DRAFT SCOPING REPORT

Environmental Impact Assessment

THE PROPOSED DEVELOPMENT OF A POWER PLANT IN MBONAMBI MUNICIPALITY

Umbani Power Company

PURPOSE OF THIS DOCUMENT

Umbani Power Company is proposing to develop a cogeneration power facility in the Mbonambi Local Municipality, KwaZulu-Natal. This facility will either be a 270 or 540 MW power station, pending Eskom's requirements. Golder Associates Africa Pty Ltd has been appointed as the independent environmental consultants to undertake the Environmental Impact Assessment (EIA) for the proposed 540 MW power facility.

In 2003/4 a detailed feasibility study for the project was conducted. An EIA was commissioned, albeit at a different location, and Scoping was finished. The EIA was never completed because, at that time, it was not possible to establish new power generation capacity at Eskom's ruling price for electricity. The information gathered during this study has been used as a base for this report.

Scoping is the first phase of an EIA and involves the identification of issues and concerns regarding the proposed development. It is an important phase as it allows the public to identify issues and concerns, which then become the basis for investigations by technical specialists during the Impact Assessment phase.

The EIA regulations state that all interested and affected parties must have the opportunity to verify that all the issues they raised during the Scoping Phase have been captured, understood, interpreted and contextualised. The main purpose of the Draft Scoping report is to provide:

- An overview of the proposed development;
- An overview of the existing environment in the project area,
- An overview of the EIA process, including the public participation process, and
- A review the issues and concerns identified by stakeholders during the Scoping process, and the way forward in the Impact Assessment Phase.
- The Draft Scoping Report (this report) and its accompanying reports will be available for comment from 10 May 2008- 10 June 2008.

After the public comment period, the Final Scoping Report will be sent to the Department of Environmental Affairs and Tourism for consideration and approval of the Plan of Study for Impact Assessment.

PUBLIC COMMENT ON THE DRAFT SCOPING REPORT DURING 10 MAY 2008 TO 10 JUNE 2008

The Draft Scoping Report and Summaries of the report have been distributed to key stakeholders that requested to be kept informed about this proposed project in response to invitations distributed in November 2007. Copies of the report are also available at strategic public places in the project area (see below). Stakeholders are also invited to request additional photocopies or electronic copies from the public participation office

PUBLIC PLACE	CONTACT PERSON	TELEPHONE
eNseleni Public Library	Ms Gugu Ngema	035 907 5880/1
KwaMbonambi Library	Ms Pinkie Sandu	035 580 4963
Khenani Community Hall	Mr Mbokazi	082 832 0272
Empangeni Library	Ms Lethiwe Mazibuko	035 907 5601/5640
ACER Offices, Mtunzini	Ms Nicole Marneweck	035-340 2715
Richards Bay Library	Ms Rosemary Chapman	035 907 5843
Project website	http://www.acerafrica.co.za/umbani	

Stakeholders could comment on the Draft Scoping Report in any of the following ways:

- Completing the comment sheet enclosed with the report;
- Additional written submissions; and
- Comment by email or telephone.
- The Draft Scoping Report will be available for public comment from 10 May to 10 June 2008.

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LIST OF ABBREVIATIONS

Term / Abbreviation	Description
DEAT	Department of Environmental Affairs and Tourism
DAEA	Department of Agriculture and Environmental Affairs
DME	Department of Minerals and Energy
DWAF	Department of Water Affairs and Forestry
EIA	Environmental impact assessment
EMP	Environmental Management Plan
Ha	Hectares (measurement of area)
I&APs	Interested and affected parties
IDZ	Industrial Development Zone
MW	Megawatt
m	Meters (measurement of distance)
MPRDA	Minerals and Petroleum Resources Development Act
NDA	National Department of Agriculture
N2	National Road 2
NEMA	National Environmental Management Act
NGO	Non-government Organisation
RBCAA	Richards Bay Clean Air Association
RBCT	Richards Bay Coal Terminal
ROD	Record of Decision
SAHRA	South African Heritage Resources Agency
WULA	Water Use License Application

1 INTRODUCTION AND PROJECT OVERVIEW

1.1 Introduction and background

Greater economic development in South Africa, and specifically in the Richards Bay area, has produced a need for new power generation facilities. Umbani Power Company (Umbani), a cogeneration power producer, is proposing to develop either a 270 or 540 MW Fluidised Bed Boiler Power Plant in the KwaMbonambi area of KwaZulu-Natal. The output of this facility will be dependent on Eskom's requirements; however this Environmental Impact Assessment (EIA) will review the potential impacts and benefits associated with a 540MW plant. This cogeneration facility will utilise discard coal from existing and decommissioned mines in KwaZulu-Natal and Mpumalanga Provinces. The electricity produced will be fed into Eskom's transmission network, and should result in the significant stabilisation of electricity supply in the greater City of uMhlathuze area.

During 2003/4 a detailed feasibility study for the proposed development of a power station was undertaken by Black and Veatch International (BVI), albeit at a different site which was located within the Richards Bay Industrial Development Zone (IDZ) (Site 1D). The CSIR was commissioned to undertake the EIA at that time and the scoping phase of the EIA was completed. The next phase of the assessment was never initiated, primarily due to Eskom's price for electricity purchases, at that time, making it unfeasible to establish new power generation capacity. A subsequent shift in electricity purchases and the increasing demand for electricity has enhanced the opportunity of developing the proposed cogeneration power station.

Box 1: Cogeneration power producer

Cogeneration is often understood as a process using a combination of heat and power to generate energy from the combustion of fuels. In this case electricity will be generated through the combustion of waste products in the form of discard coal, a by-product of the mining industry in South Africa.

A key component of the cogeneration technique is that it aims to simultaneously create more energy from a single fuel source, through an environmentally sensitive technique striving to decrease the amounts greenhouse gas emissions. The heat at which fuels are burnt, and the engineering methodologies implemented are the key driving forces behind this technology. (EcoGeneration Solutions LLC. Companies, 2008).

1.2 Motivation for the project

The Richards Bay IDZ and other commercial enterprises in Richards Bay and Empangeni, mark the City of uMhlathuze as having one of the highest growth rates in South Africa. This necessitates an improved quality and supply of local power as the nearest power station is

approximately 400km away. The longevity of the Richards Bay IDZ and the continued economic development in the area requires the development of effective infrastructural support. The proposed project aims to achieve this by supplying the City of uMhlathuze and Mbombani with approximately 540W of extra power into the existing electrical grid system.

In 2006, Eskom initiated a competitive bidding system between independent power producers, opening the market for power generation companies to deliver electricity into the national grid on a competitive basis. This has made it viable for Umbani to investigate the possibility of developing a cogeneration power facility to supply Eskom with the extra power needed.

South Africa is able to produce power substantially cheaper than other countries; due to the high volumes of coal within the country. This project proposes to use the low cost discard coal from the coal dumps of mines inland. This discard coal has low calorific value and, for this reason, is not exported into international markets. The coal dumps can have an impact on the surrounding environment, if not managed correctly. This proposed project has developed a use value for the discard coal, and aims to generate electricity to boost economic development in South Africa.

South Africa also has a high-class rail infrastructure used to transport coal to the coast for export. This infrastructure allows the proposed project to be based closer to where the electricity generated will be distributed, thereby promoting a more stabilised power supply. The transmission losses are also reduced as the electricity generated can be fed directly into the Municipality grid. It is for these reasons that the identification of the two proposed sites has been dependent upon three key characteristics; namely close proximity to a good road and railway infrastructure, close to existing electrical infrastructure, and located on relatively flat topography.

1.3 Legal requirements for this project

In terms of the Environmental and Conservation Act (Act 73 of 1989) an Environmental Impact Assessment is required for those activities that have the potential to impact significantly on the environment. It is a process, indicated in Figure 1, aimed at identifying, predicting and assessing the potential positive and negative impacts on the environment associated with a proposed development. It includes developing recommendations and mitigation methods that can be implemented to reduce the impact of the proposed project on the environment.

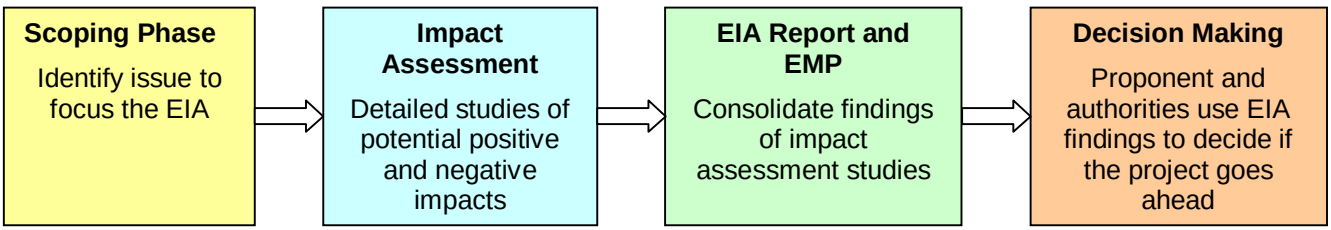

Figure 1: Brief outline of the EIA phases

The main purpose of an EIA is to provide the relevant authorities with sufficient information on the proposed project, to allow them to make a decision on whether or not the project application should be accepted or rejected. The EIA process includes a number of phases, which are illustrated in Figure 1 above, this report provides the information gathered during the Scoping Phase.

Box 2: The meaning of the word 'environment'

The definition of the word environment as referred to in EIA's, includes not only the physical (land, water, air, soils) and biophysical environment (fauna and flora), but also the socio-economic environment (politics, culture, history, the national and international economy).

1.3.1 NEMA, (Act No. 107 of 1998)

The National Environmental Management Act (Act No. 107 of 1998) is South Africa's overarching environmental legislation, and provides a framework for environmental management. In terms of the NEMA, 1998 (Act No. 107 of 1998) as amended, and the EIA Regulations published in July 2006, environmental authorisation is required from the KwaZulu-Natal Department of Agriculture and Environmental Affairs (DAEA) for the proposed development of a cogeneration power facility.

A full EIA is required in terms of the EIA Regulations, 2006, promulgated in terms of Section 24 (5) of NEMA. Below is a list of those activities associated with this proposed development.

Activity 1 (R387 of 2006) – "*The construction of facilities or infrastructure, including associated structures or infrastructure for:*

- *(a): for the generation of electricity where the electricity output is 20 megawatts or more; or the elements of the facility cover a combined area in excess of 1 hectare;*

- (l): *the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more*";

Activity 2 (R387 of 2006) – "*Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more*."

Other legislation which needs to be taken into account during this EIA (although not limited to) includes the:

- National Nuclear Regulator Act (Act 47 of 1999);
- National Water Act (Act 36 of 1998);
- National Environmental Management Biodiversity Act (Act 10 of 2004); and the
- White Paper on Integrated Pollution and Waste Management for South Africa (Notice 227, Government Gazette 20978 of March 2000).

1.3.2 EIA Applicant and Environmental Assessment Practitioner

Umbani has appointed Golder Associates Africa (Pty) Ltd in association with Acer (Africa) Environmental Management Consultants, as the independent Environmental Assessment Practitioners (EAPs) to undertake the Environmental Impact Assessment Process (EIA). Both Golder and Acer (Africa) are experienced in environmental assessment and management, and are familiar with the EIA requirements for the proposed project. See Table 1 for the project team.

Table 1: EIA Project Team

NAME	ORGANISATION	ROLE
Mr Rob Hounsome	Golder Associates Africa	Lead EAP
Ms Kristine van der Meer	Golder Associates Africa	EIA Researcher
Dr Dieter Heinsohn	Acer (Africa)	Public Participation Leader
Ms Debbie Steenberg	Acer (Africa)	Public Participation Coordinator
Ms Nicole Marneweck	Acer (Africa)	Public Participation Practitioner

(The EAPs have no vested interest in the proposed project and have signed a Declaration of Independence to that effect.)

Expertise of Lead EAP

Rob Hounsome is a registered Environmental Assessment Practitioner of South Africa (EAPSA) and is a registered professional natural scientist (Pr.Sci.Nat Reg. No. 400123/96). He is the Leader of Golder's Sustainable Development Division, and has over 14 years experience with various aspects of environmental assessment and management. He provides consultancy and advisory services in terms of various aspects of environmental assessment and management (with both the International Lending community and project developers), Strategic Environmental Assessment and State of the Environment Reporting, Sustainability Appraisal and Management, the Development of Sustainable Development Strategies and Communication, and Sustainability Indicators. He has worked throughout Africa and globally, having conducted projects in Algeria, Botswana, the Democratic Republic of the Congo, Ethiopia, Mozambique, Namibia, Nigeria, Russia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe, the United Arab Emirates and Oman. He is the recipient of a number of awards for example from South Africa's Council for Scientific and Industrial Research; the BHP Billiton International Health Safety and Environmental Award (2001), and IAIASA National Premium Award for Excellence in Environmental Assessment (2002).

Rob sits on a number of advisory panels such as South Africa's Interim Certification Board for EAPs, the Board of the School of Environmental Sciences at the University of KwaZulu-Natal, the indicators sub-committee of the GRI and the OECD panel for the incorporation of Strategic Environmental Assessment into International Lending.

1.4 Objectives of this report

In terms of Chapter 5 of NEMA (Act No. 107 of 1998) the amended EIA Regulations GR385 of 2006 stipulate that the Scoping Phase must:

- Gather the issues and concerns about the proposed project from potentially directly affected parties, relevant authorities, and other key stakeholders form various sectors in society;
- Identify the potential impacts associated with the proposed activity;
- Ensure that only significant issues and reasonable alternatives are examined.

A key requirement is to ensure that all issues and concerns raised during the Scoping Phase are well documented.

The objectives of this Scoping Report include:

- Providing information to the Department of Agriculture and Environmental Affairs (DAEA) and to other interested and affected parties (I&APs) on the proposed development of a power station in KwaMbonambi;
- Creating a further opportunity for stakeholders to comment and raise issues of concern relating to the proposed development;
- Demonstrating that alternatives have been considered as stipulated in EIA Regulations GR385 of 2006;
- Providing a description of the baseline receiving environment; and
- Highlighting potential impacts that should be investigated further during the ongoing EIA process.

1.4.1 Responsibilities of I&APs

Registered I&APs are entitled to comment, in writing, on all submissions made to the authority to raise issues that they believe may be of significance provided that:

- Comments are submitted within the timeframes set by the competent authority or extensions of timeframes agreed to by the applicant or EAP;
- A copy of comments submitted directly to the competent authority is served on the applicant or EAP; and
- The I&AP discloses any direct business, financial, personal or other interest which that party may have in approval or refusal of the application.

2 LOCATION AND REGIONAL SETTING

The proposed project is investigating two possible sites located in the uThungulu District Municipality of KwaZulu-Natal, South Africa (see Figure 2). Richards Bay and Empangeni are the major residential, industrial and commercial centres located in this District. Richards Bay is the busiest and largest port in Africa, and is an ideal location for heavy and resource-intensive industry as well as agro-processing endeavours and tourism projects (Richards Bay IDZ, 2007). The port is well situated in South Africa and caters for the domestic, industrial and commercial activities in Gauteng, and provides an access point for international markets too.

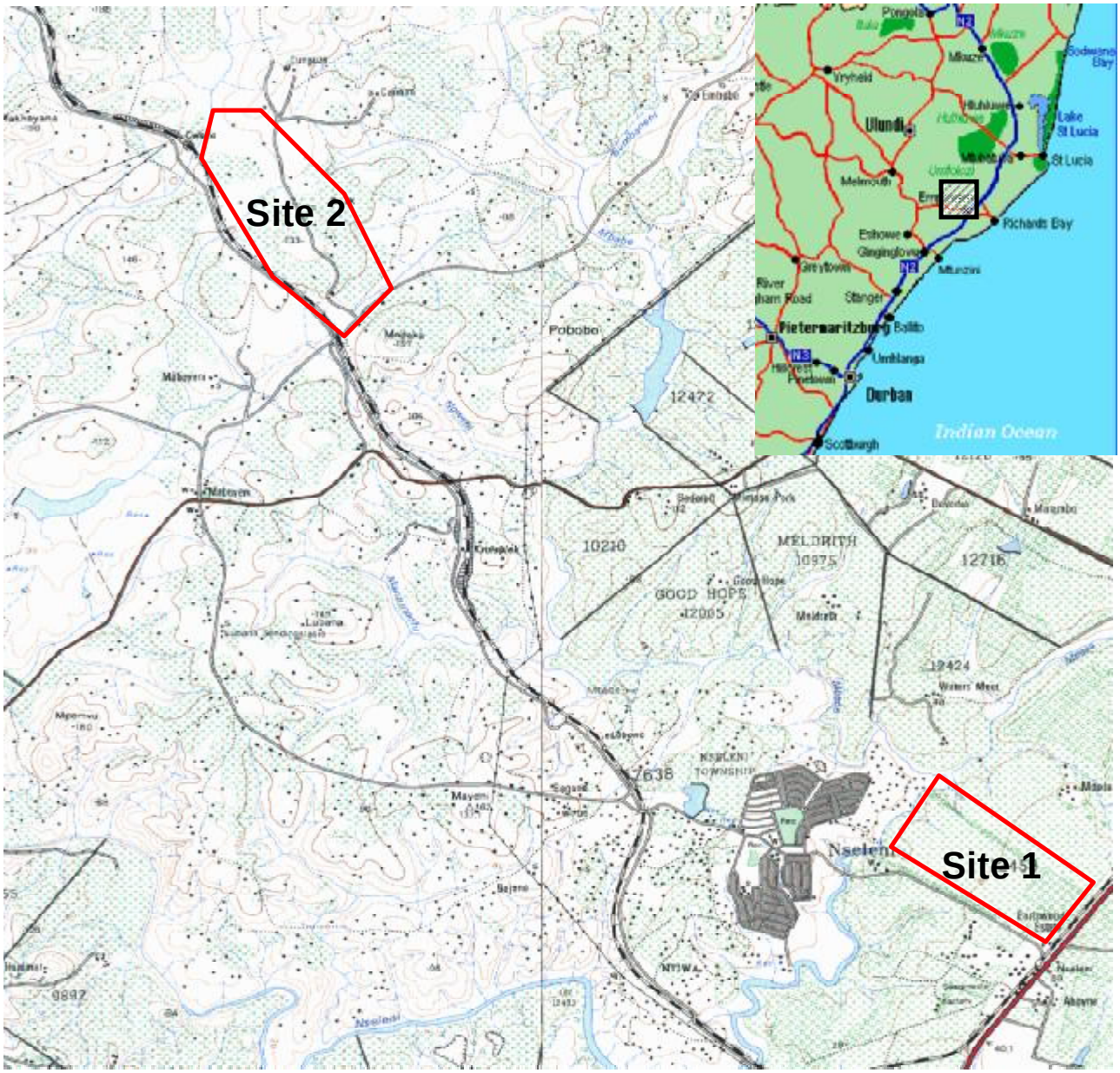

Figure 2: Map indicating the regional setting and location of both sites (Sourced from: South Africa 1:50 000 Maps -2831DB 2832CA)

The Richards Bay port was established in 1976 as a bulk-port to export coal. A railway system, Transnet Freight Rail, runs from the mining regions of KwaZulu-Natal and Mpumalanga to the Richards Bay Coal Terminal (RBCT). It is also used to transport cargo from the Richards Bay port around South Africa, and passes in close proximity to both proposed project sites, making it possible for coal to be transported to and from the sites easily. This was a critical factor in the identification of the proposed sites. The two potential sites are discussed in more detail below.

2.1 Site 1

Site 1 occupies approximately 130 hectares and lies 15km north north west of Richards Bay, 30km north east of Empangeni, and about 2km east of the Nseleni township, as the crow flies (See Figure 3). To the west it is bordered by the Mposa River. Previously this site was used for sugarcane production and sand mining. The impacts of these two land uses are evident on the site, particularly the loss of topsoil and the formation of an artificial wetland located in the middle of the site. Despite the poor quality of soil in some areas, this site is currently zoned for commercial agriculture, and is currently used for commercial timber plantations (See Photo 1).

Photo 1: Photo of Site 1

Photo 2: Photo of Invubu Substation

The N2 and Transnet Freight Railway are located to the east of the site. It is surrounded by a range of land uses, such as a commercial seedling nursery, a sawmill and other commercial timber plantations. The residential area of Nseleni is home to approximately 300 households, of which approximately all are of low to middle income.

The Invubu Substation (See Photo 2) lies approximately 2.5km south south west of Site 1, providing the good electrical infrastructure needed for the proposed cogeneration facility.

Figure 3: Map showing Site 1 (Sourced from: Google Earth)

2.2 Site 2

Photo 3: Photo of Site 2

The proposed site will occupy a minimum of 200 hectares and lies approximately 23km north-west of Richards Bay, 20km north of Empangeni, and about 5km west of the residential area of Mabhuyeni (See Figure 4). The site is currently zoned as part of the settlement clusters in the Ingonyama Trust land. The land is therefore currently used for subsistence agriculture, livestock grazing, and is characterised by scattered rural settlements (See Photo 3). Other commercial activities in the area include sugar cane production.

The Transnet Freight Railway runs along the south-west border of the site. It is accessed from Empangeni on the western bypass road from the R34. This road eventually travels back onto the N2, albeit as a dirt road. This provides an easy access route to and from site and should this site be chosen, provides an opportunity for upgrading local infrastructure in the area.

Figure 4: Map showing Site 2 (Sourced from: Google Earth)

3 PROJECT DESCRIPTION

3.1.1 Fluidised bed boiler technology

In the 1970's, the increased demand for energy production that was economically viable and environmentally sensitive lead to the evolution of fluidised bed combustion technology. Today these systems are used worldwide; however this proposed project is the first of its kind in South Africa.

One significant advantage of the fluidised bed combustion technology proposed for the Umbani project is that it can use low grade coal as fuel, and at present South Africa has an abundance of discard coal piles from the mining industry.

Circulating Fluidised Bed (CFB) combustion technology is classified as a 'clean coal technology' as approved by the World Bank, because lower temperatures within the CFB boiler ensure a reduction in the formation of Nitrogen Oxides and limited Sulphur Dioxide emissions, thereby reducing environmental impacts during power generation. Limestone added with the fuel absorbs the sulphur dioxides emitted during coal combustion and forms calcium sulphate (gypsum), which

is removed with the ash. This cleaner technology ensures that more stringent environmental guidelines are adhered to, as Sulphur Dioxide emissions are reduced.

Fluidised bed boiler technology is a process where fuel and materials are suspended by strong jets of hot air thereby creating a highly agitated mass, resembling boiling water. This allows the coal or fuels to burn more completely and efficiently than in a conventional coal power plant. The burning fuel creates heat producing steam which is responsible for driving the steam turbine. There are three specific characteristics which control the process, namely:

- The size of the particles;
- The combustion-bed temperature; and
- The fluidising air velocity.

CFB technology is characterised by:

- Being able to burn a wide variety of fuels;
- High combustion efficiency due to the convective current in the boiler;
- Being suitable for low grade coals with high Sulphur content and low heat value while still maintaining acceptable emission levels;
- Being recognised by the World Bank for its low Sulphur Dioxide emissions, and because the combustion of coal occurs at reduced temperatures, Nitrogen Oxide emissions are limited too; and
- The CFB facilities are smaller than the conventional pulverised fuel or chain grate stoker coal fired power stations fitted with FGD.

3.2 Power generation process

Power is generated through the combustion of coal and/or biomass in a boiler to produce steam. The steam drives a steam turbine which in turn drives an electrical generator thereby producing electricity. In this case, the boiler or steam generator used is a circulating fluidised bed (CFB) type boiler.

In the CFB boiler coal and sorbent (limestone or dolomite) are added into the furnace. The sorbent is added to control the Sulphur Dioxide emissions, because it acts like a ‘scrubber’, absorbing the sulphur content of the coal. Water is then fed into the tubes that surround the furnace and the combustion pass areas, as it is heated, steam is produced and delivered to a steam turbine. In order to extract maximum energy from the steam, the steam escaping from the steam turbine (low pressure steam) is drawn into a steam surface condenser that operates under a vacuum pressure. This condenser is cooled by circulating water passing through tubes within the condenser, and

hence the steam is condensed. The condensed steam is returned to the CFB boiler in a continuous closed cycle and reused to produce more steam.

The low pressure steam has the potential to be used in other industrial activities (such as paper mills), however the potential users must be located within a relatively small distance from the power plant in order to make effective use of this relatively low energy content of the steam. The proposed Umbani cogeneration facility has to date not identified any potential users of this steam, and hence it will be condensed and recycled to extract maximum energy from the steam for power generation.

The circulating cooling water is also recycled within the CFB. It is cooled in either a mechanical forced draft cooling tower or a hyperbolic natural draft condenser, before it can be reused in the steam surface condenser. In both of these cooling systems, water is cooled by air forced upwards (either by fans or the natural draft of the hyperbolic tower) pressured against the downward flow of hot water (from the condenser) falling into the cooling tower by a multitude of spray nozzles. This cycle of operation is utilised by 99% of the power generation facilities in South Africa.

Each steam turbine within the CFB is connected to an electrical generator to produce electricity. The electricity is then fed into high voltage power lines that are used to transfer the electricity into a nearby substation. This substation is part of a transmission network used to distribute electricity to the relevant sectors. For this proposed project, the electricity produced will be supplied directly to Eskom, who will then distribute to the necessary sector/ persons. Figure 5 provides a simplified diagram of the power generation process.

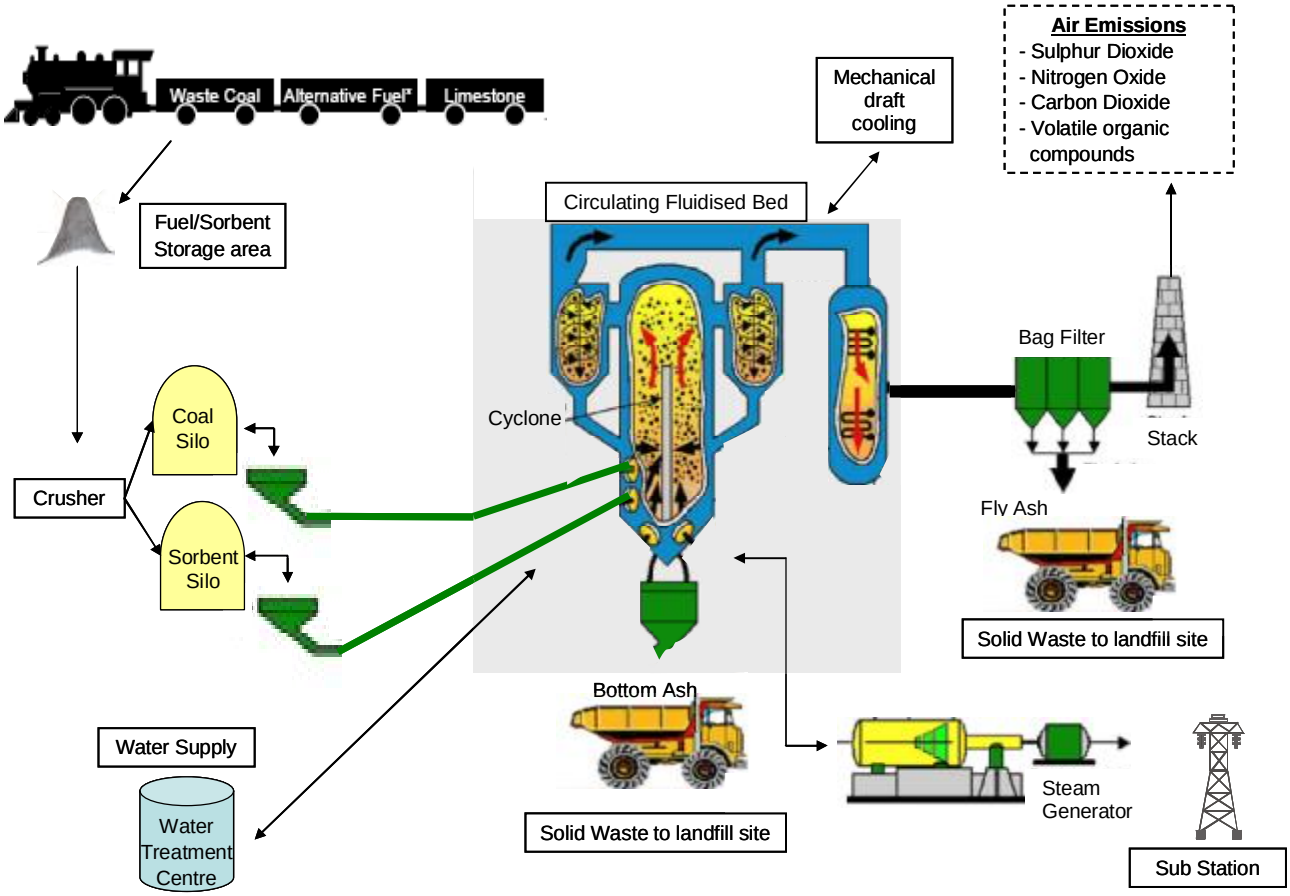

Figure 5: Simplified power generation process using CFB technology

3.3 Facility description

The proposed power generation facility will occupy approximately 60 hectares and will consist of all on-site equipment and systems necessary to safely and reliably generate up to 540MW of electricity. The figures indicated in this Draft Scoping Report represent the amounts of material required for a 540MW cogeneration facility. In the event Eskom require only a 270MW power facility, all input and output figures will be approximately halved.

The plant will consist of:

- Material handling systems for coal, biomass and limestone, including unloading, transport and storage systems;
- Raw water supply and storage;
- Four CFB boilers each producing sufficient steam to supply one steam turbine;
- Four steam turbines which will drive four generators that can produce 135MW of electricity;

- Fly ash and bed ash collection storage and disposal equipment;
- Flue gas emissions control equipment exhausting through a chimney stack (height to be determined during the feasibility study);
- Closed cycle cooling water system incorporating mechanical drat or natural draft hyperbolic cooling towers;
- A 275kV switchyard consisting of high voltage switch gear, cables and electrical protective devices;
- A water treatment facility, waste water treatment facility;
- Other service buildings for administration and auxiliary services; and
- .Fire detection and protection systems.

The following provides a description of the major facility equipment and operation process which will be used on-site.

3.3.1 Raw material handling and storage

Raw material delivery and unloading

Fuel (discard coal) will be delivered predominantly via rail to site. Each train of 100 cars has a capacity of 8 000 tonnes, and when the plant is operating at full capacity two trains will deliver coal every 1,5 days. Each train will take approximately four hours to offload the raw materials.

Sorbent delivery (limestone) will also be delivered by rail, and will occur at a rate of 430 000-450 000 tonnes per annum. The fuel and sorbent will be conveyed to the storage silos in accordance with established South African standards and should have minimal environmental pollution. Dust prevention methodologies will be implemented and spills will be dealt with as soon as possible.

Storage facilities

Coal and Limestone

Coal will be transported to fuel storage stockpiles via a conveyor system, which will run from the rail wagon tippler hopper to the individual storage piles. The plant will incorporate long and short term stockpiles. Coal will be transported via mobile equipment to long term storage piles during periods of high generation capacity and coal supply interruptions. Long term (30 day) stockpiles are necessary to ensure the power plant has sufficient supply of fuels at all times. A dust suppression system (water sprays) will be used to minimise dust pollution at the storage sites.

Similarly, sorbent will be transferred from the rail wagon tippler by conveyor to the sorbent stacking equipment. Mobile equipment will be used to move both the sorbent and fuel from their respective storage piles into reclaim hoppers, where it is then fed into the boilers.

Chemicals

The chemicals used on site are required only for the treatment of water. These chemicals will be contained by bund walls in the chemical storage facilities. These facilities will have sufficient volume to ensure that all chemical spills are contained in the bunded area. This will allow the chemicals to be collected efficiently and effectively to minimise environmental impacts.

Liquid effluent will be pumped to a neutralisation tank which, in conjunction with a waste water treatment facility will ensure that all water collected is adjusted to meet the proper environmental standards prior to discharge.

Raw material handling systems

Coal will be transported via belt conveyors to a high impact crusher, where the coal is crushed to approximately 3 millimetres. From here the fuel will be transported through transfer points on the conveyor system and will be deposited into the fuel silos at the CFB boiler. The fuel silos will be sized to contain sufficient coal for operation of the boilers for 30 days.

The crusher will be completely enclosed for dust control, while the conveyor belts will have a sprayer suppression system placed at each conveyor transfer point to control dust pollution. When the system is working at high capacity operations, it will only take a single daylight work shift to load the silos. Sorbent will also be crushed and conveyed to the storage silos adjacent to the CFB boiler.

3.3.2 Power plant processes and systems

CFB Boiler combustion

In a CFB boiler, combustion of the fuel occurs in a fluidised bed of fuel and sorbent at the bottom of the furnace. Heavy fuel oil is used as a start up fuel and to ensure stable combustion at below 30% load. The steam generator is fully enclosed, top supported and designed to ensure reliable continuous operation. Steam is produced in superheater, reheater and economiser tube bundles located in the flue gas passes and water wall tubes surrounding the furnace. Primary and secondary air systems are used to provide combustion air. Air heaters are used to preheat combustion air to ensure optimum combustion efficiency. Flue gas emissions control is achieved by the addition of limestone (Sulphur Oxide control), the relatively low combustion temperature (Nitrogen Oxide control) and bag houses or electrostatic precipitators (particulate control).

Steam turbine and generator

To ensure maximum plant efficiency the steam turbines will be a reheat, condensing steam turbine comprising a combined high pressure / intermediate pressure steam turbine and a separate steam turbine. The steam turbines converts the energy of the steam produced by the CFB boilers to mechanical energy which is used to drive the generators that produce electrical energy. Low pressure steam exhausted from the steam turbine is condensed in a water cooled condenser that is positioned below the low pressure turbine.

The generators will be rated to supply 135MW each at 0.9 power factor and will comply with all South African Grid Code requirements. The generator terminal voltage will be approximately 15kV which will be increased to the grid voltage of 275kV. Generator transformers will be used to connect the electricity into the Eskom transmission system. Power for operation of the power plant will be taken from the low voltage side of this generator transformer.

Combustion ash storage and beneficial re-use

Fly ash produced by the CFB boiler will consist of a mixture of the ash in the fuel and calcium sulphate. The calcium sulphate is produced by the reaction of the sorbent (calcium carbonate) and the sulphur in the flue gases. The exact composition of this mixture will depend on the ash content, the calorific value (heat content), and the sulphur content of the coal.

The fly ash collection equipment will ensure emissions of particulates released during the combustion phase of the CFB will not exceed current World Bank standards (50mg/Nm3). The exact chemical composition of the combustion ash will be assessed for each fuel burned in the CFB boiler to determine the opportunity to use the ash for beneficiary activities. Research has indicated that in many cases the ash leachate is non-toxic and can be used for soil remediation, coal mine reclamation, cement manufacturing, as well as other uses (Hawkey, G.M. and Merino, M.P.)

The ash will be transported either in a hydrated state or in an enclosed tanker truck to prevent ash dust being released. To date Umbani have been reviewing the possible uses of ash in the KwaMbonambi area. Potential projects include the development of an ashblock plant, or alternatively the use of ash for road stabilisation in the area. A cooperation agreement has been drafted with an ash beneficiation company, however any agreement is dependent upon Umbani being awarded the project. In the event there are no secondary uses for ash produced, Umbani have also been assessing two possible ash disposal methods. The ash will either be railed back to the coal mine where it will be safely deposited, or it will be disposed of at a demarcated dump site close to the power generation site. A key characteristic of most ash resources is that it is an inert substance and hence can be used for many beneficial activities. Umbani will continue to assess the probable chemical composition of the ash to determine if there are any other possible beneficiary uses for the ash.

Electrical switchyard/substation

The power produced from the proposed project will be fed into either Eskoms' Invubu substation and then into Eskoms's transmission grid which will supply the distribution grid of the uMhlathuze Municipality. The control and protection equipment for the substation and transmission lines will be located in the main power plant control area. This equipment will use Alternating Current (AC) and Direct Current (DC) systems.

The generating voltage of 11kV will be stepped-up to 275kV through two generator unit transformers. The power plant will be connected to the existing transmission grid through a 275 kV switchyard/substation, and auxiliary loads will be fed through two 275/11kV station utility transformers. The metering of energy will be done at Invubu substation for the energy sale from or energy purchase by the power plant.

The step-up transformer will be equipped with on-load tap changers, and will be protected from voltage surges by surge arresters. Internal and external faults will be detected and protected by protection relays. There will also be an islanding protection scheme to separate the power plant and uMhlathuze transmission system from the Eskom Invubu substation, in the event of an electrical fault upstream on the Eskom side.

Transmission lines

The transmission lines will originate from the power plant substation on a dead-end structure. The towers are anticipated to be double-circuit lattice steel structures with conductors fro each circuit arranged on each side of the tower. The grounding of the transmission lines will be undertaken through two methods. Ground rods will be used when they can be driven and meet the maximum ground resistance. Alternatively a counterpoise system will be installed where the grounding cable will run parallel to the line, and meet grounding requirements. These structures will have a protective coat against corrosion and will be painted.

3.3.3 Water treatment facility processes and systems

Process water systems

The water system components will include a water supply system, a fire and service water tank, a process water pre-treatment system, a water de-mineraliser, and cooling tower basin a pre-discharge treatment system. Approximately 16-32 mega litres per day of water will be required for cooling and this is proposed to be supplied from the municipal water board. These water requirements have to date been approved by the water authority.

Table 2: List of water processes and their functions

Process water system	Function
Fire and service water tank	• Specified level of water allocated for fire protection • Provide fresh water for wash down • Supply the de-mineralised water system
Water pre-treatment system	• De-mineralise the boiler feed water
De-mineralised water system	• De-mineralise all steam cycle process feed water
Cooling tower basin	• Storage of all steam cycle blow-down and other miscellaneous process drains till further use is required.
Pre-discharge treatment system	• Oil separator plant will remove oily waste from the water collected from floor drains. • Water will be discharged into the deep-sea effluent pipeline operated by the uMhlatuzue Water Board.

Cooling system

The cooling system within the power plant will consist of water being circulated from the steam surface condenser to the cooling tower via underground circulating water piping. In order to control the concentration of impurities, a certain percentage of this water will be discharged and replaced with clean water (blow-down water). This water will then discharged into the uMhlathuze Water Board effluent pipeline or used in the fly ash disposal / beneficiation process.

Storm-water collection and disposal

The majority of process areas will be covered in order to eliminate the possibility of storm-water contamination, and all roof drains will be discharged into the separate plant storm-water management system. All site storm-water runoff will be collected and directed into a storm-water collection and disposal system. Storm-water falling into outdoor contaminated and bunded areas will be forwarded to the oil/water separator for treatment prior to discharge.

3.4 Inputs and Outputs

The inputs and outputs necessary for the generation of power in a CFB power generation facility is indicated in Figure 6.

Inputs

Discard coal will be railed to the proposed project site via the Transnet Freight Railway system, from the mine dumps in the northern KwaZulu-Natal area. It is anticipated that approximately 200 wagon unit trains will be brought to the site, each with a wagon capacity of 83 tonnes respectively. It is anticipated that 3 trains of raw materials (coal and limestone) will be delivered every 2 days, as the plant will utilise approximately 11 000 tonnes of discard coal per day.

It is anticipated that the uMhlathuze water supply pipeline will provide the proposed power generation facility with the necessary 16-32 mega litre water requirements.

Outputs

The electricity produced from the proposed power plant will be fed into either Eskom's Invubu Sub Station at Site 1 Site 2, which is part of the Eskom transmission network delivering electricity throughout the uMhlatuze Municipality. The spent steam from the steam turbine will be cooled and condensed and reused in the CFB, unless downstream users of steam are identified.

Air Emissions

Air emissions will comply with current World Bank standards.Table 3 indicates the probable air emission quantities that will occur during the operation of the plant.

Table 3: Probable emissions during operation of the plant

Air pollution emissions from proposed project		
Parameter	24 hours (mg/Nm^3)	Annual (tonnes)
Particulate Matter (PM_{10})	50	N/A
Carbon Monoxide	N/A	5,500,000
Sulphur Dioxide	2000	41000
Nitrogen Oxide	750	N/A

Solid Waste

Solid waste that will be produced during operation of the power plant include combustion ash and gypsum. As stated above there is a possibility to use combustion ash for beneficiary activities (such as cement manufacturing, sludge stabilization or soil remediation). The exact composition of the combustion ash is dependent upon the chemical composition of the fuel, and the sulphur content of the coal. The coal will be scrubbed with a sorbent (limestone) to reduce Sulphur Dioxide emissions and thus an amount of calcium sulphate (gypsum) will be present in the combustion ash. The amount of gypsum will be dependent upon the sulphur content of the coal and the required air emission limits. The chemical composition of the ash produced from this cogeneration facility, will need to be investigated to determine secondary uses of the combustion ash.

Other likely solid waste will include rags, worn equipment parts and office supplies. These wastes will be transported to the local dumpsite.

Cooling tower blow-down water

It is anticipated that the proposed 540MW cogeneration facility use any waste water to condition (moisten) the combustion ash prior to disposal or other use to aid handling or transport. Thus

wastewater disposal will be minimised. Any residual wastewater will be treated and disposed in accordance with local South African water disposal regulations.

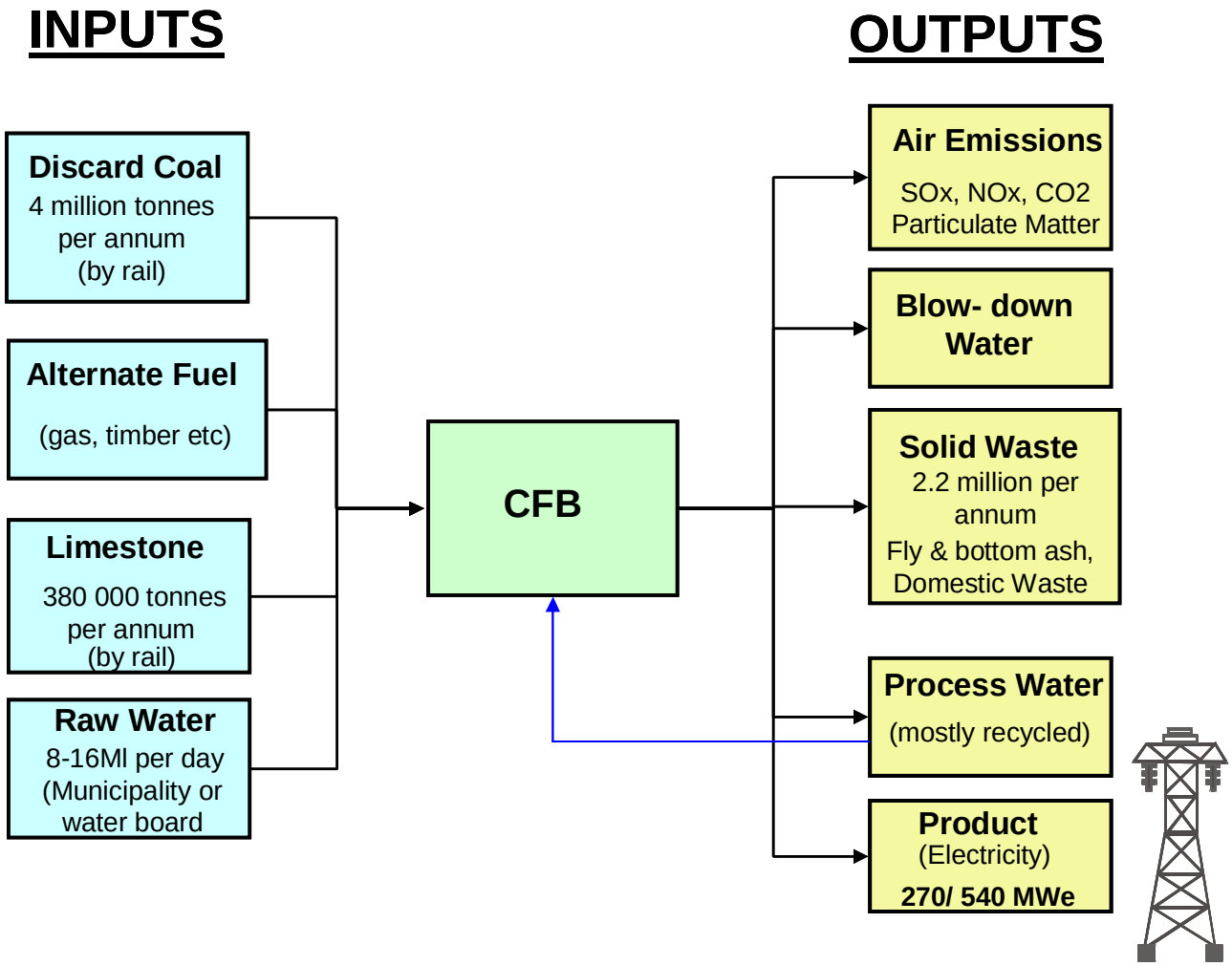

Figure 6: Inputs and outputs of the CFB power generation process

3.5 Site Layout

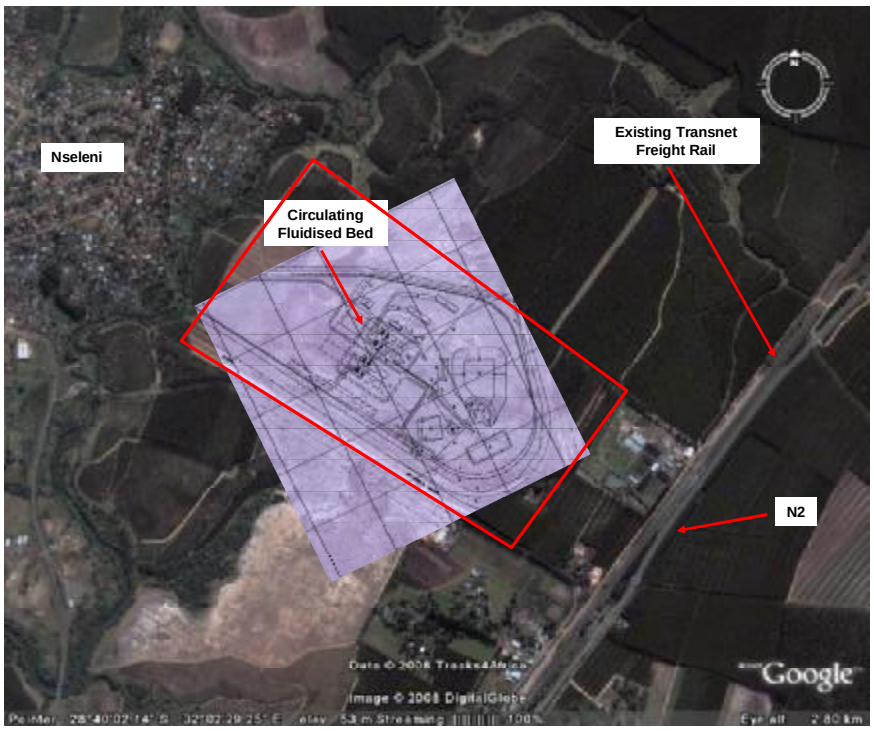

Figure 7: Proposed site layout for Site 1

Figure 8: Proposed site layout for Site 2

4 RECEIVING ENVIRONMENT

The two proposed sites are located within Mbonambi Local Municipality situated within the uThungulu District Municipality in the north-east of KwaZulu-Natal. The Nseleni site (hereon referred to as Site 1) and the Mabhuyeni site (hereon referred to as Site 2) lie approximately 11km (along the railway) from each other. Despite this close proximity, Site 1 is located in Ward 2 whereas Site 2 is located in Ward 7. The following chapter describes the ecological and socio-economic characteristics of each site, therefore identifying the area which could be affected by the proposed development.

4.1 Climate and atmospheric conditions

The uThungulu District Municipality experiences a subtropical climate with hot and humid summers and warm winters. The climate is greatly affected by the daily changes between berg and on-shore air movements. These local wind conditions, namely north-easterly and south-westerly flows, are characteristic of any sea/land interface. The south-westerly winds are often associated with cold fronts travelling up the east coast of South Africa, and are usually preceded by a dry, hot warm front.

Rain falls predominantly in the summer months, although precipitation is experienced throughout the year, October to March are the wetter months. The mean annual range for the area is approximately 800mm to 1400mm. The area experiences high humidity levels during summer, with temperatures averaging at 21.9ºC. Winters are generally more moderate as a result of its inland location, and temperatures average between 8ºC to 18ºC.

4.2 Geology, topography and soils

4.2.1 Topography

Mbonambi Local Municipality comprises of a long flat coastal plain, which rises gently from the coast towards the west where it reaches heights of approximately 200 meters above sea level (Annual Report, 2007). Site 1 is located on the edge of the coastal plain with relatively flat topography and a slight downward gradient on the west of the site. The slopes that occur on this site are characterised as being less than 2%.

Site 2 is characterised as more open and low hills or ridges with slopes ranging from 3% to 5%. This site will require levelling prior to construction, as the land slope descends to the northwest of the site.

4.2.2 Geology and soils

The western sections of the Mbonambi area belongs to the Karoo Sequence. This is characterised by the Dwyka Formation of glacial deposits where the base consists of layers of sandstone, mudstone and shale of the Ecca group. Basaltic lavas usually enclose this formation.

Site 1, according to Mucina, L. and Rutherford, M.C. (2006), is located in the Maputaland Coastal Belt. The sandy coastal plain is separated from the sea by a line of dunes, and lies approximately 45 meters above sea level. This site was previously mined for sand resources, but is currently used as a timber plantation. Due to the mining of the soil in the 1970's the quality and fertility of the soil has declined thereby reducing timber yields. Another consequence of this extensive sand mining is the presence of a human induced wetland, which exists between the timber plantations.

Mucina, L. and Rutherford, M.C. (2006) define Site 2 as existing within the Zululand Coastal Thornveld, as it lies approximately 95 meters above sea level. Soils are mainly black with a relatively high (35-55%) clay content, and range between 200-300 mm in depth. The Mbonambi Annual Report (2007) describes soils in the west being a clayey loam with a high erodibility potential.

4.3 Surface and ground water

The rivers on the southern section of the Mbonambi Local Municipality drain towards the coastal lakes of Nhlabane, Nsezi and Mzingazi, all of which form part of the Mhlatuze catchment (Annual Report, 2007). The groundwater in the western sections of the Mbonambi area is generally of a poor quality. Bore holes are expected to give moderate yields, although this is dependent on the depth of saturated sand, grain size and recharge events.

To the west of Site 1 lies the Mposa River. This river drains into the Nseleni River that eventually drains into Lake Nsezi. Within the timber plantations is an artificial wetland formed as a result of the intensive sand mining. This wetland is considered to be of low ecological significance. There is one borehole present on site which serves the sawmill water requirements. Site 2 is bordered by a tributary of the Cwaka River to the northwest. The local community rely on a number of bore holes for their domestic water supply.

4.4 Air quality

The Richards Bay Clean Air Association (RBCCA) is responsible for monitoring Air Quality in the Richards Bay area. There are five monitoring stations located at Arboretum, Widenwiede, Caravan, Veldenvlei and Hillside, which record data continuously throughout the year. The Department of Environmental Affairs and Tourism (DEAT) has developed air quality standards for South Africa, and these are indicated in Table 4 below. These standards have been compared to the Environmental Health and Safety (EHS) air quality standards.

Table 4: Ambient air quality standards for South Africa and the IFC/ EHS Thermal Power and General Guidelines (2007)

Ambient Air Quality Standards ($\mu g/m^3$)		
Parameter	**Averaging period**	
	24-hours	Annual
PM_{10}	180 (150)	60 (50)
Total Suspended Particulates (TSP)	300 (230)	100 (80)
Sulphur Dioxide (SO_2)	125 (150)	50 (80)
Nitrogen Oxide (NO_2)	±185(150)	±94(100)

(Air Quality Act, No 39 of 2004 and EHS; 2007)*1*

The state of the atmosphere at both sites is generally good. Site 1 is more likely to have a poorer air quality than Site 2, due to the close proximity to the N2 and the Richards Bay IDZ, however more research is needed during the Impact Assessment phase to determine the extent of air quality (see Section 8.1.3 on air quality study).

4.5 Flora and fauna

Most of the Mbonambi area can be considered as having low species sensitivity (Annual Report, 2007). Site 1 is currently used for timber plantations. There is little game on the site, which can be attributed to both the land use type and the poaching from the surrounding communities. The few species that do exist on the site include birds, snakes, rats etc. At present an attempt has been made to rehabilitate the Mposa River. This has involved the planting of both indigenous and endangered species along the banks of the river. Species were specifically chosen for their low use value to the community, with the hope that there will be a greater preservation of the species.

Site 2 is located within the rural area of Mabhuyeni. The land is currently used for livestock grazing and subsistence farming by the communities living in the area. The site predominantly consists of grasslands with a few shrubs and bushes. The most common crops that are grown in the area include maize and sweet potato. Most of the homesteads in the area own a number of chickens, goats or cattle. The level of species diversity within the area is unclear, and further investigations are required.

4.6 Socio-economic environment

4.6.1 Population demographics

The Mbonambi Municipality has an estimated population of 106, 943 of which 53% are women (Annual Report, 2007). Site 1 is located in Ward 2 of the Mbonambi Local Municipality. The towns of Nseleni and KwaMbonambi are located within this ward. These towns are evidence of the

1 '±' values are those values which have been converted from parts per million (ppm) to micrograms per cubic meter (ug/m^3) to allow for comparison.

Apartheid era and are densely populated. The 2001 Census data indicated a relatively stable population, with most of the population falling between the 5-49 age groups. There are a significantly low percentage of older persons, with only 11.8% of the population being over the age of 50.

Table 5: Age profile of Mbonambi Local Municipality, Ward 2

Ward 2		
Age Group	**No**	**%**
0-4	1072	10.7
5-19	2694	26.8
20-29	2119	21.1
30-49	2970	29.6
50-64	829	8.2
65 and over	366	3.6

(Sourced from Municipal Demarcation Board)

Site 2 is located in a predominantly rural setting of the Mbonambi Local Municipality (Ward 7). The area is sparsely populated with homesteads, and is interspersed with cultivated land. A baseline survey was undertaken 8-10 February 2008 on Site 2, to determine the number of persons that would be potentially affected by the development of the proposed cogeneration facility. A total 378 people were identified of the 38 households interviewed during the survey. Not all of these persons may reside on the premises, however they still return to the homestead for regular/ annual visits. Most of the respondents interviewed were the head of the homesteads, and most of them were male. Homestead sizes range from 32 dependents (highest) to 3 dependents (lowest), with an average of 10 persons being associated with each homestead. According to the demarcation website, the population in Ward 7 is moderately young, with the majority (40.9%) of the population being between the ages of 5-19.

4.6.2 Employment and education

It is understandable that the majority (58.9%) of the population in Site 1 will be employed, as they are within the economically active age groups and are in close proximity to main transport routes into Richards Bay and Empangeni. However, the majority of the population are involved in elementary work, and this can probably be attributed to the fact that most (56.9%) of the population have either no schooling or only primary school level education. Only approximately 5% of the population have received a tertiary education.

The population at Site 2 have attended higher education training; however the majority of persons describe their schooling as predominantly consisting of sections of primary or secondary education training rather than a completed schooling career. This coupled with the rural livelihoods of subsistence farming and livestock grazing, provides an explanation as to why the majority (57%) of the population are not economically active. The few persons that are employed are involved in elementary work see Figure 9.

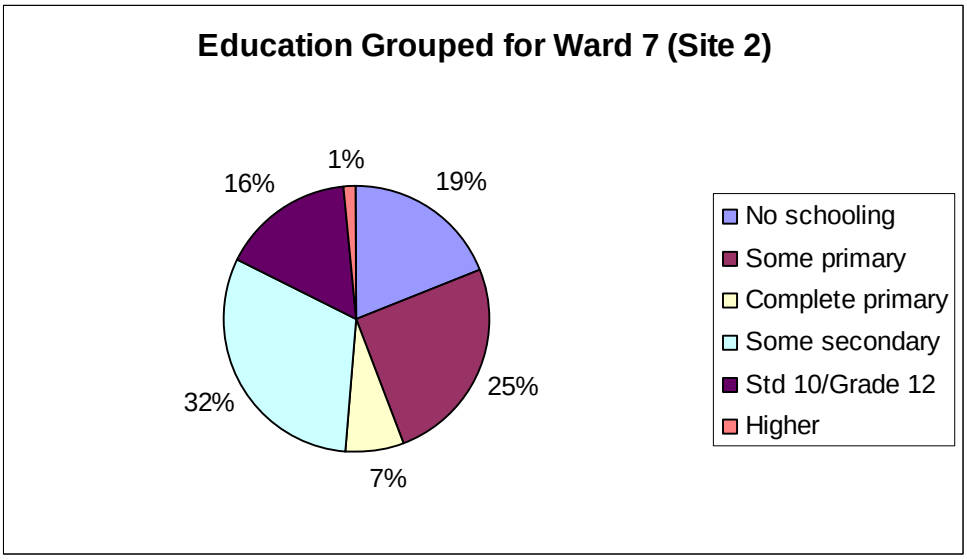

Figure 9: Pie chart indicating the level of education for Ward 7

(Sourced from: Municipal Demarcation Board)

4.6.3 Income distribution

Household sizes vary between Ward 2 and Ward 7. The majority (79.7%) of households in Ward 2 have one to three occupants, whereas in Ward 7 most households have approximately 10 people. Despite having more occupants in the household, up to 30% of households in Ward 7 have no income; hence these households are more vulnerable to changes on their land, which could affect their subsistence production. Conversely, in Ward 2 most (38.9%) of the population earn between R 4801-R9 600 per household, and another 23.9% earn between R9 601- R19 200. Figure 10 indicates the differences in household incomes between each Ward in the Mbonambi Local Municipality.

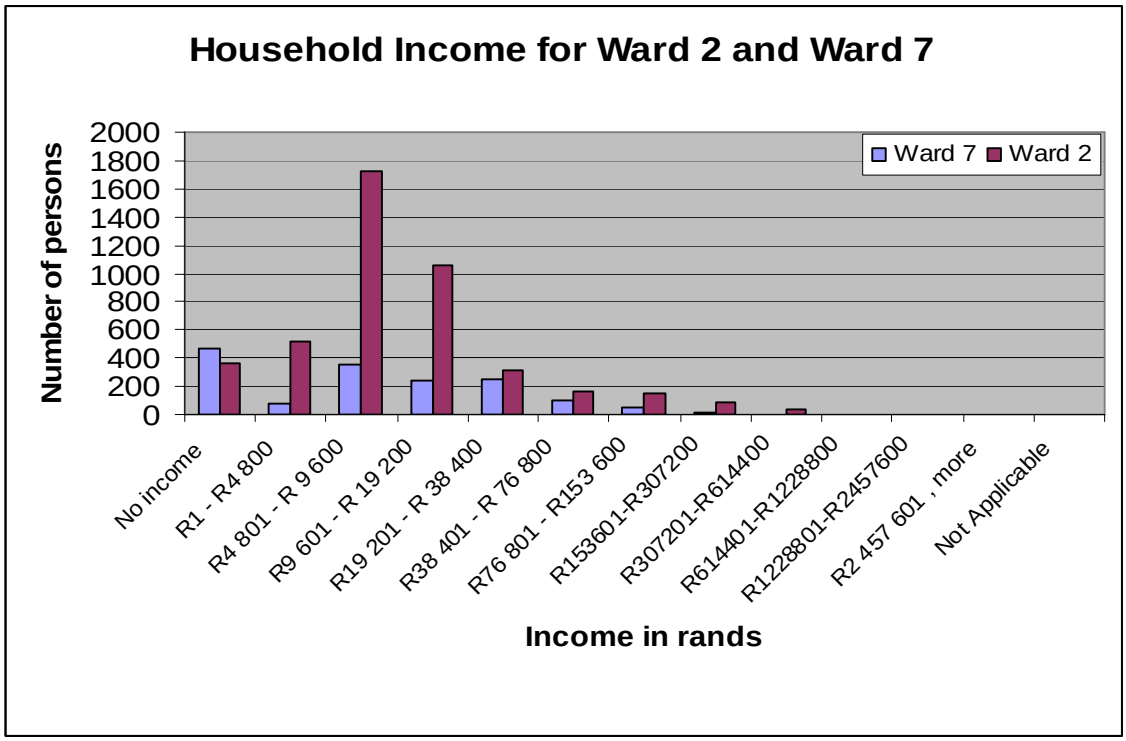

Figure 10: Bar graph indicating the household income for Ward 2 and Ward 7 in Mbonambi Local Municipality

(Sourced from: Municipal Demarcation Board)

4.7 Infrastructure and services

Many peri-urban and rural areas in the project area are not adequately equipped with infrastructure and services (ACER (Africa), 2000). This section describes the transport routes, domestic water supplies and sanitation, industrial wastewater system and the fire and rescue services available in Mbonambi Local Municipality.

4.7.1 Transport

"The Mbonambi Municipality has a well developed road network on a national, district and local scale, but the condition of the majority of the local roads are poor, and access is problematic in wet conditions" (Annual Report, 2007). At present the road infrastructure requires an upgrade, and in some cases specific roads need to be constructed. At present each site is easily accessible by both the rail and road network throughout the area.

Site 1 is located in close proximity to the west of the National Route 2 (N2), which is a principle route between Durban and the sub region. Site 2 is accessed from Empangeni on the western bypass road from the R34. It is located to the north of the rail transport system. It is proposed that the main road travelling from Empangeni through Mabhuyeni, and eventually meeting with the N2 will be tarred prior to the commencement of the project. This will assist with dust pollution and erosion.

Airport facilities are located in the Richards Bay area, and the Richards Bay Port can allow bulk materials to be delivered and transported from the harbour to the site during construction.

4.7.2 Domestic water supply and sanitation

uThungulu District Municipality is the Water Services Authority and Water Services Provider for the Mbonambi Municipal area (Annual Report, 2007). In the informal towns and settlements there is no formal service for sewage disposal. This has the potential to pollute underground water supplies, thereby increasing the spread of diseases.

In Ward 2 (Site 1), most (60.8%) of the population have access to water via a water pipe in their yard; through a regional local scheme or from a borehole near or on their property. At present there is an asbestos water pipeline located beneath the surface of Site 1, which supplies the nursery near site. This pipeline will need to be removed during the construction phase of the project, and the contents discarded where minimal impact will result.

The majority of the community at Site 2 obtain their water from boreholes in the area. Some homesteads rely on other water resources (such as water trucks, rainwater collection tanks or collecting water from the river), however these households indicated that they tend to run out of water on a weekly and monthly basis. The majority of the homesteads have pit latrines as sanitation facilities. Only 16% said they did not have any sanitation facilities.

4.7.3 Fire and rescue services

In 2007 the Mbonambi Local Municipality signed an arrangement with the uThungulu District Municipality Rural and Metro Emergency Services to render Fire Fighters and Emergency Services. The Rural Metro assists in the:

- Preventing the outbreak or spread of fires;
- Fighting and extinguishing of fires;
- The protection of life of property against fires or other dangers; and
- Catering of Ambulances services as an integrated part of Fire Brigade Services.

4.7.4 Energy (cooking, heating, lighting)

The two key sources of energy for cooking and heating in Ward 2 and 7 are electricity and wood. The majority (71%) of households in Ward 2 have access to electricity for lighting.

The community in Site 2 rely on more than one source of energy for lighting, heating and cooking. Of the 38 households only 60% have access to electricity, however these homesteads and the other homesteads without electricity rely on other sources of energy (paraffin, wood and candles).

4.7.5 Housing

The housing development plan developed by the Municipality outlines the housing backlogs in terms of slum clearance, rural housing backlog as well as families residing in single living quarters. The housing backlog in the Mbonambi area is approximately 7, 502. Site 1 is a privately owned farm used for commercial timber plantations. It does not have any housing structures present on the site.

Site 2 has a mixture of buildings constructed from concrete blocks with corrugated iron for roofing, and rondawels with thatch roofing. Other structures include outhouses or chicken/ goat houses which are mainly constructed from broken bricks and stones, wire mesh and wood. There are a total of 149 buildings and 39 outhouses. Other infrastructure present on the site includes cattle kraals, car ports and store rooms.

4.7.6 Community health

A healthy community is dependent upon a number of different factors, such as access to a safe water supply, adequate sanitation, good air quality, effective waste management and education. The spread of HIV/AIDS is also of great concern to the overall well being of a community. The Annual Report (2007) for Mbonambi Local Municipality states that there are no clear statistics that can reliably determine the rate of HIV/AIDS infected in the area. It is for this reason that the national ratio of 1:4 people that are HIV positive is applicable to this area.

4.8 Sites of archaeological and cultural interest

There should be no sites of archaeological or cultural interest on Site 1, however this would need to be determined during the Impact Assessment phase of this EIA. During the baseline survey undertaken 8-10 February 2008 a total of 161 gravesites were pointed out to the project team. This figure may not include all the gravesites present on Site 2, because there is a possibility that more gravesites will be identified by persons not residing on the site.

A number of households identified the church in Ntoyeni (adjacent to the project site) as a place of cultural significance, whilst others identified the Khenani Community Hall (in Ntoyeni) as having cultural importance. This will need to be investigated during the Impact Assessment phase of the EIA.

4.9 Noise

The power plant should not result in high noise levels, and therefore should not impact on the surrounding local communities.

4.10 Visual aspects

Due to the close proximity of Site 1 to the Nseleni Township and the N2 there is the potential for the power station to have visual impacts on the surrounding areas. This site is in close proximity to

the N2, which is a thoroughfare for persons travelling to St Lucia Wetland Park, a World Heritage Site. The potential for negative visual impacts is relatively high.

Conversely, Site 2 is located in a predominantly rural area, where there is little thoroughfare. It is not foreseen that the proposed power plant will have any negative visual impacts on the surrounding area.

5 PROJECT ALTERNATIVES

In terms of the EIA Regulations of 2006, the assessment of alternatives[2] is imperative when undertaking an EIA. Umbani has reviewed a number of alternatives based on three critical factors; namely rail, electrical and water/ effluent infrastructure.

As discussed earlier a feasibility study was undertaken for another site in 2003/4. Since this Scoping Report was completed, Umbani undertook to assess a number of other potential sites that were identified as potential sites for the construction of the cogeneration power facility.

Figure 11 provides an indication of the alternative sites considered that have already been considered as potential alternatives.

2 *In terms of Chapter 5 NEMA (Act 107 of 1998) EIA Regulations (GNR 385 of 2006) 'alternatives' are defined as: "In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to- a.) the property on which or location where it is proposed to undertake the activity; b.)the type of activity to be undertaken; c.) the design or layout of the activity; d.) the technology to be used in the activity; and the operation aspects of the activity.*

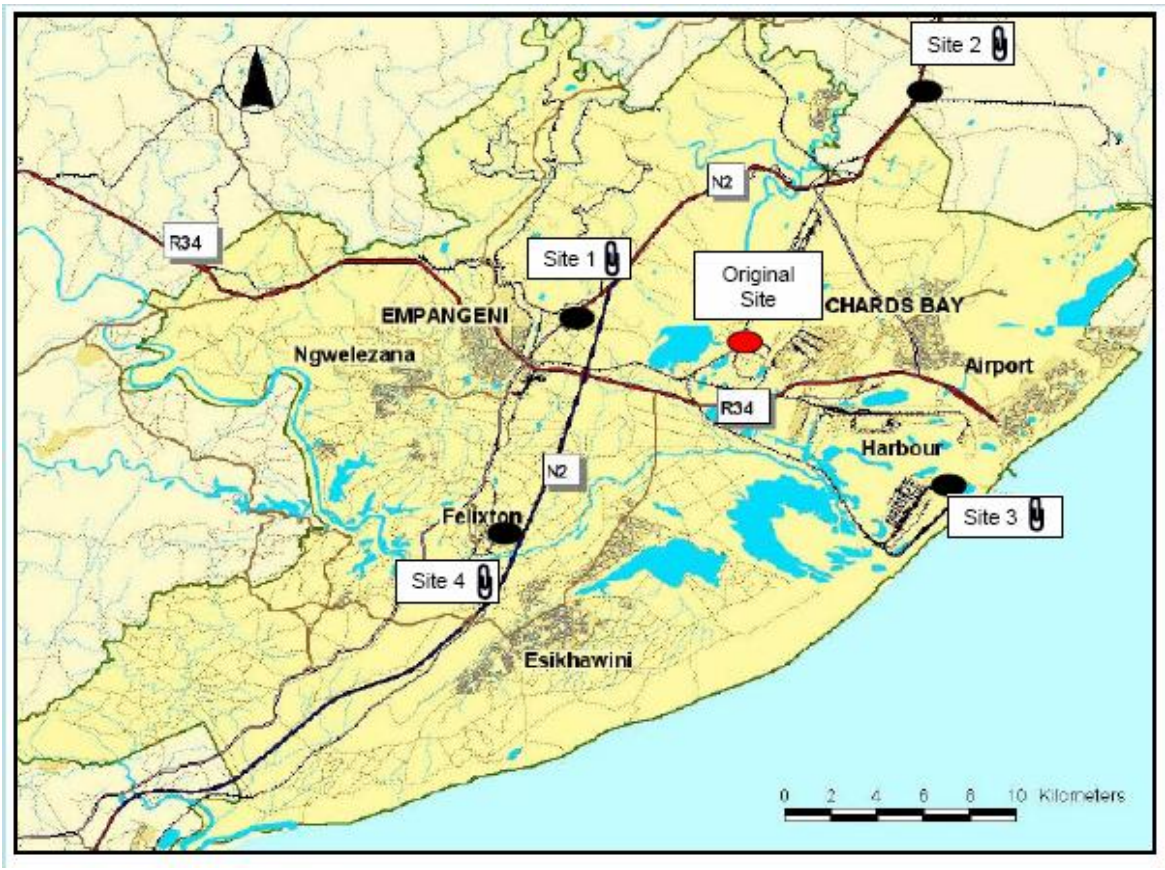

Figure 11: Map indicating alternative sites assessed

These sites were discarded for a variety of reasons, resulting in the preferred alternatives which are currently being assessed in this EIA. Below is a description explaining why these sites were not adequate.

Original Site: This site contained red data species (i.e. Kwambonambi grasslands) which was identified during the previous Scoping phase. This site is also located within the Richards Bay IDZ and would have had a cumulative impact on the air quality in the region.

Site 1: This site is located on a hill north of Empangeni, and would not be aesthetically pleasing to persons living within the city. Although the Athene sub-station is very close to this site, rail and water infrastructure would be a problem. This would also be exacerbated by the fact that there already exists a number of servitudes on this site too.

Site 2: Currently being assessed as Site 1 in this Scoping report.

Site 3: This site is located opposite the RBCT, in the dunes loop. Despite that this site has good rail and water infrastructure, it does not have the electrical infrastructure necessary for the plant. An electrical servitude would be required from this site, which is not possible due to the location of the Impala substation. There is also a potentially sensitive wetland onsite.

Site 4: This site is located in the 100 year floodline in Richards Bay, and does not have the rail infrastructure necessary for the transportation of coal to the site. However water and electrical infrastructure were adequate on this site.

The map does not indicate the proposed Mabhuyeni site (Site 2), because this site was identified only later in the process.

6 ENVIRONMENTAL IMPACT ASSESSMENT

6.1 What is an EIA?

A full EIA process essentially has four phases as follows:

- **The Scoping Phase**, during which key issues and concerns regarding the development are identified for further evaluation. The Scoping Report should also discuss the EIA Phase and illustrate how this phase is carried out;
- **The Impact Assessment Phase**, the relevant issues identified during Scoping are assessed by environmental specialists to determine their possible impact on the environment and to recommend ways to reduce the negative impacts and enhance the positive impacts.
- **Environmental Impact Report Phase**, the findings of the specialist reports are combined into an Environmental Impact Assessment Report which is then made available for comment by stakeholders.
- **Decision-Making Phase**, based on the findings in the EIA Report, the DAEA will decide whether the development of a power station in the Zululand area will proceed or not. This is the final phase of the EIA and requires that an Environmental Management Plan is finalised and submitted to the authorities for review. The full EIA process is shown in Figure 12.

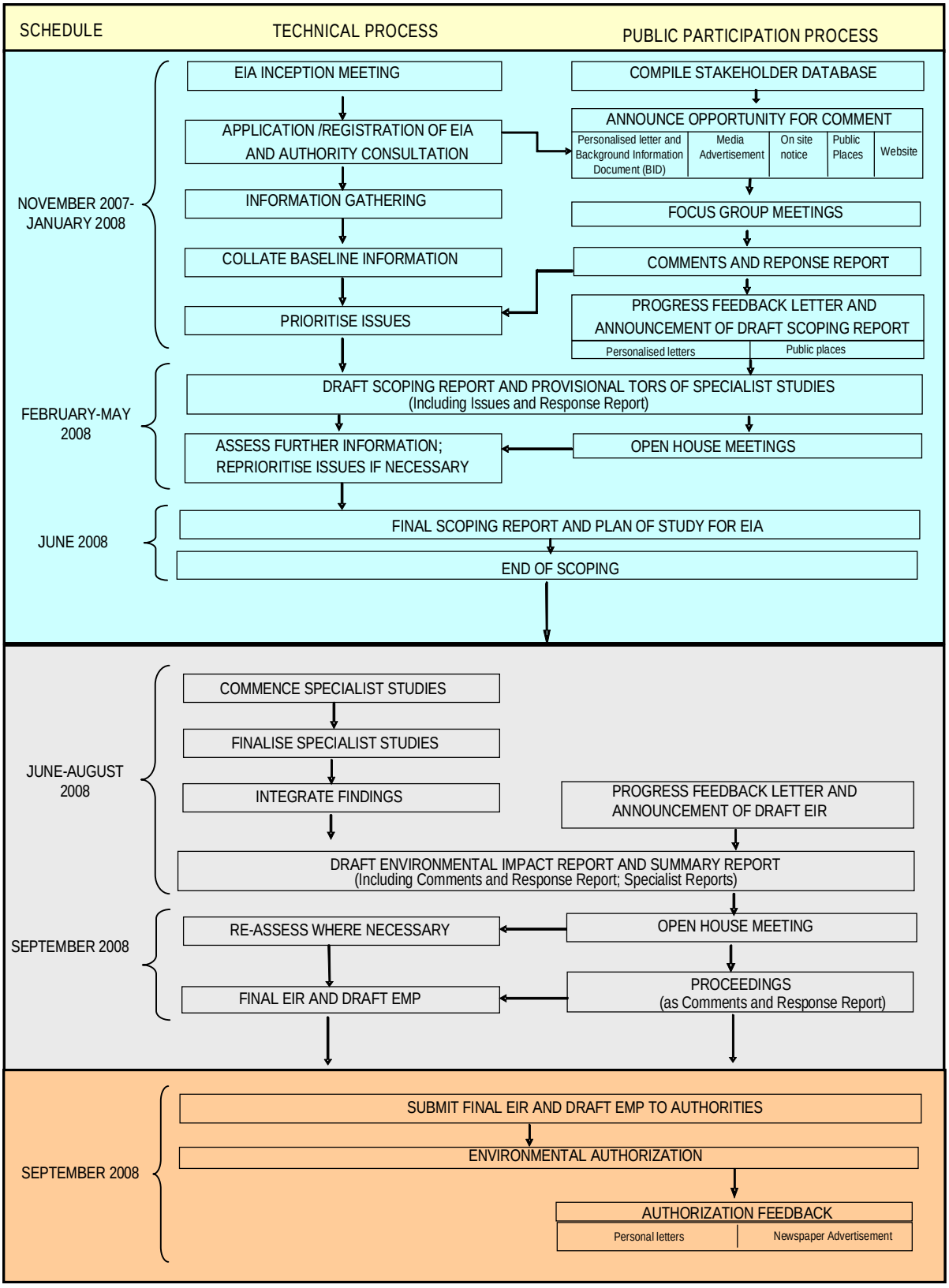

Figure 12: Diagram of the full EIA process to be undertaken for the proposed project

An EIA comprises of two interlinked processes namely the technical and public participation process.

6.2 Technical process

6.2.1 Application for authorisation

An application for authorisation together with Golder Associates declaration of independence and landowners consent forms was submitted to DAEA during May 2008. The Plan of Scoping was presented to the authorities, it described the process under taken during the Scoping Phase.

6.2.2 Specialist scoping

This process involved the assessment of previous environmental and technical studies and existing information, thereby determining the scope of the project. Site visits were conducted during this period to ensure a greater environmental and socio-economic understanding of the proposed project sites.

6.2.3 Issue identification and evaluation and Report Writing

A key element of the Scoping process is to ensure all issues raised during the technical and public participation processes are identified and evaluated. Issues and impacts from each process were collated and grouped according to the nature of the impact, and evaluated in terms of their potential impact.

6.3 Public participation process

6.3.1 Objectives of the public participation process in EIA

The primary objective of public participation is to provide an opportunity whereby stakeholders, technical specialists, the competent authority, other authorities and the development proponent work together to create an atmosphere for improved decision making. This has been achieved by raising a diversity of perspectives while not forcing consensus. This is done to achieve measurable trade-offs in the interests of establishing a sound balance between economic growth, social equity and ecological integrity.

For all public participation activities undertaken to date and for all future activities, the core values of the International Association for Public Participation (described in Box 1) have been applied

Box 3. Core Principles of the International Association for Public Participation

1. The public participation process seeks out and facilitates the involvement of those potentially affected.
2. The public should have a say in decisions about actions that affect their lives.
3. Public participation includes the promise that the public's contribution will influence the decision.
4. The public participation process communicates the interests and meets the process needs of participants.
5. The public participation process involves participants in defining how they participate.
6. The public participation process provides participants with the information they need to participate in a meaningful way.
7. The public participation process communicates to participants how their input affected the decision.

These core values have been translated into practice by:

- Inclusive consultation that has taken place with all sectors of society and that has afforded a broad range of stakeholders the opportunity to become involved (bearing in mind that it is not practically possible to personally consult with every individual in the project area).
- Wide announcement of the project in a variety of ways and over an extended period of time.
- The provision of sufficient and easily accessible information in non-technical language to enable meaningful contributions by members of the public through the assessment process.
- Providing information to members of the public in a variety of forms, viz. by way of discussion documents, presentations at meetings and workshops, and the media.
- Making special efforts to include the needs and desires of historically disadvantaged communities.
- Allowing sufficient time for members of the public to examine material and to provide inputs.
- Enabling stakeholders to provide inputs by various methods, for example, written submissions, comment sheets, e-mails, faxes, meetings, workshops, public meetings and personal contact with members of the EIA team.
- Providing stakeholders with ongoing feedback and acknowledgement, and the opportunity to verify that their issues have been considered (and if not, to receive an explanation for this).

This section of the report highlights the key elements of the public participation process to date. Sections 56 to 59 of Regulation R385 are applicable, with the important elements relating to the public participation process being the following:

- The manner in which potential Interested and Affected Parties (I&APs) were notified of the application for authorisation, and that a public participation process was mandatory. This includes notice boards, giving written notice to land owners, letters, information documents and advertisements in the media (Section 56).
- Opening and maintaining a register, which contains the names and addresses of I&APs. These include all persons who have submitted comments, organs of State who have some form of jurisdiction in the assessment process, and all those who have requested that they be registered as I&APs (Section 57).

- Registered I&APs are entitled to comment, in writing, on all written submissions made to the competent authority by the applicant or the EAP managing the application, and to bring to the attention of the competent authority any issues, which that party believes may be of significance when the application is considered for authorisation (Section 58).
- The comments of registered I&APs must be recorded and included in the reports submitted to the competent authority (Section 59).

The public participation programme underpinning the EIA for the proposed power station has been structured into four phases, viz. preparation, scoping, impact assessment and announcement of the record of decision. Up to the present, i.e. the compilation of this Draft Scoping Report, only the first two phases are applicable.

Although informed via various media releases, stakeholders residing in the area and further a field had received limited exposure to the power plant proposed by the Umbani Power Company. Therefore, a public participation programme was initiated in December 2007. Activities undertaken to date are as follows:

6.3.2 Preparation for stakeholder consultation

- Project initiation and site visits.
- The identification of stakeholders and the creation of a comprehensive stakeholder database. This is an on-going exercise that will continue for the duration of the environmental impact assessment. Up to the present, stakeholders represent a wide sectoral distribution of society, viz.
  - National, Provincial and Local Government.
  - Conservation authorities, notably, Ezemvelo KZN Wildlife, and environmental groups, for example, the Wildlife and Environmental Society of Southern Africa and the Zululand Environmental Alliance.
  - Local civil society organisations, for example, the Richards Bay Ratepayers Association and the Richards Bay Clean Air Association.
  - Agriculture.
  - Industry and mining.
  - Transport.
  - Commerce.
  - Tourism.
  - Labour.
  - Education.
  - Media.
  - Grassroots communities, and Non Government and Community Based Organisations.
- Key stakeholders were personally briefed about the project, primarily by telephone.

6.3.3 Public participation during Scoping

The key objective of public participation during Scoping is to provide the public with an opportunity to assist in defining the scope of the technical studies to be undertaken during the Impact Assessment. The announcement of the project commenced in January 2008 and was achieved by a variety of methods.

- A personalised letter in English and Zulu was sent to all I&APs, predominantly in the study area but also from further a field, informing them of the proposed project and inviting them to participate in the environmental assessment process.
- Background Information Documents and Comment Sheets in English and Zulu accompanied the personalised letter to all I&APs.
- Background information Documents and Comment Sheets were left at the following public places in the study area:
  - Richards Bay Public Library.
  - Empangeni Public Library.
  - Mbonambi Municipal Offices.
- Statutory advertisements in English and Zulu were placed as follows:
  - English in the Zululand Observer on 7 February 2008.
  - English in the Natal Mercury on 7 February 2008.
  - Zulu in the Ilanga on 7 February 2008.
  - Zulu in the Umlozi on 7 February 2008.
- Relevant tribal communities and ward councillors were consulted.
- An EIA Web Site has been created. The EIA Web Site hosts all public participation documents, including, to date, the following:
  - Letter: Invitation to participate.
  - Advertisement.
  - Background Information Document.
  - Comment Sheet.
  - Draft Scoping Report.
  - Key Stakeholder Meeting Minutes.
  - On-site Notice Boards (English and Zulu) have been erected at Site 1 and Site 2.

Documents listed above are contained in Appendix 1, 2 and 3.

A series of key stakeholder meetings were held during the Scoping Phase where presentations were made and key stakeholders were given the opportunity to raise their issues and concerns. Issues raised during the key stakeholder meetings were included in the Comment and Response Report. The following meetings were held:

Table 6: List of key stakeholder meetings

Key Stakeholder	Date of meeting
City of uMhlathuze	18 February 2008.
Zenith Estates (Davidson Family)	18 February 2008.
Zululand Chamber of Business	19 February 2008.
Richards Bay Clean Air Association	19 February 2008.
Mbonambi Local Municipality	21 February 2008.
Ezemvelo KZN Wildlife	21 February 2008.
Wildlife and Environment Society of South Africa	28 February 2008.
Department of Water Affairs and Forestry	29 February 2008.
uThungulu District Municipality	29 February 2008.
Grantleigh School	4 April 2008.
Local Community at Site 2	4 April 2008.

Issues raised have been captured in a Comment and Response Report, which is appended to this Draft Scoping Report (Appendix 3). This report will be updated to include any additional I&AP contributions that may be received as the EIA process proceeds, and as the findings of the EIA become available.

Additional activities that will be undertaken for Scoping include:

- The issuing of a personalised letter providing feedback on progress and also announcing the availability of the Draft Scoping Report for public review. The purpose of the Draft Scoping Report is to enable I&APs to verify that their contributions have been captured, understood and correctly interpreted.
- The availability of the Draft Scoping Report will also be announced by similar methods employed for announcing the proposed project, for example, media releases, advertisements and community briefings.
- Summaries of the Draft Scoping Report will be available in English and Zulu. These summaries, along with complete versions of the Draft Scoping Report, will be available at various public venues in the study area (Table 7) as well as on the EIA Web Site.
- During the public review period, three open houses will be hosted in KwaMbonambi, eNseleni and Mabhuyeni, to discuss the findings of Scoping and also to provide stakeholders the opportunity to verify that their issues have been captured accurately and adequately understood.
- The proceedings of the open houses will be compiled as a discussion document and stakeholders will be afforded an opportunity to comment.
- Thereafter, the Scoping Report will be finalised and issued to the competent authority for consideration.
- Feedback from the competent authority will be conveyed to stakeholders by way of a personalised letter (signifying the end of Scoping).

Table 7: List of public venues

PUBLIC PLACE
eNseleni Public Library
KwaMbonambi Library
Khenani Community Hall
Empangeni Library
ACER Offices, Mtunzini
Richards Bay Library
Project website: www.acerafrica.co.za/umbani

6.3.4 Public participation during the Impact Assessment

The Impact Assessment will focus on specialist investigations. Progress with these investigations will be supplied to stakeholders by way of personalised letters. However, towards the end of the Impact Assessment phase, there will be additional open houses to discuss the findings of the various studies as contained within the integrated Environmental Impact Report. The availability of material and aspects related to the public meetings will be handled in the same manner as for the Draft Scoping Report and associated public meetings. Similarly, the proceedings of the meetings will be compiled as a discussion document and distributed in the public domain for comment. In this way, public comment will be incorporated into the Environmental Impact Report prior to its submission to the competent authority for consideration and the issuing of a Record of Decision.

6.3.5 Record of Decision

Once the competent authority has issued a Record of Decision on the proposed development of a Fluidised Bed Power Station, this will be conveyed to members of the public via advertisements and personalised letters. Since any objections to a Record of Decision need to be lodged with the MEC: Agriculture and Environmental Affairs, the announcement of the Record of Decision will signify the completion of public participation for the proposed development.

7 ASSESSMENT OF POTENTIAL ENVIRONMENTAL ISSUES

The focus of the Scoping Phase is to identify key issues and concerns that have been identified during public participation and technical processes, and ensure that these are investigated during the Impact Assessment phase of the EIA. The issues and concerns that have been identified have been grouped into the following categories:

Table 8: Issues identified during scoping phase

Process	Materials handling
	Waste and waste management
	Infrastructure: – Transport – Fire and rescue services
Ecological	Air quality and health impacts
	Ecology
	Water
Socio-economic	Social and socio-economic issues
	Noise and visual disturbances
Site Analysis	Site 1
	Site 2

These categories are assessed in terms of their potential impact during construction and operation of the cogeneration power facility.

7.1 Process impacts

7.1.1 Materials Handling

Stakeholder issues

Stakeholders have identified the unloading and storage of raw materials on-site as an issue that may impact on groundwater pollution. The stockpiling of coal was specifically identified as a material which could result in acid mine drainage into groundwater resources, as well as a source of particulate dust during both the loading and transporting of the material. There was also a concern about where the limestone will be sourced from, and how it will be transported and stored on-site. The key issue was how these raw materials will be handled in such a way that will prevent pollution.

Queries were raised about the lifespan of the project in terms of the availability of raw materials (i.e. coal sources). This project aims to use the discard coal which is in abundance in the hinterland of South Africa, however stakeholders are still interested in the ability of the power plant to utilise other sources of fuel, such as biomass or gas, and the potential environmental impacts that are associated with each fuel source.

Study team review

Construction

The construction of the power plant will require raw materials to be stored onsite. These materials, as well as the construction vehicles on-site have the potential to contaminate groundwater, or pollute the atmosphere if it is not managed correctly. These potential impacts on the environment need to be assessed during the air quality specialist study, and ecological study.

Operation

Discard coal and limestone will be railed on-site and unloaded into specifically into demarcated areas. The offloading and storage of these raw materials has the potential to produce fugitive dust emissions both on-site and off-site along the railway. The air quality specialist study will need to assess to the extent to which these dust emissions will impact on the surrounding environment.

Spillages from the handling of raw materials or storage thereof can result in an impact on groundwater quality. It is expected that all raw materials will be stored in silos, however the transportation of these materials on conveyor belts could result in groundwater contamination. Storm-water quality may also be impacted, as the spill of raw material may dissolve in storm-water during periods of high rainfall. The impacts associated with materials handling will be assessed during the solid waste management specialist study and this study will identify any mitigation strategies that can be implemented to reduce the impact on environment.

7.1.2 Waste and waste management

Stakeholder issues

Stakeholders have expressed concerns over the types of solid waste produced during the power generation process and the management thereof. Of particular concern is the effect of ash by-product on human health, the environment and crops cultivated in the area. Stakeholders are concerned that an ash dump could have negative impacts on the surrounding environment, and would like to know how these impacts are being evaluated in the Impact Assessment phase of the EIA. Some stakeholders understood that ash could potentially be used for beneficial downstream activities, and it was suggested that it be used for either cement manufacturing or the hardening of rural roads.

Other concerns about solid waste management include:

- What other types of solid waste will be generated, and their potential impacts on the environment;
- Dump site capacity, and the opportunity for pollutants leaching into groundwater resources; and

- Rehabilitation management plan for both site closure and the discard coal stock piles being used as the raw materials.

Study team review

Construction

The most likely solid waste produced during construction will include discarded materials, equipment and supplies packaging, cleared vegetation and debris. The potential impact of the collection, management and disposal of these solid wastes will be dependent on the capacity of local dumpsites to receive these waste products. These impacts should be have low significance as they will be local in extent, short in duration and low in intensity, however the waste specialist study will assess these impacts.

Operation

The power production process relies on the burning of fuels to generate the energy necessary to turn the steam turbine. During the combustion of coal in a CFB, the by-product 'combustion ash' (consisting of fall out and bottom ash) is produced, collected and stored in an ash silo. The potential for ash particulates to be released into the atmosphere will be negligible; however this still needs to be addressed during the air quality specialist study.

The management of this solid waste will be a two fold assessment during the EIA. Firstly, impacts associated with dumping the ash by-product at a designated dump-site will need to be reviewed. Secondly, the option for beneficiary uses of the ash by-product will need to be assessed. For both assessments, the chemical composition of ash will need to be determined. The chemical composition is dependent upon the fuel characteristics burnt in the CFB. If the fuel is discard coal, the chemical composition is dependent upon the Sulphur content in the discard coal, as well as the Sulphur Dioxide removal rate of the sorbent material and other inorganic chemical components in the coal. For this reason secondary uses of ash will be determined by assessing the probable status of the CFB ash, and the likely activity that will be "cost effective, environmentally sound and equally protective of human health and environment" (Lecuyer, I *et al*; pg 1). This will be undertaken during the solid waste specialist study.

The impacts associated with transporting and containing this by-product, will also be addressed during the solid waste study, and potential mitigation methods to reduce environmental and social impacts will be developed.

Other solid wastes generated during the operation of the plant are expected to be minimal, consisting mostly of rags, worn equipment parts and office supplies. The storage and proper management of these wastes on site is imperative to reducing or eliminating potential impacts on groundwater quality. These mitigation strategies will be identified during the solid waste management study. The study will also review the possibility of KwaMbonambi Municipality collecting the solid waste sending it through to local landfill facilities, from either Site 1 or Site 2.

7.1.3 Transport Infrastructure

Stakeholder issues

Key issues and concerns include:

- The likely increase in volume of vehicles on the road and railway;
- The impacts associated with an increase in congestion on the current road and rail infrastructure; and
- Pollution impacts associated with the movement of goods to and from site.

Study team review

Construction

Road traffic volumes will increase during the construction phase due to an increase in:

- Rail and trucking of construction materials to and from the site;
- Public transportation volumes as a result of more commuting employees; and
- Commuters waiting on the side of the road for transportation.

The significance of these impacts will be determined during the traffic specialist study. Secondary impacts on health and safety will need to be considered during this study too.

Operation

There will be an increase in rail transportation as coal and sorbent is brought in from the hinterland. The transportation of discard coal into site every 1,5 days should have minimal impact on the rail usage at present. The anticipated volume of increase in trains will be determined during the traffic study, and should assess the associated impacts at railway crossings and deterioration of infrastructure.

Another potentially significant impact on transport is the operation of the draft cooling towers, which has the potential to create or induce fogging. The fog produced may reduce visibility in the surrounding area, placing road users in risk. Modelling of the cooling tower drift and fogging will reveal the extent and intensity of impacts to nearby transportation and livelihoods.

7.1.4 Fire and rescue infrastructure and services

Stakeholder issues

A key concern for stakeholders is the ability of emergency response personnel in the KwaMbonambi area to deal with a potential disaster. It is believed that this local municipality is not

equipped enough or does not have the facilities to deal with a development of this nature, and therefore it is considered as a significant risk with significant environmental and social impacts.

Study team review

During the construction of the power plant, there should be no risk of a fire or an accident occurring. It is, however, still imperative that this EIA assess the possibility of an accident and the availability of fire and rescue services to cope with an incident.

Monitoring systems will be implemented during the operation of the plant, and an evacuation plan will be designed to ensure a state of preparedness in the event of an accident. The impact assessment phase will investigate a 'worst case scenario' and will assess the ability for the local municipality to provide the support and assistance in the event of a potential disaster. The effectiveness of this will be reviewed during the risk assessment specialist study.

7.2 Biophysical Impacts

7.2.1 Air quality and health impacts

Stakeholder issues

Air quality is an issue that raises most concerns in the Richards Bay area, and despite this project being located outside of the Richards Bay Industrial Development Zone, stakeholders are still concerned about the cumulative impact of air pollution. Other air quality concerns include:

- The potential volumes of Sulphur Dioxide, Nitrogen Oxide, Carbon Dioxide and particulates (especially dust) that will be emitted from the storage and combustion of raw materials during the power generation process;
- The probable risk and secondary impacts of air pollution, including the potential for unpleasant odours, on human health, the environment, and specifically on timber and other crops grown in the area.
- The potential impacts on local schools, communities and businesses in close proximity to the proposed site;
- The direction of the air pollution plume in relation to Richards Bay, KwaMbonambi and Nseleni areas; and
- The implementation of an air pollution monitoring and control system.

Study team review

<u>Construction</u>

The majority of air quality impacts will occur during the construction phase of the proposed project. The combined activities of clearing vegetation and grading the land will result in high levels of dust

pollution. Other sources of air pollution would include exhaust emissions from the operation of construction equipment, such as large combustion equipment and vehicles.

Although these impacts will be local in extent and short in duration, the intensity of the impacts has the potential to result in a significant impact on the surrounding communities. The potential health impacts and impacts on commercial plantations will need to be investigated during the air quality impact assessment.

Operation

Umbani Power Company proposes to implement a number of different strategies to control atmospheric emissions, some of which include scrubbers and baghouse filters. These strategies are aimed at minimising the amount of pollutants released into the atmosphere. The circulating fluidised bed combustion technology is able to burn a wide variety of fuels, whilst ensuring lower Sulphur Dioxide and Nitrogen Oxide emissions. This is due to the CFB operating at low combustion temperatures. Other emissions during the operation phase of the project will occur from ancillary project equipment (pumps, tanks, vehicles etc). These emissions should be minimal, however all emissions will be monitored and will need to comply with the stringent World Bank and South African ambient air quality standards.

The air quality specialist study will assess the degree and extent of Sulphur Dioxide, Nitrogen Oxide, particulate matter and Carbon Dioxide emissions. In order to provide an analysis of the potential impacts from these emissions, an air quality specialist study will be required to, firstly, provide an analysis of the baseline air quality at each site, and secondly model the likely air pollutant dispersion scenarios.

The modelling scenarios will assist in determining the appropriate stack height and controls necessary to assure emissions do not exceed the ambient air quality standards, or impact negatively on human health (possible increase in respiratory problems, unpleasant odours and allergies) or commercial/ subsistence farming (acid rain and the reduction in crops). The intensity of these impacts will be determined during the air quality specialist study.

7.2.2 Ecological

Stakeholder issues

Key stakeholders are particularly concerned about the extent of impacts on the flora and fauna environment of KwaMbonambi. This includes the potential disruption of birds' flight paths between wetlands in the area, due to both the cogeneration power plant and its associated electrical infrastructure (i.e. power lines). In the event wetlands are located on either site, it was suggested that a functional assessment of the wetland should be undertaken; to determine the loss of biodiversity should the wetland be affected.

Stakeholders have been involved in programmes to clear alien invasive species in the KwaMbonambi area, and have raised concerns over the potential for nutrients to be leaked into water resources resulting in a resurgence of alien invasives.

Study team review

The two sites being investigated in this EIA are currently being used either for commercial (Site 1) or subsistence farming (Site 2). It is not anticipated that any endangered species will be located on either site; however an ecological study will ensure both sites are investigated for sensitive fauna and flora. Other issues that could have an impact on biodiversity are described in the construction and operation phase impacts below.

Construction

The removal of vegetation and levelling of the sites may have an impact on water bodies and biological species in close proximity. This needs to be investigated both during water and ecological specialist study, and management and rehabilitation plans need to be developed to minimise impacts on biodiversity. During the levelling of Site 1, an asbestos water pipe running below the ground will need to be re-routed. This has the potential to impact on biological resources and air quality and should be considered as a potentially significant impact.

Operation

A key component of this project was to develop the proposed plant in close proximity to an existing power sub-station. This would ensure that less power lines needed to be constructed to transmit the electricity produced, inadvertently reducing impact on the ecological environment. The extent and significance of impacts on fauna and flora in KwaMbonambi will need to be investigated during the ecological specialist study.

7.2.3 Water resources:

Stakeholder issues

Water resources in KwaMbonambi and Richards Bay are already considered to be in high demand, from both industries and residential developments. The pressure on water resources and its associated infrastructure has resulted in a number of stakeholders raising issues and concerns about water demand and disposal. The issues raised include:

Water supply:

- Whether or not water will be extracted from the Nseleni River;

- The potential of using grey water as a water source for the power plant. Some suggestions include the Empangeni Sewage Treatment Plant, the uMhlathuze Water Marine Outfall Pipeline or the Mondi Effluent.
- The quality of water required for the plant, and the potential impacts that could ensue from using 'dirty water'; and
- The probability and location of a bulk pipeline required to bring water on and off site;

Waste water discharge (industrial and domestic):

- Whether or not water will be discharged into the Nseleni River;
- The types of pollutants that will be discharged as dissolved solids;
- The probable quality and temperature of discharged water and the potential impacts on the aquatic environment;
- The capacity of current sewage works to deal with the domestic waste from the power plant;
- The impacts on groundwater resources, and the potential for pollutants to filter into surface water resources; and
- The implementation of an effective storm-water management strategy.

Study team review

Construction

Construction activities that may result in an impact on water quality and the environment include:

- Contamination of storm water runoff;
- Contamination of groundwater from incorrect handling of construction materials and chemical lubricants;
- Erosion from the construction site and the associated increased turbidity and downstream sedimentation; and
- Sewage discharge and waste water discharge into existing treatment systems.

Operation

Water usage required for the plant during operation is approximately 16-32 mega litres per day, depending on what size power plant is required by Eskom (270MW or 540MW power generation facility). These water requirements include both the industrial and domestic uses for water. The water specialist study will investigate the capacity of the City of uMhlathuze to supply water during the operation phases of the co generation power plant.

The three main liquid discharges from the site are process water, sewage and storm-water. During operation process water will be cooled and recycled wherever possible. Waste water will be stored in a cooling tower, of which licensing and size will be determined during the water study. The collection and treatment measures of discharged effluent will be designed to comply with the standards and conditions imposed by the DWAF, under the waste water discharge license. The water specialist study will need to assess the potential impacts of discharging from this deep-sea effluent, taking into consideration the potential thermal changes (increase) and associated impacts on the aquatic life surrounding the effluent submerged outfall.

Effluent estimated at around 3 mega litres per day, for approximately 150-200 employees and plant processes, will be discharged into the Nseleni Treatment Works. The Impact Assessment phase will assess if there is enough capacity at these facilities to deal with the domestic and operational requirements of the plant.

Storm-water runoff will be collected via roof drains, curbs and culverts and routed into a separate plant storm-water management system. All storage vessels, liquid-filed equipment (e.g. transformers and breakers), equipment with high lubricant use (steam turbine and lube oil storage area), and fuel unloading areas will be equipped with fuel and oil containment measures. The storm-water collected at these areas will be routed through an oil/water separator prior to release. The measures described above will ensure minimal to no groundwater contamination throughout operation.

7.3 Socio-economic Impacts

Socio-economic impacts can not always be clearly described in terms of their impact during construction or impact during operation phase. It is for this reason that some of the following issues are not discussed specifically relating to construction/operation impacts.

7.3.1 Issues pertaining to employment

Stakeholder issues

Stakeholders are interested in the job opportunities that will be associated with the development of the proposed plant. There is a concern with Site 1 that with an influx of workers into the area there will be an increased prospect for informal developments to be established adjacent to the site and within the region. This raises concerns about safety and security, due to the perceived risk associated with these types of settlements.

Study team review

There could be a maximum of 1,900 job opportunities during the peak time of construction of the site, but only 150 permanent positions will be required to operate the site. These persons will either be recruited from the surrounding community, or brought in specifically for their skills. In the event that they are brought into the area to either construct or work in the proposed plant, they will

be housed in accommodation facilities either on-site or off-site. The potential impact associated with the influx of persons into the area will be assessed during the Impact Assessment phase.

Other indirect job opportunities that could result in the employment of an additional 1500 persons in the surrounding area could include the sale of food stuffs to workers on-site; or the potential for providing an accommodation space for workers (e.g. bed and breakfast). These will be investigated during the socio-economic study.

7.3.2 Issues pertaining to future opportunities on the land

Stakeholder issues

Stakeholders are concerned that the development of this power plant and its associated structure might result in the loss of land, and the opportunities for future developments that exist with owning undeveloped land. Associated with this is the potential loss in property values, due to the perceptions of the impacts associated with a power plant.

Stakeholders have also expressed concerns that this power plant development may result in an industrial node, where future industrial proponents will use the power station as leverage for future development in the area. This is because the land will be changed from being a commercial / subsistence agriculture land use to an industrial land use.

Study team review

Site 1 is located in a fairly developed area (in terms of commercial farming) and farmers have the opportunity to subdivide their land for future economic endeavours. On the other hand Site 2 is part of Ingonyama Trust where persons residing on the land do not own the land but are rather given use rights to it. The different characteristics of each site provide an understanding of the issues identified by stakeholders, especially in terms of future economic opportunities and loss of property value.

The issue of the power plant resulting in the development of an industrial zone will need to be assessed during the Impact Assessment phase. The spatial development framework for the KwaMbonambi Municipality as well as the City of uMhlathuze Municipality must be taken into consideration during the assessment of potential future industrial developments. Future projects must be taken into accounted throughout the Impact Assessment phase, especially if this project is to asses the possibility of cumulative risks or impacts.

7.3.3 Social benefits of the project

Stakeholder issues

Stakeholders are interested in the potential capacity building initiatives that can be implemented to boost the local community that will be surrounding the proposed power plant. The possible social benefits that may arise from this proposed project, specifically for Site 2 stakeholders, must be developed through a collaborative process with the community. This will ensure that community initiatives are applicable to the area and will ensure the community's needs are satisfied and not perceived needs of the community are implemented.

Study team review

This development has the opportunity to benefit the local community through local initiatives aimed at identifying the needs and wants of the community, and then developing projects intended to provide for those needs. Site 2 is a rural community which could benefit greatly from this project, however the needs of this community must be established to ensure the sustainability of these projects into the future. The social impact assessment must provide an analysis on wants and needs within the community as a process of identifying potential social benefits that could boost the community.

7.3.4 Social implications of the power plant

Stakeholder issues

Stakeholders have identified a few social issues that must be considered during the impact assessment phase. This includes:

- The potential identification of heritage resources at Site 1 and Site 2; and
- The possibility of students being removed from local schools due to the perceived environmental and social impacts associated with the power plant.

Study team review

The perceived risks and impacts associated with a power plant can only be addressed through an investigation into the quantifiable impacts and an evaluation of these impacts. The objective of the EIA is to provide a holistic assessment of all impacts associated with a proposed development and provide an analysis on these findings. This EIA strives to investigate all the potential impacts associated with the proposed development on the KwaMbonambi area, and provide stakeholders with the information of the findings of the specialist study. This information is integral to developing an Environmental Management Plan (EMP), which aims to ensure a proposed development is undertaken with the least possible impact.

7.3.5 Resettlement and relocation

Stakeholder issues

Stakeholders at Site 2 have raised concerns and issues over the probable relocation and resettlement that will occur if Site 2 is selected. The key issues raised at the meetings include:

- The enumeration process would need to be conducted in a sensitive and transparent manner.
- Community members should select a committee with community representatives to discuss remuneration details with the proponent.
- Community members would like to understand how they will be compensated, with cash or materials to build houses. Will they be relocated to rural areas or townships? The greatest concern is whether or not they will be left worse off than they are now.
- Whether or not Umbani will assist persons who are resettled after the relocation process has occurred?
- The potential for people living in the cities to return during construction and, only then, identify an important gravesite. What will the remuneration process be then?
- Stakeholders also discussed the low cost housing that has been planned for the area surrounding Site 2. The concern is that should the houses be allocated within Site 2, how each person will be assured that they will receive their house promised from the government if they are then also compensated by Umbani.

Study team review

The World Bank describes the word resettlement as a process which ensures that all the direct economic and social losses resulting from land acquisition and/or the restriction of access to land, be compensated through either:

- The economic rehabilitation of displaced persons, to improve (or at least restore) incomes and living standards; or
- Acquisition of land and physical structures on the land, including businesses or through physical relocation.

The specific details on the best process for relocation and remuneration for Site 2 will need to be undertaken during the Impact Assessment phase. A key component of this study will be to ensure that World Bank Operating Procedures are taken into account, thereby ensuring people are not left worse off than before the development of the cogeneration power facility.

7.3.6 Noise and visual disturbances

Stakeholder issues

Stakeholders have described how the current activities on the Transnet Freight Railway result in noise pollution in the area. They are concerned that this proposed project may result in higher quantities of noise which would impact on schools in the region. These concerns are specifically related to the railway siding and the on and offloading of raw materials on-site.

Other stakeholders have expressed concerns that the proposed cogeneration power plant will not be aesthetically pleasing in the natural environment of the two proposed sites. Of particular concern is the impact of light pollution generated by the plant and potential impacts it will have on the forestry sector's fire detection cameras.

Study team review

Construction

Potential noise impacts associated with construction include the construction activities; such as noise from the construction equipment, clearing and levelling of the site, noise from workers on-site, as well as the increase in transportation on both road and railway. These noise disturbances have the potential to impact on residential areas and schools within the vicinity of the construction site. Likely visual impacts associated with the clearing of the site and storage of construction vehicles and equipment on site need to be investigated too.

Operation

The noise levels during operation of the power plant should not be excessive; however the potential increase in ambient noise levels needs to be assessed to determine the significance of the impact. Potential noise sources that will be investigated include the noise associated with the handling of raw materials and finished product, and the operational low hum of the CFB. The impacts on the rural community at Site 2 would probably be greater than the impact on the Nseleni township. This is because Nseleni is denser and located in close proximity to the N2, whereas the community at Site 2 is settled more sparsely with minimal noise activities near to the site.

Visual impacts may also be experienced as the power station infrastructure will contain about a 120 meter tall stack, as well as other infrastructure which will change the current landscape. Due to the current land uses on Site 1, the opportunity to reduce visual impact is high as the power plant can be 'hidden' behind the tall gum trees already present on site. The visual impacts at Site 2 would greater than Site 1 because the site is located in a rural setting with open grasslands, rather than plantations. The extent of the potential visual impacts will be investigated in the Impact Assessment phase.

7.4 Cumulative impacts and risk

Stakeholder issues

- At present there is an EIA being undertaken for the proposed development of an Aluminium Fluoride Production Facility. The proponent Alfluorco (Pty) Ltd is proposing to develop a Sulphuric Acid, Hydrogen Fluoride and Aluminium Fluoride Manufacturing Plant, in the Mbonambi Municipal Area, KwaZulu-Natal. The potential cumulative environmental impacts are of particular concern to stakeholders at Site 1.
- Stakeholders have also identified that should Alflourco and the proposed power plant be developed simultaneously, the probability of increased industrial development in the area could be great.
- Other concerns include the risk associated with residing in close proximity to the proposed power plant, and especially in terms of a worst case scenario.

Study team review

Cumulative impacts must be assessed as there is a potential for other industrial activities to be developed in the area. The current EIA being undertaken for the proposed development of the Aluminium Flouride Production Facility indicates that there is possibility for future industrial developments in the Mbonambi area. The two projects, which are completely independent of each other, will however require cumulative impact assessments to be undertaken. The objective will be twofold, firstly to determine if the two projects are compatible, and secondly to assess the potential cumulative impacts associated with the sites being located in close proximity to one another. The cumulative assessment will need to assess the likely impacts on air quality, water use and communities residing in close proximity to the proposed projects.

The risks related to the development of the proposed power station must also be assessed both quantitatively and qualitatively. Investigations must be undertaken to identify the quantitative information that will review all the risks associated with the proposed project. Qualitative assessment will review the fears, doubts and concerns associated with the proposed cogeneration facility looking specifically at the reasons behind those concerns.

8 COMPARATIVE SITE ANALYSIS

In order to focus the ongoing EIA specialist studies, a comparative analysis of the two preferred sites has been conducted. The comparative analysis takes into account the various aspects that would define the sustainability of the project, relating to: environmental and social performance, technical and infrastructural issues, and economics. The results of the comparative analysis are presented in Table 9. In the analysis, a Risk Weighting has been applied to each criteria which is defined as a “Risk to the sustainability of the project” rather than as a risk to the environment and/or society. A weighting factor of 1-5 has been applied in which a score of:

- 1 = No risk to the project
- 2 = Low Risk
- 3 = Moderate Risk
- 4 = High Risk and
- 5 = Potential fatal flaw

The sites have then been compared in comparison with one another and scored '1' or '2' in which a score of 1 represents the better of the two for that criteria. The scores were then multiplied by the weighting and the outcome added to result in a total comparative score.

Table 9: Comparative assessment of Sites 1 and 2

Criteria	Risk weighting	Comparative Risk		Score	
		Site 1	Site 2	Site 1	Site 2
Infrastructural requirement to provide a sustainable water supply to the site.	2	1	2	2	4
Infrastructural requirement to remove effluent from the site.	2	1	1	2	2
Challenges associated with the purchase of land.	3	1	2	3	6
Rezoning requirements	4	1	1	4	4
Infrastructural requirement for electrical connections	2	1	1	2	2
Ancillary infrastructure to site (bridges, roads, etc.)	2	1	1	2	2
Rail/coal offloading/conveyor facilities	4	2	1	8	4
Geotechnical conditions	3	2	1	6	3
Land cost	2	2	1	4	2
Ease with which ash wastes can be removed from the site.	4	2	1	8	4
Social implication of the proposed development on site (including the requirements for relocation).	4	1	2	4	8
Environmental concerns (principally: air quality and biodiversity)	3	2	1	6	3
Community acceptance	4	2	1	8	4
Risks to communities	3	2	1	6	3
			TOTAL SCORE	65	51

Although neither site contains any significant risks or fatal flaws, on the basis of this analysis, Site 2 is preferred for ongoing assessment. This does not alter Site 1 remaining a potential location for the proposed power station.

The ongoing EIA specialist studies will focus on Site 2 as will the ongoing public participation activities. As Site 1 remains a potential location, should studies on Site 2 identify significant environmental or social issues, EIA-studies will commence on Site 1 and stakeholders informed of this change.

9 PLAN OF STUDY FOR IMPACT ASSESSMENT PHASE

This chapter describes the proposed methodology that will be used to investigate the issues and concerns described in Chapter 7.

The generic terms of reference apply to all specialist studies and are in place to ensure consistency of content and style in the specialist reports. This will help simplify the task of compiling the integrated Environmental Impact Report.

- Outline the study approach to be assumed and identify assumptions and sources of information.
- Briefly describe the affected environment and its sensitivity in terms of this study.
- Identify current and potential future sources of risk to the environment during construction, commissioning and operation of the project.
- Quantify, wherever possible, the potential direct and cumulative effects.
- Identify and list the specific legislation and permit requirements which potentially could be infringed upon by the proposed project.
- Assess the significance of the impacts (See Figure 13). So far as possible, the specialist shall quantify the magnitude of impacts and outline the rationale used in their study to identify the potential environmental impacts. The impacts should be described in terms of the following criteria:

Probability	**Duration**
- Low Probability - Medium Probability - High Probability - Definite	- Short (0-5 years) - Medium (5-15 years) - Long term (impact ceases after operational life of activity) -Permanent
Intensity	**Extent**
- Low - Moderate - High	- Local - Regional - National - International

Figure 13: Diagram identifying the four criteria determining the significance of an impact

- Make the results of prioritisation available to scrutiny by stakeholders; and ensure the
  - Assessment of impacts is robust and defensible. Issues must be described as either:
    - *Low*: where the impact will not have an influence on or require to be significantly accommodated in the project design; or
    - *Medium*: where it could have an influence on the environment which will require modification of the project design or alternative mitigation; or
    - *High:* where it could have a "no-go" implication on the project regardless of any possible mitigation.
  - Status of the impact is described; specifically whether it is positive (a benefit), negative (a cost), or neutral.
  - Degree of confidence in the predictions is based on the availability of information and specialist knowledge.
- Recommended management action
  (a) Mitigation objectives - what level of mitigation must be aimed for:
  (b) Recommended mitigation/enhancement action
  (c) Effectiveness of the mitigation action
  (d) Recommended monitoring and review programme

9.1 Specialist Studies

It is necessary for the following specialist studies to be undertaken as per the scoping phase.

9.1.1 Materials handling and solid waste management

Objectives

The objective of this study is to assess the significance of impacts associated with the handling of raw materials onto and off the site. This will include an investigation into mitigation strategies that could be implemented to minimise the impacts. This study must also assess the potential waste products generated through the power generation process, specifically focusing on the impacts of ash dumps and the potential for beneficiary uses of combustion ash.

Methodology

- An assessment of raw material handling systems that will implemented, including potential impacts associated with the storage of coal on-site.

- A detailed examination of the processes used to generate electricity using CFB technology, specifically highlighting potential risk under normal conditions, start up, shut-down and maintenance operations.

- A specific look at the option of beneficiary uses for ash.

9.1.2 Transport

Objectives

The objectives of this study will be to determine how the proposed cogeneration power facility will impact on the current traffic volumes experienced on the roads and rail. This will include an assessment of the likely increases in public transportation and vehicles/ trains which will be used during construction and operation of the site. These potential increases in traffic volumes must be assessed according to their probable impact on pollution levels both on-site and off-site.

Methodology

- Environmental risks associated with the movement of materials utilised for power generation must be quantified and valued according to their significance of impact. This includes:
  - The transporting of coal and sorbent (limestone) from source along the Transnet Freight Railway to the site.
  - The movement of materials on-site on the conveyor system.
  - The storage of raw materials on-site.
- A comprehensive account of solid waste management opportunities and constraints.
- Provide a comprehensive cumulative mass-balance to ensure that all waste streams have been identified and characterised in terms of quantities generated. Composition and disposal options.
- Review the technology to be used in terms of the “best practicable environmental option” principle.
- Provide a detailed review of legislative requirements pertaining mainly to waste and effluents of the proposed cogeneration plant.
- Identify all permits required for waste management and materials handling on and off-site.
- Sufficient information regarding mitigation and remedial measures that should be utilised to reduce any impacts that have been identified, also including potential opportunities for reuse and re-cycling of materials (specifically ash).
- Provide potential monitoring and measuring plans that would be needed to assist in managing the environmental impacts identified in the specialist study.

The Transportation Study will be closely related to that for the materials handling and solid waste management study and should:

- Provide an analysis of the effect of materials and personnel transport on the road traffic in KwaMbonambi sub-region.
- Identify any fatal flaws along the major road and rail networks for the transport of raw materials for the cogeneration facility.
- Perform a basic assessment on the effect of road transportation on existing infrastructure and stipulate remedial measures to alleviate potential problems on transport networks in the area.

9.1.3 Air quality and health impacts

Objectives

The specialist study will aim to address the generation and dispersion of air pollution arising from the proposed cogeneration power plant. Specifically, the air quality specialist study will review the impacts of Sulphur Dioxide, Nitrogen Oxide, Carbon Dioxide and particulates on human health and the surrounding flora and fauna. The predicted emissions from the project should be evaluated in the context of the surrounding land uses, relevant legislation and international guidelines.

Methodology

The study should specifically:

- Develop a baseline emissions inventory using existing data available from the RBCAA;
- Describe the power generation process utilising CFB, with respect to the pollutants released into the atmosphere.
- Discuss the human health and general environmental implications of the pollutants released (with a particular focus on Sulphur Dioxide, Oxides of Nitrogen and dust/particulates).
- Prepare and emissions inventory for normal operation of the cogeneration power station quantifying the projected future emissions, together with all data needed for dispersion modelling, such as gas flows, temperatures, heights of release etc.
- Discuss the meteorology of the KwaMbonambi area and identify possible abnormal or “upset” atmospheric conditions, their effect on emissions, and their likely frequency. This will require the collection of appropriate meteorological data for air quality modelling from all available and relevant sites. This should include wind speed and direction, temperature, cloud cover, and land use.
- Dispersion modelling for the co generation power station alone, and as part of the KwaMbonambi area land uses. Modelling should utilise available annual data and should predict the annual average as well as the 24-hour and 1-hour emission scenarios. The modelling should provide an indication of the width of a necessary buffer zone for the plant.
- Present the modelled predictions as maps showing isopleths on a base map of KwaMbonambi.
- Discuss the predictions in terms of existing South African air pollution guidelines, as well as international standards (in particular those of the World Health Organisation).

- Evaluate the risk to human health of atmospheric emissions, specifically looking at the persons who will be located in close proximity to the power plant.
- Evaluate the effects of atmospheric emissions on plants and agriculture, in particular agricultural activities in the area (e.g. subsistence agriculture).
- Model possible "upset" scenarios over appropriate time periods, probably 24-hour or 1-hour. Present and discuss "upset" scenarios and their implications on human health.
- All model inputs should be recorded in the Specialist Report.
- Evaluate the impacts associated with dust that might result from construction and operation processes.
- Consider the impacts of "greenhouse gas" emissions in relation to South Africa's contribution to the overall load and the country's international commitments.
- Identify and discuss any needs for pollution abatement and mitigation that are apparent from the study. This should be linked with recommendations for a monitoring programme of either in-stack or ambient concentrations.
- Assess all impacts arising from air pollution on human health, specifically addressing respiratory problems, unpleasant odours and allergies from criteria pollutants emanating from the proposed development.
- The atmospheric study should assess whether the proposed development could impact on flora and fauna in the surrounding areas through increased atmospheric deposition. Deposition effects on land use characteristics should also be considered.

9.1.4 Surface water and Groundwater: resource management and waste water management

Objectives

To determine the water resources available for the construction and operation of the site, and to investigate the potential impacts of water effluent on surface and groundwater quality within the receiving environment. This study will also assess the capacity of sewage treatment works to deal with the domestic waste of the plant.

Methodology

- The water study will firstly identify and confirm all sources of potential water usage and contamination arising from the proposed development. Of particular significance will be the runoff and seepage of storm-water collection and discharge.
- The water specialist study should include a review of any potential future water requirements.
- Water effluent investigation must look to:
  - Identify and assess the capacity of existing waste water infrastructure to provide a deposit for water effluent produced from the plant.
  - Provide a detailed evaluation of all effluents existing from the proposed cogeneration power plant and the impacts of these on the receiving environment.
  - Effluent discharge water quality requirements in terms of local/national regulations including National Water Act (Act 36 of 1998) and other legislation identified as pertinent.

- Conduct a water contamination study which should include an ecological and toxicological assessment of downstream areas from the proposed development site.
- Assess the effect of effluent water quality on future water uses and the hydrological environment, in particular on wetlands in the area.
- Identification of effluent water treatment/remediation requirements or opportunities.

The Water Study should be collated as a Water Management Plan that includes consideration of:

- The potential for water recycling and re-use.
- Water quality monitoring and performance management.
- Any infrastructural requirements to reduce the risk of water contamination (e.g. seepage into groundwater resources).

9.1.5 Ecological study

Objectives

The ecological study will review areas of ecological significance on the proposed site, assessing the potential loss in biodiversity that may result due to the construction and operation of the proposed power plant. It is necessary for this ecological study to provide a management plan that could be implemented to control the spread of alien invasives on site.

Methodology

The method for assessing the ecological significance of the site should include:

- A description and map of vegetation communities on the study site.
- A Wetland Delineation and Functional Assessment must be undertaken to investigate if a license is required. In the event a wetland is identified, an off-site mitigation strategy should be assessed, which may identify a potential wetland rehabilitation site within the same catchment area.
- An identification of any plant species of conservation importance (rare, threatened or endangered).
- Produce a sensitivity map for all alternatives which includes the layout superimposed onto the maps.
- Comments on the importance of each of the vegetation communities and their restorability.
- Present a plan for mitigating the adverse effects of site clearing. Highlight appropriate mitigation measures of impacts to any rare plant and animal species.
- Discuss plans to return affected areas to a self-sustaining habitat, considering such factors as biological capability and diversity.

9.1.6 Social and socio economic employment, infrastructure, direct/ indirect benefits,

Objectives

The objective of this study will be to determine the impact of the construction and operation of the proposed cogeneration power plant on the local, regional and national economies and social lives. Specifically this study should focus on the issue of resettlement and identifying the best possible strategy to ensure that all affected parties are not left worse off than before the development of the proposed plant.

Methodology

- The employment of opportunities created during construction and operation must be categorised into skilled and unskilled labour.
- The nature and number of new local economic opportunities must be identified.
- A survey of potentially affected households will be undertaken to identify the baseline socio-economic conditions of the community. This will assist in developing a Resettlement Action Plan aimed at relocating persons and ensuring they are not left worse off than before the development of the proposed power plant. This must be undertaken in partnership with the committee of community representatives.
- The social impact assessment must assess the potential social benefits this project can have in boosting the local economy and improving current conditions. These must be identified through a collaborative process with the local community.
- The social impact assessment must review the cultural heritage of the site.

9.1.7 Aesthetics (visual and noise)

Objectives

To provide and analysis of the visual and noise impacts that are associated with the construction and operation of the proposed power station, specifically considering the current sense of place and land use on site.

Methodology

- A general description of the surrounding environment.
- A description of the major installations that would impact on the aesthetic appeal of the area.
- An investigation into the lighting on the facility and its impact on fire detection camera's in the surrounding areas.
- An acoustic study into the current ambient noise levels on the proposed site, and an assessment of the probable increase in noise levels as a result of the construction and operation of the proposed power plant.

- The study should propose necessary measures to reduce the potential noise and aesthetic impacts.

9.1.8 Risk Assessment and cumulative studies

Objectives

To understand the general perceptions associated with the proposed cogeneration facility, specifically looking at the quantitative and qualitative issues that may impact on the surrounding environment.

Methodology

- Provide a description of the power generation process, specifically assessing the possible worst case scenario associated with this development.
- Estimate the probability of a major incident.
- Review an intended on-site emergency plan, and assess whether or not the procedures are suitable to the proposed surrounding environment.
- Project the worst case scenario, reviewing the extent of the impact on the surrounding environment.
- Identify and quantify the potential cumulative impacts associated with the proposed Alflourco development, and provide an assessment of the compatibility of these two projects to one another.

10 CONCLUSION AND WAY FORWARD

The information gathered in this report has provided a good indication of the environmental and social impacts associated with the proposed development of a cogeneration power facility. The meetings held with key stakeholders have been important in developing a set of issues and concerns regarding the project, and therefore guiding the terms of reference for the Specialist Studies during the Impact Assessment Phase.

The next phase of the EIA process involves meeting with Interested and Affected Parties to discuss the findings of this report. Stakeholders will be contacted regarding the dates of this meeting, and all Interested and Affected Parties are invited to comment on this Draft Scoping Report, and express any issues or concerns they feel are missing from this report. The information gathered during the public meetings will be incorporated into the Final Scoping Report which will be submitted to DAEA for approval by the middle of June 2008.

11 REFERENCEES

Department of Environmental Affairs and Tourism, (2006) General Regulations 385 in terms of Chapter 5 of the National Environmental Management Act, 1998.

EcoGeneration Solutions LLC. Companies (2008). 'What is cogeneration?' Sourced from http://www.cogeneration.net/whatiscogeneration.htm on 22 April 2008, 9:00am.

Hawkey, G.M. and Merino, M. P. 'Beneficial Applications of CFB Ash at Mississippi Lignite Mining Company's Red Hills Mine'

Mbonambi Annual Report (2007)

Municipal Demarcation Board, (2008). 'http:// www.demarcation.org.co.za' Sourced on 12 January 2008, 12:00am.

Lecuyer, I.; Gueraud, S. and Bursi, J.M, 'Different uses of CFB ash- EDF investigations'.

APPENDIX 1

BACKGROUND INFORMATION DOCUMENT AND COMMENT SHEET

APPENDIX 2

COPIES OF ADVERTS AND SITE NOTICE

APPENDIX 3

COMMENTS AND RESPONSE REPORT

APPENDIX 4

COPIES OF STAKEHOLDER COMMENT SHEETS AND LETTERS

APPENDIX 5

LIST OF STAKEHOLDERS