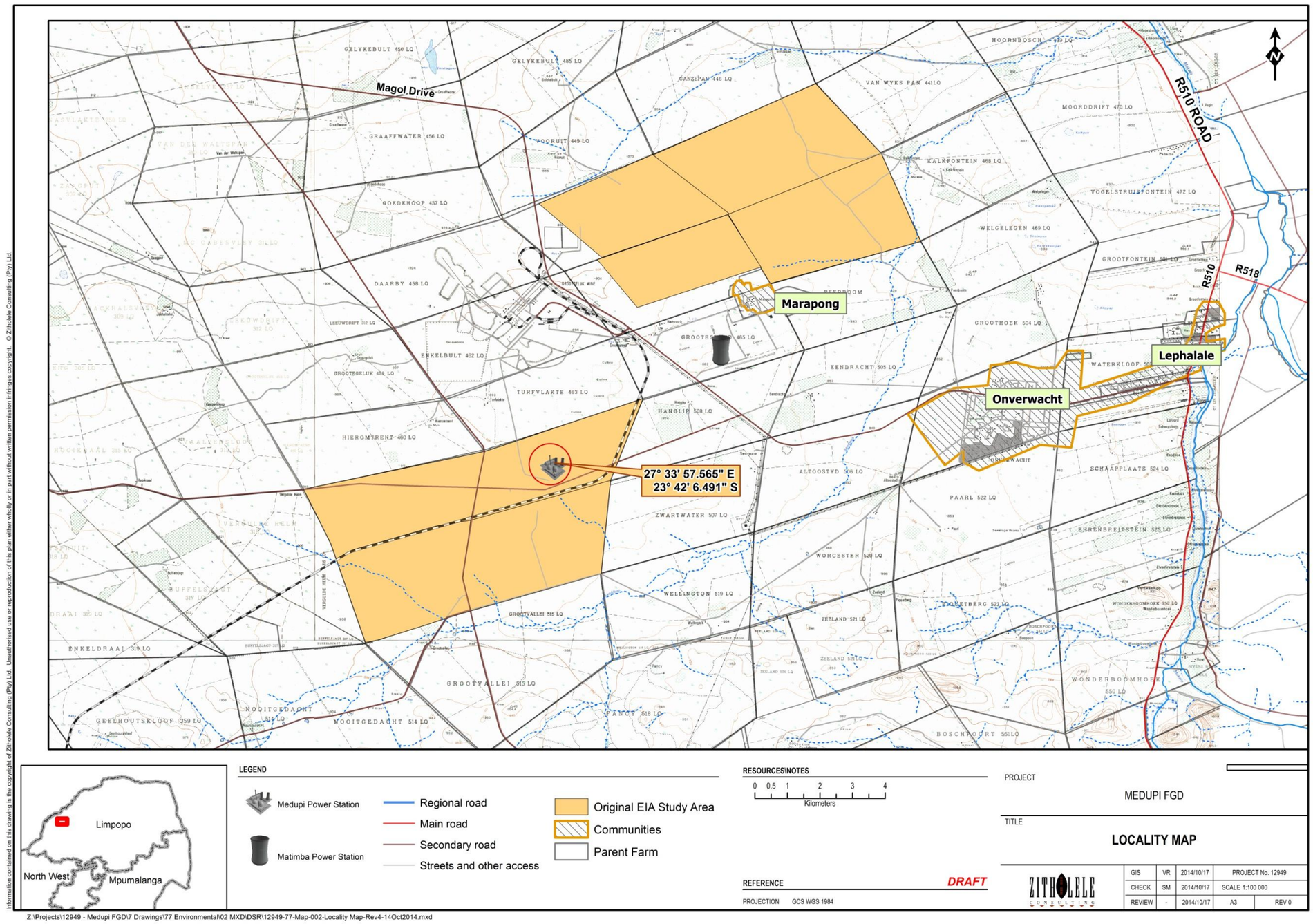

Figure 1: Locality Map indicating the Medupi Power Station study area

2.1.2 FGD System

Eskom's Air Quality Strategy established an SO2 emissions target of 400mg/Nm^3 at 6% O_2 for power stations commissioned between 2002 and 2017. This target complies to the minimum emissions standards stipulated by the National Environmental Management: Air Quality Act (Act 39 of 2004), which requires a concentration of 500mg/Nm^3 at 10% O_2. The Air Quality Strategy further recommended that the Medupi Power Station be fitted with a flue gas desulphurisation technology in order to comply with the emissions standards set.

The Medupi FGD retrofit is designed to accommodate design coal as well as "worst" coal quality. The "worst" coal quality has a significantly higher sulphur content. The design caters to limestone quality of 85% purity and 96% purity. The actual limestone composition that will be utilised is not yet defined.

The absorber is a large cylindrical tower, with several limestone slurry sprayers. This is where the acidic flue gas comes into contact with the limestone slurry.

During the electricity generation process the coal will be combusted and sulphur within the coal will form SO_2. As discussed previously, uncontrolled SO_2 emissions for the design coal will be about 3 714mg/Nm^3 and will be about 5 855mg/Nm^3 for worst coal. In order for the Medupi Power Station to adhere to the Eskom Air Quality Strategy target of 400mg/Nm^3, the power station must retrofit technology with an SO_2 deduction efficiency of 94% for worst coal quality.

Medupi will retrofit the wet limestone FGD system. This system reacts limestone ($CaCO_3$) with gaseous SO_2 to form non-toxic gypsum crystals ($CaSO_4 \cdot 2H_2O$). To achieve this the limestone is ground into fine particles to increase the surface area for reaction. A mixture of limestone and water will circulate from the absorber reaction tank to spray headers in the upper part of the absorber. This slurry formed in the absorber will be atomized into fine droplets by spray nozzles and distributed throughout the flue gas entering the absorber.

During the return to the absorber reaction tank, the slurry droplets will absorb the acids, including SO_2, from the flue gas. The water from the slurry will evaporate and saturate the flue gas. The water loss will be compensated for by the addition of makeup water. The solids will be retained in the absorber tanks and will form gypsum crystals ($CaSO_4$) due to the addition of oxidation air via compressors located near the absorbers. To minimize the potential for scaling at the wet/dry interface, the oxidation air will be quenched with water.

Appendix E1 provides a drawing of the absorbers for unit 1 and 4, with general geometric dimensions, to be used for the FGD retrofit. Appendix E2 shows the open spray tower diagram. These appendices serve to provide a visual representation of the infrastructure associated with the FGD operation for SO_2 reduction.

Above the sprayers a mist eliminator will be installed for initial droplet separation from the flue gas. Thereafter a second mist eliminator will remove the majority of any liquid droplets that are still remaining. The runoff from the droplet separators will be returned to the absorber. The flue gas, after SO_2 removal, will leave the absorber and exit at the chimney.

The absorber slurry will be limited to a concentration of about 30 000 ppm for chlorides. A bleed stream of liquid from the absorber will be required to maintain this level of concentration. The bleed stream from the absorber will be treated in the Zero Liquid Discharge (ZLD) Plant and the treated effluent will be reused/recycled within the FGD plant, and a waste stream of salts and sludge can be isolated for disposal. Absorber slurry will be pumped from the absorber reaction tank to the gypsum bleed tank for storage until it is processed in the gypsum dewatering system.

See **Figure 2** for the process flow diagram for a typical FGD system operation.

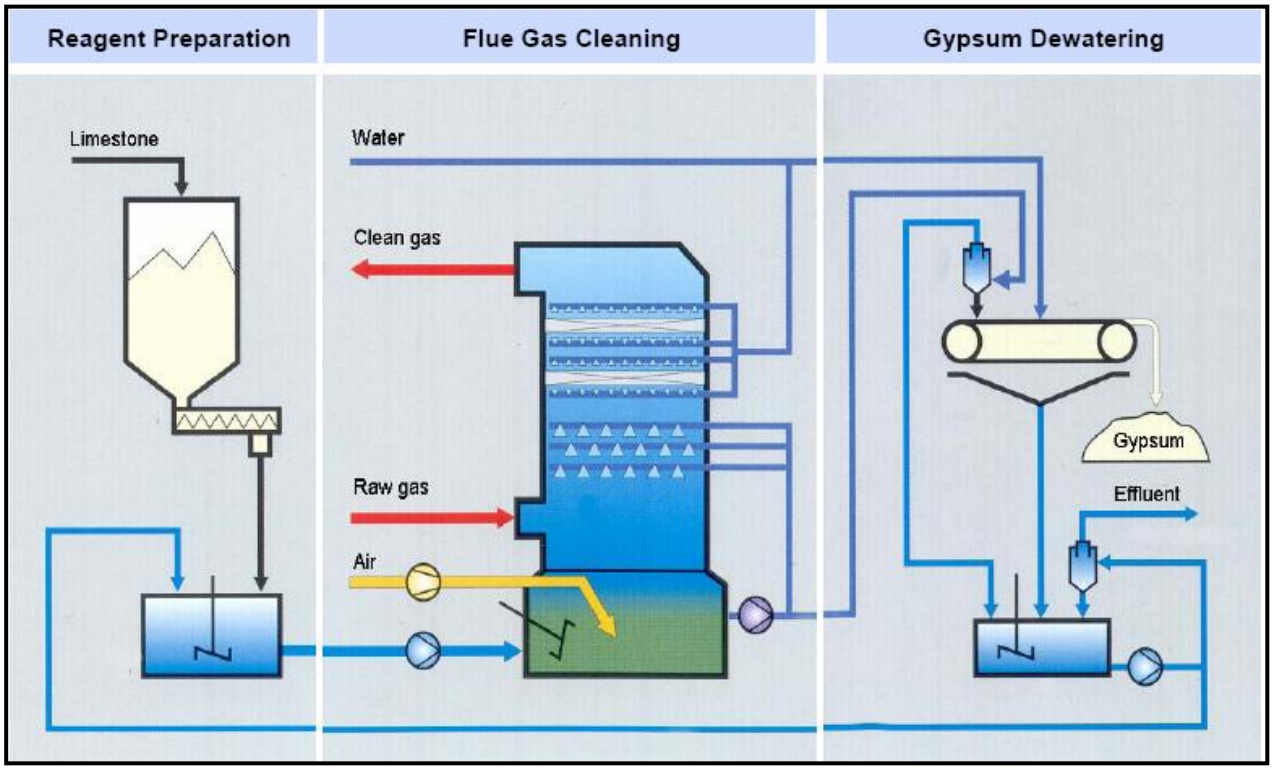

Figure 2: Simplified process flow diagram for the FGD system

2.1.3 Flue Gas Duct System

The flue gas coming from the boiler will pass through a fabric filter and an ID fan upstream of the FGD plant. In order to protect the absorbers in the case of malfunction, the existing ductwork from the ID fans to the chimney will be retained as a flue gas bypass ductwork around the FGD plant. The bypass is necessary to protect the absorbers in case of malfunction or emergency conditions or the interruption of water supply to the Medupi Power Station. This will avoid complete plant shutdown in the case of absorber malfunction by routing the flue gas through the bypass ductwork system until the absorber can be restarted. The bypass also allows for possible independent start-up of the boiler and the FGD.

The flue gas leaving the existing ID fans will be diverted to the absorber inlet, via additional dampers. Flue gas will enter the absorber and flow from the bottom to the top. Existing ductwork will be used for the bypass. The inlet, outlet and bypass dampers will be double louver dampers. Seal air blowers will operate between the dampers to minimize any leakage of flue gas through the closed damper.

The layout of the ductwork and equipment supports the possible future addition of flue gas cooling heat exchangers. However this equipment is not included in the Basic Design and is planned to be added to the scope during the execution phase.

2.1.4 Draft System

The existing ID fans have been constructed with sufficient pressure capacity in their original design in order to provide additional pressure increase required to overcome the system resistance of the FGD retrofit.

2.1.5 Chimney

Each of the two chimneys contains the flues from three boilers. The existing chimneys will be reused with minor modification. The inside diameter of the existing flues is adequate to cater to the flue gas volumes. The liner associated with the chimneys has sufficient transitional velocity for condensation re-entrainment to withstand the calculated worst-case design so that re-entrainment of moisture droplets will not occur.

The steel flue liner material for Medupi is identical to that used for Kusile Power Station. Furthermore, modifications to the chimney drain piping and the chimney drain system are necessary to return collected condensation to the gypsum bleed tanks.

2.1.6 Makeup water and Wash Water Supply

Makeup water for the FGD system will be supplied by the existing raw water reservoir which is supplied by the MCWAP scheme. A sand filter pre-treatment system will clarify the water to appropriate quality required by the FGD equipment. Water will be supplied by gravity feed or by two of the low pressure raw water pumps drawing water from the reservoir.

After pre-treatment the majority of the water is sent to the Process Water Tanks for utilization in the FGD process. The makeup water is also used in the FGD Closed Cycle Cooling Water System cooling tower makeup and the FGD ZLD treatment system. The backwash from the raw water filters will be discharged into the existing dirty water drains system.

The three Process Water Tanks (two operational and one backup) have a storage capacity of 8 hours of full load operation, supplying all FGD plant water demands. Six process water pumps, each providing 100% redundancy, and one spare pump for each tank, will secure the necessary backup water supply. Water will be supplied from the pumps to all systems requiring clean process water.

Makeup water will be consumed entirely by the FGD process plant and no water will be returned to the existing plant. However, effluent water from the FGD makeup water pre-treatment plant will be returned to the dirty water drains system.

Makeup water will be used to replace evaporation losses in the absorbers. This is done via mist eliminator washing. Other uses for the makeup water include the washing of the gypsum and preparation of the fresh limestone suspension.

Appendix C1 provides a visual representation of the process followed for water handling associated with the FGD process.

2.1.7 Limestone handling and reagent preparation

New limestone material handling systems will be developed to receive limestone arriving via rail cars or trucks. Negotiations are currently underway with Transnet Freight Rail. Limestone handling will occur within a linear type yard layout. Similarly the single wagon rotary tippler was identified as the most appropriate technology choice for handling the limestone.

Limestone will be extracted from the hopper via a belt feeder and fed onto an underground link conveyor. The limestone will then be fed onto a stockout conveyor with a traveling tripper that will deliver the limestone to the stacker. However, this methodology is under preliminary design and may be subject to changes.

The limestone will be stockpiled and evaluated before it is conveyed to the limestone silos located in the reagent preparation area. The limestone stockpile will provide 30 days' worth of limestone storage for the FGD system, and will be equipped with dust suppression sprayers. Each of the three limestone silos will have a storage capacity of 24 hours catering to 50% of the design consumption.

From the silos the limestone will be fed by weigh belt feeders into the wet ball mills, located in the Limestone Preparation Building. These ball mills will be constructed as overflow ball mills. The mill itself will primarily consist of a rotating drum containing steel balls. The total mill feed flow will be composed of water and new limestone feed, which will pass through the grinding chamber and be reduced in size. The ground slurry will be collected in the mill recycle tank and classified by means of pumps and a hydrocyclone station.

The final product will slow from the hydrocyclone overflow by gravity to the limestone slurry feed tank, with oversize particles being recycled to the mill inlet for additional grinding.

2.1.8 Gypsum refinement and dewatering system

Gypsum will be produced from the FGD process as a by-product of the wet scrubbing process. A slurry will comprise gypsum, a mixture of salts ($MgSO_4$ and $CaCl_2$), limestone, CaF_2, and dust particles. Refinement is necessary to separate the gypsum from the other materials. The refinement process will be carried out in two steps – separation and dewatering. Separation will be carried out by means of gypsum hydrocyclones. Then dewatering will occur using horizontal vacuum belt filters.

The overflow from the gypsum hydrocyclone station, containing finer portion of solid particles, is fed into the reclaim water tanks. A small amount of the gypsum hydrocyclone overflow must be bled off from the system into the wastewater treatment plant to avoid concentration of fine particulate and dissolved chlorides. This portion of the overflow will be fed to the wastewater hydrocyclone feed tank.

The wastewater, now containing only a low concentration of very small particles, is pumped into another hydrocyclone battery for separation of the finer particles from the wastewater. The overflow hereof is sent to the FGD ZLD system, while the remaining particles and underflow is directed to the reclaim tanks.

In order to produce commercial-grade gypsum, it is necessary to keep the chloride content under a certain limit. For this reason, during the dewatering process, the filter cake will be washed with FGD makeup water to decrease the chloride content to an acceptable level for saleable gypsum.

The gypsum discharged from the horizontal vacuum belt filter will be dropped onto a collecting conveyor by means of bifurcated chutes. An online monitoring system installed within the gypsum production process will be utilised to assess gypsum quality. The collecting conveyor will take the gypsum to the transfer house where the gypsum will be transferred to one of two link conveyors feeding a series of gypsum conveyors.

The commercial grade gypsum will be fed onto an elevated mobile tripper car at the gypsum facility. Material from the car will be stacked in the three indoor day storage piles. The separate storage piles will allow for one pile to be stacked while another is being reclaimed and a third is quality tested. Saleable gypsum will be reclaimed from the storage piles and sold to the appropriate market. The gypsum storage facility will accommodate 100% of the total gypsum production for three days, but it is anticipated that only 20% of the gypsum will be required for commercial sales. Eskom is currently investigating markets for gypsum resale. This will have a significant impact on the amount of gypsum that will require disposal. Gypsum which is not commercial-grade will be disposed of either at the ADF or at an alternative facility.

Appendix C2 provides a flow diagram of the activities involved in gypsum handling.

2.1.9 FGD Zero Liquid Discharge Treatment System

A new FGD ZLD treatment system will be required to treat:

- the FGD system chloride bleed stream;
- the existing total organic compound scavenger regeneration wastewater from the existing plant; and
- the FGD cooling tower blowdown streams (however based on the expected quality of the blowdown, this may be recycled as makeup water to the FGD).

The FGD chlorine bleed stream and FGD cooling tower blowdown stream will first be directed to one FGD ZLD pre-treatment holding tank and two 100% capacity pre-treatment holding tank forwarding pumps. The holding tank will also receive filter press filtrate and off-spec recirculation from the FGD ZLD pre-treatment process. The high pH of the scavenger wastewater could cause precipitation of solids in the pre-treatment holding tank, so it will be transferred directly to the FGD ZLD pre-treatment system.

The pre-treatment process will include physical/chemical treatment to precipitate solids and heavy metals from the water. Lime and soda ash are used to convert the dissolved calcium and magnesium into salts so that the water can be effectively treated in the brine concentrators and crystallisers. Due to the large amounts of lime and soda ash required it is estimated that one 18 000kg truck of lime will be required every 8 hours and one 18 000kg capacity truck of soda ash will be required every 5 hours. There are higher risks of social and environmental impacts with higher volumes of wastes to be transported, requiring more frequent truck trips.

After chemical treatment, the precipitates are settled out in clarifiers as slurry, which is sent to a filter press dewatering system. The water is recovered from the slurry and returned to the clarifier. In turn, slurry from the clarifier will be sent to the filter presses. The filter press filtrate will be returned to the pre-treatment holding tank.

The physical/chemical treatment system will be sized to handle the incoming flows plus the filtrate from the filter press and any other process recycle streams. Solids will be collected in a concrete bunker underneath the presses.

Liquids from the pre-treatment process will be directed to a brine concentrator feed tank, which will be fed with the appropriate chemicals. Water from this tank will be pumped to the brine concentrator influent heat exchangers and into the deaerator. The brine concentrators will use a seeded slurry process. The brine concentrator portion of the system operates by using mechanical vapour compression. The design will produce a distillate product stream and a concentrated brine waste stream from the treated wastewater. The distillate product will be combined with the distillate from the crystalliser process and will be directed to the plant for reuse.

Two independent waste blowdown streams will be utilised to maintain close control of the recirculating brine chemistry. Seed is recovered and recycled from the waste brine stream to the recirculating brine. The concentrated brine waste stream will be fed to the crystalliser feed tanks for storage. Steam will be utilised to maintain the tank contents at a predetermined temperature. This is to prevent corrosion to downstream equipment and quenching of the crystalliser recirculating brine. The stream driven crystallisers will remove the balance of the recoverable water and a stream of wet solids will be discharged from each centrifuge. Within the crystalliser water will be continuously evaporated while a purge stream is circulated through the centrifuge to remove waste for disposal. Excess liquid from the centrifuge will be removed and further concentrated. The brine concentrator will have a foam detection system to identify any excess foaming in the brine concentrator.

Appendix C3 provides a visual interpretation of the activities carried out during the wastewater handling.

2.1.10 Auxiliary Steam System

The FGD auxiliary steam system will distribute auxiliary steam to the FGD ZLD treatment system. Auxiliary steam is provided to the brine concentrator deaerator equipment within the FGD ZLD treatment system, where it is used to heat the wastewater solution. The steam is mixed within the treatment process and recovered with the ZLD distillate. Therefore there is not a return stream for steam or steam distillate.

2.1.11 FGD closed cycle cooling water

A new, independent closed cycle cooling water (CCCW) system will provide heat rejection for the heat exchangers associated with the FGD equipment that requires water cooling. The CCCW system will provide cooling to:

- Limestone ball mill lubrication system;

- FGD system air compressors;
- Brine concentrator/crystalliser equipment in the ZLD area.

Cooling water for the CCCW system will be of condensate quality and will be supplied by the existing plant to the CCCW expansion tank which is elevated to allow for gravity fill of the system. The CCCW heat exchangers will transfer heat from the circulating cooling water to the auxiliary cooling water. The open cycle cooling water pumps will pump the auxiliary cooling water through the CCCW heat exchangers and to the wet cooling tower. The wet cooling tower will reject heat from the auxiliary cooling water to the atmosphere and will return it to the system at a specified temperature.

2.1.12 Fire protection

The existing fire protection system will be extended to the FGD area and the new rail yard area. Existing firewater pumps will provide pressure for FGD fire protection. New fire water booster pumps will be used to maintain fire water pressure at elevated points within the system.

2.1.13 Compressed Air

The compressed air system will supply dry air for all the service and instrument air uses of the FGD and rail yard. Two 100% FGD air compressors and two 100% filter/air dryers will provide compressed, oil-free air at the required capacity and pressure to meet the FGD requirements.

2.1.14 Potable water

The existing potable water system will be extended to ensure supply to the potable water requirements of the FGD area. Two 100% potable water booster pumps will ensure adequate pressure to meet system demands. Backflow preventers will prevent contamination into the potable water system and backpressure regulators will isolate the nonessential water users in the event of low system pressure.

2.1.15 FGD blowdown system

The FGD blowdown system collects and conveys process waste fluids by means of drain trenches, sumps and sump pumps. The sumps and trenches will be below grade, reinforced concrete structures. Process wastewaters and slurries will be discharged into the trenches, which are sloped for gravity feed into the associated sumps. Sumps that receive slurry will have agitators to maintain solids suspension. Each sump will contain two 100% sump pumps to transfer the contents to the appropriate discharge location. Sump level measurement will start and stop the sump pumps in an alternating mode that automatically cycles between pumps to ensure even run time. Sump pumps and pipelines that transfer slurry will be flushed with process water upon pump shutdown.

2.1.16 Auxiliary power supply

High voltage

A new 132kV power supply is under investigation for installation at the 132kV switchyard to provide backup power to the FGD system. This backup power is required to maintain 100% redundancy in the FGD power system.

Medium voltage

New auxiliary transformers will transform 11kV three-phase power supplied from the existing 11kV system, to 6900V three-phase power as required by the FGD system and the rail yard. The transformers will supply 6900V to the FGD plant board switchgear buses through main breakers. The switchgear buses for similar service will be connected through a tiebreaker. The main breakers and the tiebreaker will make it possible for a switchgear bus to be fed from two separate sources.

Low voltage

The 400V FGD auxiliary power system will consist of LV switchgear, power cables and LV loads. Main power supply to a board or switchgear is generally through a6.6/0.42kV dry-type, delta-wye transformer. Tie-breakers connect boards of similar service. The tie-breaker and incomer breaker are equally sized. The main breakers and the tie-breaker make it possible for a switchgear bus to be fed from two separate sources. The switchgear buses will distribute power through feeder breakers to 500V FGD loads.

Distribution 400V power system

The 400V FGD auxiliary power system will consist of low-voltage (LV) switchgear, power cables, and LV loads. The main supply to the LV switchgear will be from the 6.6kV switchgear through the 6.6kV/0.42kV dry-type transformers. These transformers will be an integral part of the LV switchgear.

Main power supply to a board or switchgear will be through a 6.6/0.42kV dry-type, delta-wye transformer. Tiebreakers will connect boards of similar service. The main breaker and the tiebreaker will make it possible for a switchgear bus to be fed from two separate sources. The switchgear buses will distribute power through feeder breakers to 400V FGD loads.

Emergency electrical supply

A new emergency diesel generator (EDG) will be required to provide emergency shutdown power at 6.6kV upon loss of normal 6.6kV AC power supply. The existing 2500kVA Medupi EDG's do not have this additional capacity to support these loads. The EDG will be connected to a 6.6kV AC essential switchgear and provide a backup power feed to the essential 6.6kV pumps. The essential power will then be distributed to step-down transformers which will supply 400v AC essential boards in each of the FGD clusters. From there the power will be distributed to loads such as the valves that must operate on the loss of power to the FGD system, etc.

There is not sufficient space for the new FGD EDG building and essential services substation near the Medupi EDG building due to the existing infrastructure. Therefore the proposed location for the FGD EDG building is more centrally located to service the FGD loads.

Essential electricity supply

New 230V AC uninterruptible power supply (UPS) systems will be provided for all FGD buildings containing LV 400V boards. These UPS systems will provide essential power for board control as well as functioning as "dip-proof" power supplies to maintain contactor position.

2.1.17 Control system

The existing Medupi control and instrumentation system will be extended to include all equipment required to allow the operation and monitoring of the FGD system and associated activities. A DCS will provide control, display, alarming, reporting and archive capabilities for the retrofit of the new FGD system. A bi-directional loop is provided for reliability so that a break in a fibre will not affect the network.

The FGD ZLD treatment system will be provided with a dedicated control room in the FGD ZLD treatment building.

2.1.18 Rail

A new rail yard siding forms part of the current application. This siding will facilitate that limestone, and other materials, are transported to the Medupi Power Station by rail. The rail yard area will include the following infrastructure:

- A dirty water control dam;
- Lined channels for diversion of grey and dirty water to the control dam;
- Clean water channel/s to southern culvert under the transnet servitude;
- Shunting locomotive workshop;
- Shunting locomotive refuelling station (less than 80 000);
- Operation staff facilities;
- Control room;
- Containment tank for sewage and effluent management;
- Fire water supplies;
- At least one substation.

Stormwater will be managed on site and will be addressed in the drainage design.

In close proximity to the rail yard will be the limestone and gypsum handling facilities including:

- Gypsum storage building;
- Limestone stockpile;
- Conveyors; and
- Associated infrastructure.

2.2 Motivation for the Project

2.2.1 Environmental and Health Motivation

One of the most significant air quality impacts of electricity generation is the emission of SO_2 to the atmosphere. SO_2 reacts with other compounds in the environment to form particles that are a risk to human health. These small particles penetrate into the tissue of the lungs and can cause emphysema and bronchitis and can aggravate existing heart disease (UN Environmental Protection Agency; 2014). Evidence has been documented of a connection between short term SO_2 exposure and adverse respiratory symptoms including bronchoconstriction and aggravated asthma.

At Medupi Power Station the uncontrolled SO_2 emissions for the design coal will be about 3,405mg/Nm^3, dry at 6% O_2. The Air Quality Act currently stipulates that the SO_2 emissions limit for existing plants is 3,500mg/Nm^3 at 10% O_2 by 2015, and 500mg/Nm^3 at 10% O_2 by 2020. The Eskom Air Quality Strategy currently stipulates that emissions should comply with 20% below legislated SO_2 emissions limit. This relates to a required compliance of 2800mg/Nm^3 at 10% O_2 by 2015, and 400mg/Nm^3 at 6% O_2 by 2020.

The flue gas desulphurisation process proposed for retrofit at the power station will reduce the SO_2 emissions by approximately 94%. This brings the emissions to below the environmental protection threshold and reduces the impacts of the power station on the environment.

The retrofit of the FGD will not have significant impact to the receiving environment because the infrastructure and the construction phase activities are limited to within the already disturbed Medupi Power Station footprint. Moreover, there will be very little loss and discharge of water due to the use of a Zero Liquid Discharge (ZLD) system.

2.2.2 Socio-Economic Motivation

It must be noted that the Medupi Power Station is funded by the World Bank. In complying to one of the conditions of the World Bank loan agreement, Medupi must effectively reduce SO_2 emissions. The Medupi Power Station is part of an integral building plan to ensure that Eskom is able to meet the electricity demand projected for the future. Eskom must double its capacity to 80 000MW by 2026 for this purpose (Eskom website; 2014).

The Medupi Power Station will increase the current Eskom generation capacity by 4, 800MW. This is crucial to addressing the current electricity crisis in South Africa. Without the addition of the new power stations, such as Medupi and Kusile, the current demands for electricity will not be met. This will significantly impact on the provision of basic services to a large percentage of the South African population.

Electricity brown-outs and black-outs have considerable social effects, which are most devastating on the low income populations. These include compromise of safety and health to vulnerable communities. Furthermore, the loss of consistent electricity supply has massive repercussions on industry and economics of the country. Short and medium term unreliable electricity supply may have devastating impacts to large and small businesses due to loss in production and damage to equipment. This in turn will have a definite implication on our country's economy.

The reduction in SO_2 emissions by the FGD will mitigate potentially significant health impacts associated with SO_2 emissions. This is an important motivation for FGD, in terms of human health and welfare for the communities residing especially in close proximity to the Medupi Power Station.

2.2.3 Need and Desirability

Table 2: Assessment of the Need and Desirability of the Medupi FGD Retrofit Project.

NO.	QUESTION	DESCRIPTION	ANSWER
1.	Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant authority?	The Medupi Power Station has been approved and is currently in construction phase. Therefore, it is evident that industrial development to promote economic growth and improvement to human welfare, in terms of provision of electricity, is an acceptable land use to the authorities for the period that the Medupi Power Station will operate (50 years). The Flue Gas Desulphurisation retrofit project is supplement to the Medupi Power Station to mitigate emissions to an acceptable level.	Yes
2.	Should the development, or if applicable, expansion of the town / area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time.	Due to the fact that the Flue Gas Desulphurisation Project is a supplement to the existing and approved Medupi Power Station in order to mitigate emissions from the operation of the power station, it is imperative that the Flue Gas Desulphurisation retrofit occur at the power station 6 years after the power station becomes operational.	Yes
3.	Does the community / area need the activity and the associated land use concerned (is it a societal priority)?	The Flue Gas Desulphurisation retrofit is proposed in order to mitigate the potential health impacts of the Medupi Power Station emissions on local communities. Therefore the community does indeed need this project to go-ahead as a societal priority in order to protect human welfare.	Yes
4.	Are the necessary services with adequate capacity currently available or must additional capacity be created to cater for the development?	Additional water is required for the Flue Gas Desulphurisation retrofit project. This water is required for the operation of the Flue Gas Desulphurisation technology and Eskom is undertaking authorisation and licensing processes for provision of water via MCWAP phase 2 through the current environmental authorisation process, as a Water Use License Application. There may be a requirement for purchase of additional land for purposes of new disposal facilities for the FGD system.	Yes
5.	Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure	This supplement to the Medupi Power Station is provided for within the municipal infrastructure planning and the project is a mitigation activity linked to the authorised power station. No additional development is required as all aspects of the retrofit will occur in close proximity to the Medupi Power Station and will be directly related to the	Yes

NO.	QUESTION	DESCRIPTION	ANSWER
	planning of the municipality (priority and placement of services and opportunity costs)?	operation of the Medupi Power Station. However, there is the potential that additional land may be required to be purchase to accommodate new disposal facilities necessary for the FGD operation.	
6.	Is this project part of a national programme to address an issue of national concern or importance?	This project is a part of the Eskom project to address current and future electricity demand within Southern Africa. Ingula Pump Station, Kusile Power Station and Medupi Power Station are the key generation developments within the Eskom "build programme" to secure electricity supply for the next 50 years.	Yes

3. ENVIRONMENTAL LEGISLATION

This part of the Scoping Report (SR) is intended to provide a detailed account of all environmental legislation which may have bearing on the proposed project. Particular attention will be paid to the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The NEMA (1998) is regarded as South Africa's Environmental Management Framework Act. An overview of sector specific environmental Acts which govern specific elements or project activities and the relevance to the proposed project will also be provided.

In order to ensure that Environmental Management Best Practice Principles are adhered to, all guidelines which are relevant to the proposed project activities have also been taken into consideration during the preparation of this SR. Determining the applicability of all environmental management legislation is fundamental to facilitating compliance with the applicable provisions of these Acts.

3.1 The Constitution of the Republic Of South Africa, 1996 (Act No. 108 Of 1996)

The Constitution of the Republic of South Africa, 1996 (hereafter referred to as "the Constitution") is the supreme Law in South Africa. The Bill of Rights is included in Chapter 2 of the Constitution. The Environmental Right as set out in Section 24 of the Constitution and states that –

Everyone has the right –

a) to an environment that is not harmful to their health or well-being; and
b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
   i. prevent pollution and ecological degradation;
   ii. promote conservation; and
   iii. secure ecologically sustainable development and use of natural resources,
   iv. while promoting justifiable economic and social development.

The National Environmental Management Act, 1998 (Act No. 107 of 1998) is the primary statute which gives effect to Section 24 of the Constitution. The Environmental Right contained in Section 24 of the Constitution also places responsibility on the Environmental Assessment Practitioner (EAP), the Applicant and the Competent Authority to ensure that this right is not infringed upon. The Sector Guidelines for Environmental Impact Assessment (2010) (Government Notice 654) describes a number of responsibilities which are placed on the EAP, Applicant and Competent Authority to ensure conformance with the statutory Environmental Right.

These responsibilities include:

- All parties to the EIA Process have a duty not to infringe other persons' rights in terms of Section 24 of the Constitution.
- The Applicant must ensure that while the development incorporates measures that prevent or control environmental pollution or degradation, it also maximises the positive environmental impacts.

- There must be an equitable balance between the rights of the applicant and the broader public. In this regard, the consideration of need and desirability is critical as it requires the strategic context of the development to be considered with the broader societal needs and public interest.
- The provisions of the Bill of Rights are binding on decision-makers.
- Decision-makers must ensure that their decisions are in keeping with the environmental right and promote an environment that is not harmful to health or well-being.

3.2 National Environmental Management Act, 1998 (Act No. 107 of 1998)

Environmental Management can be defined as the management of human interaction with the environment. Fuggle and Rabie (Strydom & King; 2009) defines Environmental Management as the regulation of the effects of peoples' activities, products and services on the environment. Although South Africa has a comprehensive array of environmental legislation and policies in place, these must be aligned with the provisions of the NEMA (1998), in particular the National Environmental Management Principles stipulated in Chapter 1 of the NEMA (1998). The Environmental Management Principles are centred around providing explicit guidance for co-operative and environmental governance on all matters relating to decision-making which will affect the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state, and to provide for matters connected therewith.

Although the proposed project is primarily concerned with the retrofit of the flue gas desulphurisation system, all supporting infrastructure and activities must be included within the application process for authorisation and/or licensing. The supporting infrastructure and project activities, in addition to the FGD retrofit, fall within the ambit of the NEMA (1998). These project activities trigger activities listed in the Environmental Impact Assessment Regulations Listing Notice 2 (Government Notice R545) as amended, therefore requiring Environmental Authorisation before they may be implemented. The proposed activities prompt a full Scoping and Environmental Impact Reporting Process. Each of the project activities as well as the corresponding listed activity is provided in Table 3**.**

Table 3: Description of Listed Activities

No.	Listing Notice	Listed Activity		Description
•	Listing Notice 2 of 2010, Government Notice R544	3	The construction of facilities or infrastructure for the storage, or storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	Limestone will be purchased off site and will be transported to site either by railway or by truck. The limestone will be stored on site for use within the FGD process. The FGD process will produce wastes in the form of gypsum, sludge and salts. These wastes will be stored on site prior to disposal either on site or off site. Gypsum may be of commercial grade and can be sold.
•	Listing Notice 2 of 2010, Government Notice R545	6	The construction of facilities or infrastructure for the bulk transportation of dangerous goods – (iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons day.	Limestone will be transported to the Power Station via railway line or trucking. The limestone will be transported on site via conveyors. In addition, waste products may require transport to off-site disposal facilities, should they not be disposed of on site. This may be done by conveyors should an appropriate disposal site be identified in close proximity to the Power Station. Transportation on site will be predominantly by conveyor. This is within an industrial area.
•	Listing Notice 2 of 2010, Government Notice R545	11	The construction of railway lines, stations or shunting yards, excluding – (i) Railway lines, shunting yards and railway stations in industrial complexes or zones; (ii) Underground railway lines in a mining area; and (iii) Additional railway lines within the reserve of an existing railway line.	The railway yard will be constructed on an area adjacent to the Medupi Power Station and will be for the purposes of transporting the limestone to the Power Station by rail. The railway yard will also facilitate the transportation of other materials to and from the Power Station.
•	Listing Notice 2 of 2010, Government Notice R545	15	Physical alteration of undeveloped vacant or derelict land for residential retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more.	The railway yard will be constructed on an area adjacent to the Medupi Power Station and will be for the purposes of transporting the limestone to the Power Station by rail. The railway yard will also facilitate the transportation of other materials to and from the Power Station.

3.3 The National Environmental Management Waste Act, 2008 (Act No. 59 of 2008)

All Waste Management Activities are regulated by the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) and the regulations thereunder. Owing to the nature and composition of the ash that is generated by the combustion of coal, it is considered to be hazardous waste and as such also falls within the ambit of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA). A number of the project activities associated with the proposed Medupi Flue Gas Desulphurisation Retrofit project are regarded as Waste Management Activities. As such these activities are governed by the NEM:WA (2008) and must conform to the provisions of the Act.

In order to regulate waste management activities and to ensure that they do not adversely impact on human health and the environment, the NEM:WA (2008) introduced the licensing of waste management activities. All waste management activities which are listed in Government Notice 921 (2013) in terms of the NEM:WA (2008) requires licensing from the Competent Authority before these activities may proceed. Prior to the implementation of any waste management activity listed in Category A, of Government Notice 921 (2013), a Basic Assessment Process as set out in the Environmental Impact Assessment Regulation made under Section 24(5) of the NEMA (1998) must be carried out as part of the Waste Management License Application Process. However prior to the implementation of any Waste Management Activities listed in Category B of Government Notice 921 (2013), a Scoping and Environmental Impact Reporting Process must be carried out as part of the Waste Management License Application Process. Each of the project activities, as well as the corresponding waste management activity, is provided in Table 4

Table 4: Description of applicable Waste Management Activities listed in the Government Notice 921 (2013)

No.	Category	Waste Management Activity		Description
1.	Category B	1	The storage of hazardous waste in lagoons excluding storage of effluent, wastewater or sewage.	Sludge and salts generated by the FGD process may be stored on site in lagoons prior to disposal. This has not yet been confirmed, but the application includes this activity for completeness.
2.	Category B	5	The treatment of hazardous waste in lagoons, excluding the treatment of effluent, wastewater or sewage.	This activity will only be triggered should the preferred co-disposal of all wastes at the ADF not be feasible. In which case, an alternative and additional waste facility will need to be constructed on site, requiring that the salts and sludge be treated in lagoons.
3.	Category B	7	The disposal of any quantity of hazardous waste to land.	While the ash disposal facility has been authorised and licensed, the co-disposal of gypsum and possibly salts and sludge at the ADF will require that the disposal of these new, but associated wastes be licensed.
4.	Category B	10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	While the ADF has already been licensed, the operation may change should co-disposal be authorised for this application. Additionally, should co-disposal not be authorised, then new and additional facilities will need to be constructed, including lagoons for the treatment and disposal of sludge and salts.
5.	Category C	2	The storage of hazardous waste at a facility that has the capacity to store in excess of 80m3 of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such wastes.	Limestone will be purchased off site and be transported to site via rail or truck. The limestone will need to be stored prior to use in the FGD process. Gypsum, sludge and salts will be generated by the FGD process and may require storage prior to treatment and/or disposal, or, in the case of gypsum, possible sale.

3.4 The National Water Act, 1998 (Act No. 36 of 2008)

The activities associated with the proposed Medupi Power Station FGD retrofit project trigger some of the Water Uses that are defined in Section 21 of the National Water Act, 1998 (Act No. 36 of 1998) (NWA). Accordingly these Water Uses may not be undertaken without being granted a Water Use License from the DWS. In accordance with Sections 40 and 41 of the NWA (1998), a Water Use License Application Process will be carried out. The resultant documents from the WULA process will include completed WULA Forms as well as a Technical Report. These documents will be submitted to DWS for review and decision making. Although a joint PPP is followed for the WULA within the EIA Phase, these two EA processes constitute separate applications and submissions are made to the respective Competent Authorities.

Table 5: Description of Water Uses

Water Use	Description	Potential Section 21 Water Uses
Section 21 (a)	Taking water from a water resource	The allocation of water from MCWAP phase 2 for use at Medupi Power Station for the FGD operation constitutes the abstraction of water from a water resource.
Section 21 (g)	Disposing of waste in a manner which may impact on a water resource.	This water use is related to the disposal of wastes at the ADF, or alternative facility, which may have a potential impact on ground and surface water resources. In addition there will be at least one new dirty water control dam associated with the limestone and gypsum handling area.
Section 21 (h)	Disposal of water that has been heated within a power generation process.	This may be triggered by the disposal of any water that has been treated or heated within the power generation process. The only water that may be disposed of will be that used to condition ash, gypsum, sludge and/or salts prior to the disposal of these wastes at the Ash Disposal Facility or alternative disposal facility.

3.5 Additional Environmental Legislative Requirements

A number of additional legislation and guidelines may have a bearing on the proposed Medupi Glue Gas Desulphurisation Retrofit project. Although authorisation in terms of these various acts may not necessarily be mandatory the requirements of these acts have been taken into account.

Table 6: List of additional applicable Environmental Legislation

Act	Applicable Section	Relevance on project
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 34: Structures	Structures which are older than 60 years may not be demolished without a permit issued by the relevant provincial Heritage Resources Authority. No structures older than 60 years were recorded in the Heritage Impact Study (Bohlweki; 2006; pg 378).
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 35: Archaeology, palaeontology and meteorites	Any archaeological or paleontological objects that are found on the site, must be reported to the provincial Heritage Resources Authority. The discovered archaeological or paleontological objects may not be removed from its original position and damaged, destroyed or altered prior to a permit being issued by the heritage resources authority.
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 36: Burial grounds and graves	Any graves that are discovered may not be destroyed, damaged, altered, exhumed or removed from its original position without a permit issued by SAHRA or a provincial heritage resources authority.
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Section 38(1)(c): Heritage Resource Management	As the proposed development area may exceed 5000 m^2, with the submission of the Heritage Impact Assessment to SAHRA, the responsible heritage resources authority has been notified of the project and provided with information relating to the project. Authorisation to proceed with the development is required from SAHRA.
Hazardous Substance Act, 1973 (Act No. 15 of 1973)	-	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)	National Ambient Air Quality Standards, Government Notice 1210, Government Gazette 32816, 24 December 2009	The Air Quality standards published in Government Notice 1210 must be adhered to. Medupi has applied for an Air Emissions License as an independent process. At present the appeals response has been submitted to the relevant provincial authority (LEDET) and decision is awaited.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	Section 6	Provisions included in the act regarding the implementation of control measures for alien and invasive plant species must be adhered to.
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self-employed persons to person other than their employees.

Act	Applicable Section	Relevance on project
Lephalale Municipality Integrated Development Plan Final Draft 2013-2016	-	The Integrated Development Planning is regarded as a tool for municipal planning and budgeting to enable municipalities to deliberate on developmental issues identified by communities. The IDP points the Medupi Power Station out as a significant contributor to the economy of Lephalale and one of the key employers of the area.
Lephalale Municipality By-laws		The Lephalale Municipality By-Laws have been reviewed and will be taken cognisance of for the duration of the integrated environmental authorisation process to ensure that requirements therein are addressed. Some relevant by-laws include waste management, air quality and traffic.

In order to ensure that a best practice approach is adopted for the EIA Process and to ensure that the EIR provides sufficient information require by the DEA to reach a decision, the following guidelines have been considered in the compilation of this Environmental Impact Report:

- National Environmental Management Act, 1998 (Act 107 of 1998) Implementation Guidelines Sector Guidelines for Environmental Impact Assessment Regulations Government Notice 654 of 2010, published in Government Gazette 3333, dated 29 June 2010.
- National Environmental Management Act, 1998 (Act 107 of 1998) Publication of Need and Desirability Guideline in terms of the Environmental Impact Assessment Regulations, 2010, Government Notice 792 of 2012, Government Gazette 35746, dated 05 October 2012.
- Department of Water Affairs & Forestry, 1998. Waste Management Series. Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste.
- DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria
- Department of Environmental Affairs, 2011. A user friendly guide to the National Environmental Management: Waste Act, 2008. South Africa. Pretoria.
- DEAT (2004) Criteria for determining Alternatives in EIA, Integrated Environmental Management, Information Series 11, Department of Environmental Affairs and Tourism (DEAT), Pretoria

4. ALTERNATIVES

4.1 Site alternatives

The Flue Gas Desulphurisation infrastructure will need to be attached to the existing power station infrastructure in order for the exhaust emissions to be diverted to the FGD units for removal of the SO_2. The FGD retrofit must take place at the existing Medupi Power Station and therefore there are no site alternatives for this process.

4.2 Technology alternatives

The Medupi Power Station motivation for selection of technology was for the maximum reduction in SO_2 emissions in order to achieve emission rates compliant with the legislated minimum emissions standards of 500 mg/Nm^3 at 10% O_2. In other words, the technology would be required to produce a removal efficiency of greater than 93% based on the worst coal quality scenario.

The wet and semi-dry FGD technology options are technically capable of meeting the emission reduction required. Eskom undertook a financial comparative analysis of semi-dry and wet FGD technology and found that the wet FGD has a lower life cycle cost. The issue of water constraints were considered during this analysis and it was recorded that the wet FGD technology can be fitted with a gas cooler upstream of the absorber to reduce water consumption to levels comparable to semi-dry FGD. The Medupi Flue Gas Desulphurisation Retrofit project is considered “cooler ready” from a spatial perspective.

The technology review and selection was carried out in 2005. During this time alternative FGD technologies, as well as project implementation impacts of wet limestone scrubbers against alternative technologies, were assessed (World Bank and African Development Bank Project Progress Report 3; 2014).

The assessment studies favour Wet FGD technology, assuming no water constraints. Some of the supporting factors for wet FGD technology were identified as:

1. The reagent costs and life cycle costs are approximately 3 to 4 times lower for wet FGD than for semi-dry FGD;
2. The existing Medupi Power Station has been designed to accommodate the retrofit of wet FGD infrastructure and it will require significant time and capital expenditure to redesign the existing structures for an alternate technology;
3. If water is a constraint, there is the option of installation of a flue gas cooler. This will reduce water consumption by up to 30%. This will make the water consumption comparable to that of semi-dry FGD technology.

The outcome of the technology assessment and selection was that Medupi Power Station was designed to be a “Wet FGD Ready” station. This involved the following design inclusions:

- Space allocation behind the stack for the absorber and common facilities;
- Stack lining and induced draft (ID) fans sized to handle additional pressure drop.

The technology assessment and selection was carried out independently of the environmental authorisation process. The Wet FGD technology has been identified as the preferred solution for assessment during the EIA and Waste Management Application processes.

4.2.1 Wet FGD

Wet FGD technology, utilising a limestone reagent, is the most frequently used technology applied to pulverised coal fired boilers that combust coal with a medium to high sulphur content. Wet FGD processes are known for a high removal efficiency and high reagent utilisation.

4.2.2 Wet FGD with Inlet gas Cooler

The wet FGD with inlet gas cooler technology is a modification to the system to utilise a heat exchanger at the inlet of the FGD to reduce temperatures of the flue gas flowing to the absorber. In this way there is a reduction in the amount of water evaporated as the flue gas cools to saturation temperature.

Cooling can be carried out using a regenerative gas-to-gas heater to remove heat from the incoming flue gas. However, a regenerative heater exchange would have a total pressure drop of 16 mbar and the pressure drop across the wet FGD system would exceed the maximum pressure drop that the design can accommodate. Therefore, cooling by use of a single pass water-cooled heat exchanger would be the preferred cooling system for the Medupi Wet FGD process. A single pass cooler for the flue gas will limit the pressure drop to within the capability of the existing ID fan. The heat recovered from the flue gas can be diverted to another low temperature heat demand elsewhere in the plant.

The inlet gas cooler will reduce the flue gas inlet temperature to the absorber from 145°C to 100°C and the outlet temperature of the absorber from about 52°C to 49°C.

An inlet cooler could be retrofitted to the Medupi Wet FGD infrastructure should this be required as a result of water constraints to the operation.

4.2.3 Semi-dry FGD

Semi-dry FGD technology utilises significantly less water than wet FGD technology because the dry systems do not saturate the flue gas with water but rather use hydrated lime instead of limestone as the reagent for capturing SO_2. One of the considerations that was taken into account during the technology selection process, is that the Dry FGD technologies do not produce saleable by-products, whereas the Wet FGD system does (gypsum). This requires that all wastes produced must be disposed of in a landfill site.

No wastewater is produced with the semi-dry FGD as all the water is evaporated or contained as water of hydration in the dry by-product mixture. This eliminates the costs of an additional wastewater treatment system.

4.2.4 Selected technology

The technology that was selected during the feasibility phase of the Medupi Power Station was the Wet FGD. The key recommendations for selection of the Wet FGD included:

- Semi-dry FGD would pose significant challenges for application at Medupi Power Station, primarily that the retrofit of a semi-dry FGD infrastructure could not be implemented within the expected outage durations or in the space allocated by the original plant design;
- Total life-cycle costs of the semi-dry FGD system are significantly higher than those for wet FGD;
- The significant difference in water consumption between semi-dry and wet FGD technology could be reduced by the application of a flue gas cooling system to the wet FGD process. The flue gas cooling system would reduce the water consumption of the Wet FGD to approximate water consumption expected for semi-dry FGD technology;
- Limestone, the reagent for wet FGD technology, is readily available for the Medupi Power Station purposes and would be bought locally.

4.2.5 Technology Alternatives for purposes of EIA

The selection of the wet FGD technology was undertaken prior to this EIA and technology alternatives are therefore not addressed in detail nor assessed in the impact rating system for purposes of decision-making for this application.

4.3 Design alternatives

4.3.1 Wet FGD Design alternatives

For the selected wet FGD there are only 2 design alternatives considered. These are:

- wet FGD design without inlet flue gas cooling; and
- wet FGD design with inlet flue gas cooling.

The basic designs are identical. However, the design with cooling will require a heat exchanger at the inlet of the FGD to reduce the temperature of the flue gas entering the absorber. The heat exchanger consists of a closed loop water cooling system with associated pumps, as well as a disposal heat sink and associated ductwork. All other equipment is considered similar in size and demand to the Wet FGD design option without cooling.

4.3.2 Design Alternatives for purposes of EIA

The technology selection report (2014) recommended that the client implement wet FGD technology. The technology with or without cooling were considered equal on an overall technical and economic basis. The EIA will assess the two design alternatives through the impact assessment phase. It should be noted that the Medupi Power Station has been designed to accommodate an inlet flue gas cooler, should this be required.

4.4 Waste disposal facility alternatives

Medupi Power Station already has the appropriate licensing and authorisation for disposal of the ash at the licensed Medupi Ash disposal facility. However, there are 3 additional waste streams that will require disposal from the FGD process. The alternatives that have been identified are discussed below. The waste disposal alternatives have been identified by Zitholele and will be refined during the Impact Assessment Phase.

4.4.1 Option 1 - Off-site disposal at existing landfill

Due to the fact that it is likely that some or all of the waste streams generated by the FGD process will be classified as hazardous by the waste classification, it would be necessary to transport the waste to one of two currently licensed hazardous waste landfill sites operating within South Africa. Considering the volumes of waste and the proximity of the site, it is proposed that the waste be trucked to Holfontein in Mpumalanga Province for final disposal.

The implications of this alternative for disposal are that:

- There will be considerable potential for environmental impact during loading, trucking and off-loading;
- A high risk of trucking incidents due to the frequency and distance of travel;
- The potential for impact will be on a much larger area than those impacts limited to the Medupi footprint;
- The carbon emissions from vehicle exhaust fumes will impact over a greater area and on an already identified priority area for emissions.

This alternative includes the trucking of all wastes from the FGD process (gypsum, sludge and salts) to Holfontein Hazardous Landfill Site A comparative analysis will be carried out during the EIA phase. This comparative analysis will compare alternatives against environmental, engineering and financial considerations in order to eliminate fatally flawed alternatives.

4.4.2 Option 2.1 - Disposal at the Ash Disposal Facility

It is proposed that the ash, gypsum, salts and sludge be disposed of at the ash disposal facility. The feasibility of this disposal alternative will be better informed once the Waste Classification Study has been carried out to determine what waste Types will be requiring disposal on site. Should all the wastes be of the same Type, this alternative will propose to mix all of the wastes together for disposal at the ADF. An appropriate barrier system will be designed according to the waste classification results.

4.4.3 Option 2.2 - Disposal on site, separating salts and sludge from ash and gypsum

Should there be any reason why disposal of mixed wastes cannot take place, then it is proposed that the chemical wastes (sludge and salts) are disposed of within the ADF, but in a separate “compartment” to the ash and gypsum. This will require that the existing design and proposed operations of the ash disposal facility be amended to accommodate this separation of waste streams

within the ADF. The Waste Classification study will have further input into the consideration of this disposal alternative. An appropriate barrier system will be designed according to the Waste Norms and Standards (South Africa, 2013[2]).

4.4.4 Option 3 - New on-site facility for salts and for sludge

Should the disposal of chemical waste streams (sludge and/or salts) at the ADF not be feasible for implementation or acceptable for authorisation, then a separate facility/ies will need to be constructed on site. The facility/ies will cater to salts and/or sludge, depending on the requirements. This facility will be designed according to the specifications for the required landfill Class appropriate to the waste Type. Liaison with the DEA Waste Directorate as well as the outcome of the Waste Classification Study will inform the comparative analysis of this alternative with others that have been considered.

This alternative will address the instance where neither salts nor sludge can be disposed of at the ADF.

4.4.5 Option 4 – Salts and sludge to off-site facility

This alternative will consider the trucking of chemical salts to the Holfontein Landfill Facility. This alternative requires that gypsum be disposed of at the ash disposal facility. The impacts of Option 1 and Option 5.1. are similar in terms of the trucking waste over significant distances.

4.4.6 Option 5.1 – New facility for salts and sludge only

It is proposed that the EIA consider that a new facility may be required for the slats and sludge on site at the Medupi Power Station. This facility will need to be managed and operated by the Power Station. This alternative relies on the gypsum being disposed with the ash at the ash disposal facility.

This alternative will address the instance where salts and sludge cannot be disposed of at the ADF but where gypsum can be disposed of at the ADF.

4.4.7 Option 5.2 – New facility for the salts and sludge and gypsum

Should none of the FGD waste streams be suitable for disposal at the ADF, then new facilities may be considered to cater to this waste. Separate facilities will be required for each waste, thereby requiring 3 new facilities. The estimated area for gypsum is about 200ha at 50m above ground level. About 140ha will be required for the disposal of salts and sludge within lagoons to a depth of 5m.

4.4.8 Alternatives for purposes of EIA

The principle alternatives will be considered during the EIA Phase of this project and will be discussed with the appropriate authorities and specialists. The waste classification study will inform the requirements for disposal of the waste streams. A comparative analysis will be carried out to eliminate those alternatives which may be impractical or fatally flawed. Following this analysis, the remaining alternatives will be carried through to the Impact Rating to identify the preferred

alternative and to provide a rating table indicating potential impacts associated with each alternative.

4.5 Transportation alternatives

4.5.1 Conveyor

Transportation of materials on site will be primarily by conveyor. This will reduce the volumes of vehicle traffic on site and will allow for smooth transitions of materials from one facility to the next. The conveyors will be maintained and monitored to ensure that they are operating efficiently and that there are no significant environmental impacts generated along the conveyor route, i.e. spills.

Conveyors may be used as appropriate for all on site transport of:

- Limestone;
- Gypsum;
- Chemical salts;
- Sludge.

4.5.2 Rail

A new rail yard siding forms part of the current application. The rail yard includes associated infrastructure, such as limestone handling areas and dirty water control dams. This siding will facilitate that limestone, and other materials, are transported to the Medupi Power Station by rail. This is a preferred means of transport of materials, as the risk for environmental and social impact is reduced from that of trucking materials.

4.5.3 Truck

Trucking will be used as a contingency for transport of materials where conveyors are not appropriate on site. The trucking on site will be minimal. However, sludge and salts will be trucked to the appropriate disposal facility/ies, be this on-site or off-site.

4.5.4 Alternatives for purposes of EIA

Preferred alternatives for transport have been selected during the pre-feasibility phase and tie in with the existing transport methods that will be utilised for the Medupi Power Station. The use of conveyor on site is supported by the EAP in that the products will follow a predetermined and unchanging route. This will make it more practical for management and monitoring of the transport of products and wastes in terms of potential environmental impacts. The use of rail for the import of limestone, among other products, is preferred to trucking due to the limited potential for associated environment and traffic impacts. Transport alternatives will be discussed during the Impact Assessment Phase but will not be compared or rated for selection of a preferred alternative.

5. SCOPING PROCESS

5.1 Site investigation

A site investigation took place on Thursday 16th January 2014. The site investigation was aimed at:

1. understanding the condition of the receiving environment;
2. identifying the areas on site flagged for FGD footprint;
3. identifying potential environmental or social impacts of significance.

An induction was held at Medupi Power Station where the Zitholele team were prepared for safety and emergency procedures for implementation while on site. The Zitholele team was orientated by means of plot diagrams and maps.

During the site visit, the existing Medupi Power Station infrastructure was observed and the footprints of the various FGD facilities and associated infrastructure was identified. This provided the EAP with an understanding of the cumulative and individual impacts that may be generated by the FGD and the Power Station post-FGD retrofit. The outcome of the site visit informed the identification of specialists deemed necessary to provide detailed investigation.

From the site visit it is clear that the footprint for the FGD infrastructure will be located on disturbed habitat as all infrastructure will be within the impacted Medupi Power Station footprint which has been cleared of all fauna and flora. Additionally, the existing specialist studies for soils, groundwater, surface water and visual impacts will be sufficient for use in this study.

5.2 Identification of Issues

The site visit provided a clear indication that the footprint for the FGD infrastructure will be located within the already impacted Medupi Power Station property. All floral and faunal habitat has been removed and the area is either concreted or open soil. No natural surface water bodies are directly impacted upon by the FGD infrastructure. Moreover, the existing specialist studies carried out for the Medupi Power Station will still be valid in terms of the cumulative impacts of the power station and the FGD retrofit to the receiving environment.

Through the Scoping Phase it has become evident that there current socio-economic issues of significance that may affect the Medupi FGD Technology Retrofit project. Some of these socio-economic issues relate to job security, training and employment as well as water allocation and utilisation.

5.3 Identification of required Specialist Studies

The client commissioned specialist consultants to undertake specialist assessments of the receiving environment prior to the impact generated by the Medupi Power Station construction phase. These assessments provide a valuable basis for the FGD retrofit project in terms of cumulative impacts of the Medupi Power Station (including FGD).

All of the existing Medupi Power Station specialist assessments will be utilised for the purposes of the FGD EIA process. While the specialist studies carried out for the Medupi Power Station EIA

remain effective in describing the original receiving environment and informing the impact rating of the FGD on specific aspects, four specialist studies will need to be updated with specific reference to the FGD retrofit.

It should be noted that if alternative waste disposal sites are required outside of the existing Medupi Power Station footprint, specialist studies will need to be carried out, at the minimum, for groundwater, geotech, ecological assessment and surface water, in order to inform site selection and to rate potential impacts generated by the new waste disposal site/s.

5.3.1 Air quality

Air emissions from the power station will definitely be altered by the FGD retrofit and this will need to be assessed and documented. Zitholele has identified Airshed Professionals as the specialists who carried out the initial air quality impact study. Airshed Professionals will be undertaking a follow up air quality impact assessment for the FGD retrofit in order to provide a comprehensive comparison of air emissions expected from the Power Station before and after the FGD retrofit.

The air quality study will address:

- Description of the ambient air quality;
- Identification of project activities that will impact on air quality;
- Impact Assessment of the potential impacts;
- Cumulative impacts to air quality;
- Mitigation measures for significant impacts;
- Monitoring programmes for significant impacts.

The air quality study will investigate SO_x, NO_x, PM10 and respirable dust generated by the project activities and will relate these to environmental and social impacts.

5.3.2 Waste Classification

The FGD retrofit will generate similar but independent waste streams to the ash from the Power Station operation. These waste streams will include:

- Gypsum;
- Sludge;
- Salts.

These waste streams are generated by the FGD process. The waste classification study will be required in order to:

- Classify the 4 wastes from Medupi Power Station operation independently as well as a combined waste;

- Provide recommendations for disposal, including input into comparative analysis of disposal alternatives;
- Classify the requirements of the barrier system for the waste disposal facility according to the classification of the wastes.

The waste classification is an essential input to the design of the ash disposal facility and any other waste disposal facilities required on site.

5.3.3 Socio-economic Assessment

A specialist has been tasked with updating the Socio-economic Impact Assessment that was carried out for the Medupi Power Station EIA in 2006. The updated report will need to take cognisance of current socio-economic issues within the Lephalale Municipality, as well as those associated with the project that manifest on a national scale.

The Socio-economic study will address:

- Description of the current socio-economic status of the Lephalale area;
- Discuss areas of vulnerability in terms of social and economic stability within the study area;
- Identify significant socio-economic impact generated by the project activities;
- Mitigation measures and actions that can be implemented during construction and operation phases.

5.3.4 Ecological assessment

Some of the rail yard area falls outside of the Medupi Power Station footprint that has been impacted upon by the construction of the Power Station. Therefore, specialist ecologists have been appointed in order to assess the rail yard site as a receiving environment. The ecologists will undertake a baseline survey to investigate the potential for Red Data Species or habitats of conservation value. The ecological survey will include the limestone handling areas and associated infrastructure footprint.

The ecological assessment will provide:

- A description of the receiving environment for the rail yard site;
- A list of any Red Data Species identified on site;
- A sensitivity map to indicate habitats of conservation value;
- Impact Assessment Rating of the project activities on the rail yard site in terms of ecology;
- Cumulative assessment discussion and rating for impacts to ecology within the larger study area;
- Mitigation recommendations to minimise impacts to ecology at the rail yard;

- Planning recommendations to ensure long term monitoring of ecology impacts.

5.4 Public Participation

Public participation is an essential and legislative requirement for environmental authorisation. The principles that demand communication with society at large are best embodied in the principles of the National Environmental Management Act (Act 107 of 1998, Chapter 1), South Africa's overarching environmental law. In addition, Section 24 (5), Regulation 54-57 of GNR 543 under the National Environmental Management Act, guides the public participation process (PPP) that is required for an Environmental Impact Assessment (EIA) process. The PPP undertaken during the scoping phase of the EIA also took the Integrated Environmental Management Guideline Series (Guideline 7) – Public Participation in the Environmental Impact Assessment Process, GN234, promulgated 10 October 2012).

The public participation process for the proposed integration of the proposed Medupi Power Station FGD Technology Retrofit has been designed to satisfy the requirements laid down in the above legislation and guidelines. This section of the report highlights the key elements of the PPP to date.

5.4.1 Objectives of public participation in an EIA

The objectives of public participation in an EIA are to provide sufficient and accessible information to I&APs in an objective manner so as to:

- During Scoping:
    - Assist the I&APs with identify issues of concern, and providing suggestions for enhanced benefits and alternatives.
    - Contribute their local knowledge and experience.
    - Verify that their issues have been considered and to help define the scope of the technical studies to be undertaken during the Impact Assessment.
- During Impact Assessment:
    - Verify that their issues have been considered either by the EIA Specialist Studies, or elsewhere.
    - Comment on the findings of the EIA, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones.

The key objective of public participation is to ensure transparency throughout the process and to promote informed decision making.

5.4.2 Identification of interested and affected parties

The identification of stakeholders is ongoing and is refined throughout the process. As the on-the-ground understanding of affected stakeholders improves through interaction with various stakeholders in the area the database is updated. The identification of key stakeholders and community representatives (land owners and occupiers) for this project is important as their contributions are valued. The identification of key stakeholders and interested and/or Affected

Parties (I&APs) were done in collaboration with Eskom (through the I&AP database for the EIAs in the area), the local municipalities and other organisations in the study area.

The I&APs' details are captured on Maximiser, an electronic database management software programme that automatically categorises every mailing to I&APs, thus providing an ongoing record of communications - an important requirement by the competent authority for public participation.

According to the NEMA EIA Regulations under Section 24(5) of NEMA, a register of I&APs (Regulation 55 of GNR 543) must be kept by the public participation practitioner. Such a register has been compiled and is being kept updated with the details of involved I&APs throughout the process (See Appendix D1)

5.4.3 Announcement of opportunity to become involved

The opportunity to participate in the EIA was announced in June 2014 as follows:

- Site Notices were erected at Medupi Power Stations (public entrance road) as per EIA Regulation 54(2)(a)(i) (Appendix D2) (**Figure 3**).

Figure 3: Site Notice at main road entrance to Medupi Power Station (Steenbokpan Road)

- Distribution of a letter of invitation to become involved, addressed to I&APs and organisations, accompanied by a Background Information Document (BID) containing details of the proposed project, and a registration sheet were done in June 2014 by e-mail, fax & post (Appendix D3).

The BID was also distributed in the study area at residential houses, bus stops etc. (**Figure 4**).

Figure 4: Distribution of Background Information Document in surrounding

- The announcement of the EIA process was announced in the Mogol Post, the local community newspaper (Appendix D4).
- EIA process notices (A3 site notices) were placed at conspicuous and prominently public places, invite stakeholders to participation in the EIA process.

Figure 5: EIA Process Notices put up in prominent public places

5.4.4 Obtaining comment and contributions

The following opportunities are available during the Scoping phase for I&APs to contribute to the finalisation of the Scoping Report:

- Completing and returning the registration/comment sheets on which space was provided for comment.
- Providing comment telephonically or by email to the public participation office.
- Attending meetings that will be advertised in the Mogol Post, flyers will be distributed in the neighbouring community and posters will be erected in Lephalale at prominent public places i.e. public library, Lephalale Local Municipal Office, etc. Marapong township will be a focal point for stakeholder engagement and a public meeting will be held within this area.

The minutes of the meetings to be held will be attached to the FSR and the comments / concerns / issues raised at these meeting will be included in the Comments and Response Report (CRR).

5.4.5 Comments and Response Report

Issues / comments / concerns raised in the announcement and scoping phase of the project, were captured in an Comments and Response Report (CRR) Version 1 and appended to this DSR (Appendix D9). The issues / comments / concerns raised during the public review period of the DSR will be added to the Final Scoping Report (FSR) as Version 2 of the CRR. The contributions made by I&APs were and will be acknowledged in writing.

5.4.6 Draft Scoping Report

The purpose of the PPP in the DSR is to enable I&APs to verify that their contributions have been captured, understood and correctly interpreted, and to raise further issues. At the end of Scoping,

the issues identified by the I&APs and by the environmental technical specialists, will be used to define the Terms of Reference for the Specialist Studies that will be conducted during the Impact Assessment Phase of the EIA. A period 40 days will be made available for public review of the DSR (from 24 October to 5 December 2014).

In addition to the newspaper advertisement and site notices that announced the opportunity to participate in the EIA, the opportunity for public review of the DSR will be announced as follows:

- Advertisement in the Mogol Post.
- In a letter to all registered I&APs on the project database, which will be e-mailed to those with e-mail addresses, fax to those without e-mail addresses and post to those without an e-mail address or fax number.

The DSR, including the CRR (Version 2), will be distributed for review and comment as follows:

- Left in public venues such as libraries within the vicinity of the project area (these are listed in Table 7 below);
- Courier to identified / relevant Organs of State (Commenting Authorities)
- Electronic copies to key stakeholders
- Electronic copy to those I&APs who requested the DSR
- A copy will be available at the meetings to be held

I&APs can comment on the DSR in various ways, such as completing the comment sheet accompanying the DSR, submitting individual comments, in writing, by post or e-mail.

Table 7: List of public places where the Draft Scoping Report will be made available

VENUE	ADDRESS	CONTACT
Printed Copies		
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Electronic Copies		
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5.4.7 Final Scoping Report

The Final Scoping Report (FSR) & Plan of Study for EIA will be updated with the additional issues raised by I&APs and may contain new information. The FSR will be submitted to the Competent Authority (the Department of Environmental Affairs (DEA)), identified Organs of State, key stakeholders, and to those individuals who specifically request a copy. I&APs will be notified of the availability of the FSR.

In the Impact Assessment Phase of the EIA Specialist Studies will be conducted to assess the potential positive and negative impacts of the proposed project, and to recommend appropriate measures to enhance positive impacts and avoid or reduce negative ones. I&APs will be kept informed of progress with these studies.

5.4.8 Public participation during the Impact Assessment

Public participation during the impact assessment phase of the EIA will mainly involve a review of the findings of the EIA, presented in a Draft Environmental Impact Report (DEIR), the Draft Environmental Management Programme (EMPr) and the volumes of Specialist Studies.

An EIA Newsletter will be distributed to all registered I&APs on the project database providing information such as:

- DEA's acceptance of the FSR and approval of the Plan of Study for EIA;
- Envisaged timeframes of the various specialists' studies to be undertaken;
- Envisaged timeframes of the impact phase; and
- Envisaged timeframes of the Public Participation activities.

I&APs will be advised in good time of the availability of these reports and how to access them. The dates and venues of public and other meetings will be provided to all registered I&APs.

5.5 Reporting

The Draft Scoping Report was compiled during mid-2014, with the aim of providing an overview of the receiving environment and the proposed project. Site investigation, desktop studies and review of available literature informed the compilation of the Draft Scoping Report. Comments received from stakeholders during the public notification period have been reviewed and discussed with the client for consideration in the Draft Scoping Report content.

The Draft Scoping Report will be reviewed internally by the consultant, Zitholele Consulting, as well as by the client prior to making this document available for public comment. It is envisaged at this stage of the processes, that the public comment period will run from about mid-September to early November 2014. Once public comment has been received, this will be considered for purposes of the Final Scoping Report, which will be submitted to commenting and decision-making authorities before the end of the year.

The purpose of the Final Scoping Report is to provide the authorities with information around the receiving environment and the proposed project activities. The Scoping Report also provides a Plan of Study for the Impact Phase. The authorities may then request additional information for the Scoping Phase, or accept the FSR, and provide input to the Impact Assessment Phase.

6. ISSUES IDENTIFIED

Due to the fact that the construction and installation of infrastructure for the FGD retrofit will take place within the already impacted Medupi Power Station footprint, there are limited impacts of significance that will be generated on the receiving environment.

At the Scoping Phase it has been noted that the following issues will need to be unpacked and assessed during the EIA Phase of the process:

- Waste handling and disposal;
- Air emissions;
- Water usage;
- Social economic spin offs.

These issues have been identified through stakeholder engagement, site investigation and review of existing and appropriate reports and documentation.

6.1 Waste handling and disposal

The Medupi Wet FGD technology will generate three key waste streams. These are gypsum, sludge and salts. The handling and disposal of these wastes may generate a potentially significant impact to soil, groundwater and surface water. For this reason, the waste handling and disposal activities will be investigated more rigorously within the Impact Assessment Phase.

The expected rate of gypsum generation during operational phase of the Wet FGD technology is between 1.67 and 1.69 million tonnes per year. It is anticipated that approximately 20% of the produce gypsum will be of commercial-grade. However, the client has not yet identified a market for this gypsum.

The alternatives of waste disposal on-site and off-site will be further assessed and investigated in the Impact Assessment Phase. Should off-site waste disposal facilities be required, then various specialist studies will be required to inform site selection, description of the receiving environment and assessment of impacts.

6.2 Air quality

The Wet FGD technology retrofit is expected to reduce SO_2 emissions by approximately 94%. This will align the Medupi Power Station to the National Environmental Management: Air Quality Act (Act 39 of 2004) minimum emissions standards for SO_2. This will indicate a significant positive air emissions impact generated by the FGD retrofit. Zitholele will have the specialist air quality assessment, carried out in 2005 by Airshed Professionals, updated by the same consultants, in order to confirm this technology specification.

6.3 Water Usage

The Wet FGD technology requires a significant amount of water for operation, as per Table 8 below, which was provided by Eskom engineer on request.

Table 8: Water usage volumes for Wet FGD technology

Water Usage	Estimated water volumes m^3/hour
Process Water	1 118.4
Sealing Water	14.4
Closed Cycle cooling makeup water	29
Backwash for pre-treatment filters	17.7
Total	**1 179.5**

The Wet FGD technology water utilisation requires that the Impact Assessment Phase investigate how the FGD retrofit at Medupi Power Station will:

- Reduce water utilisation as far as practical;
- Reuse water in a responsible manner;
- Impact on other water users within the catchment;
- Source water for the project; and
- Investigate alternative water sources as a contingency.

It is understood that the Medupi Power Station water allocation from the MCWAP scheme will be increased during the subsequent phases of this scheme. The Water Use License Application process for the Medupi MCWAP water allocation is being carried out as an independent and strategic process.

6.4 Socio-economic impacts

Socio-economic impacts from the FGD retrofit may have positive and negative effects. These will relate directly to:

- Human health and welfare;
- Employment opportunities;
- Improved, sustainable electricity supply;
- Potable water allocation and supply for local agriculture, industry and domestic use;
- Economic development.

7. RECEIVING ENVIRONMENT

In investigation of the receiving environment of the Medupi Power Station footprint, much information was sourced from the original Medupi Power Station Scoping Report (Bohlweki; 2005). Chapter 5: "General description of Study Area" (Bohlweki, 2005) of the original Scoping report (Bohlweki, 2005) provides a description of the receiving environment prior to the Medupi Power Station construction. In Section 7 of this current report, the receiving environment is discussed broadly and it must be noted that the FGD retrofit activities will occur predominantly within an impacted footprint.

Should there be any development of alternative waste disposal facilities outside of the Medupi Power Station footprint, the receiving environment for the selected sites will need to be assessed appropriately for purposes of baseline environment description, site selection and impact assessment.

7.1 Climate

The climatic regime of the Lephalale area is characterised by hot summers and mild winters. The long-term annual average rainfall is 485 mm, of which 420 mm falls between October and March. The area experiences high temperatures, especially in the summer months, where daily maxima of >40°C are common. The annual evaporation in the area is approximately 2 281mm. Frost is rare (Bohlweki Environmental; 2006). The predominant winds (as measured during April) are generally north-easterly and have a wind speed of about 2 m/s to 4m/s (C&M Consulting Engineers; 2013).

The climate within the Lephalale Municipality, and Limpopo Province in general, results in a negative climatic water balance, and very little water for utilisation by industry, mining, agricultural and domestic land use.

7.2 Air quality

According to the Airshed Professionals Air Quality Report (2005), the following sources of atmospheric emissions are currently impacting on air quality and are located within the Lephalale Local Municipality areas:

- Matimba Power Station;
- Grootegeluk coal mine
- Veld fires;
- Sewage works on the farm Nelsonkop;
- Windblown dust from unvegetated areas and due to agricultural activities;
- Household fuel combustion;
- Vehicle exhaust emissions; and
- Medupi Power Station will also be contributing to atmospheric emissions once operational.

The Lephalale Municipality IDP 2014 to 2016 shows that more than 95% of the Waterberg District Municipality's industrial emissions are generated within the Lephalale Municipality. Similarly, more than 95% of the SO_2 emissions for the District Municipality are generated within the Lephalale area.

Lephalale has been identified as a priority area for atmospheric emissions (DEA; 2012). The DEA has identified the Lephalale Municipality as exceeding ambient air quality standards, resulting in significant impact to air quality and human health. The ambient air quality is therefore poor and requires specific and focused mitigation.

7.3 Ecology

The Medupi Power Station footprint occurs within the Savanna Biome. Vegetation types, as discussed within the Medupi Scoping Report (Bohlweki, 2006), that occur in the study area include the following:

- Mixed Bushveld - the vegetation varies from a dense bushveld to open tree savanna.
- Sweet Bushveld - vegetation is dominated by Acacia species that increase to dense thickets, at the expense of the grass layer, when under pressure.
- Waterberg Moist Mountain Bushveld - the high proportion of unpalatable grasses within this vegetation type has resulted in the common term 'sour bushveld'.

The ecology report as discussed in Section 7 of the Bohlweki EIA Report (2006) indicates that the floristic species biodiversity of the study area is considered to be relatively poor. The report indicated that in terms of fauna, any impacts to the area would likely result in migration of faunal communities to surrounding areas. This is possible due to the uniformity of the habitat of greater area, including surrounding properties.

However, while considering the above assessment summaries, there is presently no indigenous habitat remaining within the site footprint subsequent to the construction of the Medupi Power Station. The pre-construction phase for the Power Station included the removal of all vegetation and topsoil from the site in preparation for construction. Therefore the receiving environment for the FGD retrofit is heavily impacted and there are not expected to be any Red Data Species or habitats of conservation remaining within the Medupi Power Station footprint. **Figure 6** below provides visual evidence of the extent of impact that has been generated on the majority of the site by the Medupi Power Station construction phase.

An additional ecological assessment will be carried out on the rail yard and associated infrastructure, including the limestone offloading area and associated facilities, due to the fact that this new infrastructure is planned on the border of the Medupi Power Station footprint and does impact on a small footprint that was not assessed under the original EIA.

Figure 6: Photograph of the current condition of the receiving ecology

7.4 Geology

The geological description below is taken directly from the specialist geology assessment as discussed in Sections 8 of the Scoping Report (Bohlweki, 2005) and the EIA Report (Bohlweki; 2006). There is no reference within the Bohlweki report as to what company carried out the geology assessment.

The Waterberg Coalfield comprises a graben structure with the Eenzaamheid fault forming the southern boundary and the northern boundary being delineated by the Zoetfontein fault. Archaean granite rocks outcrop to the north of the Zoetfontein fault and sediments of the Waterberg Group outcrop to the south of the Eenzaamheid fault.

The study area is further subdivided by the Daarby fault, a major northeast, then northwest, trending fault. The Daarby fault has a down throw of 360m to the north, at an angle of 50° to 60°. The down throw of 360 m to the north serves to bring the Grootegeluk Formation rocks to the south in contact with the younger Clarens Formation sandstone and Letaba Formation basalts in the north. Thus the fault divides the coalfield into a shallow (opencast) coal area to the south of the Daarby Fault, and a deep north coal area.

The Eenzaamheid fault has a throw of 250 m to the north and the fault is near vertical. The fault brings the upthrown Waterberg Group sediments on the south side of the fault in contact with shallow coal on the northern side of the fault.

Due to the fact that the groundwater in the area has potential for enhancement, it is important that any activities that have the potential to impact on groundwater should be located away from the fault lines as described above.

The risk of the FGD retrofit impacting significantly on geology is very low. The majority of the new infrastructure is above surface and foundations will not impact on geology of more than approximately 2m below surface. Should alternative waste disposal facilities be required, these may have minor impacts on surface geology and will most likely be located away from the disturbed Medupi footprint.

Figure 7 below provides an overview of the underlying geology of the receiving environment.

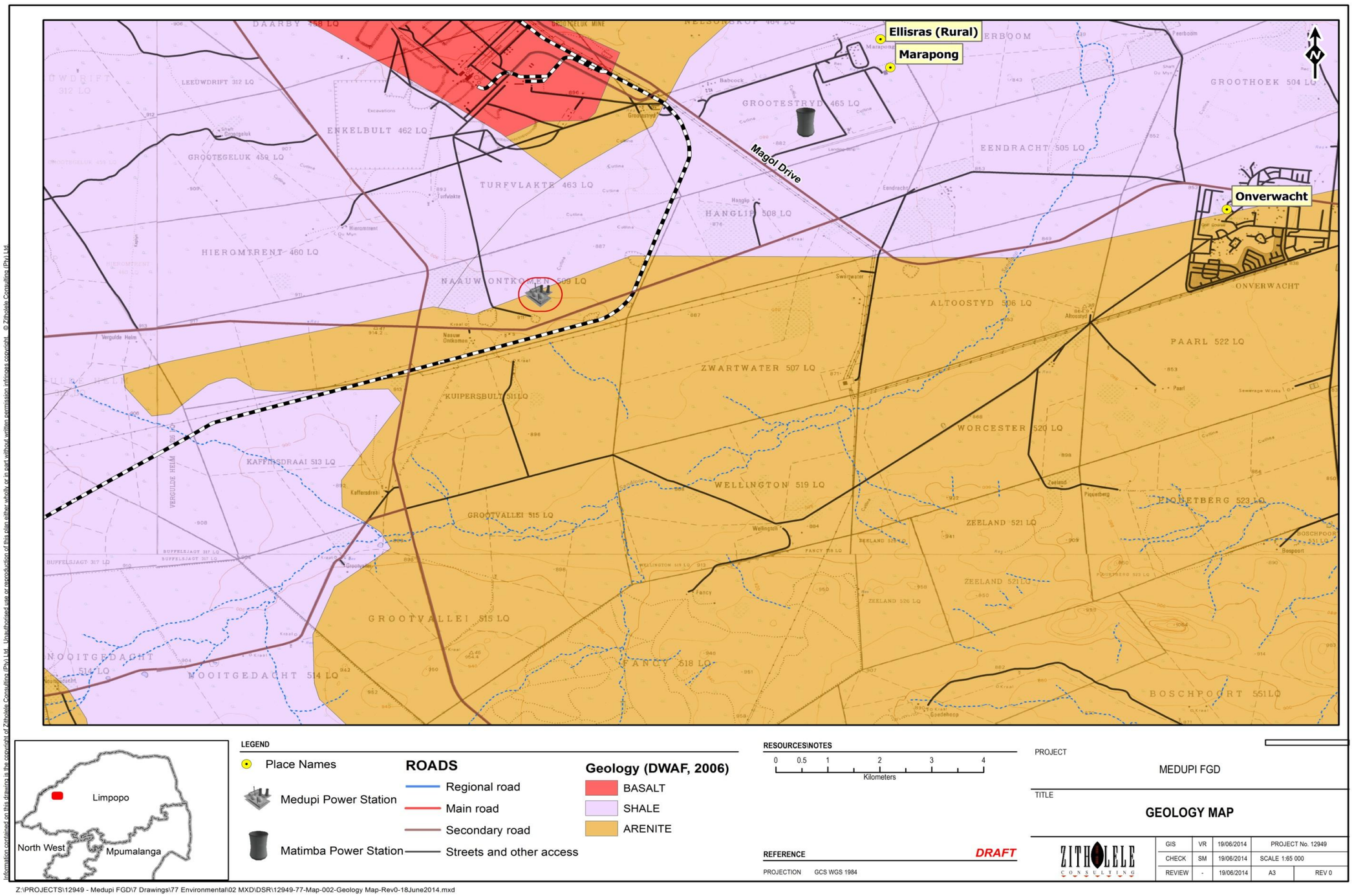

Figure 7 : Underlying geology in the Lephalale area

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7.5 Groundwater

The groundwater description is taken directly from the specialist groundwater report carried out for the Medupi Power Station Scoping Report (Bohlweki; 2005) and Medupi Power Station EIR (Bohlweki; 2006).

The groundwater potential of the formations located in the study area are limited in their pristine state due to low permeability, storage, and transmissivity. There are no artesian boreholes located within the study area. No large-scale groundwater abstraction occurs in the study area, even along the numerous faults.

The geological structures can enhance the groundwater potential in the area by increasing the permeability and transmissivity of the host rock. Secondary processes, such as faulting and fracturing, can create secondary fractured rock aquifers. Groundwater occurs within the joints, bedding planes, and along dolerite contacts within the Waterberg Group sediments

The groundwater potential of the fractured transitional zones between weathered and unweathered crystalline Letaba basalt rocks is good. Deeper fractures within the basalt, associated with faulting, have good groundwater potential. Fractured fault zone, especially if related to tensional stresses, are potentially rich targets for groundwater development. The graben structures are associated with tensional stresses, thus the Eenzaamheid fault could be an area of increased groundwater potential.

Groundwater will be important in terms of the potential impacts of disposal alternatives on site. The original specialist Groundwater Assessment will be utilised for purposes of the Medupi FGD Technology Retrofit EIA. However, should alternative disposal sites be required, the groundwater will be reinvestigated for these sites.

7.6 Surface Water

The general description of the surface water within the area is taken directly from the Surface Water Specialist Study conducted for the Medupi Power Station Scoping Report (Bohlweki; 2005).

The study area falls within the Mogol River Catchment, which drains into the Limpopo River to the north (

Figure 8). The Mokolo River catchment covers an area of 8 387 km2. The catchment stretches from the Waterberg Mountains though the upper reaches of the Sand River, and includes the Mokolo Dam and a number of small tributaries that join the main Mokolo River up to its confluence with the Limpopo River. The topography of the area is flat, varying between 900 and 922 mamsl1. The general topographical drainage system is poorly developed and drains in an easterly direction towards the Mogol River (810 mamsl).

There are no surface water bodies within the Medupi Power Station footprint. Therefore, no surface water resources will be directly affected by the FGD retrofit.

Figure 8 provides a visual indication of the surface hydrology associated with the study area.

The groundwater abstraction in the study area and surrounds is limited. Some game and livestock watering, low sustainable borehole yields and very little domestic groundwater usage is characteristic of the area. Mokolo Dam supply is utilised for most water uses. Eskom and Grootegeluk Coal Mine, as well as the municipality supply reticulated water to the area.

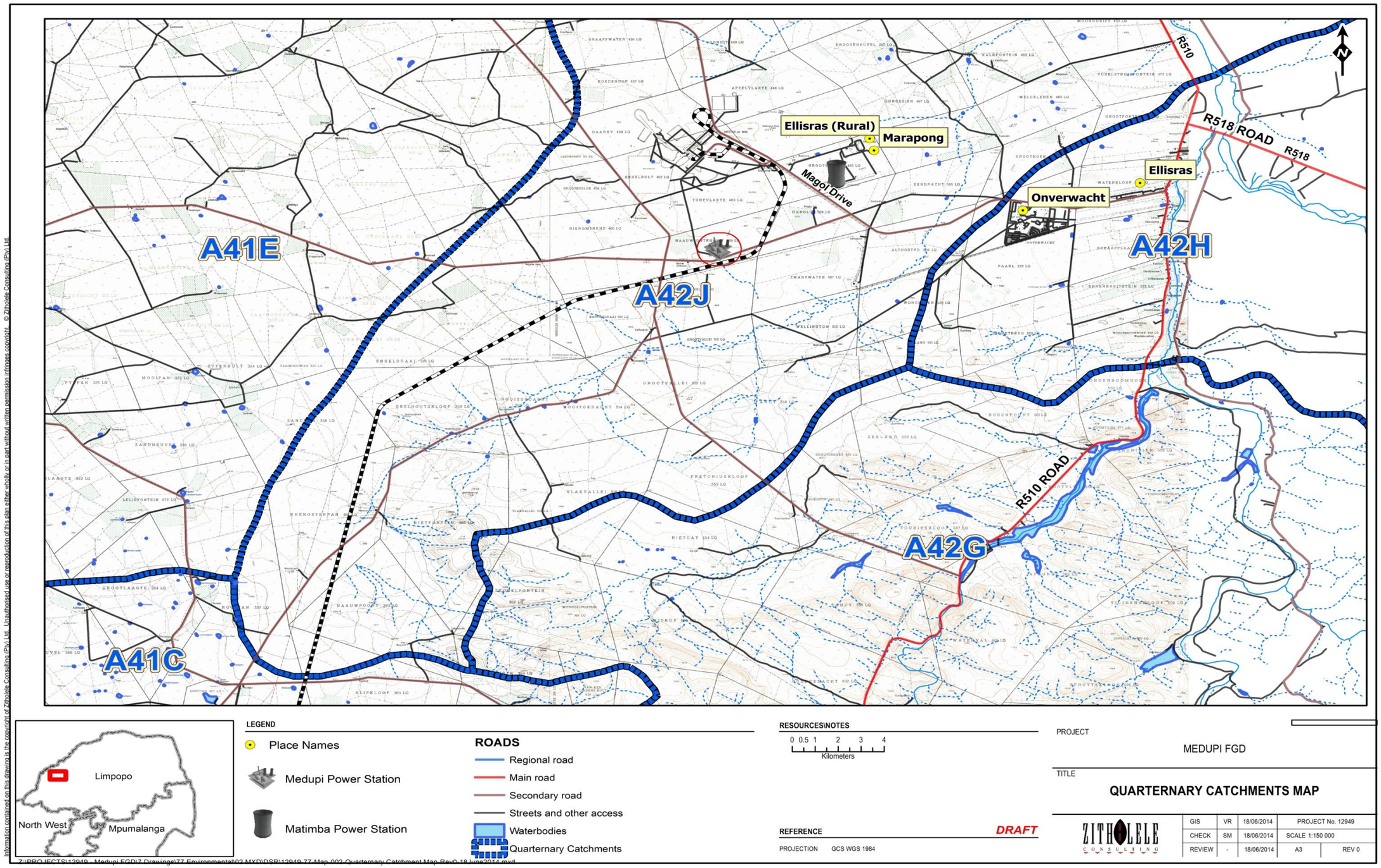

Figure 8 : Surface Water for the Lephalale study area

7.7 Water Uses

The water use within the catchment is predominantly agriculture (87%) and industry (13%) related.

Currently water availability and water use in the catchment are in balance. However, within the provisions of the National Water Act (Act 39 of 1998 as amended) as stipulated in the National Water Resources Strategy, there is a need to meet the water requirements of the Reserve (Basic Human needs and Ecological) in terms of water quantity and quality. Taking the requirements into account, there is insufficient water to maintain the current balance. Added to this, it is anticipated that water demand will increase with new developments proposed in the Mokolo Catchment, such as new or expanded mining activities and new power stations (Bohlweki; 2005).

The MCWAP scheme has been initiated in order to provide adequate water to supply the current and planned water users with allocations of water from the Mokolo Dam. Medupi Power Station already has an allocation for water from the MCWAP phase 1 scheme. There is currently a Water Use License Application in process for additional water allocation to Medupi from the MCWAP phase 2 scheme in order to supply for the planned FGD technology operation. This Water Use License is been applied for at a strategic level by Eskom.

The Limpopo Province, and in particular, the Lephalale area, is a water stressed area with evaporation significantly higher than precipitation. Agricultural and industrial land uses in the municipal area are water intensive.

It is anticipated that water utilisation by the Medupi FGD technology retrofit will be an issue of contention and needs to be addressed more rigorously within the Impact Assessment Phase.

7.8 Land Use

Principle land uses in the study area were identified during the original Medupi Power Station Scoping Phase (Bohlweki; 2005) as:

- Agricultural land devoted mainly to game and cattle farming.
- Residential and industrial areas – i.e. Onverwacht, the town of Lephalale; and
- Grootegeluk Mine, which is owned by Kumba Resources Pty Ltd;
- The Matimba Power Station;
- Game farms and lodges including the Ferroland Private Game Reserve; and
- Sewage works on the farms Zongezien and Nelsonskop.

In addition to these primary land users, Medupi Power Station will become one of the larger industries within the Lephalale Municipality. The Medupi FGD operation may require the purchase of additional land in order to accommodate new disposal facilities. At this stage disposal alternatives are still under investigation. Should additional land be required, this will be assessed by appropriate specialist consultants in order to inform the Impact Assessment Phase.

The IDP (2014-2016) indicates that the primary corridor within the Lephalale Municipality is the national road N11 connecting to Mokopane in the north west.

7.9 Socio-economic

The socio-economic description is taken, to a large degree, from the Medupi Scoping Report for the authorisation of the power station (Bohlweki; 2005), as well as from the Lephalale Municipality Integrated Development Plan 2014-2016. A Socio-economic report compiled by SRK Consulting (Ismail *et al*; 2013) also provides a more recent summary of the Lephalale Municipality current status.

The study area is situated approximately 15km west of Lephalale in the Limpopo Province. The Medupi Power Station is positioned in the area under the jurisdiction of Lephalale Local Municipality, which forms part of the Waterberg District Municipality. The Lephalale Local Municipality covers an area of 19 605km^2, and consists of 11 wards.

The IDP for the Lephalale area (2014-2016) indicates that there has been a 35.8% population increase within the Lephalale Municipality between 2001 and 2011. The IDP also indicates focal areas for the Municipality to be job creation, improved infrastructure and a transition to a low carbon economy. This aligns with the Medupi FGD project as the operation of the Medupi Power Station (with FGD) will contribute to these initiatives.

The Lephalale Municipal economy is largely dependent on mining and electricity generation as primary economic sectors. Agriculture and tourism feature as less significant economic contributors. The majority of the population resides in almost 40 rural villages. The key issues for address in terms of social upliftment include housing, social community facilities, provision of water and electricity (Ismail, *et al*; 2013).

One of the most important issue for address as highlighted within the 2014-2016 IDP is future water use and allocation. This is important in terms of supply to mining, agriculture and industry as well as to the growing domestic water use demand. Other issues within Lephalale Municipality relate to unemployment, low literacy rates and services to rural communities.

8. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

Considering that the FGD retrofit activities will occur within the already impacted Medupi Power Station footprint, the potential environmental and social impacts are expected to be focused around waste management, air quality, water utilisation, potential groundwater impacts and socio-economic aspects.

8.1 Waste Management

The handling and disposal of wastes generated by the Medupi FGD technology retrofit will have a potentially significant impact on soils, groundwater and surface water. The proposed alternatives for disposal of the various waste streams will be a focal area for address during the Impact Assessment Phase. A waste classification specialist report is being commissioned for the purpose of:

- Classifying the wastes into Types, according to the Waste Norms and Standards for disposal;
- Identifying and describing the requirements for the appropriate Class of disposal barrier system;
- Informing the assessment of alternatives for waste disposal.

8.2 Air quality

The aim of the Medupi FGD retrofit is to reduce SO_2 emissions and, similarly, the Power Station's impact on air quality. Therefore it is expected that the proposed project will have a positive impact of high significance to air quality. This impact will be assessed by a specialist consultant and the Impact Assessment Phase will provide a rating for the impact generated by the FGD retrofit.

8.3 Water utilisation

The Lephalale Municipal area is highly water stressed and relies on the import of water from outside sources to supply water users in the area. Water users are predominantly agriculture and industrial operations. Due to the fact that the proposed Wet FGD technology requires a significant volume of water for operation, it is anticipated that the approval of the Wet FGD retrofit to Medupi Power Station will have a significant impact on water utilisation in the area.

8.4 Groundwater

Groundwater impacts are directly associated with the disposal of waste to land. Should an alternative waste disposal site, in addition to the existing ADF, be required, a groundwater investigation will be required in order to assess the potential for impact to the receiving groundwater resource. For the existing Medupi footprint, available specialist groundwater studies will be reviewed for purposes of the EIA.

8.5 Socio-economic

The FGD retrofit proposed for Medupi Power Station will have a socio-economic impact to the local and national population in terms of, but not limited to:

- Possible employment of semi and highly skilled job seekers for construction phase;
- Ensuring compliance to the conditions of the World Bank loan, thereby assuring that the Medupi Power Station is funded and comes on line to supplement the South African electricity generation network;
- Reducing the potential health implications to local communities by decreasing the SO_2 emissions, which have been scientifically linked to chronic lung conditions and heart disease; and
- Water allocation for the Medupi FGD retrofit from the MCWAP Phase 2.

Socio-economic impacts will be assessed as a focus of the Impact Assessment Phase.

9. PLAN OF STUDY FOR EIA

9.1 Introduction

In terms of Chapter 5 of the NEMA EIA regulations, EIA refers to the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application. This includes an assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the proposed development as well as the cumulative impacts thereof. Mitigation measures for each significant impact are to be determined. Alternative land uses or developments, their impacts and their cumulative impacts will also be considered and compared with those of the proposed development. Details of the Public Participation Process (PPP) followed during the course of the assessment will be provided and it will be indicated how issues raised by stakeholders have been addressed. Knowledge gaps will be identified and descriptions of the arrangements for monitoring and management of the environmental impacts will be given.

9.2 Terms of Reference for Specialist Studies

The client appointed appropriate consultants to undertake the necessary specialist studies during the authorisation processes for the Power Station construction. Subsequent to the site investigation and based on the availability of these specialist studies for the receiving environment of the FGD retrofit, it is anticipated that the following original studies can be utilised for purposes of the FGD EIA process:

- Soils, land capability and agricultural potential;
- Geology and Geotechnical investigations (Phase 1 geotechnical investigations);
- Surface water resources (aquatic) and wetlands (including wetlands delineation);
- Groundwater resources.
- Noise pollution;
- Visual impact;
- Ecology (Terrestrial flora and fauna and Avifauna assessment);
- Heritage impact studies;
- Traffic impact studies; and
- Socio-economic investigations.

The specialist studies as above provide detailed descriptions of the receiving environment prior to the construction of the power station infrastructure. Therefore the FGD retrofit will impact upon a highly modified receiving environment and this will be motivated by evidence obtained at the site visit of January 2014. These specialist studies will be made available as appendices to the EIA Report and will inform the impact ratings and assessment.

Specialist studies that will need to be carried out specifically for the FGD retrofit will include the waste classification, socio-economic impact assessment, ecological assessment for rail yard and associated infrastructure, and the air quality assessment.

9.2.1 Waste Classification

Due to the additional waste streams generated by the FGD process, the waste classification will need to be undertaken to classify each waste stream independently and together. The objectives of this updated waste classification study will be to assess the Medupi Power Station Flue Gas Desulphurisation (FGD) Plant as per the minimum requirements for the Integrated Environmental Authorisation for Environmental Authorization and Waste Management License Application.

The scope of work includes the following activities:

- Ash classification will be based on laboratory analysis of total and leachable fractions of 3 samples of Matimba ash according to DEA norms and standards.
- FGD crystalliser solids and FGD ZLD system sludge will be classified based on estimated total concentrations of constituents provided by Eskom's engineers. These values are based on both calculated removal efficiencies and literature values. The leachable concentrations will be based on the assumption of total dissolution for trace elements. For the leachable ion concentrations relevant salt solubility limits will be used to estimate the dissolved fraction.
- The classification of gypsum is in discussion with Eskom and the design engineers. At this stage, it is likely that the engineers can provide estimates of the total salt components but not the trace element concentrations. Therefore the total estimated salt components will be used and literature solubility limits for gypsum will be used to estimate the leached ionic concentrations. At this stage it is likely that the total trace element components will be obtained from literature values and the leachable concentrations calculated assuming total dissolution of the total fraction.
- Classification of mixtures of waste materials will be based on total and leachable concentrations for ash, salts, sludge and gypsum determined as described above and taking cognisance of the estimated annual volumes of the materials produced.

The waste classification will have significant input towards the preferred alternative for waste disposal as well as the conceptual design of the required disposal facilities.

9.2.2 Socio-economic Impact Assessment

A Socio-economic Impact Assessment (SIA) will be carried out for the proposed Medupi Flue Gas Desulphurisation Retrofit project. The focus of this SIA is on the impacts that the project is expected to have on the local socio-economic environment, where the latter is defined as the area delimited by the boundaries of the Lephalale Local Municipality. However, it is recognised that the project will also have impacts that extend to a provincial and perhaps even national level.

Additionally, the SIA must provide an investigation and description of the receiving socio-economic environment. It must be noted that the proposed project is for the Flue Gas Desulphurisation Retrofit and not for the Medupi Power Station itself.

The agreement certifies that the specialist will undertake the following:

- Field work to the required level of confidence for decision-making;
- Detailed description of the baseline receiving environment;
- Trends and conditions in the environment that affects the socio-economic environment as it currently exist within the zone of influence will be identified and analysed;
- Social sensitive areas will be mapped in a sensitivity map for easy reference;
- A full description of potential impacts (direct and indirect) will be provided, relative to these specific developments;
- Practical mitigation measures will be recommended and discussed;
- If a need for the implementation of a monitoring programme in the EMP phase is evident, it will be highlighted and a programme proposed;
- Recommended management and mitigation measures to be provided in a Management Plan Format;
- Impact statement;
- Opinion of the specialist; and
- The no-go alternative should also be assessed in terms of the NEMA Regulations.

9.2.3 Ecology Assessment for Rail Yard and associated infrastructure

The ecological assessment should be carried out to address the minimum requirements for such an assessment and should be defensible to the authorities. The following activities will be carried out for purposes of an ecological assessment for the Medupi Power Station Flue Gas Desulphurisation Retrofit Project, rail yard site:

- Conduct a detailed ecological impact assessment for the rail yard;
- Describe the areas in terms of floristic and faunal species composition, assemblages, communities, red data probabilities and general environmental attributes;
- Identify and describe the effect of expected impacts on ecological attributes of the linear structure;
- Compile sensitivity maps, highlighting areas of concern;
- Conduct a detailed ecological sensitivity analysis for the linear structure in order to verify results obtained from the impact assessment;

- Propose mitigation measures to minimise expected adverse impacts.

9.2.4 Air Quality Assessment

The scope of work for the air quality assessment will include the following:

- A review of the existing air quality assessment for Medupi Power Station;
- A description of the FGD process and how it will affect emissions from the Power Station;
- A study of relevant requirements;
- A study of the receiving environment in terms of sensitive receptors:
  - The identification of sensitive receptors;
  - Atmospheric dispersion potential of the area;
  - Analysis of all available ambient air quality information to determine pre-operational phase ambient pollutant levels;
- The compilation of a comprehensive emissions inventory for the Power Station's operational phase, including:
  - Particulate Matter emissions from the operational phase activities;
  - Boiler combustion emissions (PM, NO_x, SO_2);
- Atmospheric dispersion modelling to simulate PM, NO_x and SO_2 concentrations and the change therein as a result of the FGD retrofit. Modelling to include meteorological and dispersion modelling through the use of the approved US EPA CALPUFF modelling suite;
- An assessment to determine compliance of PM, NO_x and SO_2 NMES and NAAQS;
- An impact assessment as per the methodology provided by Zitholele Consulting;
- The compilation of a comprehensive air quality specialist report with input into the Environmental Management Programme.

9.2.5 Specialist Studies for new disposal facility

The location options for alternative disposal facility/ies will only be investigated once it is determined that these facilities are necessary. Therefore, some additional specialist studies may be required specific to the location alternatives for the new disposal facility/ies. Detailed geotech and groundwater studies will be required for any new and additional disposal facility. It is likely that other specialist studies may be identified once the disposal site/s have been confirmed.

9.3 Impact Assessment Methodology

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard

impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria, as discussed below.

9.3.1 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.

9.3.2 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 9: 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

9.3.3 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. See Table 10for the criteria for rating duration of impacts.

Table 10: 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	4

	beyond construction or decommissioning. The impact is only reversible with considerable effort in implementation of rigorous mitigation actions.	
Permanent	The impact will continue indefinitely and is not reversible.	5

9.3.4 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 11 and Table 12 below.

Table 11: Criteria for impact rating of potential intensity of a negative impact.

Potential Intensity Descriptor	Definition of negative impact	Rating
High	Any impact to human health/mortality/loss of a species.	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 12: Criteria for the impact rating of potential intensity of a positive impact.

Potential Intensity Descriptor	Definition of positive impact	Rating
Moderate-High	Met 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.

9.3.5 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 13 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 13: 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

9.3.6 Cumulative Impacts

Cumulative impact 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.

9.3.7 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, spatial and temporal scale as described below:

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

Table 14 provides the resulting significance rating of the impact as defined by the equation as above.

Table 14: 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 authorised

An example of how this rating scale is applied is shown below:

Table 15: Example of Rating Scale

Nature	Extent	Duration	Potential Intensity	Likelihood	Rating
Emission of SO_2 to the environment in concentrations above the minimum emissions standards. The area is a priority hotspot in terms of air emissions and there are several industrial operations that contribute to extensive emissions of SO_2.	*Global*	Long term	HIGH	**Probable**	High
	5	4	16	0.5	12.5

9.3.8 Notation of Impacts

In order to make the report easier to read the following notation format is used to highlight the various components of the assessment:

- Extent- *in italics*
- Duration – in underline
- Potential intensity – IN CAPITALS
- Likelihood - in **bold**

Please note that the impact rating system may change slightly to accommodate ease of use. However, the basic principle of the rating system will remain the same.

9.4 Environmental Impact Report

Once the Scoping Report and the Plan of Study for the EIA is accepted by the DEA, Zitholele will begin the Environmental Impact Report.

The Environmental Impact Report will include the activity description; site assessments; public participation; a description of the issues and assessment of the site. The specialist studies results will be summarised and integrated into the Environmental Impact Report.

The WMLA Report will include all the technical information generated by the Design of the Facility, the Site Survey and the Operating Plan. In addition all the documents required by DEA for the waste license will also be included. These include the emergency and response plan, the closure and rehabilitation plan and the waste hierarchy implementation plan.

9.5 Environmental Management Programme

An Environmental Management Programme (EMPr), in the context of the Regulations, is a tool that takes a project from a high level consideration of issues impacts down to detailed workable mitigation measures that can be implemented in a cohesive and controlled manner. The objectives of an EMP are to minimise disturbance to the environment, present mitigation measures for identified impacts, maximise potential environmental benefits, assign responsibility for actions to ensure that the pre-determined aims are met, and to act as a “cradle to grave” document. The EMPr will be drafted according to the findings in the Scoping Report and EIR.

9.6 Public Participation during the EIA Phase

The purpose of public participation during the Impact Assessment Phase is to present the findings of the EIA phase and to avail the Draft EIR to the public for comments. I&APs will be afforded an opportunity to verify that their issues have been considered either by the EIA specialist studies, or elsewhere. Also, I&APs will comment on the findings of the Draft EIR, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones. Once the review is completed, the authority may decide to request additional information on matters that may not be clear from the report, authorise the application with certain conditions to be complied with by the applicant or reject the application. An EA reflecting the decision of the authority as well as any conditions that may apply will be issued to the applicant.

I&APs will be advised in good time of the availability of these reports, how to obtain them, and the dates and venues of public and other meetings where the contents of the reports will be presented for comment.

The public participation process for the EIAs will involve the following proposed steps:

- Announcement of the availability and public review of the Draft EIR;
- Host a public meeting for the stakeholders to review the Draft EIR;

- Announcement of the availability of the Final EIR;
- Notification of the authorities' decision with regard to EAs

9.6.1 Announcing the availability of the Draft EIR and the EMPr

A letter will be circulated to all I&APs, informing them in terms of progress made with the study and that the Draft EIR and EMPr are available for comment. The report will be distributed to public places and also presented at a stakeholder meeting. Advertisements will be placed in the same newspapers used in the scoping phase to announce the public review period of the Draft EIR.

9.6.2 Public review of Draft EIR and EMPr

The EIA Guidelines specify that stakeholders must have the opportunity to verify that their issues have been captured and assessed before the EIA Report will be approved. The findings of the specialist assessment will be integrated into the Draft EIR. The report will be written in a way accessible to stakeholders in terms of language level and general coherence. The Draft EIR will have a comprehensive project description, motivation and also the findings of the assessment and recommended mitigation measures. It will further include the Issues and Responses Report, which will list every issue raised with an indication of where the issue was dealt with in the EIR. The findings of the assessment and recommended mitigation measures will also be incorporated into the EIR.

As part of the process to review the Draft EIR and EMPr, one stakeholder workshop with an open house component will be arranged to afford stakeholders the opportunity to obtain first-hand information from the project team members and also to discuss their issues and concerns. Contributions at this meeting will be considered in the Final EIR.

9.6.3 Announcing the availability of the Final EIR and EMPr

A letter will be circulated to all I&APs, informing them in terms of progress made with the study and that the Final EIR and EMP are available for comment. The reports will be distributed to the same public places (See Chapter 5 with the venues) as the previous reports for I&APs to review.

9.6.4 Progress feedback

After comments from I&APs have been incorporated, all stakeholders on the database will receive a personalised letter to report on the status of the process, to thank those who commented to date and to inform them that the Final EIR and EMPr have been submitted to the lead authority for consideration. I & APs will be advised on the next steps in the process.

9.6.5 Announce authorities' decision

Registered I&APs will be notified by individual letters of the results from the authorities. Should it be a requirement from the authorities an advertisement will be placed in the same newspapers which were used during the scoping and impact assessment phases.

9.7 Submission of Final EIR and Decision Making

Using the comments generated by the PPP the Draft EIR will be updated and finalised. All comments received will be added to the CRR and attached to the Final EIR as an appendix.

The Final EIR once updated with additional issues raised by I&APs may contain new information. The Final EIR will be submitted to the DEA for decision making, and will be distributed to those I&APs who specifically request a copy. I&APs will be notified of the availability of the report by letters, advertisements and emails.

9.8 Overall EIA Project Schedule

Table 16: Primary milestones of the Project

Milestones	Date
Final Scoping Report	July to December 2014
Undertake Specialist Studies	February to March 2015
Draft EIR and EMP	June 2015
Stakeholder Engagement on EIR / EMP	July to September 2015
Finalise EIR and EMP	September to October 2015
Submission to Relevant Authorities	October 2015
Environmental Authorisation	January 2016
Appeal Period	To be confirmed in the Impact Assessment Phase

10. CONCLUSION AND WAY FORWARD

Eskom appointed Zitholele Consulting to undertake the EIA, WML and WUL application for the proposed Medupi Power Station FGD technology retrofit. This Scoping study is being undertaken with the aim of identifying potential aspects of concern (both positive and negative) on the biophysical environment and identifying issues, concerns and queries from I&APs. This DSR documents the process followed, the findings and recommendations of the Scoping study, and the proposed Plan of Study for the EIA Phase to follow.

This DSR will be submitted to the public for comment. During the comment period meetings will be held with key stakeholders, focus groups and the public to discuss the Scoping Report and any issues of significance that should be taken cognisance of on the way forward.

Following public review and comment, the Scoping Report will be finalised to address comments, and will be submitted to the authorities for acceptance. Once the FSR and plan of study for EIA has been accepted, the project will move into the Impact Assessment Phase.

This report provides accurate information as provided by the client, appropriate literature and EAP investigation.

ZITHOLELE CONSULTING (PTY) LTD

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APPENDIX A : EIA APPLICATION FORM[1]

[1] **Please note that information has already changed since the submission of these application forms and that these forms will be updated and resubmitted to the competent authority during the IA Phase of the process.**

APPENDIX B : EAP CV

APPENDIX C : PROCESS FLOW DIAGRAMS

APPENDIX D : PUBLIC PARTICIPATION SUPPORTING DOCUMENTS

APPENDIX E : ABSORBER DIAGRAMS