# ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
# FINAL SCOPING REPORT

# GOURIKWA POWER STATION CONVERSION AND TRANSMISSION INTEGRATION PROJECT

## WESTERN CAPE PROVINCE
## (DEAT Ref Nos. 12/12/20/1141 and 12/12/20/1142)

**July 2008**

***Prepared for***

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## PROJECT DETAILS

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| **DEAT Reference No.** | : | 12/12/20/1141 (power station conversion)<br>12/12/20/1142 (transmission power line) |
| **Title** | : | Environmental Impact Assessment Process<br>Final Scoping Report: Proposed Gourikwa Power Station Conversion and Transmission Integration Project, Western Cape Province |
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| **Client** | : | Eskom Holdings Limited (Eskom Generation Division) |
| **Report Status** | : | Final Scoping Report for public review |
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# PURPOSE OF THE SCOPING REPORT

Eskom Holdings Limited (Eskom) is investigating the conversion of the five units at the existing Open Cycle Gas Turbine (OCGT) plant at Gourikwa Power Station (located near Mossel Bay in the Western Cape) to a Combined Cycle Gas Turbine (CCGT) plant. This will increase the generating capacity of this existing power station by approximately 400 MW. The proposed conversion involves the addition of Heat Recovery Steam Generators (HRSG) to generate steam, and steam turbines and generators to the existing gas turbine plant (essentially adding a steam cycle to the existing gas cycle), and will be established on the same site as the existing Gourikwa Power Station.

Eskom is also proposing the construction of a 400kV transmission power line between the Gourikwa Power Station and the existing Proteus Substation to transmit the additional power generated at Gourikwa Power Station into the national electricity grid.

Eskom has appointed Savannah Environmental, as independent environmental consultants, to undertake the EIA. The EIA process is being undertaken in accordance with the requirements of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This Final Scoping Report represents the outcome of the Scoping Phase of the EIA process and contains the following sections:

**Chapter 1** provides background to the proposed power station conversion and transmission integration project and the environmental impact assessment process.
**Chapter 2** provides the strategic context for energy planning in South Africa.
**Chapter 3** describes the components of the proposed project (project scope).
**Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation program that was undertaken and input received from interested parties.
**Chapter 5** describes the existing biophysical and socio-economic environment.
**Chapter 6** presents the evaluation of environmental impacts associated with the power station conversion.
**Chapter 7** presents the evaluation of environmental impacts associated with the proposed transmission power line.
**Chapter 8** presents the conclusions of the scoping evaluation.
**Chapter 9** describes the Plan of Study for EIA.

In accordance with the EIA Regulations, a primary purpose of the Draft Scoping Report was to provide stakeholders with an opportunity to verify that the issues that they had raised through the process had been captured and adequately

considered within the scoping process, and provide the opportunity to raise any additional key issues for consideration. The Final Scoping Report has incorporated all issues and responses prior to submission to the National Department of Environmental Affairs and Tourism (DEAT), the decision-making authority for the project.

## PUBLIC REVIEW OF THE DRAFT SCOPING REPORT

The Draft Scoping Report was made available for public review from **30 May 2008 to 30 June 2008** at the following locations in the project area:

» Marsh Street Library
» D'Almeida Library
» Kwanonaqba Library
» Mossel Bay Environmental Partnership
» Dana Bay Conservancy
» SANCO
» PetroSA
» Mossel Bay Municipal Offices
» TNPA
» Farmers Association representing local and neighbouring farmers

The report was also made available on:
» www.eskom.co.za/eia
» www.savannahSA.com

Comments were requested to be submitted to Shawn Johnston of Sustainable Futures ZA by 30 June 2008 as written submission via fax, post or e-mail.

## PUBLIC MEETING: SCOPING FEEDBACK

In order to facilitate comments on the draft report, a public feedback meeting was held during the review period of the Draft Scoping Report. All interested and affected parties are invited to attend the public meting held on Thursday, 19 June 2008 at Die Graanskuur at the Dias Museum, Mossel Bay (from 18:00 – 20:00). The meeting was advertised in the local and regional printed media and registered I&APs were invited to attend. The aim of the meeting was to provide feedback of the findings of the scoping study undertaken, and to invite comment on the proposed project. Minutes of the meeting at included in Appendix H.

# SUMMARY

## Background and Project Overview

As part of its plans for increased electricity supply options, Eskom is proposing the **conversion of the five OCGT units** installed and being installed at the existing Gourikwa Power Station to Combined Cycle Gas Turbine (CCGT) units. This conversion will increase the generating capacity of the Gourikwa Power Station by approximately 400 MW by increasing the efficiency of the gas turbine plant (i.e. more power generated and sent out, for the same amount of fuel used). Overall thermal efficiency is therefore increased from approximately 34% for the current OCGTs to approximately 50% to 55% for the proposed CCGT plant, depending on the operating regime of the plant.

Electricity cannot be readily or inexpensively stored and must be used as it is generated. It is, therefore, required that electricity must be efficiently transmitted from the point of generation to the end user. It is vital that transmission capacity keeps up with both electricity generation capacity and electricity demand.

Therefore, in order to integrate the additional power generated at the Gourikwa Power Station into the national electricity grid, the **construction of a new 400kV transmission power line** between the Gourikwa Power Station and the Proteus Substation will be required.

The Gourikwa Power Station conversion and associated transmission integration project can be seen as a third phase of the original Gourikwa OCGT power station project. The construction of the initial OCGT units (i.e. the three units now in operation) was the first phase of the project. The second phase of the project (currently under construction) involves the expansion (capacity increase) of the power station by adding another two OCGT units.

The primary components of the conversion project include the following:

» A **heat recovery steam generator** (HRSG) will be added to the gas turbine to recover waste heat, to drive the steam turbine cycle. One HRSG can be linked to two or three OCGT units.
» A **condenser** which converts exhaust steam from the steam turbine back into water through a cooling process.
» Depending on the configuration, a **bypass stack** for the CCGT, anticipated to be approximately 60 m in height will be associated with each HRSG.
» **Water treatment plant** (for treatment of potable water and production of demineralised water (for steam generation)).

- **Dry-cooled technology** consisting of a system of air-cooled condenser fans situated in fan banks approximately between 25m - 30 m above ground.
- **Additional fuel storage facilities** and associated off-loading and other related infrastructure to cater for the increased fuel requirements associated with the higher load factor (i.e. longer operating hours or a mid-merit operating regime). The CCGT units can be both liquid fuel-fired or natural gas-fired. The CCGT units would initially be diesel-fired, until such time that natural gas becomes available.
- A **water tank** with a holding volume of ~2.5 million litres (i.e. water storage for ~5 days of operation).

The nature and extent of the power station conversion and transmission integration project, as well as potential environmental impacts associated with the construction of a facility of this nature is explored in more detail in this Scoping Report.

### Environmental Impact Assessment

The proposed power station conversion and associated transmission integration project is subject to the requirements of the Environmental Impact Assessment Regulations (EIA Regulations) published in GN 28753 of 21 April 2006, in terms of Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998). In terms of sections 24 and 24D of NEMA, as read with GNs R385 (Regulations 27–36) and R387, a Scoping and EIA are required to be undertaken for this proposed project.

The National Department of Environmental Affairs and Tourism (DEAT) is the competent authority for this project as Eskom is a statutory body. An application for authorisation has been accepted by DEAT (under Application Reference numbers 12/12/20/1141 (power station conversion) and 12/12/20/1142 (transmission power line)). Through the decision-making process, DEAT will be supported by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP).

The scoping phase for the proposed project forms part of the EIA process and has been undertaken in accordance with the EIA Regulations. This Scoping Report aimed to identify potential issues associated with the proposed project, and define the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving specialists with expertise relevant to the nature of the project and the study area, the project proponent, as well as a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs).

A comprehensive public participation process was undertaken in accordance with Regulation 56 of

Government Notice No R385 of 2006 during the Scoping phase of this EIA process. This public participation process comprised the following:

» **Notification of the EIA Process** in local, regional and national newspapers and on site, as well as through written notification to identified stakeholders and affected landowners.
» **Identification and registration** of I&APs and key stakeholders.
» Compilation and distribution of a **Background Information Document** (BID) to all identified I&APs and key stakeholders.
» **On-going consultation** with identified I&APs and stakeholders.
» Compilation and maintenance of a **register** containing the names and addresses of all identified I&APs and key stakeholders.
» Preparation of a **Comments and Response Report** detailing key issues raised by I&APs as part of the EIA Process.

## Evaluation of the Proposed Power Station Conversion

Potential impacts associated with the proposed power station conversion project are expected to occur during both the construction and operational phases. In general, impacts are expected to be similar to those associated with the initial phases of the power station project. New impact sources associated with the power station conversion project would include:

» **Visual impacts** as a result of the additional infrastructure associated with the conversion project to be added onto the existing power station.
» **Air quality impacts** associated with the construction phase (dust) and the operational phase (emissions from the power station).
» **Noise impacts** associated with the existing OCGT units as well as the additional CCGT components to be added onto the existing power station.
» **Impacts on the social environment** as a result of the creation of employment opportunities, influx of workers to the area, traffic movements, and impacts on sense of place.

No environmental fatal flaws have been identified to be associated with the proposed power station conversion project at this stage of the project. In order to assess the potential impacts on the environment associated with the construction and operation of the proposed power station conversion project, detailed specialist studies to address the above issues must be undertaken within the EIA phase of the project. These studies must compare the impacts associated with the conversion project to the current situation and must assess the potential cumulative impacts associated with the project.

The proposed conversion will be on the site of the existing Gourikwa

Power Station, and will not require any additional land take outside of the existing power station boundaries. Therefore, **no location alternatives** have been considered within this EIA process. The following alternatives associated with the power station operation have been nominated for consideration within the EIA Phase:

» The use of **treated water, effluent and/or stormwater** from the PetroSA facility (proposed to be piped to the power station from PetroSA via a new **~1,3 km water pipeline** proposed to be constructed parallel to the existing liquid fuel pipeline between the two facilities).
» **Dry-cooling technology** (air-cooled condensers) at the power station to reduce water requirements.
» The construction of a new dedicated **access road** to the Gourikwa Power Station directly off the N2 national road.

## Evaluation and Comparison of the Proposed Transmission Power Line Alternatives

Three technically feasible alternative transmission power line alignment corridors (approximately 500 m in width) have been identified for investigation within the EIA process. Potential impacts associated with the proposed transmission power line are expected to occur during the construction and operational phases, and have been identified through this scoping process include:

» **Impacts on flora and ecology** as a result of the disturbance of habitats within the power line servitude and at tower footprints.
» **Impacts on avifauna** as a result of collisions with the earthwire, electrocution and disturbance of habitats within the power line servitude.
» **Impacts on heritage sites** as a result of disturbance or destruction, as well as due to visual impacts on heritage sites.
» **Visual impacts** on the surrounding area.
» **Impacts on the social environment** as a result of the creation of employment opportunities, influx of workers to the area, impacts on land use, and impacts on sense of place.

From the specialist studies undertaken within the Scoping Phase, **Alternative 2 or Alternative 3** are nominated as the most preferred alternative/s in terms of all aspects considered, as these alternatives would result in impacts of least significance impacts on both the social and biophysical environments. The alternative alignments have a lower impact on the overall environment as a result of consolidation of infrastructure of a similar nature and the minimisation of impacts on current and planned land use. Therefore, both Alternative 2 and Alternative 3 are nominated for **further investigation in the EIA Phase**.

**Alternative 1** is nominated as the least preferred alternative, and therefore this alternative is **excluded as an alternative for further investigation**.

In order to assess the potential impacts on the environment associated with the construction and operation of the proposed power line, detailed specialist studies to address the above issues must be undertaken within the EIA phase of the project.

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# DEFINITIONS AND TERMINOLOGY

**Alternatives:** Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

**Ambient sound level**: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

**Condenser:** Converts exhaust steam from the steam turbine back into water through a cooling process.

**Cumulative impacts:** Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

**Direct impacts:** Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

**Disturbing noise**: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

**'Do nothing' alternative:** The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

**Dry-cooled technology:** A system of air-cooled condenser fans situated in fan banks approximately between 25-30 m above ground.

**Endangered species:** Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of

individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

**Endemic:** An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

**Environment:** the surroundings within which humans exist and that are made up of:

i. the land, water and atmosphere of the earth;
ii. micro-organisms, plant and animal life;
iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

**Environmental Impact:** An action or series of actions that have an effect on the environment.

**Environmental impact assessment:** Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

**Environmental management:** Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

**Environmental management plan:** An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

**Heat recovery steam generator (HRSG):** Component to be added to the gas turbine to recover waste heat, to drive the steam turbine cycle. In principle, a HRSG is associated with a gas turbine. One HRSG can be linked to 2 or 3 OCGT units.

**Indirect impacts:** Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

**Interested and Affected Party:** Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

**Mid-merit capacity:** Electricity capacity during the daytime from about 6 am to about 10 pm on weekdays

**Peaking generation capacity:** Peaking power refers to power generation technology designed to generate electricity during periods of high electricity demand, generally in the weekday mornings from 07:00 to 09:00 and weekday evenings from 18:00 to 20:00.

**Rare species:** Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

**Red data species:** Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

**Significant impact:** An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| BID | Background Information Document |
| CBOs | Community Based Organisations |
| CCGT | Combined Cycle Gas Turbine |
| $CO_2$ | Carbon dioxide |
| DEA&DP | Western Cape Department of Environmental Affairs and Development Planning |
| DEAT | National Department of Environmental Affairs and Tourism |
| DME | Department of Minerals and Energy |
| DWAF | Department of Water Affairs and Forestry |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| GIS | Geographical Information Systems |
| GG | Government Gazette |
| GN | Government Notice |
| I&AP | Interested and Affected Party |
| IEP | Integrated Energy Planning |
| kV | Kilovolt |
| LUPO | Rezoning and Subdivision in terms of Land Use Planning Ordinance, Ordinance 15 of 1985 |
| $m^2$ | Square meters |
| MW | Mega Watt |
| NEMA | National Environmental Management Act (Act No 107 of 1998) |
| NERSA | National Energy Regulator of South Africa |
| NHRA | National Heritage Resources Act (Act No 25 of 1999) |
| NGOs | Non-Governmental Organisations |
| NIRP | National Integrated Resource Planning |
| NWA | National Water Act (Act No 36 of 1998) |
| OCGT | Open Cycle Gas Turbine |
| PGWC | Provincial Government of the Western Cape |
| SAHRA | South African Heritage Resources Agency |
| SIA | Social Impact Assessment |

# INTRODUCTION CHAPTER 1

Eskom Holdings Limited (Eskom) is investigating the conversion of the five units at the existing Open Cycle Gas Turbine (OCGT) plant at Gourikwa Power Station (located near Mossel Bay in the Western Cape) to a Combined Cycle Gas Turbine (CCGT) plant. This will increase the generating capacity of this existing power station by approximately 400 MW. The proposed conversion involves the addition of Heat Recovery Steam Generators (HRSG) to generate steam, and steam turbines and generators to the existing gas turbine plant (essentially adding a steam cycle to the existing gas cycle), and will be established on the same site as the existing Gourikwa Power Station.

Eskom is also proposing the construction of a 400kV transmission power line between the Gourikwa Power Station and the existing Proteus Substation to transmit the additional power generated at Gourikwa Power Station into the national electricity grid.

The Gourikwa Power Station conversion and associated transmission integration project can be seen as a third phase of the original Gourikwa OCGT power station project. The construction of the initial OCGT units (i.e. the three units now in operation) was the first phase of the project. The second phase of the project (currently under construction) involves the expansion of the power station by adding another two OCGT units, fuel tanks and a switchyard to the power station.

The nature and extent of the Gourikwa Power Station conversion and transmission integration project, as well as potential environmental impacts associated with the construction of a facility of this nature (as well as all associated infrastructure) is explored in more detail in this Scoping Report.

## 1.1. The Need for the Proposed Project

Eskom contributes to its vision of “together building the powerbase for sustainable growth and development” through its core business focus on electricity generation, transportation, trading and retail. It entrenches the values of excellence, innovation, customer satisfaction and integrity across all business operations.

Achieving the vision requires in-depth planning and energetic implementation in a complex environment characterised by higher economic growth, greater demand for electricity and the heightened need for significant infrastructure expansion with attendant competition for scarce materials, funding, skills and supplier inputs. Challenges are compounded by the rising cost of primary energy and new

components, regulatory pressure, restructuring of the electricity distribution industry, expectations of better environmental performance and the growing involvement of stakeholder groups.

Considering the Government's Accelerated and Shared Growth Initiative for South Africa (ASGI-SA) targets and load growth currently being experienced, South Africa will require additional power in the next five years. To supply this additional demand in the medium term, a variety of options such as demand side management, co-generation non-Eskom generation and gas-fired plants (open cycle and combined cycle) continue to be investigated by Eskom in addition to conventional long-term supply options (such as coal and nuclear fuel plants).

As one of its increased electricity supply options, Eskom is proposing the conversion of the OCGT units at the existing Gourikwa Power Station (near Mossel Bay) as well as the Ankerlig Power Station (located near Atlantis) in the Western Cape to **Combined Cycle Gas Turbine (CCGT)** units. Due to the medium-term forecast in the demand for electricity (until approximately 2014) and constraints associated with meeting this projected demand, the conversion of these OCGT units to CCGT units is one of the few options available to Eskom to manage the projected demand in the medium-term.

The conversion of the Open Cycle Gas Turbine (OCGT) units at the Gourikwa Power Station and/or the Ankerlig Power Station will increase the generating capacity of the OCGT units within the Western Cape by approximately 400 MW. This increase in generating capacity is achieved by increasing the efficiency of the gas turbine plant (i.e. more power generated and sent out, for the same amount of fuel used at the same operating regime). Overall thermal efficiency is therefore increased from approximately 34% for the current OCGTs to approximately 50% to 55% for the proposed CCGT plant, depending on the operating regime of the plant.

This Scoping Study considers the conversion of the OCGT units at the Gourikwa Power Station to CCGT units, and considers a **maximum capacity increase of 400 MW**. Environmental studies for the conversion of the OCGT units at the Ankerlig Power Station are the subject of a separate EIA process, and Eskom have submitted a separate application for the maximum capacity increase at this power station. However, the decision around the total number of OCGT units to be converted to CCGT units, and at which power station (i.e. Ankerlig or Gourikwa) this conversion will eventually take place is still to be determined by Eskom.

As electricity cannot be readily or inexpensively stored, it is therefore required that electricity must be efficiently transmitted from the point of generation to the end user. Transmission capacity is required to keep up with both electricity

generation capacity and electricity demand. Therefore, in order to integrate the additional power generated at the Gourikwa Power Station into the national electricity grid, the construction of a new **400 kV transmission power line** between the Gourikwa Power Station and the Proteus Substation will be required.

## 1.2. Background to the Project

Environmental Impact Assessment (EIA) processes have previously been undertaken by Eskom for the approved OCGT units at Gourikwa (the existing three units (with a nominal capacity of 450 MW) approved in December 2005 and the additional two units (with a nominal capacity of 300 MW) approved in August 2007). The construction and commissioning of the initial three OCGT units is complete, and these units have been operational since mid-2007. Construction of the additional two OCGT units is currently underway and is expected to be complete end-2008/beginning 2009. The electricity generation capacity of the Gourikwa Power Station will assist Eskom in meeting the peaking electricity generation demands[1] in the medium-term (i.e. up to 2014).

Subsequently, considering the strategic electricity planning in place (refer to Chapter 2) and taking into account the continued growth in electricity demand, Eskom has determined that there is a need for **additional** power generation capacity in the **medium-term**. In considering the most suitable options to meet the increased electricity demand in the medium term, Eskom has concluded that it will be feasible to convert the existing Gourikwa OCGT units to CCGT units, thereby generating additional capacity for the same amount of fuel (under a similar operating regime) considering the load factors at which the units may have to operate.

## 1.3. Project Overview

The existing Gourikwa OCGT Power Station is located adjacent to the PetroSA Gas to Liquid (GTL) facility near Mossel Bay in the Western Cape (refer to Figure 1.1).

[1] OCGT units are best suited for peaking generation capacity (i.e. for peak periods in the morning and evenings).

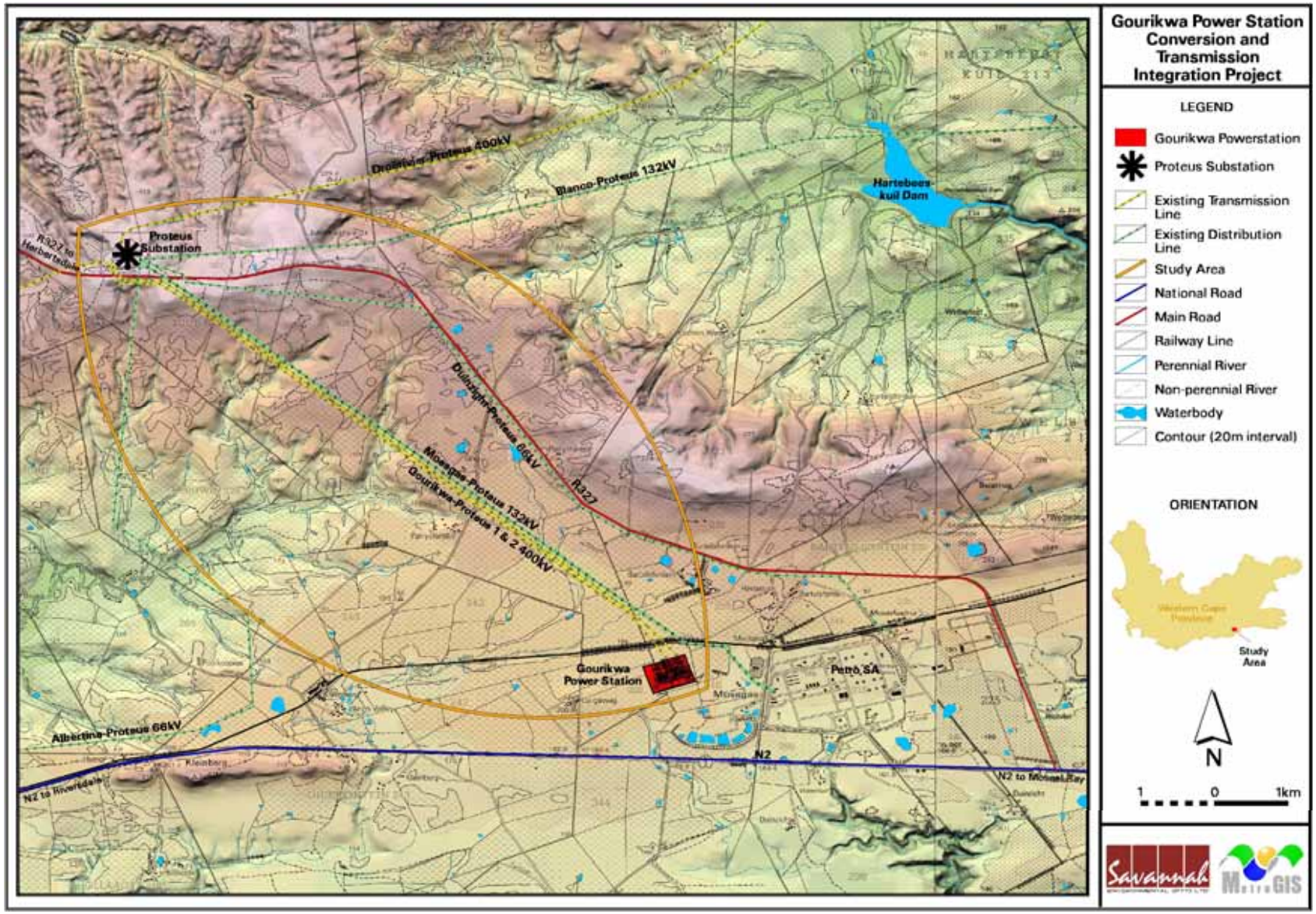



**Figure 1.1:** Locality map showing the location of the existing Gourikwa Power Station and the study area for the proposed transmission power line corridor alternatives between Gourikwa and Proteus Substation

### *1.3.1. Power Station Conversion*

The Gourikwa Power Station comprises five OCGT units (i.e. 3 existing OCGT units, plus 2 additional OCGT units under construction) each with a nominal capacity of ~150 MW, resulting in a total nominal capacity of 750 MW for the power station. Each OCGT unit consists of one gas turbine driving an electric generator.

The concept of converting the OCGT units to CCGT units is to utilise the **heat energy** from the exhaust of the gas turbine to create steam in a Heat Recovery Steam Generator (HRSG) in order to drive a steam turbine, instead of this heat energy being exhausted and lost to the to the atmosphere (as is the current scenario). Conversion of the units to CCGT is therefore based on increased cycle efficiency.

Simply stated, this can be achieved through the following (and is illustrated in Figure 1.2):

» When the hot gas exits the gas turbine as exhaust gas, it has a temperature of up to 600°C. This heat energy is transferred to water in the heat recovery steam generator, instead of being exhausted to the atmosphere.
» The heat is used to generate steam (water vapour), which powers the steam turbine to produce mechanical energy.

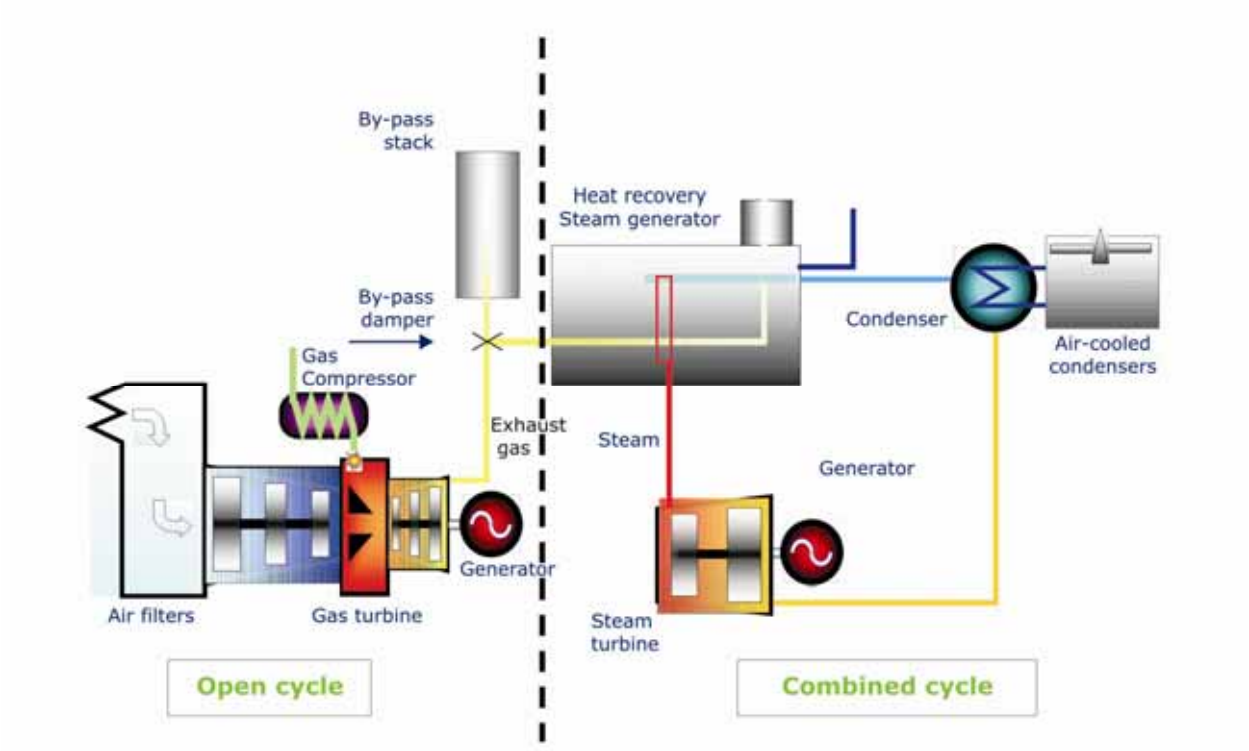



**Figure 1.2:** Simplified schematic illustrating the CCGT conversion process and components

» The resulting mechanical energy is transferred to a generator, where it is converted into electricity (i.e. electrical energy).
» A condenser converts exhaust steam from the steam turbine back into saturated water through a cooling process.

Conversion of the units to CCGT is undertaken to increase cycle thermal efficiency. It is estimated that each converted unit will produce approximately 80 MW additional capacity, i.e. approximately 50% more than a standard OCGT unit. Therefore, a maximum of an additional 5 x 80 MW (400 MW in total) increase in capacity is foreseen from the OCGT to CCGT conversion. The **total nominal capacity** of the Gourikwa Power Station will, therefore, be **1 150 MW**.

The primary components of the conversion project include the following:

» A **heat recovery steam generator** (HRSG) will be added to the gas turbine to recover waste heat, to drive the steam turbine cycle. One HRSG can be linked to two or three OCGT units.
» A **condenser** which converts exhaust steam from the steam turbine back into water through a cooling process.
» Depending on the configuration, a **bypass stack** for the CCGT, anticipated to be approximately 60 m in height will be associated with each HRSG.
» **Water treatment plant** (for treatment of potable water and production of demineralised water (for steam generation)).
» **Dry-cooled technology** consisting of a system of air-cooled condenser fans situated in fan banks approximately between 25m - 30 m above ground.
» **Additional fuel storage facilities** and associated off-loading and other related infrastructure to cater for the increased fuel requirements associated with the higher load factor (i.e. longer operating hours or a mid-merit operating regime[2]). The CCGT units can be both liquid fuel-fired or natural gas-fired. The CCGT units would initially be diesel-fired, until such time that natural gas becomes available.
» A **water tank** with a holding volume of ~2.5 million litres (i.e. water storage for ~5 days of operation).

The proposed conversion infrastructure will be on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries (refer to Figure 1.3).

[2] Mid-merit capacity is during the daytime from about 6 am to about 10 pm on weekdays.


**Figure 1.3:** Aerial photograph of the Gourikwa Power Station site showing the existing power station infrastructure, the power station expansion site, as well as the areas for the placement of infrastructure associated with the proposed power station conversion

Water will be required for the CCGT power generation process and for cooling. The feasibility and availability of various water resource options are currently being investigated with PetroSA, including the use of treated water, effluent and/or stormwater from the PetroSA facility. A preferred option will be nominated with the agreement of PetroSA for implementation based on technical, environmental and economic constraints. The water will be piped to the power station from PetroSA via a new **water pipeline** proposed to be constructed parallel to the existing fuel pipeline between the two facilities. This water pipeline would be outside of the existing power station boundaries.

Eskom also propose the construction of a new dedicated **access road** to the Gourikwa Power Station. The power plant currently shares an access road with PetroSA. The proposed access route is directly off the N2, and would be outside of the existing power station boundaries.

### *1.3.2. Integration of the CCGT Power Station into the National Grid*

A 400kV transmission power line is required to be constructed between the Gourikwa Power Station and the Proteus Substation (located approximately 11 km north-west of the power station) to integrate the additional power generated at this power station to the national electricity grid. The existing substation (high voltage (HV) yard) at the Gourikwa Power Station will be utilised, and no additional infrastructure or expansion of this HV yard is required to accommodate the new transmission power line.

Technically feasible alternative transmission power line **alignment corridors** (approximately 500 m in width) have been identified for investigation within the EIA process (refer to Figure 1.4). Through the EIA process, a preferred alternative power line corridor will be nominated for environmental authorisation (by the environmental authorities), provided no environmental fatal flaws are identified to be associated with the proposed project.

Transmission power lines are constructed and operated within a 55 m wide servitude that is established along the entire length of the power line. Within this servitude, Eskom has certain rights and controls that support the safe, effective operation and maintenance of the power line. The process of achieving options to acquire servitudes is referred to as the Servitude Negotiation Process. The procurement of servitudes will be through a negotiation process with each affected landowner and will be subject to the project being authorised by DEAT. The process of servitude negotiating is independent of the EIA process.

### *1.3.3. Summary of the Power Station Conversion and Integration Project Components*

In summary, the components of this project are as follows:

1. Conversion of five OGCT units to CCGT units at Gourikwa Power Station
2. Construction of a new water pipeline between the PetroSA facility and Gourikwa Power Station
3. Construction of a new access road to Gourikwa Power Station
4. Construction of a new 400kV power line between Gourikwa Power Station and Proteus Substation

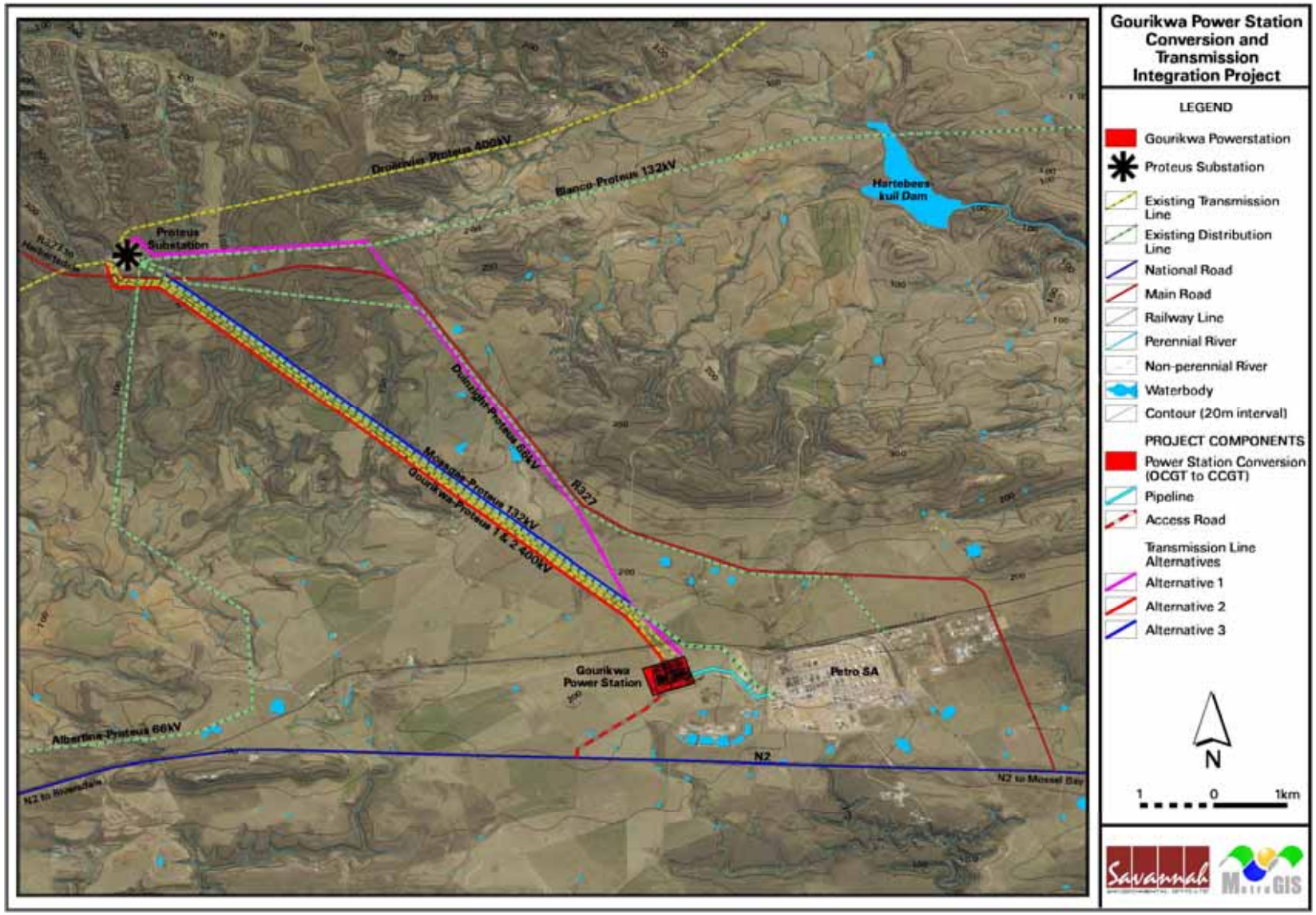



**Figure 1.4:** Locality map showing the project components: Gourikwa Power Station, the feasible alternative transmission power line corridor alternatives between Gourikwa and Proteus Substation, and the water pipeline and access road alignments

## 1.4. Requirement for an Environmental Impact Assessment Process

The proposed power station and transmission power line integration project is subject to the requirements of the Environmental Impact Assessment Regulations (EIA Regulations) published in terms of Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998). This section provides a brief overview of EIA Regulations and their application to this project.

NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. The National Department of Environmental Affairs and Tourism (DEAT) is the competent authority for this project as Eskom is a statutory body. An application for authorisation has been accepted by DEAT (under Application Reference numbers 12/12/20/1141 (power station conversion) and 12/12/20/1142 (proposed transmission power line)). Through the decision-making process, DEAT will be supported by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP).

The need to comply with the requirements of the EIA Regulations ensures that decision-makers are provided the opportunity to consider the potential environmental impacts of a project early in the project development process, and assess if environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project. Eskom appointed Savannah Environmental (Pty) Ltd to conduct the independent Environmental Impact Assessment (EIA) process for the proposed project.

An EIA is also an effective planning and decision-making tool for the project proponent. It allows the environmental consequences resulting from a technical facility during its establishment and its operation to be identified and appropriately managed. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issue(s) reported on in the Scoping and EIA reports as well as dialogue with affected parties.

In terms of sections 24 and 24D of NEMA, as read with Government Notices R385 (Regulations 27–36) and R387, a Scoping and EIA are required to be undertaken for this proposed project as it includes the following activities listed in terms of

GN R386 and R387 (GG No 28753 of 21 April 2006) relevant to the **power station conversion**:

| No & date of relevant notice | Activity No (in terms of relevant Regulation / notice) | Description of listed activity |
|---|---|---|
| Government Notice R387 (21 April 2006) | 1(a) | The construction of facilities or infrastructure, including associated structures or infrastructure, for the generation of electricity where (i) the electricity output is 20 megawatts or more; or (ii) the elements of the facility cover a combined area in excess of 1 hectare |
| Government Notice R387 (21 April 2006) | 1(c) | The above-ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of 1000 cubic meters or more at any one location or site including the storage of one or more dangerous goods, in a tank farm |
| Government Notice R387 (21 April 2006) | 1(e) | Any process or activity which requires a permit or licence in terms of legislation governing the generation or release of emissions, pollution, effluent or waste and which is not identified in Government Notice No. R 386 of 2006 |
| Government Notice R387 (21 April 2006) | 1(j) | The bulk transportation of dangerous goods using pipelines, funiculars or conveyors with a throughput capacity of 50 tons or 50 cubic metres or more per day |
| Government Notice R387 (21 April 2006) | 2 | 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 |
| Government Notice R386 (21 April 2006) | 1(k) | The construction of facilities or infrastructure, including associated structures or infrastructure, for the bulk transportation of sewage and water, including storm water, in pipelines with -<br>» an internal diameter of 0,36 metres or more; or<br>» a peak throughput of 120 litres per second or more |
| Government Notice R386 (21 April 2006) | 1(n) | The construction of facilities or infrastructure, including associated structures or infrastructure, for the off-stream storage of water, including dams and reservoirs, with a capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of the activity listed in item 6 of Government Notice No. R. 387 of 2006 |

| No & date of relevant notice | Activity No (in terms of relevant Regulation / notice) | Description of listed activity |
|---|---|---|
| Government Notice R386 (21 April 2006) | 1(s) | The treatment of effluent, wastewater or sewage with an annual throughput capacity of more than 2000 cubic meters but less than 15 000 cubic meters. |
| Government Notice R386 (21 April 2006) | 7 | The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site. |
| Government Notice R386 (21 April 2006) | 14 | The construction of masts of any material of type and of any height, including those used for telecommunications broadcasting and radio transmission, but excluding (a) masts of 15m and lower exclusively used by (i) radio amateurs; or (ii) for lightening purposes (b) flagpoles; and (c) lightening conductor poles |
| Government Notice R386 (21 April 2006) | 15 | The construction of a road that is wider than 4 m or that has a reserve wider than 6 m, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 m long. |

The following activities listed in terms of GN R386 and R387 (GG No 28753 of 21 April 2006) relevant to the **transmission power line integration**:

| No & date of relevant notice | Activity No (in terms of relevant Regulation / notice) | Description of listed activity |
|---|---|---|
| Government Notice R387 (21 April 2006) | 1(l) | The construction of facilities or infrastructure, including associated structures or infrastructure, for the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more |
| Government Notice R386 (21 April 2006) | 1(m) | any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including – a) canals; b) channels; c) bridges; d) dams; and e) weirs |
| Government | 7 | The above ground storage of a dangerous good, |

| No & date of relevant notice | Activity No (in terms of relevant Regulation / notice) | Description of listed activity |
|---|---|---|
| Notice R386 (21 April 2006) | | including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site. |
| Government Notice R386 (21 April 2006) | 12 | The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). |
| Government Notice R386 (21 April 2006) | 14 | The construction of masts of any material of type and of any height, including those used for telecommunications broadcasting and radio transmission, but excluding (a) masts of 15m and lower exclusively used by (i) radio amateurs; or (ii) for lightening purposes (b) flagpoles; and (c) lightening conductor poles |
| Government Notice R386 (21 April 2006) | 15 | The construction of a road that is wider than 4 m or that has a reserve wider than 6 m, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 m long. |

This report documents the scoping evaluation of the potential environmental impacts of the proposed construction and operation phases of the proposed power station conversion and transmission integration project. This scoping study forms part of the EIA process and was conducted in accordance with the requirements of the EIA Regulations in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

## 1.5. Objectives of the Scoping Phase

The Scoping Phase of the Environmental Impact Assessment (EIA) process refers to the process of identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA Phase. This is achieved through an evaluation of the proposed project, involving the project proponent, specialists with experience in EIAs for similar projects, and a public consultation process with key stakeholders that includes both government authorities and interested and affected parties (I&APs).

In accordance with the EIA Regulations, the main purpose of the Scoping Phase is to focus the environmental assessment in order to ensure that only potentially significant issues, and reasonable and feasible alternatives are examined in the EIA Phase. The Draft Scoping Report provided stakeholders with an opportunity to verify that the issues they had raised through the process had been captured and adequately considered within the scoping process, and provided a further opportunity for additional key issues for consideration to be raised. The Final Scoping Report has incorporated all issues and responses raised during the public review of the Draft Scoping Report prior to submission to DEAT, the decision-making authority for the project.

The Scoping Report consists of ten sections:

**Chapter 1** provides background to the proposed power station conversion and transmission integration project and the environmental impact assessment process.
**Chapter 2** provides the strategic context for energy planning in South Africa.
**Chapter 3** describes the components of the proposed project (project scope).
**Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation program that was undertaken and input received from interested parties.
**Chapter 5** describes the existing biophysical and socio-economic environment.
**Chapter 6** presents the evaluation of environmental impacts associated with the power station conversion.
**Chapter 7** presents the evaluation of environmental impacts associated with the proposed transmission power line.
**Chapter 8** presents the conclusions of the scoping evaluation.
**Chapter 9** describes the Plan of Study for EIA.

## 1.6. Details of Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA

Savannah Environmental was contracted by Eskom Holdings Limited as an independent environmental assessment practitioner to undertake an Environmental Impact Assessment (EIA) for the proposed project, as required by the NEMA EIA Regulations. Neither Savannah Environmental, nor any its specialist sub-consultants on this project are subsidiaries of or affiliated to Eskom Holdings Limited. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

The Savannah Environmental project team have more than ten (10) years experience in environmental assessment and environmental management, and have been actively involved in undertaking environmental studies for a wide

variety of projects throughout South Africa. Strong competencies have been developed in project management of environmental EIA processes, as well as strategic environmental assessment and compliance advice, and the identification of environmental management solutions and mitigation/risk minimising measures.

Jo-Anne Thomas and Karen Jodas, the principal authors of this Scoping Report, are both registered Professional Natural Scientists (in the practice of environmental science) with the South African Council for Natural Scientific Professions. They have gained extensive knowledge and experience on potential environmental impacts associated with electricity generation projects through their involvement in related EIA processes over the past ten (10) years. They have successfully managed and undertaken EIA processes for other power generation projects for Eskom Holdings Limited throughout South Africa. Curricula vitae for the Savannah Environmental project team consultants are included in Appendix A.

In order to adequately identify and assess potential environmental impacts, Savannah Environmental has appointed several specialist consultants to conduct specialist studies, as required. Details of these specialist studies are included in Chapter 4. The curricula vitae for the EIA specialist consultants are also included in Appendix A.

# STRATEGIC CONTEXT FOR ENERGY PLANNING CHAPTER 2

Eskom contributes to its vision of "together building the powerbase for sustainable growth and development" through its core business focus on electricity generation, transportation, trading and retail. It entrenches the values of excellence, innovation, customer satisfaction and integrity across all business operations.

Achieving the vision requires in-depth planning and energetic implementation in a complex environment characterised by higher economic growth, greater demand for electricity and the heightened need for significant infrastructure expansion with attendant competition for scarce materials, funding, skills and supplier inputs. Challenges are compounded by the rising cost of primary energy and new components, regulatory pressure, restructuring of the electricity distribution industry, expectations of better environmental performance and the growing involvement of stakeholder groups.

The following four strategic objectives are key to achieving this vision:

» ***Sustaining quality and continuity of supply:***
This requires effective management of total system capacity and reliability planning, focusing on primary energy availability, maintenance, refurbishment and energy efficiency. Stretch targets that ensure quality and continuity of supply need to be set while maintaining rigorous occupational health and safety standards.

» ***Capacity expansion:***
Successful delivery on the capacity expansion programme is central to Eskom's vision and entails thorough environmental impact assessments, site selection and optimisation, procurement efficiency, project management and commitment to health and safety in the construction environment, while rigorously applying Eskom's climate change and air quality strategies. The challenge is to build new plant, on time and on budget, while running existing plant at optimal levels.

» ***Funding and resourcing:***
The build programme imposes significant funding and resourcing requirements. Appropriate skills and information management systems are also vital to ensure a sustainable business and delivery on the build programme. Other key factors include multi-year pricing determination, revenue management, efficiency initiatives and Eskom's skills acquisition and retention strategies.

» ***Leveraging business operations for developmental benefits:***
Sustainability shapes the way Eskom conducts business and provides the context for its developmental initiatives.

The magnitude of Eskom's current business procurement spend and the planned capacity expansion programme create opportunities for maximising the organisation's contribution to government's Accelerated and Shared Growth Initiative for South Africa (ASGI-SA). The mechanisms include the fostering of small and medium enterprises, black women-owned businesses and skills development, accelerated electrification and Eskom's corporate social investment spend. Local content will be a core requirement when major contracts are awarded.

Over the last decade, South Africa has experienced a steady growth in the demand for electricity on the back of healthy economic growth. The continued growth in the economy has progressively reduced Eskom electricity reserves. It is expected that the reserve margin will continue on a downward trend for the next seven years until new base-load power plant is built (2014). In spite of new capacity coming on-line, which includes bringing back mothballed power stations and commissioning Open Cycle Gas Turbine plants, the electricity demand within the country is still higher than available capacity. Eskom is stepping up the implementation of this capacity expansion programme and will invest about R150 billion over the next five years in the upgrading of South Africa's power supply infrastructure. The biggest percentage of the expenditure will go towards improving generation capacity through, among others, the construction of new power stations.

The decision to expand Eskom's electricity generation capacity is based on **national policy** and informed by on-going strategic planning undertaken by the national Department of Minerals and Energy (DME), the National Energy Regulator of South Africa (NERSA) and Eskom. Strategic decisions regarding the electricity generation options to meet energy requirements within the country are made through this strategic planning process. The acceptability of options investigated at a project-specific level from a technical, economic and environmental perspective.

The hierarchy of policy and planning documentation is illustrated in Figure 2.1.

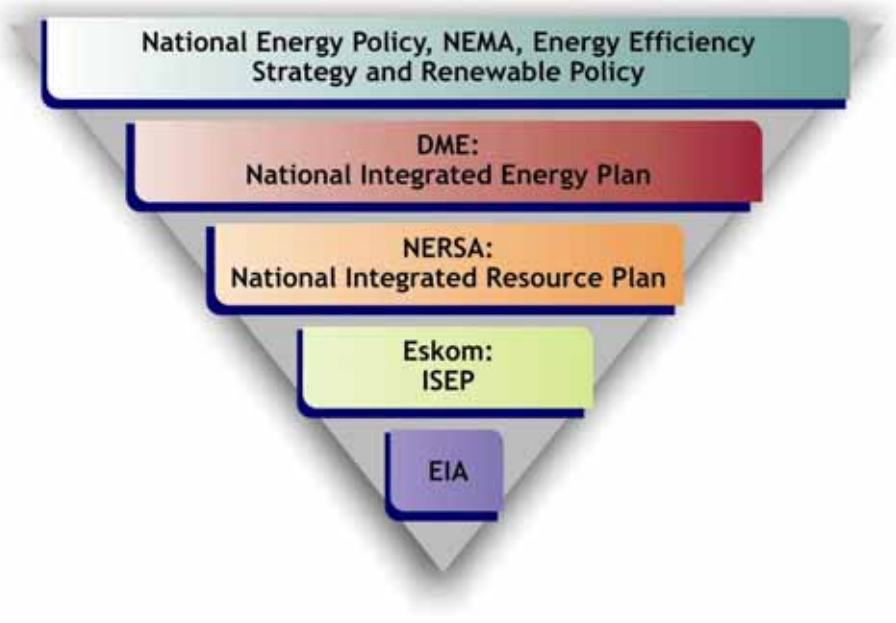



**Figure 2.1:** Hierarchy of electricity policy and planning documents

## 2.1. White Paper on the Energy Policy of the Republic of South Africa, 1998

Development within the energy sector in South Africa is governed by the White Paper on a National Energy Policy (the National Energy Policy), published by DME in 1998. This White Paper identifies five key objectives for energy supply within South Africa, that is:

» Increasing access to affordable energy services
» Improving energy sector governance
» Stimulating economic development
» Managing energy-related environmental impacts
» Securing supply through diversity.

Furthermore, the National Energy Policy identifies the need to undertake an Integrated Energy Planning (IEP) process and the adoption of a National Integrated Resource Planning (NIRP) approach. Through these processes, the most likely future electricity demand based on long-term southern African economic scenarios can be forecasted, and provide the framework for South Africa (and Eskom) to investigate a whole range of supply and demand side options.

## 2.2. Integrated Energy Plan (IEP) – 2003

In response to the requirements of the National Energy Policy, the DME commissioned the Integrated Energy Plan (IEP) to provide a framework in which specific energy policies, development decisions and energy supply trade-offs can be made on a project-by-project basis. The framework is intended to create a

balance between the energy demand and resource availability to provide low-cost electricity for social and economic development, while taking into account health, safety and environmental parameters.

The IEP projected that the additional demand in electricity would necessitate an increase in electricity generation capacity in South Africa by 2007. Furthermore, the IEP recognises:

- That South Africa is likely to be reliant on coal for at least the next 20 years as the predominant source of energy.
- That new electricity generation will remain predominantly coal-based, but with the potential for hydro, natural gas, and nuclear capacity.
- The need to diversify energy supply through increased use of natural gas and new and renewable energies.
- Continuing investigations into nuclear options as a future new energy source.
- The promotion of the use of energy efficiency management and technologies.
- The need to ensure environmental considerations in energy supply, transformation and end use.
- The promotion of universal access to clean and affordable energy, with the emphasis on household energy supply being co-ordinated with provincial and local integrated development programmes.
- The promotion of the use of energy efficiency management and technologies.
- The need to maximise load factors on electricity generation plants to lower levelised lifecycle costs.
- The need to lessen reliance on imported liquid fuels by exploring and developing oil and gas deposits.
- The need to increase existing oil refineries capacity where appropriate rather than greenfields development.
- The continuation of existing synfuel plants and supplement with natural gas as feedstock.
- The need to introduce policy, legislation and regulation for the promotion of renewable energy and energy efficiency measures and mandatory provision of energy data.
- The need to undertake integrated energy planning on an on-going basis

## 2.3. National Integrated Resource Plan (NIRP), 2003/2004

In response to the National Energy Policy's objective relating to affordable energy services, NERSA commissioned a National Integrated Resource Plan (NIRP) in order to provide a long-term, cost-effective resource plan for meeting electricity demand, which is consistent with reliable electricity supply and environmental, social and economic policies. The planning horizon for the study was from 2003 to 2022.

The objective of the NIRP is to determine the least-cost supply options for the country, provide information on the opportunities for investment into new power generating projects, and evaluate the security of supply. The NIRP also provides an assessment of the system reliability and serves as a benchmarking tool for market performance. It also examines specific public policies, including those on security of electricity supply and risks associated with the current system.

The national electricity demand forecast took a number of factors into account. These include:

» A 2,8% average annual economic growth.
» The development and expansion of a number of large energy-intensive industrial projects.
» Electrification needs.
» A reduction in electricity-intensive industries over the 20-year planning horizon.
» A reduction in the number of electricity consumers – NIRP anticipates people switching to the direct use of natural gas.
» The supply of electricity to large mining and industrial projects in Namibia and Mozambique.
» Typical demand profiles.

Various demand-side management and supply-side options are considered in the NIRP process, prior to identifying the least cost supply options for South Africa. The outcome of the process confirmed that coal-fired options are still required over the next 20 years, and that additional base load plants will be required from 2010.

The first NIRP (NIRP1) was carried out during 2001. The second NIRP was carried out under the auspices of the NER in the period 2003-2004, and shows vast improvements to NIRP1. It provides moderate and high electricity and demand forecasts, a complete database of the cost and performance of the generation plant considered in the optimisation, detailed output results, methodology applied in the planning process and risk and sensitivity analyses.

Other important changes from NIRP1 is the inclusion of risk and sensitivity analyses and scenarios to address risk factors and uncertainties that are associated with the long-term demand forecast; performance of existing generation plants; sustainability and delivery of demand-side management (DSM) options, including interruptible load supplies and changes in the electricity demand load shape. Further, NIRP2 takes into account transmission integration costs and credits for regional location of new capacity that were not considered in the previous national resource plan.

## 2.4. Integrated Strategic Electricity Planning (ISEP) in Eskom

Eskom uses a modelling tool called Integrated Strategic Electricity Planning (ISEP) to plan its future capacity strategy. By analysing usage patterns and growth trends in the economy, and matching these with the performance features of various generation technologies and demand side management options, ISEP identifies the timing, quantity and type (base load or peaking) of new capacity options required in the long-term. These options include the Return-to-Service of the three mothballed coal-fired Simunye Power Stations (i.e. Camden, Komati and Grootvlei), conventional pulverised fuel power plants (i.e. coal-based power), pumped storage schemes, gas-fired power plants, nuclear plants, greenfield fluidised bed combustion technologies, renewable energy technologies (mainly wind and solar projects), and import options within the Southern African Power Pool. As the older Eskom power plants reach the end of their design life from approximately 2025 onwards, the use of all available technologies will need to be exploited to replace these in order to supply the country's growing electricity demand.

The ISEP process identifies the timing, quantity and type (e.g. base load or peaking) of new electricity generating capacity required over the next 20 years. The planning scenarios are based on an average 4% growth in demand for electricity over the 20-year period. This translates into a 6% growth in GDP. The most recently approved ISEP plan (ISEP11) identified the need for increased *peaking* electricity generating by *2007* and additional *baseload* capacity by approximately *2010*. An increase in peaking supply has since been achieved through the commissioning of new plant, including the OCGT units at the Ankerlig and Gourikwa Power Stations in the Western Cape. Figure 2.2 illustrates Eskom's "project funnel", which shows the range of supply options being considered by Eskom to meet the increasing demand for electricity in the country. There are many projects at various stages in the project funnel including research projects, transmission lines and generating options in South Africa and Southern Africa.

As is evident in Figure 2.2, the proposed Gourikwa Power Station conversion and transmission integration project is currently within the feasibility/business case phase (indicated by the yellow circle entitled 'OCGT Conversion'), i.e. this project is currently being investigated in terms of its economic, technical and environmental feasibility.

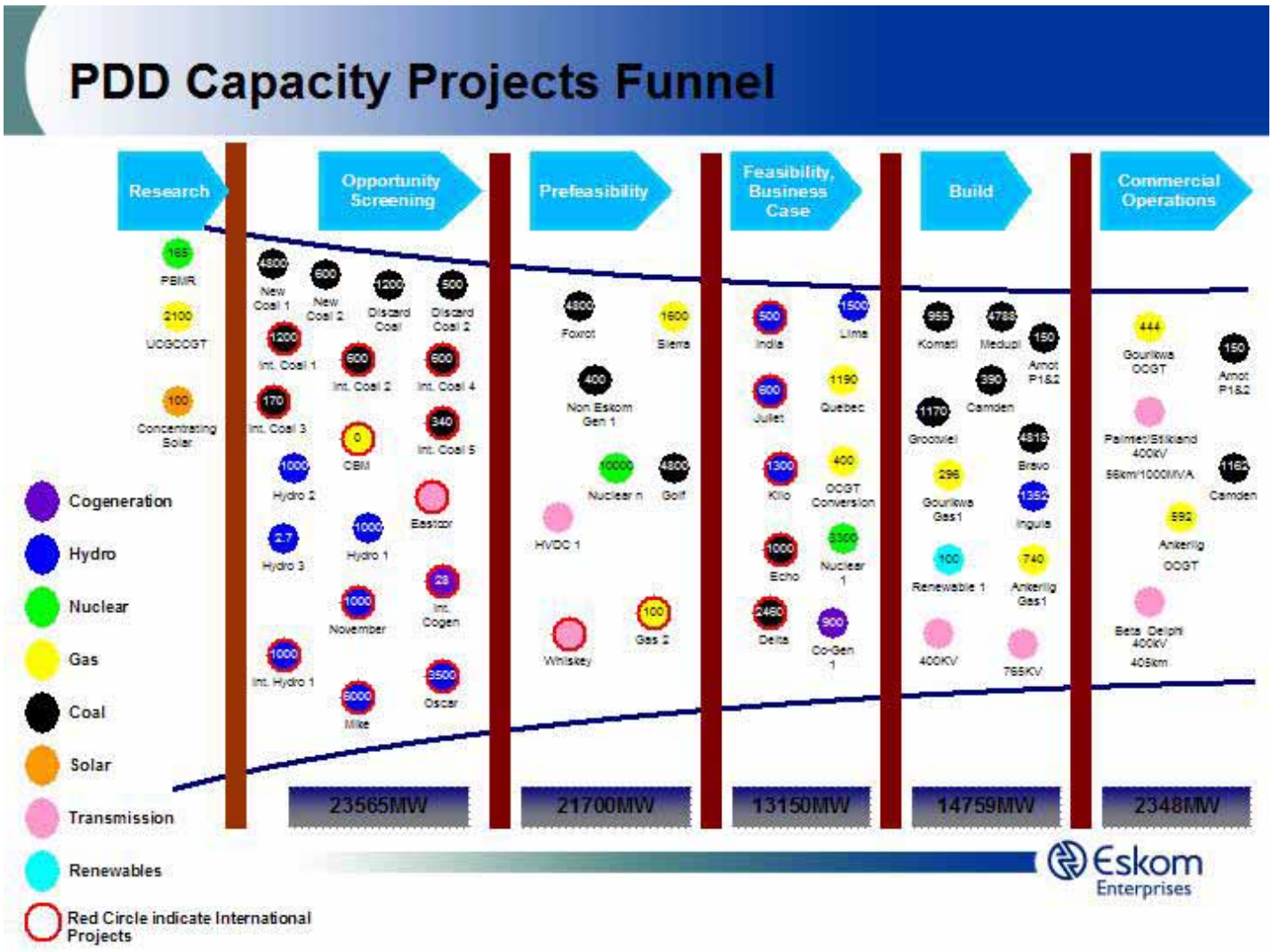



**Figure 2.2:** Eskom Capacity Projects Funnel illustrating the range of supply options being considered by Eskom to meet the increasing demand for electricity in the country

Eskom is currently conducting various energy-related projects in the Western Cape. The following list highlights some of the power generation and transmission projects which are currently in various stages of project development:

» Gourikwa Expansion (Gas 1) – under construction, to be completed end-2008.
» Ankerlig Expansion (Gas 1) – under construction, to be completed end-2008.
» Ankerlig Power Station conversion project – EIA process commenced in November 2007.
» Palmiet-Stikland 400 kV transmission line – Commissioned in August 2007.
» Nuclear 1 – Environmental Impact Assessment process has commenced. Draft Scoping Report has been made available for public comment.
» Nuclear 1 transmission power lines – EIA process to commence shortly.

» Wind Energy Facility in the Vredendal area – Final EIA report has been submitted to DEAT for authorisation.
» Pebble-bed Modular Reactor Demonstration facility - Final Scoping Report accepted by DEAT in March 2008.

## 2.5. Draft Western Cape Integrated Energy Strategy

The recent energy crisis in the Western Cape has highlighted the need to develop a plan for sustainable, secure energy provision in the Western Cape. Although various national efforts are underway to increase energy provision to the Western Cape, the Provincial Government believes that additional efforts need to be made to address the other energy challenges facing the Province, including the challenges of reducing the Province's carbon footprint and eradicating energy poverty.

The Western Cape currently relies heavily on coal-produced electricity and on petrochemicals for its energy supply. The strategy recognises that, in order to ensure that energy can be accessed from various sources in emergency situations, it is necessary to explore alternative sources of energy. The strategy lists the potential opportunities for increasing power supply to the Province. In this regard, the strategy states that the potential for gas-fired power generation is high, provided that sufficient resources of natural gas are discovered. However, supplies are currently not confirmed. Natural gas is a cleaner fossil fuel-based option than coal and can provide base load capacity.

The Strategy details various goals to which the Provincial Government of the Western Cape (PGWC) is committed and outlines a programme of action for implementation of the strategy framework (a copy of this Strategy can be obtained at http://www.capegateway.gov.za/eng/pubs/public_info/D/152704).

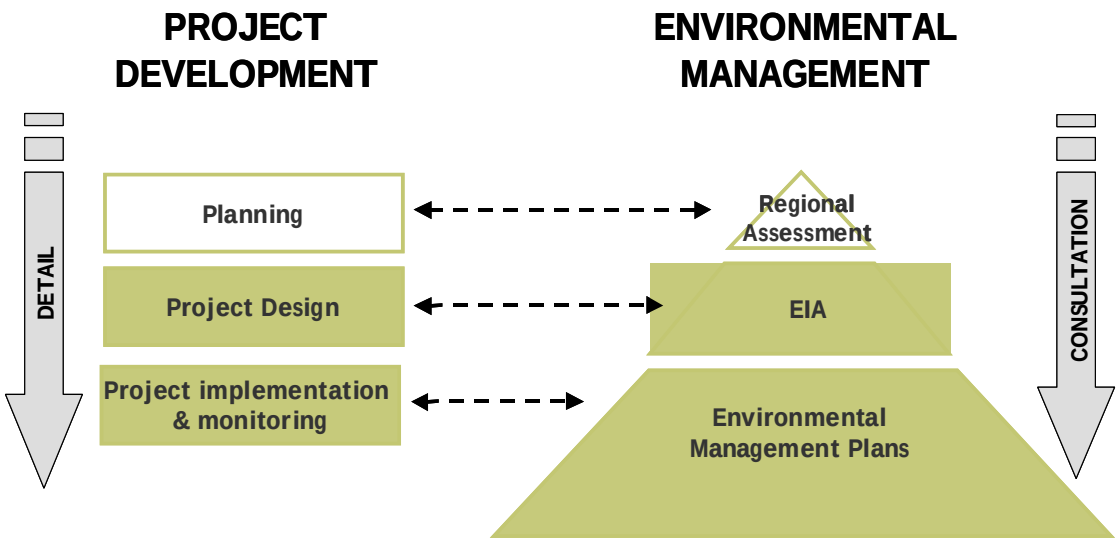
## 2.6. Project Planning and the site-specific Environmental Impact Assessment

Eskom Generation's planning process is based on anticipated electricity demand, rather than immediate load requirements in order to timeously supply the anticipated increased demand in the country. This is due to the long lead-time process of acquiring the necessary permissions to construct such infrastructure from DEAT and the National Energy Regulator of South Africa (NERSA), and negotiations with landowners, and power generation infrastructure purchase, delivery and ultimately construction.

In terms of the EIA Regulations under NEMA, a Scoping and EIA report (including a draft Environmental Management Plan (EMP)) are required to be compiled for this proposed project. The EIA is considered as an effective planning and decision-making tool in the planning process of a new power generation facility.

It allows the environmental consequences resulting from a technical facility during its establishment and its operation to be identified and appropriately managed through project design and implementation. The level of detail at a site-specific level is refined through the process, and allows for resolution of potential issue(s) through dialogue with affected parties.

The relationship between project development and the environmental assessment and management process is depicted in the figure below.



# DESCRIPTION OF THE GOURIKWA POWER STATION & TRANSMISSION INTEGRATION PROJECT CHAPTER 3

This chapter provides details regarding the scope of the proposed Gourikwa Power Station and Transmission Integration Project, including all required elements of the project and necessary steps for the project to proceed. The scope of project includes construction and operation activities.

## 3.1. Power Station Conversion

The Gourikwa Power Station comprises five OCGT units (i.e. three existing OCGT units, plus two additional OCGT units under construction) each with a nominal capacity of ~150 MW, resulting in a total nominal capacity of 750 MW for the power station. Each OCGT unit consists of one gas turbine driving an electric generator.

The concept of converting the OCGT units to CCGT units is to utilise the **heat energy** from the exhaust of the gas turbine to create steam in a Heat Recovery Steam Generator (HRSG) in order to drive a steam turbine, instead of this heat energy being exhausted and lost to the atmosphere (as is the current scenario). Conversion of the units to CCGT is therefore based on increased cycle efficiency.

Simply stated, this can be achieved through the following (and is illustrated in Figure 1.2):

» When the hot gas exits the gas turbine as exhaust gas, it has a temperature of up to 600°C. This heat energy is transferred to water in the heat recovery steam generator, instead of being exhausted to the atmosphere.
» The heat is used to generate steam (water vapour), which powers the steam turbine to produce mechanical energy.
» The resulting mechanical energy is transferred to a generator, where it is converted into electricity (i.e. electrical energy).
» A condenser converts exhaust steam from the steam turbine back into saturated water through a cooling process.

Conversion of the units to CCGT is undertaken to increase cycle thermal efficiency. It is estimated that each converted unit will produce approximately 80 MW additional capacity, i.e. approximately 50% more than a standard OCGT unit. Therefore, a maximum of an additional 5 x 80 MW (400 MW in total) increase in capacity is foreseen from the OCGT to CCGT conversion. The **total nominal capacity** of the Gourikwa Power Station will, therefore, be **1 150 MW**.

The proposed conversion infrastructure will be on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries. Therefore, no location alternatives have been considered within this EIA process.

The primary components of the conversion project include the following:

» A **heat recovery steam generator** (HRSG) will be added to the gas turbine to recover waste heat, to drive the steam turbine cycle. One HRSG can be linked to two or three OCGT units. The following configuration is currently being investigated from a technical perspective:
  * A configuration of 1 x 3:1 (OCGT: HRSG units),
  * A configuration of 1 x 2:1 (OCGT: HRSG units)
» A **condenser** which converts exhaust steam from the steam turbine back into water through a cooling process.
» A **bypass stack** for the CCGT, anticipated to be approximately 60 m in height, will be associated with each HRSG. It is anticipated that two bypass stacks will be required (depending on the configuration).
» **Water treatment plant** for treatment of potable water and production of demineralised water (for steam generation).
» **Dry-cooled technology** consisting of a system of air-cooled condenser fans situated in fan banks approximately between 25 m - 30 m above ground.
» **Additional fuel storage facilities** and associated off-loading and other related infrastructure to cater for the increased fuel requirements associated with the higher load factor (i.e. longer operating hours or a mid-merit operating regime[3]). The CCGT units can be both liquid fuel-fired or natural gas-fired. The CCGT units would initially be diesel-fired, until such time that natural gas becomes available.
» A **water tank** with a holding volume of ~2.5 million litres (i.e. water storage for ~5 days of operation).

Water will be required for the CCGT power generation process and for cooling. High quality water is required for use within the CCGT power generation process. Membranes/ion exchange systems would be required for water treatment on site. A waste treatment plant for the effluent from this water treatment system will be required. All solid waste generated from this process would be disposed of off-site at a suitably licensed waste disposal facility.

The power station is to be operated as a zero liquid effluent discharge (ZLED) system, i.e. water within the power station will be recycled for re-use in the power station process. No liquid waste from the power station will therefore be discharged.

[3] Mid-merit capacity is during the daytime from about 6 am to about 10 pm on weekdays.

### *3.1.1. Investigation of Water Resource Options*

Process water will be required for the CCGT power generation process, as well as water for cooling. It is estimated that approximately 300 $m^3$/day will be required for this purpose.

In order to meet this demand, the feasibility and availability of various water resource options were investigated by Eskom in terms of technical, economic and sustainability criteria. The water resource options have considered an assurance level of 98% and take into account an on-site storage of 5 days. These options included a) the use of the use of treated water, effluent and/or stormwater from the PetroSA facility adjacent to Gourikwa, b) the use of water from the Hartebeeskuil Dam situated approximately 7 km from Gourikwa, and c) the use of treated industrial effluent from the Hartenbos Sewage Works situated approximately 13 km from Gourikwa.

From the results of the preliminary investigations, the options of using treated water, effluent and/or stormwater from the PetroSA facility are considered the most practical and viable, and have been nominated as the preferred option/s in the short-term based on technical, environmental and economic constraints. These options are currently being jointly further investigated by Eskom and PetroSA (refer Appendix B). These options are been investigated to ensure their viability and sustainability. A preferred option will be nominated with the agreement of PetroSA for implementation based on technical, environmental and economic constraints.

The water will be piped to the power station from PetroSA via a new **~1,3 km water pipeline** proposed to be constructed parallel to the existing liquid fuel pipeline between the two facilities. Alternative routes for the fuel pipeline were previously investigated through an EIA process for the initial OCGT units at the power station (Ninham Shand, 2005). The fuel pipeline route constructed was considered to be the most appropriate and practical alignment from an environmental, technical and economic perspective. This alignment is now proposed to be mirrored though the construction of a parallel water pipeline. Therefore, no alternative alignments have been considered within this EIA process. This water pipeline would be outside of the existing power station boundaries. The water pipeline would be constructed above ground, and would require a servitude width of ~5 m.

### *3.1.2. Investigation of Cooling Technologies*

A number of cooling technology options for the CCGT have been investigated by Eskom, including dry-cooled technology and wet-cooled technology. Due to financial and technical constraints, **dry-cooling technology (air-cooled condensers)** has been nominated as a preferred option for implementation. Dry-cooling technology is less water-intensive (i.e. uses significantly less water) than wet-cooled technology, and consists of a system of air-cooled condenser fans situated in fan banks approximately 25 m – 30 m above ground. In a direct dry-cooled system, the steam is condensed directly by air in a heat exchanger (air cooled condenser) and the condensate is returned to the steam cycle in a closed loop. The air flow is induced solely by mechanical draft (i.e. caused by fans) in the air cooled condensers.

A condenser converts exhaust steam from the steam turbine back into saturated water through a cooling process. This water (condensate) is then fed into a Condensate Polishing Plant (CPP), to treat/polish it to desired qualities, before it is fed back into the HRSG as part of the steam cycle. Regeneration wastes, a highly saline effluent from the CPP, will have to be disposed of. Eskom is currently investigating various disposal options (one of which could be on-site wastewater treatment).

### *3.1.3. Additional Fuel Storage Facilities*

Conversion of the units to CCGT is based on **increased cycle thermal efficiency**. The CCGT units would utilise the **same amount of liquid fuel** (i.e. diesel) as is currently the case for the OCGT units (i.e. approximately 40 tons of diesel/unit/hour) for the same operating regime. However, in order to meet the electricity supply demand in the medium-term, the plant will have to operate for more hours per day than was anticipated for the OCGT plant (i.e. higher than anticipated load factors). Therefore, the power station will not only operate as a peaking power plant[4] as is currently the case, but will contribute to the mid-merit electricity generation supply[5].

This **higher load factor** would require **higher fuel consumption**. **Additional fuel storage facilities** will be required at the Gourikwa Power Station to cater for the increased fuel requirements associated with the higher load factor. Fuel is currently transported by pipeline to the Gourikwa Power Station site directly from the fuel supply point at PetroSA. This liquid fuel pipeline to the power station will continue to be used with the conversion project.

[4] Peaking power refers to power generation technology designed to generate electricity during periods of high electricity demand, generally in the weekday mornings from 07:00 to 09:00 and weekday evenings from 18:00 to 20:00.

[5] Mid-merit capacity is during the daytime from about 6 am to about 10 pm on weekdays.

Eskom currently has authorisation to store 10,8 million litres of fuel on the Gourikwa Power Station site (i.e. four tanks of 2 700$m^3$ capacity each). In order ensure supply of fuel to the CCGT units at the higher load factor, Eskom proposes the storage of an additional 32,4 million litres of fuel on the power station site (i.e. six tanks of 5 400$m^3$ capacity each), resulting in a total storage capacity of 43,2 million litres on site. An area to the west of the power station expansion has been earmarked for this additional fuel storage (refer to Figure 3.1). Provision would be required to be made for 6 x 5 400 $m^3$ fuel storage tanks, as well as associated infrastructure. Security of liquid fuel supply nationally is regulated by the Department of Minerals and Energy (DME)[6].

### *3.1.4. Direct Access Road to the Gourikwa Power Station site*

Eskom propose the construction of a new dedicated **access road** to the Gourikwa Power Station directly off the N2 national road. The power station currently shares an access road with PetroSA, which is not considered desirable from a safety and accessibility perspective in the long-term, as both the PetroSA as well as the Gourikwa Power Station are considered to be National Key Points in their own right.

Alternative routes for access to the power station were previously investigated through an EIA process undertaken in 2005 (Ninham Shand, 2005). The route considered to be the most appropriate and practical alignment of the three alternatives considered in the previous EIA is now being re-considered through this EIA study. Therefore, no alternative alignments are being considered within this EIA process. The route was not previously constructed as it was agreed to share the use of the existing PetroSA access point.

The proposed new access road route is approximately 1,6 km in length, and would be outside of the existing power station boundaries. This route takes access from the N2 approximately 2,5 km west of PetroSA's western-most security access road (to the landfill site) and runs in a north-easterly direction along the western boundary of the PetroSA property (refer to Figure 3.2). The proposed new road follows an existing fence line for much of its length. The access road would be constructed as a single carriageway surfaced road and would require a servitude width of approximately 15 m. A new formal access point (or intersection) would be required from the N2, and will be required to be negotiated with the South African National Roads Agency (SANRAL) and designed and constructed to their specifications.

[6] Refer to Energy Security Master Plan – Liquid Fuels, published by the DME.

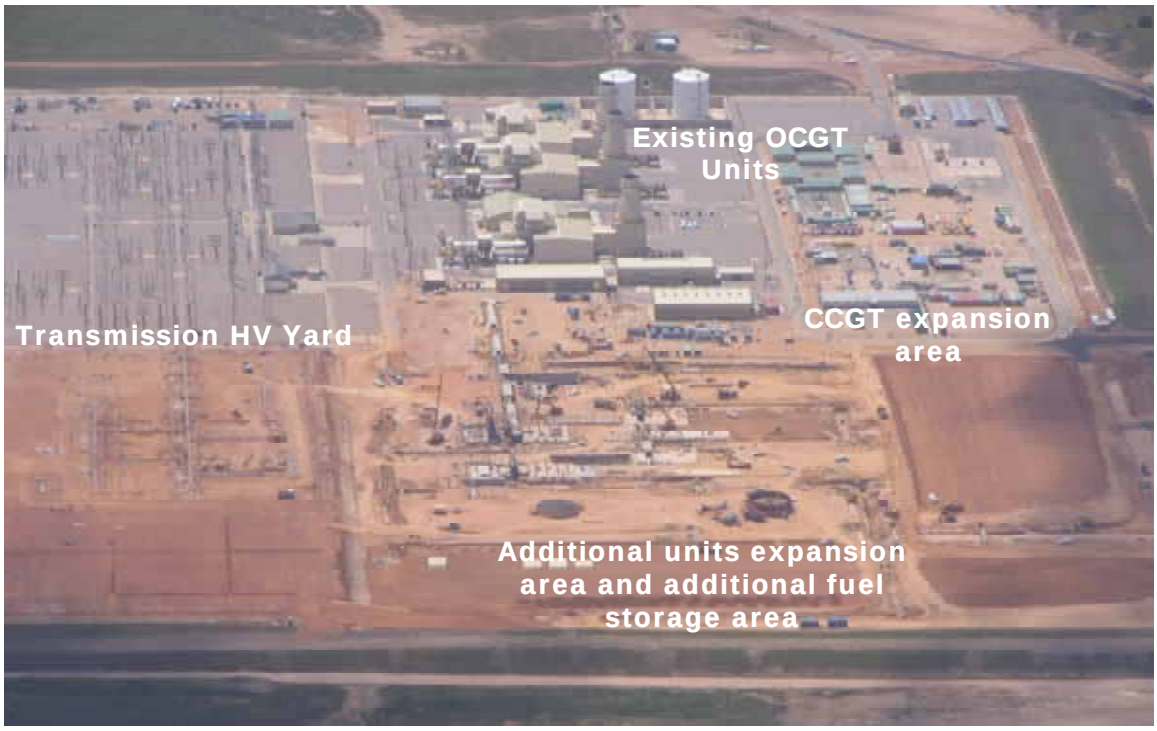



**Figure 3.1:** Aerial photograph of the Gourikwa Power Station site showing the existing power station infrastructure, the expansion site, as well as the areas for the placement of infrastructure associated with the proposed conversion

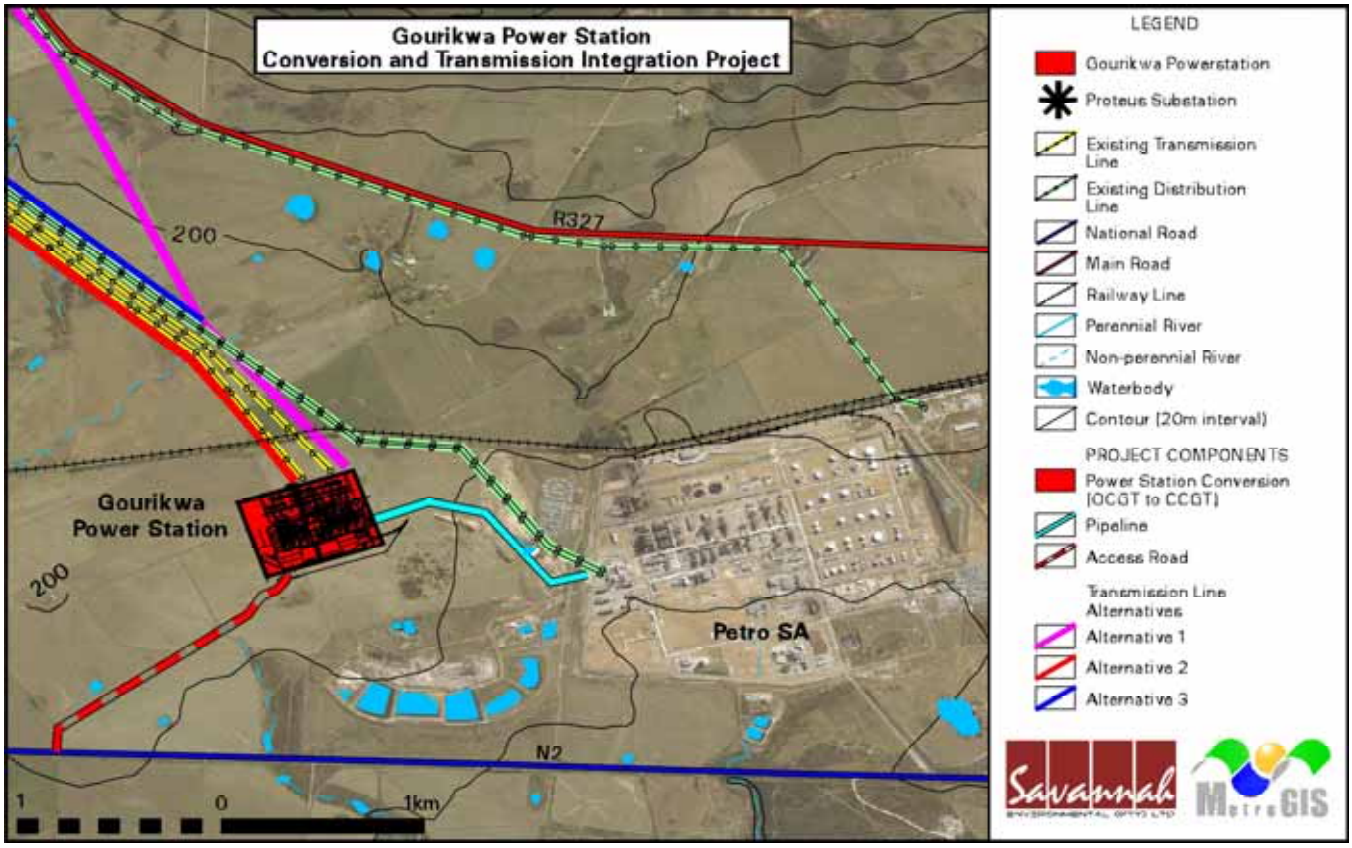



**Figure 3.2:** Map illustrating the proposed new access road route (~1,6 km in length) from the N2 in a north-easterly direction along the western boundary of the PetroSA property

### *3.1.5. Project Construction Phase*

It is expected that the construction of the power station conversion would commence in 2009, and would take a maximum of 24 months to complete, with commissioning of the first unit estimated at the end of 2011. In order to meet the urgent need for additional electricity generation capacity, Eskom would aim to fast-track this construction timeframe as far as possible.

The number of construction workers required for a project of this nature is still being determined. Construction crews will constitute mainly skilled and semi-skilled workers. No employees will reside on the construction site at any time during the construction phase, and the intention is for appropriate accommodation to be sought and provided within the nearby residential area.

### *3.1.6. Project Operation Phase*

The project is proposed to be implemented by 2011, with the commissioning of the first unit estimated at the end of 2011.

As is typical of gas turbine power stations, the expected lifespan of the power station is approximately 25 years, with the option to extend this lifespan at the end of this period through the replacement of components, should this be required. The creation of additional employment opportunities during the operational phase of the power station will be limited. It is estimated that the project will support only about 20 direct employment opportunities (operators/maintainers).

## 3.2. Integration of the CCGT Power Station into the National Grid

Eskom proposes the construction of a 400kV transmission power line between the Gourikwa Power Station and the existing Proteus Substation to transmit the additional power generated at this power station to the national electricity grid. Proteus Substation is situated approximately 10 km north-west of the power station adjacent to the R327 main road.

The proposed conversion project considers the addition of 400 MW of power generation at Gourikwa Power Station. Two new generator transformer bays will be required within the existing Gourikwa Substation high voltage (HV) yard to accommodate the new generation capacity and connect the new capacity into the greater 400kV network. No expansion of this HV yard outside of the power station footprint is required to accommodate the new transmission power line. Similarly, no expansion of the Proteus Substation HV yard outside of the demarcated footprint is required to accommodate the new transmission power line.

The Grid Gode requires a minimum of three lines for generation integration greater than 1000 MW (the total nominal capacity of the Gourikwa Power Station will be 1 150 MW with the conversion). Currently two 400kV transmission power lines integrate Gourikwa Power Station into the 400kV network at Proteus Substation. A third 400kV transmission power line is therefore required to be constructed as part of the proposed conversion project.

Three technically feasible alternative transmission power line alignment corridors (approximately 500 m in width) have been identified for investigation within the EIA process (refer to Figure 3.3).

**Alternative 1** (indicated in pink on Figure 3.3) exits the Gourikwa Power Station in a north-westerly direction until it meets the Duinzight-Proteus 66kV distribution line. The alignment then runs parallel to the Duinzight-Proteus 66kV distribution line and the R327 main road for a distance of approximately 4 km before crossing this road, turning west and following the Blanco-Proteus 132kV distribution line into the Proteus Substation.

**Alternative 2** (indicated in red on Figure 3.3) runs parallel to the two existing Gourikwa-Proteus 400kV transmission power lines (Gourikwa-Proteus 1 and 2) for the entire length of its alignment (approximately 10 km).

**Alternative 3** (indicated in blue on Figure 3.3) runs parallel to the two existing Mossgas-Proteus 132kV distribution power lines (Mossgas-Proteus 1 and 2) for the entire length of its alignment (approximately 10 km).

Through the EIA process, a preferred alternative transmission power line corridor will be nominated for environmental authorisation (by the environmental authorities), provided no environmental fatal flaws are identified to be associated with the proposed project.

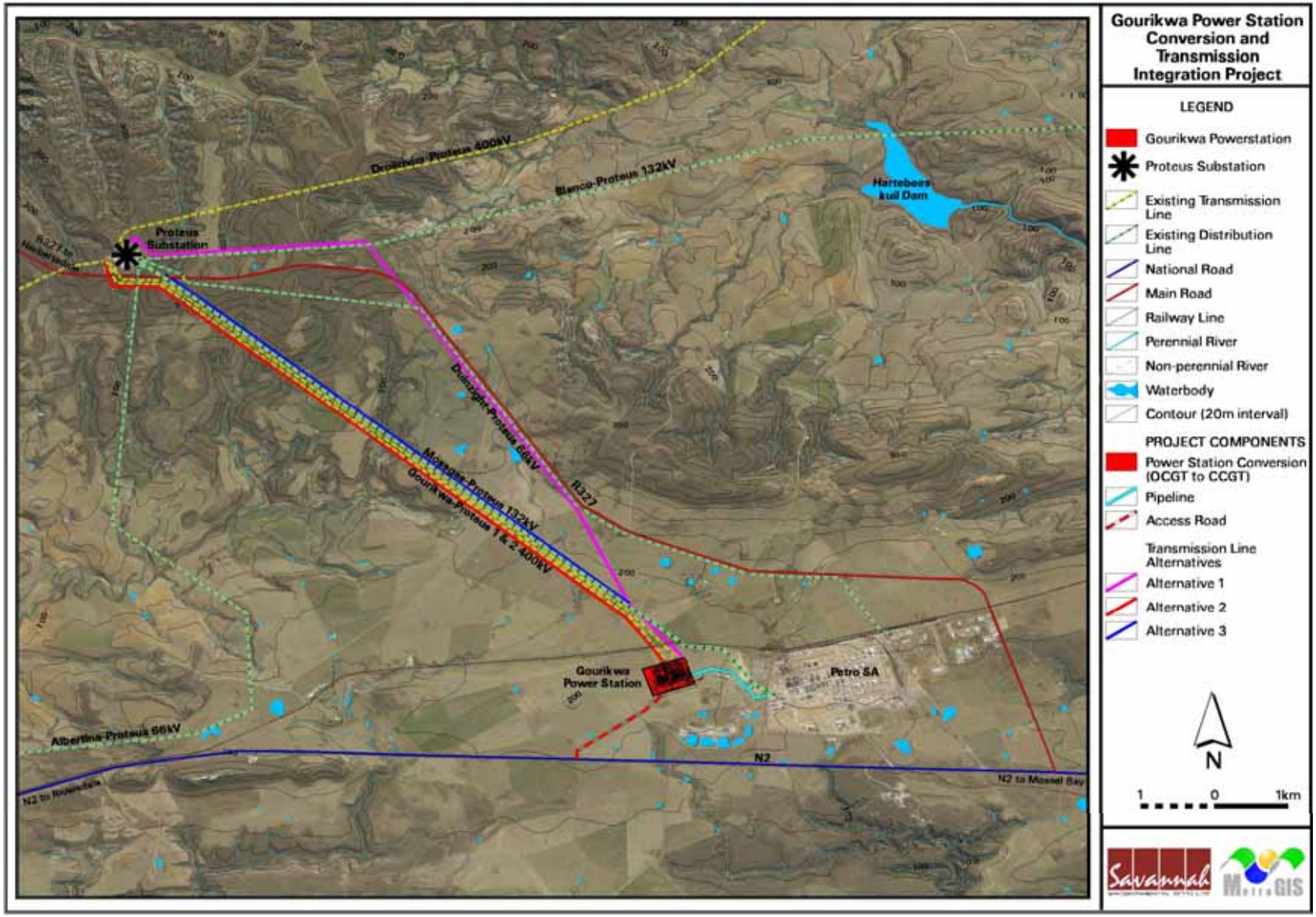



**Figure 3.3:** Locality map showing the feasible alternative transmission power line corridor alternatives between Gourikwa and Proteus Substation identified for investigation within the EIA process

Transmission power lines are constructed and operated within a servitude (55 m wide for 400kV lines) along the entire length of the line. Within this servitude, Eskom has certain rights and controls that support the safe and effective operation of the line. The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process with each affected landowner. The negotiation process is undertaken directly by Eskom and is independent of the EIA process.

While there should be reasonable confidence in the environmental feasibility of the preferred corridor nominated, other criteria may require minor alteration to the corridor which received environmental authorisation during the land negotiation process undertaken by Eskom. These may include:

» Identification of a technical problem during the detailed design phase which will require excessive cost to resolve (e.g. unstable subsurface conditions identified by detailed geotechnical investigations).
» Request by a landowner during the course of the negotiation process that the alignment be shifted to avoid disruption of a particular activity on his property, but provide a feasible new alignment.

Provided such potential deviations to the corridor are not unreasonable, it is fair for Eskom Transmission to investigate and negotiate local adjustments within the authorised corridor alignment. This may be required at a number of points along the alignment.

### *3.2.1. Project Construction Phase*

It is expected that the construction for transmission power line will commence in 2009, and would take approximately 9 months to complete. In order to meet the urgent need for additional electricity generation capacity, Eskom would aim to fast-track this construction timeframe as far as possible.

Construction crews will constitute mainly skilled and semi-skilled workers. No employees will reside on the construction site at any time during the construction phase.

### *3.2.2. Project Operation Phase*

The Transmission integration would be required to be operational prior to the Gourikwa Power Station conversion being implemented in 2011.

The expected lifespan of the proposed transmission power line is between 35 and 40 years, depending on the maintenance undertaken on the power line structures. The creation of additional employment opportunities during the

operational phase of the power line will be limited, and will be restricted to skilled maintenance personnel employed by Eskom.

# APPROACH TO UNDERTAKING THE SCOPING PHASE CHAPTER 4

An Environmental Impact Assessment (EIA) process refers to that process (dictated by the EIA Regulations) which involves the identification of and assessment of direct, indirect and cumulative environmental impacts associated with a proposed project. The EIA process comprises two phases: **Scoping Phase** and **EIA Phase**. The EIA process culminates in the submission of an EIA Report (including an environmental management plan (EMP)) to the competent authority for decision-making. The EIA process is illustrated below:


The Scoping Phase for the proposed Gourikwa Power Station Conversion and Transmission Integration project has been undertaken in accordance with the EIA Regulations published in Government Notice 28753 of 21 April 2006, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998). This Scoping Report aimed to identify potential issues associated with the proposed project, and define the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving specialists with expertise relevant to the nature of the project and the study area, the project proponent, as well as a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs). This chapter serves to outline the process which was followed during the Scoping Phase of the EIA process.

## 4.1. Objectives of the Scoping Phase

This Scoping Phase aimed to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction and operation) within the study area through a desk-top review of existing baseline data and specialist studies.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as

regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process.

Within this context, the objectives of this Scoping Phase were to:

» Clarify the scope and nature of the proposed activities.
» Clarify the reasonable and feasible project-specific alternatives to be considered through the EIA process, including the "do nothing" option.
» Identify and evaluate key environmental issues/impacts associated with the proposed project, and through a process of broad-based consultation with stakeholders and desk-top specialist studies identify those issues to be addressed in more detail in the Impact Assessment Phase of the EIA process.
» Conduct an open, participatory and transparent public involvement process and facilitate the inclusion of stakeholders' concerns regarding the proposed project in the decision-making process.

## 4.2. Overview of the Scoping Phase

The Scoping Phase has been undertaken in accordance with the EIA Regulations published in Government Notice 28753 of 21 April 2006 in terms of NEMA.

The potential impacts associated with the installation of 400 MW of additional electricity generation capacity at Gourikwa Power Station, as well as the transmission of this additional power to the national electricity network have been evaluated. Key tasks undertaken within the Scoping Phase included:

» Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
» Submission of a completed application form for authorisation in terms of Regulation 13 and 27 of Government Notice No R385 of 2006 to the competent authority (DEAT).
» Undertaking a public involvement process throughout the Scoping process in accordance with Regulation 56 of Government Notice No R385 of 2006 in order to identify issues and concerns associated with the proposed project.
» Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process (in accordance with Regulation 59 of Government Notice No R385 of 2006).
» Undertaking of independent specialist studies in accordance with Regulation 33 of Government Notice No R385 of 2006.
» Preparation of a Draft Scoping Report and Plan of Study for EIA in accordance with the requirements of the Regulation 29 Government Notice No R385 of 2006.

These tasks are discussed in detail below. Quality control sheets to ensure that all the minimum requirements for the key tasks as listed above are met are included in Appendix C.

### *4.2.1. Authority Consultation and Application for Authorisation in terms of GN No R385 of 2006*

As Eskom is a state-owned enterprise (SoE), the National Department of Environmental Affairs and Tourism (DEAT) is the competent authority for this application. As the project falls within the Western Cape Province, the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) acts as a commenting authority for the project. Consultation with these authorities has been undertaken throughout the Scoping process. This consultation has included the following:

» Pre-application consultation with DEAT and DEA&DP regarding the proposed project and the EIA process to be undertaken.
» Submission of applications for authorisation for the power station conversion and transmission power line to DEAT, with copies submitted to DEA&DP. These applications were accepted and the reference numbers 12/12/20/1141 (power station conversion) and 12/12/20/1142 (proposed transmission power line) allocated. Authorisation was therefore granted to continue with the Scoping Phase of the project. It was agreed that potential impacts associated with both the power station conversion and the transmission power line could be considered within a single report as the two projects are inter-linked. Two separate Environmental Authorisations would, however, be issued.

A record of authority correspondence within the Scoping Phase is included within Appendix D.

### *4.2.2. I&AP Identification, Registration and the Creation of an Electronic Database*

The first step in the public involvement process was to identify relevant stakeholders and interested and affected parties (I&APs). This process was undertaken by **Sustainable Futures ZA** (specialist public participation consultants) through existing contacts and databases, recording responses to site notices and newspaper advertisements, as well as through the process of networking. Stakeholder and I&AP information included on the databases from the previous EIA processes undertaken in 2005 and 2007 was verified and included within the database for this proposed project.

Stakeholder groups identified include:

» Provincial Government Departments (departments of relevance within the Western Cape Government)
» Local Authorities (Eden District Municipality and Mossel Bay Local Municipality)
» National Government Departments (Line Departments)
» Business Sector
» Localised Civil Society Groupings (Community Based and Non-governmental Organised groups)
» Organised Labour
» Environmental Groupings (Traditional and Energy Sector)

All relevant stakeholder and I&AP information have been recorded within a database of affected parties (refer to Appendix E for a listing of registered parties). Databases prepared as part of the previous EIAs undertaken for the Gourikwa Power Station were used as a basis for identifying I&APs and stakeholders for involvement within this current EIA process. While I&APs have been encouraged to register their interest in the project from the start of the process, the identification and registration of I&APs will be on-going for the duration of the EIA process. Over 120 parties have registered their interest in the project to date. The project database will be updated on an on-going basis throughout the project process, and will act as a record of the parties involved in the public involvement process.

### *4.2.3. Notification of the EIA Process*

In order to notify and inform the public of the proposed project and invite members of the public to register as interested and affected parties (I&APs), the project and EIA process was advertised in the following newspapers:

» Regional newspaper – *Die Burger*: 10 April 2008
» Regional/local newspaper – *Mossel Bay Advertiser*: 16 May 2008

In addition, site advertisements were posted at various locations throughout the study area, i.e.:

» On the Gourikwa Power Station site: attached to the fences at all entrances/gates to the facility
» At the entrance to Proteus Substation
» Along the route of the existing Gourikwa-Proteus 400 kV power lines
» D'Almeida Library
» Kwanonaqaba Library and Community notice board
» Marsh Street Library

» Dana Bay Spar notice board
» Dana Bay Friendly Store and Post Office notice board

In addition to the above advertisements and notices, key stakeholders and registered I&APs were notified in writing of the commencement of the EIA process (notifications sent out on 04 April 2008). These parties included:

» Organs of State having jurisdiction in respect of any aspect of the activity
» Municipal officials, as well as ratepayers organisations that represents the communities in the area.
» Potentially affected and neighbouring landowners
» Relevant environmental organisations
» Business and labour organisations represented in the area

The public review process and details of the public meeting was advertised in the following newspapers:

» Regional newspaper – *Die Burger*: 30 May 2008
» Regional/local newspaper – *Mossel Bay Advertiser*: 6 June 2008

In addition, all registered I&APs were notified of the availability of the report and public meeting by letter.

Copies of the advertisements placed and notices distributed are contained in Appendix F of this report.

### *4.2.4. Public Involvement and Consultation*

The aim of the public participation process was primarily to ensure that:

» Information containing all relevant facts in respect of the application was made available to potential stakeholders and I&APs.
» Participation by potential I&APs was facilitated in such a manner that all potential stakeholders and I&APs were provided with a reasonable opportunity to comment on the application.
» Comment received from stakeholders and I&APs is recorded.

In order to provide information regarding the proposed project and the EIA process, a background information document (BID) for the project was compiled at the outset of the process (refer to Appendix G). The BID (including a map and a reply form inviting I&APs to register for the proposed project and submit details of any issues and concerns) was distributed to identified stakeholders and I&APs, and additional copies were made available at public venues within the broader study area. To date, over 300 copies of the BID have been distributed.

Through consultation with key stakeholders and I&APs, issues for inclusion within the scoping study were identified and confirmed. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities were provided for I&APs to have their issues noted prior to the release of the Draft Scoping Report for public review as well as during the review period of the Draft Scoping Report, as follows:

» **Focus group meetings** (pre-arranged and stakeholders invited to attend)
» One-on-one **consultation meetings**
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants)
» Written, faxed or e-mail **correspondence**
» **Public feedback meeting** to provide information regarding the Draft Scoping Report

Table 4.1 below provides details of the formal focus group meetings held during the scoping phase of the public consultation process.

**Table 4.1:** Details of the focus group meetings held during the scoping phase of the public consultation process

| Organisation | Date |
|---|---|
| Mosselbay Environmental Partnership | 7 May 2008 |
| SANCO | 7 May 2008 |
| PetroSA | 7 May 2008 |
| Mossel Bay Municipality (Municipal Manager and Electro Technical Services) | 7 May 2008 |
| Landowners and farmers surrounding the Gourikwa Power Station | 7 May 2008 |
| Residence Association of Dana Bay Conservancy | 7 May 2008 |
| South African National Ports Authority in Mossel Bay | 8 May 2008 |

In order to facilitate comments on the draft report, a public feedback meeting was held during the review period of the Draft Scoping Report. All interested and affected parties were invited to attend the public meeting held on Thursday, 19 June 2008 at Die Graanskuur at the Dias Museum, Mossel Bay (from 18:00 – 20:00). The meeting was advertised in the local and regional printed media and registered I&APs were invited to attend. The aim of the meeting was to provide feedback of the findings of the scoping study undertaken, and to invite comment on the proposed project. Minutes of the meeting at included in Appendix H.

Notes from meetings held with stakeholders and the public meeting, reply forms returned and comments submitted by I&APs during the scoping phase are included within Appendix H. Networking with I&APs will continue throughout the duration of the EIA process.

### *4.2.5. Identification and Recording of Comments and Concerns*

Issues and concerns raised by I&APs during the scoping phase have been synthesised into a Comments and Response Report (refer to Appendix I). The Comments and Response Report includes both comments from the Scoping Phase, as well as comments on the Scoping Report (and raised at the feedback public meeting). This report provides responses from members of the EIA project team and/or the project proponent to comments raised. The responses indicate how the issues will be addressed in the EIA process, or clarification is provided. Where issues are raised that the EIA team considers beyond the scope and purpose of this EIA process, clear reasoning for this view is provided.

### *4.2.6. Evaluation of Issues Identified through the Scoping Process*

All components of the proposed power station conversion project (as discussed in Chapter 3) will be on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries. Specialist studies undertaken within the two previous EIA processes for the existing OCGT units at Gourikwa considered potential impacts on the entire site under consideration. As these EIA processes were recently undertaken (i.e. within the last 2 years) and the sites have been already disturbed through construction activities, it was not considered necessary to commission new specialist investigations into site-specific issues associated with the following:

» Heritage
» Ecology, flora and fauna
» Geology, soil conditions and erosion potential
» Soils, agricultural areas and potential
» Groundwater
» Access and transportation

Information collected within the previous studies undertaken and the conclusions drawn are assumed to be sound and based on legislated requirements. These studies have been reviewed and verified, and the relevant findings incorporated within this Scoping Report.

The conversion of the existing OCGT units to CCGT may alter the nature and/or extent of a number of issues as a result of the addition of components and the change in technology being utilised. In this regard, the following specialist

studies have been included in this Scoping Study for the power station conversion:

» Visual scoping study
» Air quality scoping study
» Noise scoping study
» Social scoping study

The findings and conclusions of the previous specialist studies undertaken in this regard for the OCGT units have been used as a basis for the specialist investigations.

In addition, the proposed transmission power line could impact on various aspects of the environment. In this regard, the following specialist studies have been undertaken:

» Visual scoping study
» Heritage scoping study
» Ecology and flora scoping study
» Avifauna scoping study
» Social scoping study

Potential issues (both direct and indirect environmental impacts) associated with the proposed project identified within the scoping process have been evaluated through desk-top studies. In evaluating potential impacts within the Scoping Phase, Savannah Environmental has been assisted by the following specialist consultants:

| Specialist | Area of Expertise | Refer Appendix |
|---|---|---|
| Demos Dracoulides of DDA | Air quality and noise scoping study for the power station conversion | Appendix J |
| Lourens du Plessis of MetroGIS | Visual scoping study and GIS mapping for the power station conversion and transmission power line | Appendix K |
| Liezl Coetzee of Southern Hemisphere | Social scoping study for the power station conversion and transmission power line | Appendix L |
| Nick Helme of Nick Helme Botanical Surveys | Vegetation scoping study for the power station conversion and transmission power line | Appendix M |
| Jon Smallie of the Endangered Wildlife Trust (EWT) | Avifauna scoping study for the proposed transmission power line | Appendix N |

| Specialist | Area of Expertise | Refer Appendix |
|---|---|---|
| Tim Hart of the Archaeology Contracts Office, Department of Archaeology: University of Cape Town | Heritage scoping study for the power station conversion and transmission power line | Appendix O |

In order to evaluate issues and assign an order of priority, it was necessary to identify the characteristics of each potential issue/impact:

» *the nature,* which includes a description of what causes the effect, what will be affected and how it will be affected
» *the extent,* wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional

The evaluation of issues has resulted in a statement regarding the potential significance of the identified issues, as well as recommendations regarding detailed investigations of these issues and other specialist studies required within the EIA phase (refer to Chapter 8). Recommendations regarding the methodology to be employed in assessing potential impacts have also been made (refer to Chapter 9).

Specialist Scoping Reports are contained within Appendices J - O.

### *4.2.7. Assumptions and Limitations*

The following assumptions and limitations are applicable to the studies undertaken within this Scoping Phase:

» All information provided by Eskom and I&APs to the environmental team was correct and valid at the time it was provided.
» The Transmission line corridors identified by Eskom are technically and economically viable. The final power line route will be determined after the EIA process within the nominated preferred power line corridor.
» Strategic, forward planning deliberations are reflected in the IEP, NIRP and ISEP planning processes and do not form part of this EIA.
» The wealth of information already in hand from the EIA process undertaken by Ninham Shand for the initial OCGT projects provide a baseline from which this EIA process finds a point of departure.
» This report and its investigations are project-specific, and consequently the environmental team did not evaluate any other power source alternatives.
» As the proposed power station conversion is to be undertaken within the Gourikwa Power Station site, no site alternatives have been investigated as part of this EIA process.

### *4.2.8. Public Review of Draft Scoping Report and Feedback Meeting*

The Draft Scoping Report was made available for public review from 30 May 2008 to 30 June 2008 at the following locations in the project area:

» Marsh Street Library
» D'Almeida Library
» Kwanonaqba Library
» Mossel Bay Environmental Partnership
» Dana Bay Conservancy
» SANCO
» PetroSA
» Mossel Bay Municipal Offices
» TNPA
» Farmers Association representing local and neighbouring farmers

The report was also made available on:
» www.eskom.co.za/eia
» www.savannahSA.com

Comments were requested to be submitted to Shawn Johnston of Sustainable Futures ZA by 30 June 2008 as written submission via fax, post or e-mail.

In order to facilitate comments on the draft report, a public feedback meeting was held during the review period of the Draft Scoping Report. All interested and affected parties were invited to attend the public meeting held on Thursday, 19 June 2008 at Die Skuur Dias Museum, Mossel Bay (from 18:00 – 20:00). The meeting was advertised in the local and regional printed media and registered I&APs were invited to attend. The aim of the meeting was to provide feedback of the findings of the scoping study undertaken, and to invite comment on the proposed project. Minutes of the meeting at included in Appendix H.

The public review process and details of the public meeting were advertised in regional and local newspapers: Die Burger and the Mossel Bay Advertiser (refer Appendix F). In addition, all registered I&APs were notified of the availability of the report and public meeting by letter.

### *4.2.9. Final Scoping Report*

The final stage in the Scoping Phase has included the capturing of responses from I&APs on the Draft Scoping Report. This Final Scoping Report is the report on which the decision-making environmental Authorities provide comment, recommendations and acceptance to undertake the EIA Phase of the process. It has been made available to DEAT and DEA&DP.

## 4.3. Regulatory and Legal Context

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels.

### *4.3.1. Regulatory Hierarchy*

At National Level, the main regulatory agencies are:

» *Department of Minerals and Energy (DME):* This department is responsible for policy relating to all energy forms, including renewable energy. It is the controlling authority in terms of the Electricity Act (Act No 41 of 1987).
» *National Energy Regulator (NER):* This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue generating licenses for power station developments to generate electricity.
» *Department of Environmental Affairs and Tourism (DEAT):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. DEAT is the competent authority for this project, and charged with granting the relevant environmental authorisation.
» *Department of Transport and Public Works:* This department is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads (as may be associated with the construction phase) on public roads.

At Provincial Level, the main regulatory agency is:

» *Provincial Government of the Western Cape (PGWC) – Department of Environmental Affairs and Development Planning (DEA&DP).* This is the principal authority involved in the EIA process and determines many aspects of Provincial Environmental policy. The department is a commenting authority for this project.

At Local Level the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. The proposed project falls within the jurisdiction of the Mossel Bay Municipality.

» In terms of the Municipal Systems Act (Act No 32 of 2000) it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control. The IDP process, specifically the spatial component (Spatial Development Framework), in the Western Cape Province is based on a

bioregional planning approach to achieve continuity in the landscape and to maintain important natural areas and ecological processes.

» By-laws and policies have been formulated by local authorities to protect environmental resources relating to issues such as air quality, community safety, etc.

### *4.3.2. Legislation and Guidelines that have informed the preparation of this Scoping Report*

The following legislation and guidelines have informed the scope and content of this Scoping Report:

» National Environmental Management Act (Act No 107 of 1998)
» EIA Regulations, published under Chapter 5 of the NEMA (GN R385, GN R386 and GN R387 in Government Gazette 28753 of 21 April 2006)
» Guidelines published in terms of the NEMA EIA Regulations, in particular:
  * **Guideline 3:** General Guide to Environmental Impact Assessment Regulations, 2006 (DEAT, June 2006)
  * **Guideline 4:** Public Participation in support of the Environmental Impact Assessment Regulations, 2006 (DEAT, May 2006)
  * **Guideline 5:** Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, 2006 (DEAT, June 2006)
  * Guideline on Public Participation, 2006 (DEA&DP, July 2006)
  * Guideline on Alternatives, 2006 (DEA&DP, July 2006)
» Specialist study guidelines published by DEA&DP (June 2005)

Those Acts, standards or guidelines which have informed the project process and the scope of issues evaluated in this Scoping Study are summarised in Table 4.2.

**Table 4.2:** List of applicable legislation and compliance requirements required for the Gourikwa Power Station conversion and transmission integration project, Western Cape Province

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements |
|---|---|---|---|
| ***National Legislation*** | | | |
| National Environmental Management Act (Act No 107 of 1998) | EIA Regulations have been promulgated in terms of Chapter 5. Activities which may not commence without an environmental authorisation are identified within these Regulations.<br>In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation.<br>In terms of GNR 387 of 21 April 2006, a scoping and EIA process is required to be undertaken for the proposed power station conversion and transmission integration project | National Department of Environmental Affairs and Tourism – lead authority.<br>Western Cape Department of Environmental Affairs and Development Planning – commenting authority. | This EIA report is to be submitted to DEAT and DEA&DP in support of the **application for authorisation** submitted in March 2008. |
| National Environmental Management Act (Act No 107 of 1998) | In terms of the Duty of Care provision in S28(1) Eskom as the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.<br>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts. | Department of Environmental Affairs and Tourism (as regulator of NEMA). | While **no permitting or licensing requirements** arise directly by virtue of the proposed project, this section will find application during the EIA phase and will continue to apply throughout the life cycle of the project. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements |
|---|---|---|---|
| Environment Conservation Act (Act No 73 of 1989) | Section 20(1) provides that where an operation accumulates, treats, stores or disposes of waste on site for a continuous period, it must apply for a permit to be classified as a suitable waste disposal facility. | National Department of Environmental Affairs and Tourism and Department of Water Affairs and Forestry. | As no waste disposal site is to be associated with the proposed project, **no permit** is required in this regard. |
| Environment Conservation Act (Act No 73 of 1989) | National Noise Control Regulations (GN R154 dated 10 January 1992).<br>Provincial noise control regulations have been promulgated for the Western Cape in Provincial Notice (PN 627/P5309/2299) dated 20 November 1998. In terms of these Regulations, industrial noise limits are 61 dBA and noise limits from any source other than an industrial source are 65 dBA.<br>Draft regulations relating to noise control published in Provincial Gazette No 6412, PN 14 dated the 25th of January 2007. Noise limits are based on the acceptable rating levels of ambient noise contained in SANS 10103. | National Department of Environmental Affairs and Tourism<br>Western Cape Department of Environmental Affairs and Development Planning<br>Local authorities, i.e. City of Cape Town | There is **no requirement for a noise permit** in terms of the legislation. A **Noise Impact Assessment** is required to be undertaken in accordance with SANS 10328. This has been undertaken as part of the EIA process (refer to Appendix J). |
| National Water Act (Act No 36 of 1998) | Section 21 sets out the water uses for which a water use license is required. | Department of Water Affairs and Forestry | The need for water use permits or licenses for water use (as defined in terms of S21 of the NWA) associated with the proposed project to be applied for or obtained will be determined once the source and water quantities are finalised and defined. |
| National Water Act (Act No 36 of 1998) | In terms of Section 19, Eskom as the project proponent must ensure that reasonable measures are taken throughout the life cycle of | Department of Water Affairs and Forestry (as regulator of NWA) | This section will find application during the EIA phase and will continue to apply throughout the life cycle of the |

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements |
|---|---|---|---|
| | this project to prevent and remedy the effects of pollution to water resources from occurring, continuing or recurring. | | project. |
| Atmospheric Pollution Prevention Act (Act No 45 of 1965) | Scheduled Processes: A specifications standard applies to the production of noxious or offensive gases. This means that pollution control equipment used in operating the process must conform to certain design criteria. Currently sixty nine (69) scheduled processes are listed in the Second Schedule to the Act. No person may carry on a Scheduled Process in or on any premises unless he is the holder of a current registration certificate. The granting of a permit is subject to compliance with certain minimum standard specifications.<br>To be replaced by the National Environmental Management: Air Quality Act (Act No 39 of 2004) on promulgation of Section 22 of this Act. | National Department of Environmental Affairs and Tourism - Chief Air Pollution Control Officer (CAPCO)<br>Western Cape Department of Environmental Affairs and Development Planning - Chief Air Pollution Control Officer (CAPCO) | Eskom have applied for an emissions permit for the current operations at the Gourikwa Power Station and are in consultation with CAPCO in this regard. Eskom may need to **obtain an amended registration certificate** from the Chief Air Pollution Control Officer (CAPCO) at DEA&DP in the event that the emissions from the power station are altered as a result of the proposed conversion project. Eskom must ensure that the conditions in the certificate are complied with at all times. |
| National Heritage Resources Act (Act No 25 of 1999) | Section 38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including<br>» the construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length;<br>» any development or other activity which will change the character of a site exceeding 5 000 $m^2$ in extent.<br>The relevant Heritage Resources Authority must be notified of developments such as linear | South African Heritage Resources Agency (SAHRA) - National Heritage Sites (grade 1 sites) as well as all historic graves and human remains<br>Heritage Western Cape - all Provincial Heritage Sites (grade 2 sites), generally protected heritage and structures (grade 3a – 3c sites) and prehistoric human remains | The area proposed for the location of the CCGT units associated with the power station conversion project is within the existing Gourikwa power station site. This area has been disturbed through construction activities associated with the OCGT power station. No heritage sites are expected to be located within this area. Therefore, **no permits** will be required to be obtained.<br>An **HIA** will be required to be |

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements |
|---|---|---|---|
| | developments (such as roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 $m^2$; or the re-zoning of a site exceeding 10 000 $m^2$ in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided.<br>Stand alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of Section 38. In such cases only those components not addressed by the EIA should be covered by the heritage component. | | undertaken for the proposed power line. A **permit** may be required should identified **cultural/heritage sites** along the proposed transmission power line be required to be **disturbed or destroyed** as a result of the proposed development.<br>An **HIA** may be required to be undertaken for the proposed water pipeline and access road to the power station, depending on the length and location of this pipeline. |
| National Environmental Management: Biodiversity Act (Act No 10 of 2004) | In terms of Section 57, the Minister of Environmental Affairs and Tourism has published a list of critically endangered, endangered, vulnerable and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007.<br>In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA phase of the project to incorporate the legal provisions as well as the regulations associated with listed | National Department of Environmental Affairs and Tourism | As Eskom will not carry on any restricted activity, as is defined in Section 1 of the Act, **no permit** is required to be obtained in this regard.<br>**Specialist ecology and flora studies** are required to be undertaken as part of the EIA process. These studies have been undertaken as part of the previously EIAs undertaken for the power station site. Specialist ecology and flora scoping studies have been undertaken for the proposed power line (refer to Appendices M -O). Detailed specialist studies will be required to be undertaken for the nominated |

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements |
|---|---|---|---|
| | threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA phase. | | preferred alternative.<br>As the power station site has been disturbed through construction activities associated with the OCGT power station, **no protected plant species** are likely to be present on the proposed development site. Therefore, **no permits** will be required to be obtained in this regard.<br>A **permit** may be required should any **protected plant species** within the power line corridor be **disturbed or destroyed** as a result of the proposed development. |
| Conservation of Agricultural Resources Act (Act No 43 of 1983) | Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Weeds are described as Category 1 plants, while invader plants are described as Category 2 and Category 3 plants. These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E. | Department of Agriculture | While **no permitting or licensing requirements** arise from this legislation, this Act will find application during the EIA phase and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, the existing weed control and management plan within the EMP must be implemented. |
| Minerals and Petroleum Resources Development Act (Act No 28 of 2002) | A mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act. | Department of Minerals and Energy | As no borrow pits are expected to be required for the power station conversion and transmission integration project, **no mining permit or mining right** is required to be obtained. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements |
|---|---|---|---|
| National Veld and Forest Fire Act (Act No 101 of 1998) | In terms of Section 12 Eskom would be obliged to burn firebreaks to ensure that should a veldfire occur on the property, that same does not spread to adjoining land.<br>In terms of Section 13 Eskom must ensure that the firebreak is wide enough and long enough to have a reasonable chance of preventing a veldfire from spreading; not causing erosion; and is reasonably free of inflammable material.<br>In terms of Section 17, Eskom must have such equipment, protective clothing and trained personnel for extinguishing fires as are prescribed or in the absence of prescribed requirements, reasonably required in the circumstances. | Department of Water Affairs and Forestry | While **no permitting or licensing requirements** arise from this legislation, this Act will find application during the operational phase of the project. |
| Hazardous Substances Act (Act No 15 of 1973) | This Act regulates the control of substances that may cause injury, or ill health, or death by reason of their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.<br>Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc, nature or because it generates pressure through decomposition, heat or other | Department of Health | It is necessary to identify and list all the Group I, II, III and IV hazardous substances that may be on the site by the activity and in what operational context they are used, stored or handled. If applicable, a **license** is required to be obtained from the Department of Health. |

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements |
|---|---|---|---|
| | means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance;<br>Group IV: any electronic product;<br>Group V: any radioactive material.<br>The use, conveyance or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force. | | |
| National Road Traffic Act (Act No 93 of 1996) | The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts.<br>The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the | Western Cape Department of Transport and Public Works (provincial roads)<br>South African National Roads Agency (national roads) | An abnormal load/vehicle permit will be required to transport the various CCGT and power line components to site for construction. These include:<br>» Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads.<br>» Transport vehicles exceeding the dimensional limitations (length) of 22m.<br>» Depending on the trailer configuration and height when loaded, some of the power station components may not meet specified dimensional limitations (height and width). |

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements |
|---|---|---|---|
| | requirements of the National Road Traffic Act and the relevant Regulations. | | |
| National Road Traffic Act (Act No 93 of 1996) | Regulation 274 (read with SABS Code 0232 which deals with transportation of dangerous goods and emergency information systems) states that the regulations are applicable where dangerous goods are transported in quantities, which exceed the exempt quantities (listed in Annex E of SABS Code 0232). Dangerous goods may only be transported in accordance with the provisions in the Regulations, unless the Minister of Transport has granted an exemption. | Department of Transport<br>Western Cape Department of Transport and Public Works (provincial roads)<br>South African National Roads Agency (national roads) | Eskom will need to ensure that **procedures** are in place **to prevent that the quantities of dangerous goods transported exceed the prescribed quantity** (listed in Annex E of SABS Code 0232). Apply for an exemption, if applicable. |
| Development Facilitation Act (Act No 67 of 1995) | Provides for the overall framework and administrative structures for planning throughout the Republic. | Western Cape Department of Environmental Affairs and Development Planning<br>Local authorities, i.e. City of Cape Town | As the power station conversion project is planned to be undertaken within the existing Gourikwa power station site, **no rezoning** or sub-division of land is required. Therefore, no land development application is required to be submitted.<br>Eskom must submit a land development application for the proposed transmission power line in the prescribed manner and form as provided for in the Act. |
| Land Use Planning Ordinance 15 of 1985 | Details land subdivision and rezoning requirements & procedures | Western Cape Department of Environmental Affairs and Development Planning<br>Local authorities, i.e. City of Cape Town | As the power station conversion project is planned to be undertaken within the existing Gourikwa power station site, **no rezoning** or sub-division of land is required. Therefore, no application in terms of LUPO is required to be |

| Legislation | Applicable Requirements | Relevant Authority | Compliance requirements |
|---|---|---|---|
| | | | submitted.<br>Given that the transmission power line is proposed on land that is zoned for agricultural use (depending on the preferred power line corridor nominated through the EIA process), a rezoning application in terms of Section 17 of LUPO to an alternative appropriate zone will be required. Rezoning is required to be undertaken following the issuing of an environmental Authorisation for the proposed project. |
| ***Provincial Legislation*** | | | |
| Nature Conservation Ordinance (Act 19 of 1974) | Article 63 prohibits the picking (defined in terms of article 2 to include, cut, chop off, take, gather, pluck, uproot, break, damage or destroying of certain flora. Schedule 3 lists endangered flora and Schedule 4 lists protected flora.<br>Articles 26 to 47 regulates the use of wild animals | CapeNature | As the power station site has been disturbed through construction activities associated with the OCGT power station, **no endangered or protected plant species** are likely to be present on the proposed development site. Therefore, **no permits** will be required to be obtained in this regard.<br>A **permit** may be required should any **endangered or protected plant species** within the power line corridor be **disturbed or destroyed** as a result of the proposed development. |

# DESCRIPTION OF THE AFFECTED ENVIRONMENT CHAPTER 5

This chapter provides a description of the environment that may be affected by the proposed Gourikwa Power Station Conversion and Transmission Integration Project. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the biophysical, social and economic environment that could be affected by, or could affect the proposed development have been described. This information has been sourced largely from existing information available for the area, and aims to provide the overall context within which this environmental impact assessment process is being conducted. A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within Appendices J – O.

## 5.1. Location of the Study Area and Property Description

The study area is located within the falls within the Mossel Bay Municipality of the Eden District in the Western Cape Province. The existing Gourikwa OCGT Power Station is located approximately 15 km west of Mossel Bay adjacent to the PetroSA plant. The power station site is approximately 1,3 km north of the N2 national road between Mossel Bay and Riversdale, and lies ~1 km west of the PetroSA plant.

The Gourikwa Power Station is located on Farm 310, Bartelsfontein 226 and a portion of Portion 1 of the Farm Patrysfontein 228. These properties are owned by PetroSA and Eskom. The existing Gourikwa OCGT power station and transmission substation site is located within PetroSA's landholding and is zoned for industrial use. Formal confirmation of the industrial zoning of the OCGT power plant site was obtained from the Mossel Bay Municipality during the EIA process undertaken for the initial OCGT units and the expansion project (Ninham Shand, 2005 and 2007). Infrastructure associated with conversion project will be developed on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries.

Apart from its location close to the N2, the power station site is considered to be relatively remote and far removed from major centres and tourist attractions.

In accordance with the requirements of Section 16(2) of the NEMA EIA Regulations, potentially affected landowners have been given notice of the proposed activity and have been provided with the opportunity to participate within the EIA process.

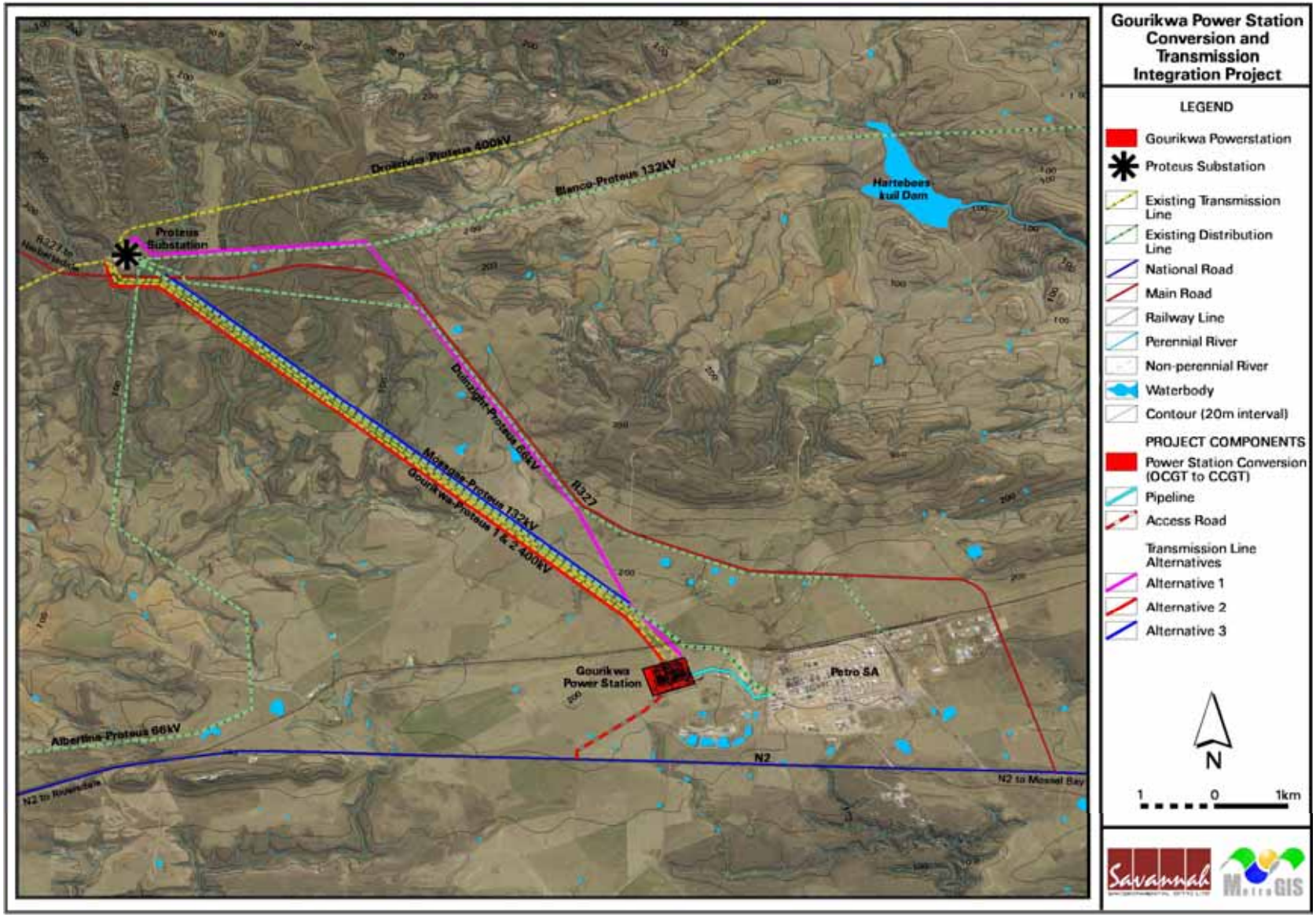



**Figure 5.1:** Locality map showing the project components: Gourikwa Power Station, the feasible alternative transmission power line corridor alternatives between Gourikwa and Proteus Substation, and the water pipeline and access road alignments

## 5.2. Social Characteristics of the Study Area

The Gourikwa Power Station is located within an existing industrial area, and is adjacent to the PetroSA plant. The predominant land use in the surrounding area is agriculture with a combination of cattle, sheep and ostriches as well as crop (mainly wheat) cultivation. The predominantly low income African and Coloured neighbourhoods of KwaNonqaba and Joe Slovo as well as the middle to upper middle income predominantly White neighbourhood of Dana Bay are situated within a 5 km radius of the development site.

Farms surrounding the Gourikwa Power Station site to the north and west include:

| Farm | Owners / Residents |
|---|---|
| B&H Boerdery | Bennie & Hennie Pienaar |
| Patrysfontein | Ignatius Muller & Quintus Muller |
| Bartelsfontein | Henry Muller |
| Hartelus | Jacques & Annelie De Villiers |
| Arum Valley | Gilbert Muller |
| Kleinberg | Lucas Muller |

B&H Boerdery, Bartelsfontein and Hartelus are situated in close proximity to the Gourikwa site, to the west (B&H Boerdery) and north (Bartelsfontein and Hartelus) respectively.

The residences of Ignatius Muller and Quintus Muller on the farm Patrysfontein, situated north-west of the Gourikwa site, are both situated within 1 km of the existing Gourikwa-Proteus 400kV servitude (Alternative 2 for proposed transmission line) and Mossgas-Proteus 132kV servitude (Alternative 3 for proposed transmission line).

### *5.2.1 Demographic Profile*

According to the 2001 Census, the population of the former Ward 11, reflecting the population within immediate proximity of the Gourikwa Power Station site, and including the neighbourhoods of KwaNonqaba and Joe Slovo as well as Dana Bay, comprised approximately 46% Coloureds, 44% Whites, and 10% Black Africans in 2001. The African population showed significantly faster growth than other groups between 1996 and 2001 and can therefore be expected to have increased proportionally since the last Census. Subsequent indicators indicate vast disparities between population groups in Mossel Bay in general, indicating the population surrounding the site to be characterised by high levels of inequality.

### *5.2.2. Age distribution*

While the African population is predominantly youthful, indicating rapid future growth, the White population is older, indicating slower growth into the future. This has important implications for social capital and cohesion, as the fastest growing sector of the population is also that characterised by the most severe shortages as shown in a range of socio-economic variables. The high percentage of the African population is in the age-group 15-34, which may be regarded as the youthful potential labour force, emphasises the need for employment opportunities for this group.

### *5.2.3. Language*

Although Afrikaans is the most commonly spoken language in the Province and the region, it is only spoken by 6% of the African population, 88% of whom are isiXhosa speakers.

### *5.2.4. Educational Profile*

Although levels of education in the Western Cape Province as well as in Eden District and Mossel Bay are generally higher than national averages, great discrepancies exist between different population groups, with a greater percentage of the African and Coloured population having received no schooling, while the Indian and White groups have significantly higher percentages having attained tertiary or higher education.

In contrast to levels of education attained, the percentage of persons aged between 15 and 24 not attending any educational institution is significantly higher in the Western Cape than nationally, with the percentage attending school correspondingly much lower provincially than for South Africa as a whole. The Eden District and Mossel Bay region correspond closer to national levels although the percentage not attending any educational institution is still somewhat higher, and school attendance lower than nationally. School attendance is roughly similar between different population groups although slightly higher amongst Whites and Africans. It is important to note that, although actual attendance may be similar, the standard of schools and consequently the quality of education available for different groups continues to sharpen disparities in actual educational attainment.

### *5.2.5. Employment and Income*

The disparity between population groups is particularly stark with relation to employment status, with the African population having more than double the percentage of unemployed persons (31%) than the Coloured group (14%), which

itself is over three times higher than the corresponding percentage amongst Whites (4%).

The construction sector in Mossel Bay is responsible for a greater share of employment (14%) than elsewhere in the district (11%), province (7%), or country (5%). This sector is furthermore the one responsible for the greatest share of employment amongst the African population, a quarter of whom were employed in it according to the 2001 Census. The great emphasis placed by community stakeholders on the potential for local job creation presented by the Development during the construction phase needs to be understood in this context, in which this is the sector in which the greatest percentage of Africans in the region have some levels of skills and experience.

While a third of workers in Mossel Bay were involved in elementary occupations in 2001, a further 15% had skills in crafts and related trades. Disparities are again great between population groups, with 42% of Africans and 41% of Coloureds in elementary occupations, compared to only 4% of Whites. Corresponding percentages for craft and trade are 22% of Africans, 16% of Coloureds, and 9% of Whites.

Income levels vary sharply between different population groups, with 78% of the African and 75% of the Coloured population earning an average individual income of less than R1 600 per month, compared to only 18% of both the White and Indian populations. Ten percent of households in Mossel Bay reported 'no annual income' in the 2001 census.

### *5.2.6. Housing, services and infrastructure*

Although almost three quarters of households in Mossel Bay resided in a 'house or brick structure on a separate stand' in 2001, this was only true for about half of the African population. A third of this group reside in 'informal dwellings in informal settlements, noting the prevalence of such settlements, which have continued to grow in years since the census. This is particularly relevant to consider with respect to the development's potential to attract both labourers and job-seekers to the area, which could place further strain on existing townships' housing, infrastructure and services.

While 91% of households in Mossel Bay appear to have access to electricity, indicating this as their primary source of energy for lighting, alternative sources are more commonly used for cooking and heating, probably due to financial constraints. These include paraffin (most common amongst Africans residing in townships) and wood (most common amongst Coloureds residing on farms).

Access to transport and communications infrastructure is relevant to consider as this impacts on access to potential employment and business opportunities. In both cases disparities are vast. Over half the African and Coloured populations travel mainly 'on foot', followed by smaller percentages travelling as in cars passengers or use public transport. By contrast 77% of the White population travel by car either as driver or passenger. More than half of the African and 40% of the Coloured population rely on access to a public telephone nearby, while 96% of the White population have telephones either in their dwellings or cell phones, or both (47%).

The N2 National Road is located approximately 1,3 km south of the existing power station site. The Kleinberg-Mossdustria railway line is located immediately north of the site and the R327 is located further to the north. The Proteus substation is located 10 km northwest of the power station site and two 132 kV and two 400 kV transmission lines run in a north-westerly direction from the site to the substation.

### *5.2.7. Heritage Profile*

Mossel Bay itself is an historic town which dates back the use of the bay as an anchorage since the first Portuguese explorers rounded the Cape. The core of the town which contains buildings which date back to the 18$^{th}$ and 19$^{th}$ century is a declared conservation area. In the more rural areas, settled agriculture as practiced by European farmers dates to the early 18$^{th}$ century. However prior to the historic period, pre-colonial settlement of the region has enjoyed massive time depth. The presence of sea caves with deep archaeological deposits has attracted the attention of archaeologists, professional and amateur since the early 19th century, however recent 21st century research has placed Mossel Bay on the international map as a key research area.

The main cave at Cape St Blaize was first described and excavated in 1888 by Lieth and Jones in 1899, then by John Goodwin in the 1920's revealing an extensive archaeological deposit dating from 200 000 years (Middle Stone Age) to the relatively recent shell middens of pre-colonial San and/or Khoekhoen herders. Lieth and Jones (1899) noted that many of the great cave deposits and prehistoric middens in the Mossel Bay – Pinnacle Point area were being 'mined' by local farmers who collected wagon loads of archaeological deposits for use as fertilizer. It would appear that severe impacts took place to local Mossel Bay heritage before the dawn of scientific enquiry.

For many years since the excavations of Cape St Blaize cave, very little archaeological research has taken place in the area until the extensive cave and rock shelters of Pinnacle Point were brought to the Attention of Prof Curtis Marean (Stoneybrook University, New York and Dr Peter Nilssen (Mossel Bay

Archaeological Project). A detailed program of research commenced, and resulted in the excavation of several sites resulting in the discovery of some very early fragmentary human remains and a complex Middle Stone Age sequence. Marean *et al* (2007) have claimed that the Middle Stone Age sequences of the mid-late Pleistocene at Pinnacle Point has produced evidence that people were exploiting marine food resources as early as 164 000 years ago. This is construed as very early evidence for modern human cognitive development.

No colonial period archaeological research has ever taken place in the study area so very little is known about early colonial period settlement, apart from that which is historically recorded and protected in the historic museum precinct and building conservation area with the town of Mossel Bay. In terms of the study area itself, no material of special significance has been identified to date. During the preparation of the Gourikwa Power Station site, a number of Early Stone Age artefacts that are between 300 000 and a million years old were collected within the excavated soils from the bulk earthworks.

Since the study areas are situated in rolling open landscape or coastal plains away from the coast, the expectation is that the kind of archaeological material that will be encountered will consist of open scatters of Early and Middle Stone Age artefacts (with rarer concentrations of later material). This kind of archaeology occurs ubiquitously throughout Southern Africa. It is only when such scatters are found in association with fossil bone or in clusters of discernable density that they are considered to have high heritage significance. Since there are no rocky outcrops, shelters or natural foci in along any of the transmission line alternatives or proposed pipeline route, occurrences of Late Stone Age archaeological material is not expected to be frequent.

## 5.3. Biophysical Characteristics of the Study Area

### *5.3.1. Climate*

The study area falls within a Mediterranean-type climate with hot summers and wet winters. The annual precipitation is approximately 400mm - 600 mm, peaking in spring and autumn. Winds are typically from the southeast during summer months, while winter frontal systems cause north and westerly winds. Strong winds with an average speed of 20 km/h are experienced during winter, while the average wind speed in summer is approximately 15 km/h.

The average mean temperature in summer is 25°C and the average mean temperature in winter is 14°C.

### *5.3.2. Geology and Drainage*

The study area is underlain by sandstone and shale beds of the Table Mountain and Bokkeveld Groups. North of Mossel Bay, rocks of the Enon Formation and other similar younger deposits (of Cretaceous and Tertiary age) are found. These rocks are deposited in an east to west elongated trough and are considered to extend offshore.

The Kouga Formation is the principal aquifer in the study area and its recharge area lies north of the PetroSA refinery.

A minor seasonal tributary of the Blinde River, which drains to the south, has its source approximately 1 km to the south-southwest of the power station site. However, the site is particularly flat and as a consequence is not well drained. A shallow water table is likely to occur in an area approximately 800 m to the east of the site, i.e. closer to the PetroSA facility.

### *5.3.3. Vegetation*

The site is located within a bioregion known as the Riversdale Plain, which lies within the Fynbos biome and the Cape Floristic Region (CFR). The South African vegetation map describes the PetroSA area as Albertinia Sand Fynbos. The vegetation in the Proteus area is indicated as being Swellendam Silcrete Fynbos, and much of the intervening area is Mossel Bay Shale Renosterveld (refer to Figure 5.2). The National Spatial Biodiversity Assessment (NSBA) indicates that the Sand Fynbos is a Vulnerable vegetation type and that the Silcrete Fynbos and Shale Renosterveld are both Endangered vegetation types on a national basis.

The ecology of the power station site has been largely transformed through the construction of the existing Gourikwa Power Station. Previous investigations of the vegetation of the power station site (Ninham Shand, 2005; 2007) have indicated that the area on which the power station is located had been recently and regularly ploughed, and also grazed by livestock. The site was dominated by grazing grasses along with a few indigenous but weedy and alien species. No rare or localised plant species were likely to persist. This area had a very low local and regional conservation value.

The most sensitive area in the vicinity of the power station was identified to be a patch of approximately 1 ha of Shale Renosterveld about 200 m to the east of the site (Ninham Shand, 2007). This patch occurred immediately east of a farm fence, and its northern border is the railway line. The vegetation here is a remnant piece of Mossel Bay Shale Renosterveld, which is an Endangered vegetation type (Rouget *et al*, 2004). The site is dominated by *Bobartia robusta*, which is a Rare Red Data listed species (Hilton Taylor, 1996) restricted to this

vegetation type west and north of Mossel Bay. Other species include *Rhus lucida* (blinktaaibos), *Metalasia pungens* (blombos), *Cynodon dactylon*, *Hypoxis setosa*, and *Falkia repens*. Various bulbs species are likely to be common, some of which may be rare and/or localised. This area has a very high local, and high regional conservation value, and should not be disturbed. Similar, but larger patches of remnant Renosterveld occur about 0,7 km west of the originally proposed site.

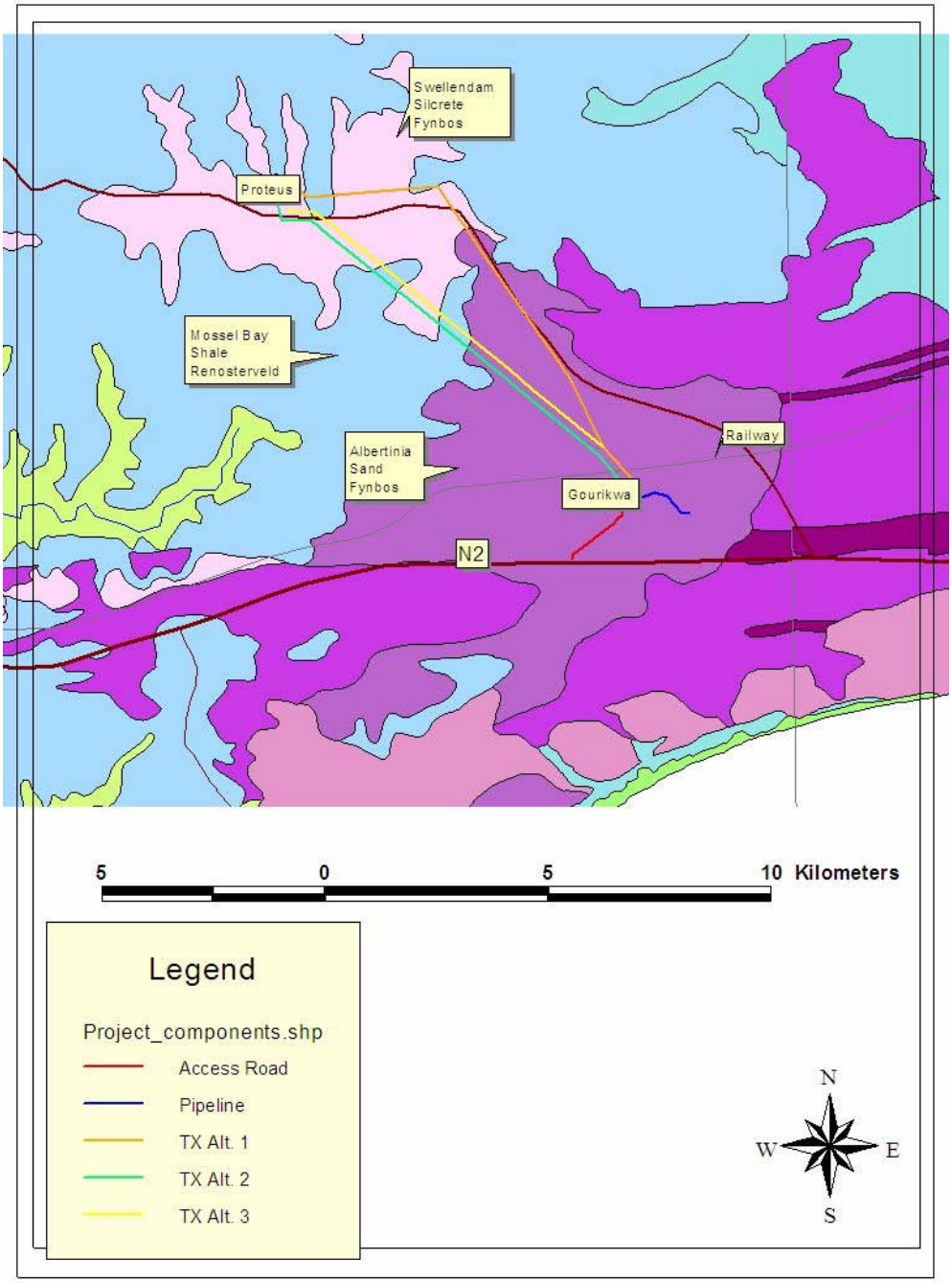



**Figure 5.2:** Project components superimposed on SA Vegetation map (Mucina & Rutherford 2006), showing local extent of the three vegetation units concerned

In addition, the other habitat of moderate concern is a grassy wetland area to the south-east of the power station site. This was a natural drainage line, but has been dammed and heavily transformed by agriculture, notably heavy stock grazing. The vegetation is dominated by grasses and sedges, most of which are common and widespread, resilient species, but occasional rare bulb species could be present. The botanical conservation value was rated as being low to moderate (Ninham Shand, 2007).

Remaining vegetation between the Gourikwa Power Station site and the Proteus Substation is a mosaic of ploughed lands and Mossel Bay Shale Renosterveld (refer Figure 5.3) and is generally in good condition with relatively few invasive alien species, although there are scattered *Acacia mearnsii* (black wattle) and *Acacia saligna* (Port Jackson). The protected species *Sideroxylon inerme* (milkwood) was recorded as being present in the thicket elements of this vegetation. This species is protected under the Forestry Act (Act No 122 of 1984), and may only be disturbed (including cutting or pruning in any way) with the relevant permit from Department of Water Affairs and Forestry.

**Figure 5.3:** View of the area between the Proteus Substation and Gourikwa, crossing mosaic of ploughed lands and Mossel Bay Shale Renosterveld.

Mossel Bay Shale Renosterveld is characterised by a high bulb diversity. The bulb *Bobartia robusta* (blombiesie) is very common in many natural areas along the

proposed power line routes and was previously Red Data Book listed as Rare (Hilton-Taylor 1996), but has been downgraded to Least Threatened as the species no longer meets IUCN requirements for Red listing (Raimondo et al – in prep.). The species is however a regional endemic, and is found only in the area from Albertinia to Mossel Bay.

*Protea lanceolata* (lance leaf sugarbush) has recently been Red Data listed as Near Theatened; Raimondo et al – In prep.), and is uncommon in the vicinity of Proteus, on the silcrete hills.

There is a low to moderate likelihood of certain very rare cryptic dwarf succulents such as *Euphorbia bayeri* (local endemic), various *Haworthia* species, and various bulbs occurring in the study area. There is also a small likelihood that the very rare *Satyrium muticum* (Endangered) could occur (the species is known from about 400m east of Proteus substation; B. Liltved - *pers. comm*.). Most of these would be likely to occur in rocky areas.

### *5.3.4. Terrestrial Fauna*

Due to the farming activities within the study area, indigenous terrestrial faunal diversity is restricted. However, there is evidence of various small mammals such as rodents, porcupines, and small antelope within the study area. In addition, PetroSA's nature reserve is located adjacent to the refinery, between the southern security fence and the N2 National Road. Species found with the Nature Reserve include springbok, Burchell's Zebra, grysbok and Cape hares (Ninham Shand, 2007).

### *5.3.5. Avifauna*

The study area consists of predominantly flat arable lands in the south, and some remaining fynbos on the rolling hills in the north. The Southern African Bird Atlas Project (Harrison *et al*, 1997) recorded a total of 157 bird species in the quarter degree square within which the study area falls, i.e. 3421BB. This included seven Red Data species, four 'vulnerable' and three 'near-threatened' (Barnes, 2000). In addition, the White Stork (Protected internationally under the Bonn Convention on Migratory Species) is considered as a threatened species for the purpose of this study. This is a relatively low diversity of bird species, and consequently Red Data species, meaning that in terms of avifauna, this study area is not particularly unique. However, several of the Red Data species recorded here are known to be extremely vulnerable to impacts of power lines, through collision. The Blue Crane, Secretarybird, Denham's Bustard and White Stork are all extremely vulnerable to collision, and several birds of these species have been reported colliding with the existing power lines in the study area previously.

# SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED POWER STATION CONVERSION CHAPTER 6

This chapter of the Scoping Report serves to evaluate the identified potential environmental (socio-economic and biophysical) impacts associated with the proposed conversion of the OCGT units at the Gourikwa Power Station to CCGT units, including potential impacts associated with the direct access road as well as the proposed water pipeline. Potential direct and indirect impacts of the components of the proposed conversion project are evaluated, and recommendations are made regarding further studies required within the EIA phase of the process.

The cumulative impacts associated with the proposed power station conversion project are expected to be associated with the addition of infrastructure to the existing power station footprint and are largely associated with potential noise, air quality and visual impacts of the facility on the surrounding environment. Cumulative effects can only be assessed once the detailed design information becomes available, and will be considered in the detailed specialist studies to be undertaken in the EIA phase.

## 6.1. Potential Impacts on Air Quality

The Gourikwa Power Station is located approximately 15 km west of Mossel Bay adjacent to the PetroSA plant. The power station site is approximately 1,3 km north of the N2 national road between Mossel Bay and Riversdale, and 1 km west of the PetroSA plant. The predominant land use in the area is agriculture with a combination of cattle, sheep and ostriches as well as crop (mainly wheat) cultivation.

The existing air quality in the area is impacted by the emissions from the existing OCGT units, as well as those from the PetroSA plant. Apart from the industrial activities in the area, other potential air pollution sources include vehicular traffic, domestic fires, ploughed fields and non-vegetated land.

### *6.1.1. Nature and Extent of Impacts*

Potential impacts are associated with both the construction and operational phases of the proposed power station conversion project. The main air pollution sources identified to be associated with the proposed power station conversion include:

» The various construction activities during the construction phase.

» The turbine combustion emissions during the normal operation phase.
» The turbine combustion emissions during start-up and upset conditions.

Potentially sensitive receptors surrounding the power station site include the farms surrounding the site, including:

» B&H Boerdery
» Patrysfontein
» Bartelsfontein
» Hartelus
» Arum Valley
» Kleinberg

The communities of KwaNonqaba and Joe Slovo and Dana Bay are situated within a 5 km radius of the development site.

» *Potential Impacts during the Construction Phase:*
Dust would be generated through the various construction activities of the proposed CCGT power station. The greatest impact of the dust would be limited to the immediate vicinity of the proposed site. This impact is expected to be of low significance.

» *Potential Impacts during the Operational Phase*
An OCGT power plant produces and releases into the atmosphere a number of gaseous and particulate emissions, such as sulphur dioxide ($SO_2$), nitrogen oxides ($NO_x$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), fugitive volatile organic compounds, greenhouse gases and inhalable particulates (PM10). In addition, heat is emitted from the OCGT power plant via the hot exhaust gasses. The impact of emissions on air quality under normal operating conditions of the OCGT units on the site is predicted to be of low significance given that the OCGT plant would not exceed any of the prescribed air emission limits (Ninham Shand, 2007).

The exhaust emissions during normal operation, start-up and upset conditions could have a negative impact on the air quality of the area in close proximity to the power station. The type of emissions are not expected to change from those currently generated by the OCGT units, since instead of being released into the atmosphere after the turbines, as the gases from the OCGT plant will pass through a heat recovery system and then be released. The only variations to the OCGT emissions will be the different release heights of the new stacks and the temperature of the emitted gases. These changes could have a small additional negative impact on potentially sensitive receptors in the vicinity of the power station. If vapour recovery systems are installed on fuel storage tanks, air pollution impacts associated with emissions from fuel

storage tanks are anticipated to be small. The extent of potential impacts associated with all emissions from the power station will need to be quantified and assessed in the EIA. Cumulative impacts associated with the proposed project within the study area will also be investigated.

Potential impacts on human health could potentially occur where people live in close proximity to the power station site. The duration of these impacts will be long-term, i.e. for the lifespan of the project. The extent of potential impacts will need to be assessed in the EIA.

### *6.1.2. Conclusions and Recommendations*

In order to determine existing air quality and assess potential air pollution impacts as a result of the proposed power station conversion project and to make recommendations with regards to mitigation measures, as well as air quality monitoring (if deemed necessary), a specialist air quality impact assessment (including modelled scenarios) must be undertaken in the EIA Phase. This study will consider the following conditions:

» Normal operations
» Start-up and upset conditions
» Cumulative impacts of emissions to air for the area

## 6.2. Potential Noise Impacts

The existing noise environment in the study area is impacted by the existing Gourikwa Power Station and the PetroSA plant. Other noise sources include localised vehicular traffic from the N2 national road located to the south of the site.

The control of noise in the Western Cape is legislated in terms of the Noise Control Regulations promulgated under the Environment Conservation Act (Act No 73 of 1989) as adopted by the Provincial Gazette Number 5309 of 20 November 1998. Under these regulations, rural environments are considered as sensitive from a noise impact perspective.

The acceptable daytime and night time rating levels in a rural district with little road traffic are, 45 dBA and 35 dBA respectively. Noise levels measured in the surrounding area as part of the previous EIA processes (Ninham Shand, 2007) were found to be approximately 43 dBA.

Wost-case scenario noise levels associated with the approved OCGT units at the Gourikwa Power Station for normal daytime operation of the units for five hours out of the 16 daytime hours were predicted to exceed the measured ambient

level within a distance of 1 920 m from the centre of the power station. This area includes the farming areas up to the R327 in the north, Montana and the residences at Harterus to the northeast and to Langewag to the southwest. At these locations, noise intensity would be expected to be between negligible and low. However, near the boundaries of the OCGT facility, this intensity would range between medium and very high. It was predicted that when all the proposed OCGT units are operated continuously (worst-case scenario), the measured ambient level of 43 dBA would occur up to a distance of 3 000 m from the centre of the OCGT power station. This was predicted to result in a high intensity of noise at Montana and Harterus, and to a very high intensity at Langewag and Bartelsfontein (Ninham Shand, 2007). To this end, Eskom have negotiated a noise buffer zone of 1,5 km radius around the existing Gourikwa power station facility in order to ensure that no further development occurs within this zone, thereby preventing the potential for additional future impacts on sensitive receptors.

### *6.2.1. Nature and Extent of Impacts*

The conversion of the Gourikwa Power Station units from open cycle to combined cycle will introduce additional noise sources, including:

» The construction equipment and activities during the construction phase.
» The equipment during the operational phase such as:
  * the air filters
  * the gas compressor
  * the gas turbine
  * the generator
  * the electricity transformers
  * the fans associated with the stacks
  * the heat recovery equipment
  * the steam generator
  * the steam turbine
  * the air-cooled condenser system associated with the dry-cooling system

» *Potential Impacts during the Construction Phase:*
  Noise associated with construction activities is generally of local extent and short duration. The construction operations are not expected to have any significant impact on the nearest residences in the surrounding area. The noise impact therefore is expected to be of low significance.

» *Potential Impacts during the Operational Phase:*
  The introduction of additional noise sources could have additional impacts (direct and cumulative impacts) as a result of the increase of the noise levels within and around the power station site. The duration of the noise impact is

expected to be long-term, i.e. for the duration of the operational life of the project. The extent of the impact will be dependent on the final design and any mitigation implemented, and will be considered in the detailed specialist studies to be undertaken in the EIA phase.

#### *6.2.2. Conclusions and Recommendations*

In order to assess the nature and extent of the noise emissions from the CCGT units (and verify the expected significance thereof), information regarding the reduction efficiency and the noise emissions will need to be obtained from the design engineers and included in the assessment within the detailed EIA phase. The noise sources will then be used in a noise model in order to calculate the resulting noise levels around the power station and assess the potential direct, indirect and cumulative impacts associated with the proposed project. This detailed assessment will be performed in the EIA phase in accordance with the South African National Standards (SANS).

### 6.3. Potential Visual Impacts

Apart from its location close to the N2 National Road, the Gourikwa Power Station site is considered to be relatively remote and far removed from major centres and tourist attractions. It is located adjacent to the N2 between Mossel Bay and Riversdale, approximately 1 km west of the PetroSA plant.

#### *6.3.1. Nature and Extent of Impacts*

The conversion of the power station from OCGT to CCGT technology, as a visual concern, primarily entails the increase of the dimensions of the gas turbine units. The tallest of the new components (such as the stacks) will be 60 m tall whereas the existing tallest structures (exhaust stacks) are 30 m tall. Additional infrastructure associated with the conversion project includes the construction of a small water treatment plant, and six additional fuel tanks (with a total capacity of approximately 32 million litres) west of the OCGT facility footprint.

An initial viewshed analysis of the proposed Gourikwa conversion project (based on a 20 m contour interval digital terrain model of the study area) indicates the visibility of the OCGT plant at full capacity (i.e. five turbine units) and the potential future visual exposure after the conversion (refer to Figure 6.1). The object offset for the current power station was taken at a maximum 30 m above ground level (i.e. the height of the OCGT stacks) and the proposed converted

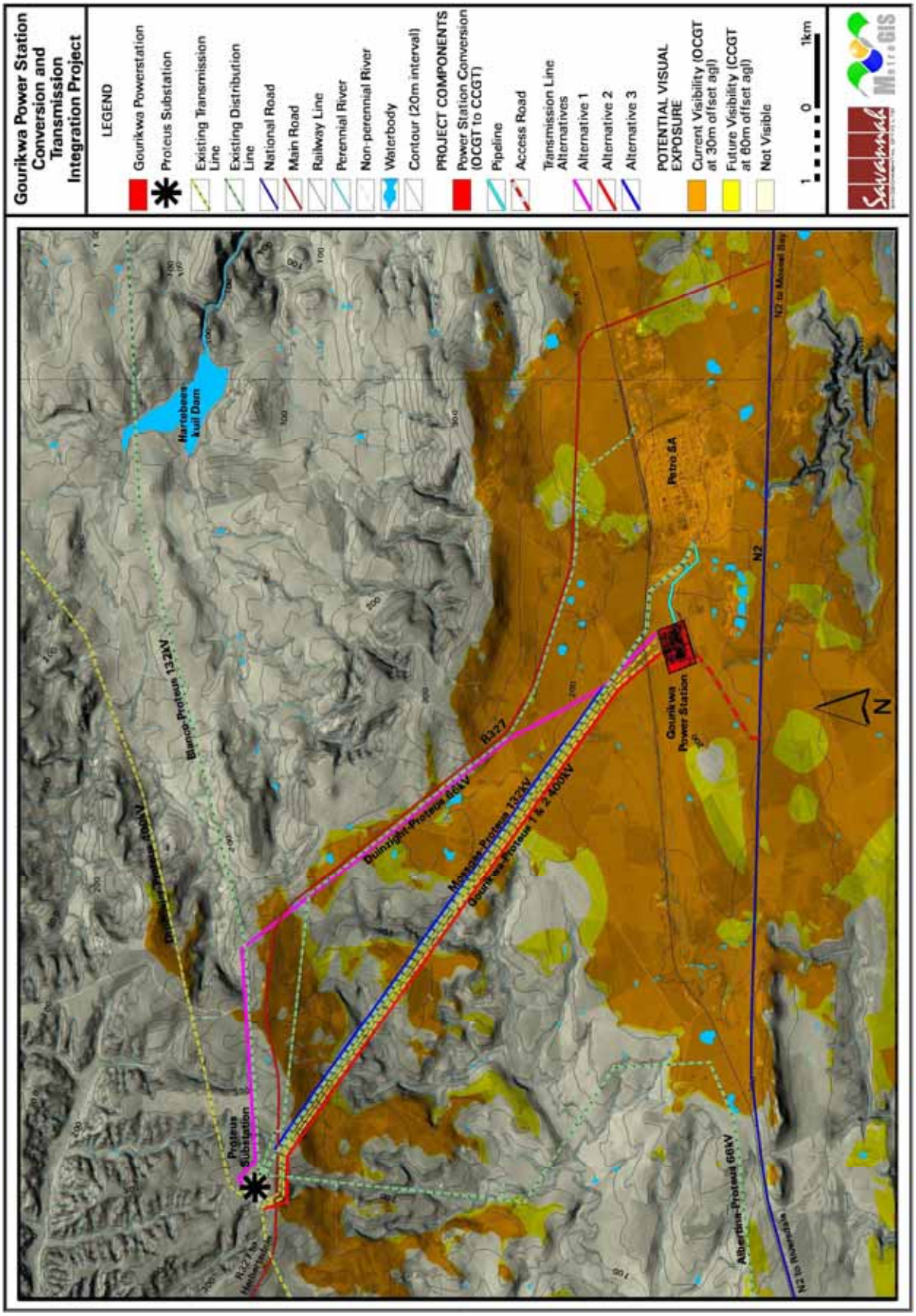



**Figure 6.1:** Potential visual exposure of the Gourikwa power station

power station was taken at 60 m offset above ground level. [7].

It becomes apparent that the facility would be relatively exposed due to the predominantly flat topography of the region. The general trend of the visual exposure (for the OCGT power station) shows a larger area with a short to medium distance exposure (up to 5 km from the power station), and a smaller, scattered area with medium to long distance exposure north-west of the site. The areas shown in yellow indicate the additionally exposed land after the conversion to a CCGT power station. The increase in dimensions of the power station, following the conversion process, does not increase the visual exposure of the power station significantly.

**Figure 6.2:** View of the existing Gourikwa OCGT power station from the N2

The construction of the ~1,3 km water supply pipeline adjacent to the fuel supply pipeline between Gourikwa power station and PetroSA is not expected to pose a risk of significant visual impact. The construction of the proposed new access road to the power station is similarly not expected to cause a significant visual impact, provided that no tall lighting structures (i.e. street lights) are proposed to be erected along this road, and it would provide access to an existing industrial complex.

[7] This viewshed analysis is based on the facility alone and does not include the proposed Gourikwa-Proteus transmission line. Separate viewshed analyses were done for the three transmission line alternatives (refer to Chapter 7).

**Figure 6.3:** Photograph taken travelling south along the R327 towards the Gourikwa power station (seen in the background)

### *6.3.3. Conclusions and Recommendations*

The fact that additional areas are potentially exposed to the power station following the conversion process does not imply that it constitutes a significant visual impact, at least not for all of the exposed areas. Further investigation is necessary in order to determine the specific visual impact within these exposed areas (i.e. the potential occurrence of sensitive visual receptors).

No potential visual impacts are expected to be associated with the proposed pipeline or the access road. Therefore, no further studies are required to be undertaken for these components of the project.

The visual impact assessment within the EIA will address issues related to the visibility of the proposed OCGT to CCGT conversion project, as well as potential cumulative visual impact of the power station conversion project. These issues or criteria will aim to quantify the actual visual impact and to identify areas of perceived visual impact.

Other issues/criteria to be addressed by the visual impact assessment include:

» Visual distance/observer proximity to the facility (apply the principle of reduced impact over distance)
» Viewer incidence/viewer perception (identify areas with high viewer incidence and negative viewer perception)
» Landscape character/land use character (identify conflict areas in terms of existing and proposed land use)
» Visually sensitive features (scenic features or attractions)

» General visual quality of the affected area
» Potential impact of the power station conversion on the tourism and eco-tourism potential of the area
» Visual absorption capacity of the vegetation
» The effect of existing man-made structures on the visual exposure
» Potential visual impact of lighting (after hours operations and security)
» Potential mitigation measures

An initial scanning level assessment of the above issues did not reveal any fatal flaws to be associated with the proposed power station conversion project. These issues should however still be investigated in greater detail in order to scientifically motivate and/or identify any other mitigating/aggravating circumstances.

## 6.4. Potential Impacts on Vegetation

The power station site is located within a bioregion known as the Riversdale Plain, which lies within the Fynbos biome and the Cape Floristic Region (CFR). The South African vegetation map describes the PetroSA area as Albertinia Sand Fynbos.

The ecology of the power station site has been largely transformed through the construction of the existing Gourikwa Power Station. No significant natural vegetation remains in the proposed pipeline route to PetroSA, due mostly to previous cultivation.

The direct access road to the power station is proposed to run along an existing fence line for much of its length. The fence separates two cultivated lands. Approximately 90% of the proposed route has previously been ploughed and/or planted to pasture and can therefore be considered to be disturbed. Species diversity is very low in these areas, and there is an almost zero likelihood of any rare or localised plant species occurring within these disturbed areas of the proposed route.

Scattered Thicket elements, including species such as *Rhus lucida* (blinktaaibos) occur within 5 m of the fence line (see Figure 6.4). These thickets are considered to be important roosting and shelter sites for numerous birds and insects, and therefore have ecological value. However, the botanical value of these thickets is considered to be Low to Moderate.

**Figure 6.4:** View along proposed new access road route towards N2, showing scattered shrubs along fenceline and adjacent ploughed lands

A patch of heavily grazed natural Renosterveld vegetation is located approximately 800 m due south of the power station site. This vegetation is considered to be of Moderate conservation value. Species diversity is relatively low within this patch of natural Renosterveld vegetation, due to heavy grazing by stock. Only one species of conservation concern was noted, being *Bobartia robusta*. This species is quite common in this patch, being non-palatable. The species is a regional endemic, but is not Red Data listed, as it no longer meets IUCN requirements for Red listing (Raimondo et al – in prep.). A number of small seasonal wetlands also occur in the area.

### *6.4.1. Nature and Extent of Impacts*

Direct impacts occur primarily at the construction stage, and the nature of the impact is direct loss of vegetation within the development footprint. Indirect impacts occur mostly during the operational phase (post construction), and in this case the nature would vary from the introduction of alien vegetation and alien animal species (such as Argentine ants), to partial disruption of ecological processes due to the effects of the alien species, to partial disruption of ecological processes due to fragmentation of habitat.

The construction of the proposed power station conversion and the water pipeline between the PetroSA site and the power station is not predicted to have any direct negative impacts as no natural vegetation occurs within the proposed development area.

The proposed road route may impact on small patches (<1 ha in total) of remnant natural vegetation. Loss of natural vegetation (and possibly small areas of seasonal wetland) will occur in these areas and is expected to be localised in extent. However, most of the proposed route passes through cultivated lands with no significant natural vegetation.

Potential indirect impacts which may be associated with the proposed project include introduction of alien species, to partial disruption of ecological processes due to the effects of the alien species, to partial disruption of ecological processes due to fragmentation of habitats. Impacts are expected to be of low to negligible significance at the local level due to the disturbed nature of the study area.

Extensive Eskom infrastructure development is taking place in the region, and on-going development inevitably has a cumulative negative impact on remaining natural vegetation. In this particular instance the cumulative impacts are likely to be low negative, as most of the development is taking place in previously cultivated areas, and footprints and permanent vegetation losses are very small within the vegetated areas (<1 ha in total).

### *6.4.3. Conclusions and Recommendations*

As no impacts are expected as a result of the proposed power station conversion and construction of the water pipeline, no further studies are required to be undertaken for these components of the proposed project. The proposed pipeline route is acceptable and should have no botanical impact.

The final alignment of the proposed new road access should be such as to accommodate the identified areas of botanical sensitivity in the area. This would result in the road having a minimal impact on vegetation. A field survey of the final proposed road route should be undertaken as part of a detailed EIA assessment, and standard impact assessment methodology employed to assess the potential impacts. The Impact Assessment should clearly outline practical mitigation that can be implemented to reduce any identified botanical impacts of significance.

## 6.5. Potential Impacts on Heritage Sites

Since the study areas are situated in rolling open landscape or coastal plains away from the coast, the expectation is that the kind of archaeological material that will be encountered will consist of open scatters of Early and Middle Stone Age artefacts (with rarer concentrations of later material). This kind of archaeology occurs ubiquitously throughout Southern Africa.

### *6.5.1. Nature and Extent of Impacts*

The site of the power station site has been largely disturbed through the construction of the existing Gourikwa Power Station. Therefore, no impacts on heritage sites are expected to be associated with the proposed conversion project.

It is anticipated that the laying of the water pipeline may cause limited impacts to buried and surface archaeological material (mainly dispersed scatters of Middle Stone Age (MSA) and early Stone Age (ESA) material) which is known to occur on the coastal plain. Most of the area that is proposed to be disturbed has already been subject to extensive earthmoving operations when the PetroSA (Mossgass) plant was built in the 1970s. This will have rendered the heritage value and archaeology of the study area valueless. Therefore, no significant impacts on heritage resources are anticipated as a result of the construction of the water pipeline.

The proposed access road will pass through an area that is known to contain ESA and MSA material. However, it is not expected that this material will occur in a density or context that will necessitate changes to the proposed route, or result in any other significant impacts.

### *6.5.3. Conclusions and Recommendations*

No risks in heritage terms have been identified with respect to the proposed conversion as this involves modifications to an existing structure which does not trigger a need for a heritage assessment. As no impacts are expected as a result of the proposed power station conversion or water pipeline, no further studies are considered to be necessary to be undertaken. A field survey will be required to be undertaken as part of the EIA in order to assess impacts of the proposed access road on heritage resources.

## 6.6. Potential Impacts on the Social Environment

The Gourikwa Power Station site is located in a predominantly rural area, with the dominant land use being agriculture. The site is located approximately 15 km

west of Mossel Bay adjacent to the PetroSA plant, within the Mossel Bay Municipality of the Eden District in the Western Cape Province. The neighbourhoods of KwaNonqaba and Jo Slovo as well as Dana Bay are situated within a 5 km radius of the development site. Properties utilised for farming are in the immediate vicinity of the facility.

### *6.6.1. Nature and Extent of Impacts*

Potential impacts on the social environment as a result of the proposed power station conversion project are expected to occur as a result of both the construction and operational phases. Social impacts for the conversion can therefore be expected to be similar to those that were identified for the initial OCGT Development, which was assessed in 2005, as well as the expansion of the OCGT plant, which was assessed in 2007 (Ninham Shand, 2005; 2007).

» *Potential Impacts during the Construction Phase:*

***Temporary local employment opportunities***

Construction activities could create a number of temporary employment opportunities, resulting in a positive economic impact. The proposed conversion project would result in on-going construction opportunities following the completion of the current construction of additional OCGT units at the Gourikwa site.

Employment can be regarded as an important requirement for ensuring an improvement of livelihoods in the area. For this impact to truly be of benefit to the local population, emphasis must be placed on employment of local people as far as possible. Employment conditions on the site should also be considered to maximise potential positive impacts.

Potential impacts are expected to be of low to medium significance at the local level. The magnitude of this impact will depend on the number of construction workers to be employed, either by Eskom itself or by contractors.

Although the impact on employment will be temporary, due to high levels of poverty and unemployment, any impact on job creation in the area will have some positive impact and therefore be of some positive significance. This impact can be optimised by focusing on local employment creation where possible, and addressing current labour concerns. This will be assessed in more detail in the detailed SIA to be undertaken in the EIA phase of the process.

***Businesses Opportunities***

Representatives of local business organisations who have been engaging in consultation with Eskom have stressed the importance of emphasising local

BEE procurement and ensuring local businesses are granted fair opportunities to tender for contracts. Potential positive impacts are expected to be of low to medium, depending on the number of local business opportunities that may be created. This will be investigated in more detail in the detailed SIA to be undertaken in the EIA phase of the process.

***Housing of temporary workers***

The housing of workers brought from other areas presented problems during previous phases of the OCGT development. The levels of vulnerability of local communities in the area are perceived to increase significantly if a further influx of workers or work seekers occurs into their areas for the following reasons:

* Limited land availability in existing townships for new residents.
* Infrastructural concerns including possible problems with waste and sewerage disposal by informal squatters.
* Perceptions that the presence of construction workers from elsewhere could aggravate existing social problems (such as alcohol and drug abuse, unwanted pregnancies, etc.).
* Increased burden on the local economy as a result of an influx of workers into the area.
* The belief that an influx of outsiders to the area may result in greater security concerns for neighbouring landowners and residents.

This potential impact is expected to be of low to medium significance at a local level, depending on the extent to which labourers are brought from other areas, and where such workers are housed.

***Influx of job seekers***

In addition to a possible influx of labourers, large developments are also known to attract numbers of hopeful job-seekers to an area in search of possible employment. This would be a cumulative impact to similar trends that have been noted in the area as a result of its rapid industrial development. The rapid growth of African and Coloured settlements, and particularly expansion of informal squatter settlements on the edges of these areas as a result of such influx, is amongst the often overlooked impacts of developments on surrounding low-income communities. Such in-migration that can be expected to result from the proposed conversion project, as expectations of possible employment rise in surrounding areas, can have several negative implications on the local population, including:

* Increased pressure on low-cost housing provision.
* Competition for jobs as outsiders often provide cheap labour.

* An increase in the unemployed population becomes an economic burden for existing communities.
* Crime levels rise if population density and unemployment levels rise. The potential for crime can be exacerbated by the increased perception of inequality between the very wealthy and very poor.
* The influx of foreigners has many negative repercussions for the social integrity of local communities. It can lead to community disintegration, and other social problems at the community and/or family levels.

This potential impact is expected to be of low significance at a local level. The extent to which Eskom's activities, the proposed conversion process in particular, add to the perception of Mossel Bay as a source of potential employment can be considered minimal.

***Social conflict***

The social environment in which the power station conversion is proposed is characterised by high levels of poverty and unemployment, and stark inequalities between different population groups. This creates an atmosphere in which scarce resources and potential opportunities (particularly related to employment and other types of benefits that may be associated with a development of the scale proposed) become the object of fierce competition within local communities. The lack of efficient institutional leadership structures in the area has led to the emergence of various locally-based groups and organisations claiming to represent community interests. In the atmosphere of competition for scarce resources and fears of some benefiting over others, claims of legitimacy and representivity of such organisations are frequently disputed.

The legacy of past discrimination, much of which is perceived to continue, can still be felt acutely in local communities neighbouring the development site, with high levels of distrust between different population groups. Still persisting socio-economic disparities continue to deepen the divide between the White population and local African and Coloured communities, while competition and fears of scarcity amplifies conflict between the African and Coloured population groups, both perceiving the other to be 'relatively better off' in terms of access to opportunities.

Many years of effective exclusion from economic benefits has led to high levels of resentment amongst local communities. Experiences with large employers in the area (PetroSA is often mentioned as a point of reference) have reinforced such a sense of exclusion, particularly emphasised by the repeated experience of seeing outside labour brought in for work on large contracts while the majority of the local population are in desperate need of employment.

Potential impacts are expected to be of low to high significance at a local level.

***Increase in traffic as a result of construction traffic***

A traffic assessment conducted for the OCGT power plant noted that during the construction of the plant, heavy duty and abnormal vehicles will transport equipment to the site. A similar situation is expected for the conversion project. This is a short-term situation and will not substantially impact on the national road or traffic flows. However, it will be necessary to have the necessary traffic accommodation arrangements in place when the abnormal load vehicles are in transit.

» *Potential Impacts during the Operational Phase:*

***Provision of electricity: Local/regional/national linkages and macro-economy***

The purpose of the Gourikwa Conversion project is to improve Eskom's capacity to provide for South Africa's increasing demands for electricity in the medium-term (i.e. until 2014). The most significant and far reaching social impact during the operational phase of the project will hence be the provision of electricity for the South African population.

Electricity supply makes an important contribution towards economic growth, and hence to employment creation and poverty alleviation on a national level. If peak demand exceeds supply, the reliability and quality of electricity services will be negatively impacted. Unreliable electricity supply is likely to have significant negative economic (and hence social) consequences, as has been evidenced particularly in the Western Cape in 2006. These impacts derive from the fact that several economic sectors - manufacturing industries, in particular - are dependent on the electricity sector for their operation and survival. Electricity generation and provision therefore constitute an enabling industry without which few other industries would be able to flourish.

Therefore, the impact associated with the proposed project is expected to be one of high positive significance at a national level.

***Ongoing employment opportunities for locals***

Given the skilled nature of the employment opportunities associated with the operation phase, it is unlikely that employment opportunities will benefit members of local communities. It is unlikely that the operation of the CCGT power station units will employ more people than is currently the case at the existing power station, and an impact of low positive to no significance is predicted. The extent to which local procurement has taken place to date will

however be investigated as part of the detailed SIA to be undertaken in the EIA phase.

***Social Investment***

Eskom Development Foundation is a Section 21 company and a wholly-owned subsidiary of Eskom Holdings Ltd. The Development Foundation is responsible for: initiating and evaluating Eskom's corporate social investment (CSI) related projects; coordinating and integrating Eskom's CSI activities; and developing grants and donations in South Africa.

The role of the Development Foundation is to enhance the socio-economic fabric of society by supporting social and economic projects that primarily focus on capacity building, job creation and poverty alleviation through grants and donations in an integrated, efficient and effective way. The Foundation focuses on communities where Eskom implements its capital expansion programme and communities it operates in.

The following social developments initiatives are currently in the pipeline for neighbouring communities surrounding the Gourikwa power station. These will be discussed in the detailed SIA as part of the EIA process (Ramanotsi, 2008).

| Proposed Project | Scope of work / Deliverables |
|---|---|
| Information Communication Technology (ICT) for Education | Providing Computers and ICT network connectivity and wireless infrastructure to facilitate advance teaching and learning |
| CEF Creating Effective Families, D' Almieda | Equipment, Appliances, Training & Paving |
| Siphucule Pre- Primary School Kwa-Nonqaba | Infrastructure upgrade (paving & varandah),domestic appliances, furniture, equipment , toys and food garden |
| Imekhaya Primary School Kwa-Nonqaba | Infrastructure upgrade (sports field), food garden, sewing output |
| Isalathiso Secondary School Kwa Nonqaba | Equipment and appliances for a soup kitchen |

An impact of low to high positive significance can be expected, depending on the type and extent of Social Investment implemented by Eskom. The significance of this positive impact can be maximised through appropriate targeting of Social Investment. This will be discussed further in the detailed SIA to be undertaken in the EIA phase of the process.

***Impacts on Sense of Place*[8]**

As the proposed Gourikwa Power Station conversion would take place on the existing Gourikwa Power Station site, located adjacent to the PetroSA site, impact on sense of place can be expected to be limited. It should, however, be noted that the tallest of the new components (i.e. the stacks) will be 60 m tall, whereas the existing tallest structures (exhaust stacks) are 30 m tall. Eskom are also planning additional fuel storage on the site. This may have an impact as a result of cumulative visual impacts (to be assessed as part of a separate specialist study).

Impacts on residents of neighbouring farms primarily relate to noise and visual impacts. Noise impacts were noted as of medium to 'very high' significance in the assessment for the OCGT expansion in 2007. Neighbouring residents mention noise as the most significant impact associated with the operation of the existing power station. Potential visual and noise impacts that may be associated with the construction phase of the conversion project will be addressed in separate specialist assessments. As these issues relate closely to people's perceptions of the project, key findings of the Visual Assessment and Noise Assessment will be noted in the detailed SIA to be undertaken in the EIA phase of the process.

Concerns have been raised by the Dana Bay residents regarding the development of the area as a power generating hub by Eskom. Concerns particularly relate to the location of the power station alongide the N2 coming into Mossel Bay from Cape Town, which is considered as an important tourist route. The main concern noted is the potential impact of such an industrial power zone on tourism, which is an important driver of the Mossel Bay economy.

The potential impact on tourism was raised in the Urban Econ economic assessment for the original OCGT site in 2005 which evaluated the various tourism clusters which currently exist in the Mossel Bay area and established that the proposed site would not affect the existing tourism route as the nearest tourism attraction is located approximately 15 km away from the proposed site. In addition, it was emphasised that the proposed site is located near the existing PetroSA GTL Plant. "As a result of this plant, which was established a number of years ago and which is very visible in the landscape as an industrial activity; tourism activities have tended not to locate near to this site… There are a total of 5 attractions within a 15 km

[8] The term sense of place has been defined and utilised in different ways by different people. To some, it is a characteristic some geographic places have and some do not, while to others it is a feeling or perception held by people (not by the place itself). It is often used in relation to those characteristics that make a place special or unique, as well as to those that foster a sense of authentic human attachment and belonging.

radius but they will not be impacted directly. Therefore the proposed OCGT power plant will not be in any way a negative contributor towards current tourism activities in the Mossel Bay area." (Urban Econ, 2005).

Potential impact are expected to be of low to medium significance. These impacts will be assessed in detail within the SIA, based on findings from visual, noise, air quality and (previous) traffic assessments.

***Impacts on Health and Safety***

Potential impacts on health and safety could result from:

* Storage of additional fuel on-site
* Impacts on air quality during operation

The risk assessment conducted for the expansion of the OCGT site (Ninham Shand, 2007) indicated risks associated with storage of both diesel and propane to be confined to the immediate site area. Social impacts of such risks can therefore be considered minimal. An additional risk assessment for the additional fuel storage proposed on the site should be undertaken in order to confirm that this is the case with this new scenario.

Impacts on air quality were cited as minimal during the assessment undertaken for the OCGT expansion (Ninham Shand, 2007). A detailed air quality impact assessment must be undertaken in order to confirm that this will remain the case with the proposed conversion project (refer to Section 6.1).

### *6.6.3. Conclusions and Recommendations*

In order to assess the potential impacts on the social environment associated with the construction and operation of the proposed power station conversion project (and verify the expected significance thereof), a detailed Social Impact Assessment (SIA) must be undertaken within the EIA phase of the project.

## 6.7. Impacts associated with the 'Do-nothing' Alternative

The 'do-nothing' alternative is the option of not converting the existing Open Cycle Gas Turbine units at Gourikwa Power Station to Combined Cycle Gas Turbine units.

The electricity demand in South Africa is placing increasing pressure on Eskom's existing power generation capacity. Using the strategic electricity planning in place (refer to Chapter 2) and taking into account the continued growth in electricity demand, Eskom has determined that there is a need for additional

power generation capacity in the medium-term. In considering the most suitable options to meet the increased electricity demand in the mid-term (i.e. by 2011), Eskom has concluded that the most feasible option is the conversion of the existing Gourikwa OCGT units to CCGT units, thereby generating additional capacity for the same amount of fuel (under a similar operating regime). The CCGT units can be operated for longer periods than the OCGT units, and can therefore be successfully utilised as mid-merit capacity, with the OCGT units still being available for use during peaking periods.

The do-nothing option will result in electricity demands in the medium-term not being met. This has serious short- to medium-term implications for economic growth on a provincial and a national level.

**Therefore, this option is rejected as a feasible alternative and is not considered further in the EIA.**

# SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED TRANSMISSION POWER LINE CHAPTER 7

Three technically feasible alternative transmission power line alignment corridors (approximately 500 m in width) have been identified for investigation within the EIA process (refer to Figure 7.1). This chapter serves to comparatively evaluate the identified potential environmental (socio-economic and biophysical) impacts associated with the proposed power line alternatives in order to nominate one preferred alternative power line corridor for further investigation within the EIA phase. Recommendations are made regarding further studies required within the EIA phase of the process. Where possible, recommendations for the management of these impacts have been made.

The cumulative impacts associated with the proposed transmission power line are expected to be largely associated with visual impacts of the infrastructure on the surrounding environment. Cumulative effects can only be assessed once a preferred alternative has been nominated, and will be considered in the detailed specialist studies to be undertaken in the EIA phase.

## 7.1. Potential Impacts on Vegetation

The study area is located within a bioregion known as the Riversdale Plain, which lies within the Fynbos biome and the Cape Floristic Region (CFR). The South African vegetation map describes the PetroSA area as Albertinia Sand Fynbos. The vegetation in the Proteus area is indicated as being Swellendam Silcrete Fynbos, and much of the intervening area is Mossel Bay Shale Renosterveld.

Approximately 70% of the land crossed by Alternative 1 is agricultural land, with the remaining 30% being natural vegetation. In terms of Alternatives 2 and 3, this ratio is about 60% agricultural and 40% natural vegetation. However, the total distance of natural vegetation crossed is similar (within 15%) for all three alternatives. No natural vegetation of any consequence remains within the cultivated areas.

Very little Albertinia Sand Fynbos remains along any of the routes, and the bulk of the remaining natural vegetation is Swellendam Silcrete Fynbos and Mossel Bay Shale Renosterveld. There is significant overlap of species between these two vegetation types and they are also structurally rather similar, with Thicket elements occurring in fire protected and well watered areas. Remaining vegetation is generally in good condition with relatively few invasive alien species, although there are scattered *Acacia mearnsii* (black wattle) and *Acacia saligna* (Port Jackson).

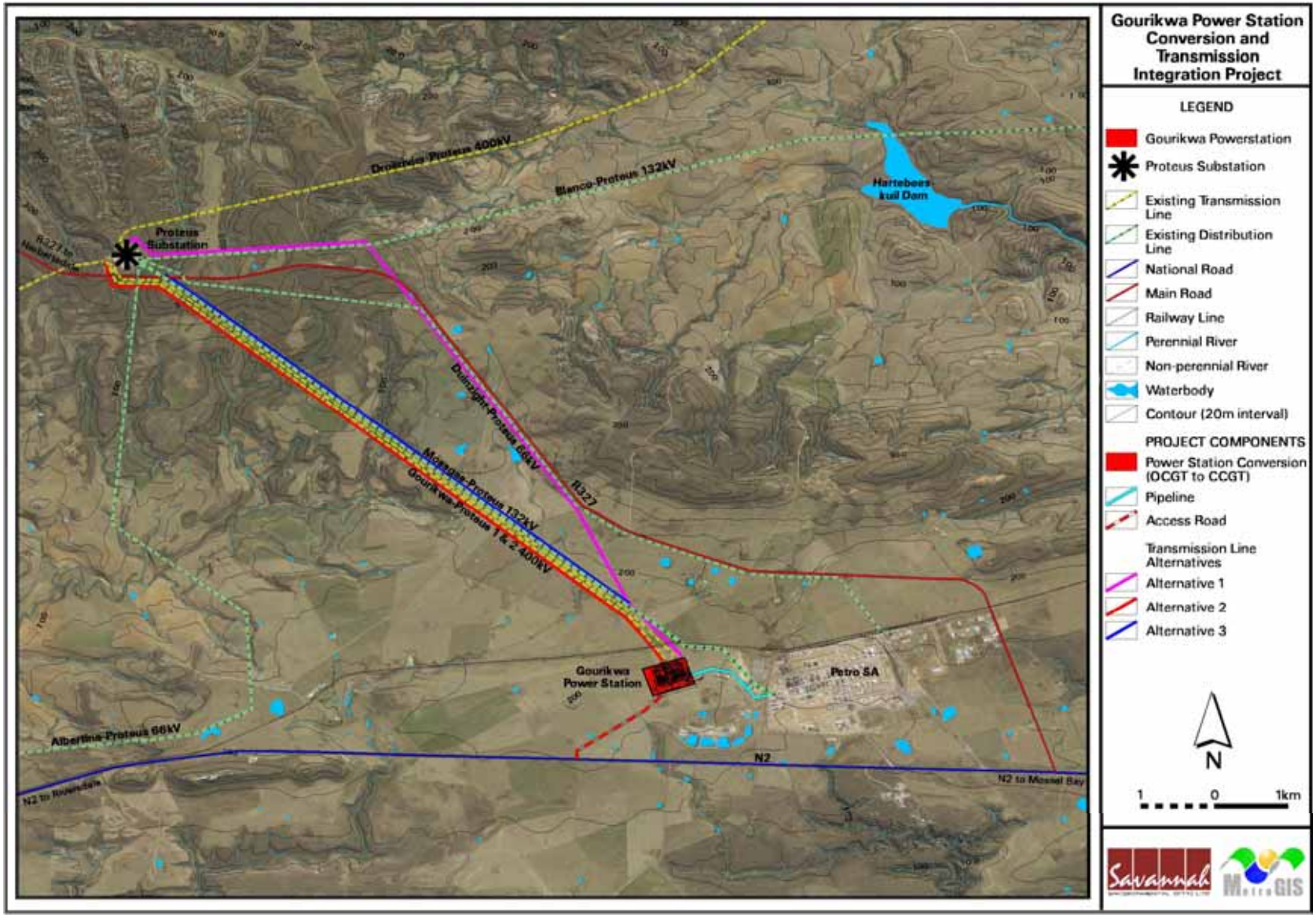



**Figure 7.1:** Locality map showing the feasible alternative transmission power line corridor alternatives between Gourikwa and Proteus Substation identified for investigation within the EIA process

The protected species Sideroxylon inerme (milkwood) was recorded as being present in the thicket elements of this vegetation.

Mossel Bay Shale Renosterveld is characterised by a high bulb diversity. The bulb *Bobartia robusta* (blombiesie) is very common in many natural areas along the proposed power line routes and was previously Red Data Book listed as Rare (Hilton-Taylor 1996), but has been downgraded to Least Threatened as the species no longer meets IUCN requirements for Red listing (Raimondo et al – in prep.). The species is however a regional endemic, and is found only in the area from Albertinia to Mossel Bay.

*Protea lanceolata* (lance leaf sugarbush) has recently been Red Data listed as 'Near Theatened'; Raimondo et al – In prep.), and is uncommon in the vicinity of Proteus, on the silcrete hills.

There is a low to moderate likelihood of certain very rare cryptic dwarf succulents such as *Euphorbia bayeri* (local endemic), various *Haworthia* species, and various bulbs occurring in the study area. There is also a small likelihood that the very rare *Satyrium muticum* (Endangered) could occur (the species is known from about 400m east of Proteus substation; B. Liltved - pers. comm.). Most of these would be likely to occur in rocky areas.

### *7.1.1. Nature and Extent of Impacts*

Direct impacts occur primarily at the construction stage, and the nature of the impact is direct loss of vegetation within the development footprint. Indirect impacts occur mostly during the operational phase (post-construction), and in this case the nature would vary from the introduction of alien vegetation and alien animal species (such as Argentine ants), to partial disruption of ecological processes due to the effects of the alien species, to partial disruption of ecological processes due to fragmentation of habitat.

Direct impacts during the construction phase of the transmission line are essentially only in the tower footprints (usually less than 20 $m^2$), where vegetation loss would be permanent. Natural vegetation exists in only 30% – 40% of the linear extent of the alternative transmission line routes. The total extent of permanent vegetation loss on such tower footprints for any one of the three lines is likely to be less than 1 ha. Temporary vegetation loss may occur in the areas surrounding the towers, in the laydown areas, and in the access roads needed for stringing, laydown, and tower erection.

Potential indirect impacts which may be associated with the proposed project include introduction of alien species, to partial disruption of ecological processes due to the effects of the alien species, to partial disruption of ecological processes

due to fragmentation of habitats. Impacts are expected to be of low to negligible significance with the implementation of appropriate mitigation measures.

Extensive Eskom infrastructure development is taking place in the region, and on-going development inevitably has a cumulative negative impact on remaining natural vegetation. In this particular instance the cumulative impacts are likely to be of low negative significance, as most of the development is taking place in previously cultivated areas, and footprints and permanent vegetation losses are very small within the vegetated areas (<1 ha in total).

#### *7.1.2. Comparison of Transmission Power Line Alternatives*

All three alternative transmission line routes run parallel to and adjacent to existing disturbance. Alternative 1 runs across farmland until it joins the R321 to Herbertsdale, runs along the road, and then crosses the road and joins the existing 132kV line to Blanco from Proteus. Alternatives 2 and 3 run next to and parallel to the new transmission line from Gourikwa direct to Proteus Substation.

Given that all new routes cross similar extents of natural vegetation and run parallel and mostly adjacent to existing disturbances there is **no clearly preferred alternative** (amongst Alternatives 1, 2 and 30) from a botanical perspective. Overall botanical impacts associated with construction and operation of such a line are likely to be of low significance.

#### *7.1.3. Conclusions and Recommendations*

There is no clearly preferred transmission line route. Whichever alignment is selected botanical impact should be of low negative significance after mitigation. A field survey of the nominated preferred alternative power line route should be undertaken as part of a detailed EIA assessment, and standard impact assessment methodology employed to assess the potential impacts. The Impact Assessment should clearly outline practical mitigation that can be implemented to reduce any identified botanical impacts of significance.

### 7.2. Potential Impacts on Avifauna

The Southern African Bird Atlas Project (Harrison *et al*, 1997) recorded a total of 157 bird species in the quarter degree square within which the study area falls, i.e. 3421BB. This included seven Red Data species, four 'vulnerable' and three 'near-threatened' (Barnes, 2000). In addition, the White Stork (Protected internationally under the Bonn Convention on Migratory Species) is considered as a threatened species for the purpose of this study. This is a relatively low diversity of bird species, and consequently Red Data species, meaning that in terms of avifauna, this study area is not particularly unique.

### *7.2.1. Nature and Extent of Impacts*

Due to their size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Typically, a development of this type could be expected to impact on the birds of the area through: collision of birds with earth wires and conductors; electrocution of birds on towers; destruction of bird habitat; disturbance of birds; and birds causing electrical faulting on the power line.

» **Electrocution** refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. This impact is practically impossible on the proposed power line due to the large clearances, and is therefore not considered further.

» **Collision** refers to the scenario where a bird collides with the conductors or earth wires of overhead power lines. The groups of birds most severely impacted by collision with overhead lines are bustards, storks and cranes. These species are generally large, heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines. An unknown number of smaller, fast-flying species – especially pursuit hunting raptors such as falcons - are also prone to colliding with power lines. Unfortunately, many collision-sensitive species are considered threatened in southern Africa, and many are long-lived, slow reproducing species poorly adapted to coping with high rates of adult mortality, inflated by power line casualties.

  Several of the Red Data species recorded in the study area are known to be extremely vulnerable to impacts of power lines, through collision. The Blue Crane, Secretarybird, Denham's Bustard and White Stork are all extremely vulnerable to collision, and several birds of these species have been reported colliding with the existing power lines in the study area previously. This impact is anticipated to be of high significance. The existing lines in the area have killed numerous birds, particularly Blue Cranes and White Storks.

» During the construction phase and maintenance of power lines some **habitat destruction and alteration** inevitably takes place. This happens with the construction of access roads and the clearing of servitudes. Taller vegetation (>4 m in height) within power line servitudes has to be trimmed at regular intervals in order to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors, and to minimise the risk of fire under the line which can result in electrical

flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity to the servitude through modification of habitat. Similarly, these activities impact on birds through disturbance, particularly during the bird's breeding activities.

This impact is anticipated to be of very low significance in the south of the study area, which is mostly transformed, and no longer natural habitat. In the north of the study area, natural fynbos exists which elevates the significance of habitat destruction slightly. However the area does not appear pristine and already has several existing power lines, which are mitigating factors for this impact.

### *7.2.2. Comparison of Transmission Power Line Alternatives*

Two of the three alternatives involve construction of the new transmission power line in the same corridor as the existing four power lines (two 400kV and two 132kV lines). **Alternative 3** is the most preferred alternative, for the following reasons:

» Placing the new line adjacent to existing power lines (two 132kV and two 400kV power lines) is desirable from an avifaunal perspective as it:
  * reduces the amount of habitat destruction during construction and maintenance since there are existing roads;
  * reduces the amount of disturbance in the landscape as the existing lines are already a disturbance;
  * partially mitigates for the impact of collision, since the more lines are placed together the more visible the overhead cables become, and risks are kept together rather than spread out across the landscape.
» Placing a 400kV line on the outside of this consolidated corridor, would also be advantageous from a bird collision perspective as it would 'shield' the lower inner 132kV lines (the existing 132kV lines have recorded numerous collisions of Blue Cranes and other species – EWT Database).

Alternative 1 is the least preferred corridor from an avifaunal perspective for the following reasons:

» For most of its route it will be the only line of this size in the vicinity, this introduces new threats into the vicinity.
» It appears to pass more farm dams (3 medium size dams compared to one small one on the other three corridors). Dams will attract various bird species associated with water, many of which are vulnerable to collision with overhead cables.

### *7.2.3. Conclusions and Recommendations*

Potential impact on avifauna as a result of collisions within the overhead power line is anticipated to be of high significance as the existing lines (particularly the existing 132kV lines) have killed numerous birds (through collisions), particularly Blue Cranes and White Storks. The selection of Alternative 2 or 3 would partially mitigate for this impact. **Alternative 3** is nominated as the preferred option, with Alternative 1 being the least preferred. It will be necessary to mark approximately half of the transmission power line with a suitable anti-collision marking device in order to further mitigate the potential for impacts (especially collisions).

## 7.3. Potential Impacts on Heritage Sites

Since the study areas are situated in rolling open landscape or coastal plains away from the coast, the expectation is that the kind of archaeological material that will be encountered will consist of open scatters of Early and Middle Stone Age artefacts (with rarer concentrations of later material). This kind of archaeology occurs ubiquitously throughout Southern Africa.

### *7.3.1. Nature and Extent of Impacts*

Heritage sites can be negatively affected through disturbance of the land surface, destruction of significant structures and places as well as any action that will alter the feel and appearance of an historic place or building. Impacts can therefore be direct (through disturbance or destruction of sites) or indirect (as a result of visual impacts on the area or site).

### *7.3.2. Comparison of Transmission Power Line Alternatives*

Alternative 1 runs very close to the R327, which is a scenic route. While significant impacts to generally protected heritage are not expected, it has been recommended in previous studies that this alternative not be utilised due to the negative changes to the aesthetics of the R327 route.

Alternatives 2 and 3 essentially follow a similar corridor on either side of the existing Gourikwa-Proteus and Mossgass-Proteus servitudes. The general corridor that these alternatives utilise has been previously inspected and was considered suitable for the proposed activity (Hart 2006). In terms of limiting impacts to the visual qualities of the general area and confining surface displacement of archaeological material, transmission line **Alternatives 2 or 3 are generally supported over Alternative 1**.

### *7.3.3. Conclusions and Recommendations*

None of the transmission line options can be considered to be a fatal flaw in heritage terms. However **Alternatives 2 or 3 are generally supported over Alternative 1**.

A detailed heritage impact assessment of the nominated preferred alternative must be undertaken within the EIA phase in order to verify the presence of heritage sites in the area, assess potential impacts on identified sites and recommend appropriate mitigation measures to be implemented.

## 7.4. Potential Visual Impacts

Apart from its location close to the N2 National Road, the Gourikwa Power Station site is considered to be relatively remote and far removed from major centres and tourist attractions. It is located next to the N2 between Mossel Bay and Riversdale, approximately 1 km west of the PetroSA plant.

### *7.4.1. Nature and Extent of Impacts*

The visibility of the transmission power line from the surrounding areas is considered to be the major impact associated with a development of this nature. An initial viewshed analysis within the study area from each of the transmission power line alternatives is shown in Figures 7.2 to 7.4. The visibility of the transmission power line towers where calculated at a maximum offset of 50 m above ground level.

### *7.4.2. Comparison of Transmission Power Line Alternatives*

It is clear from the initial viewshed analyses that there is only a slight difference in the theoretical visibility between Alternatives 2 and 3. This is due to the two alignments running parallel to each other. Alternative 1 has a considerably larger area of visual exposure as it crosses over the ridge on which the Proteus substation is located and is exposed to areas both south and north of the ridge. In addition, Alternative 1 runs very close to the R327, which is a scenic route.

A set of criteria was used to allow for the comparison between the three transmission line alternatives in order to select the preferred alternative.

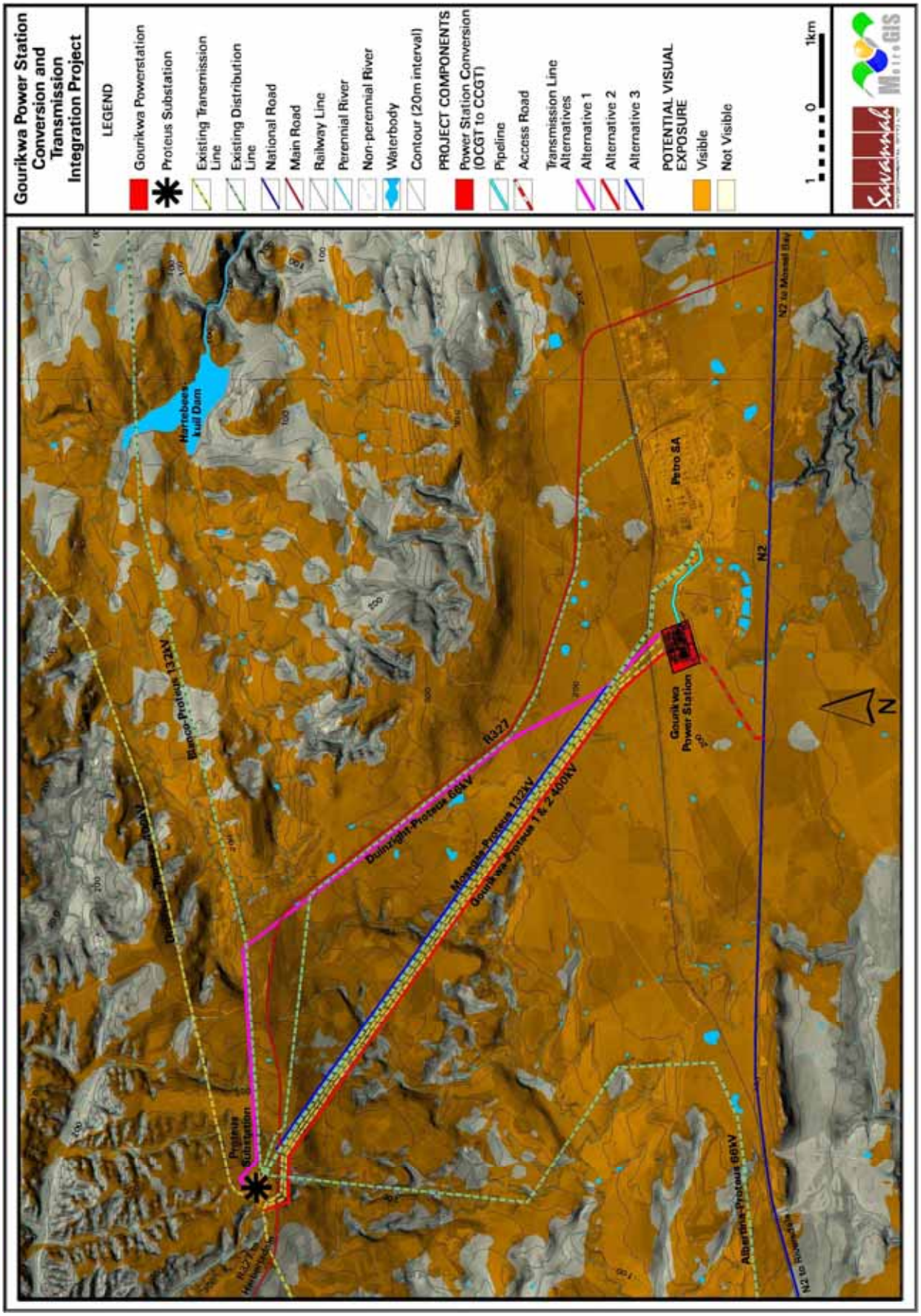



**Figure 7.2:** Potential visual exposure of transmission power line Alternative 1

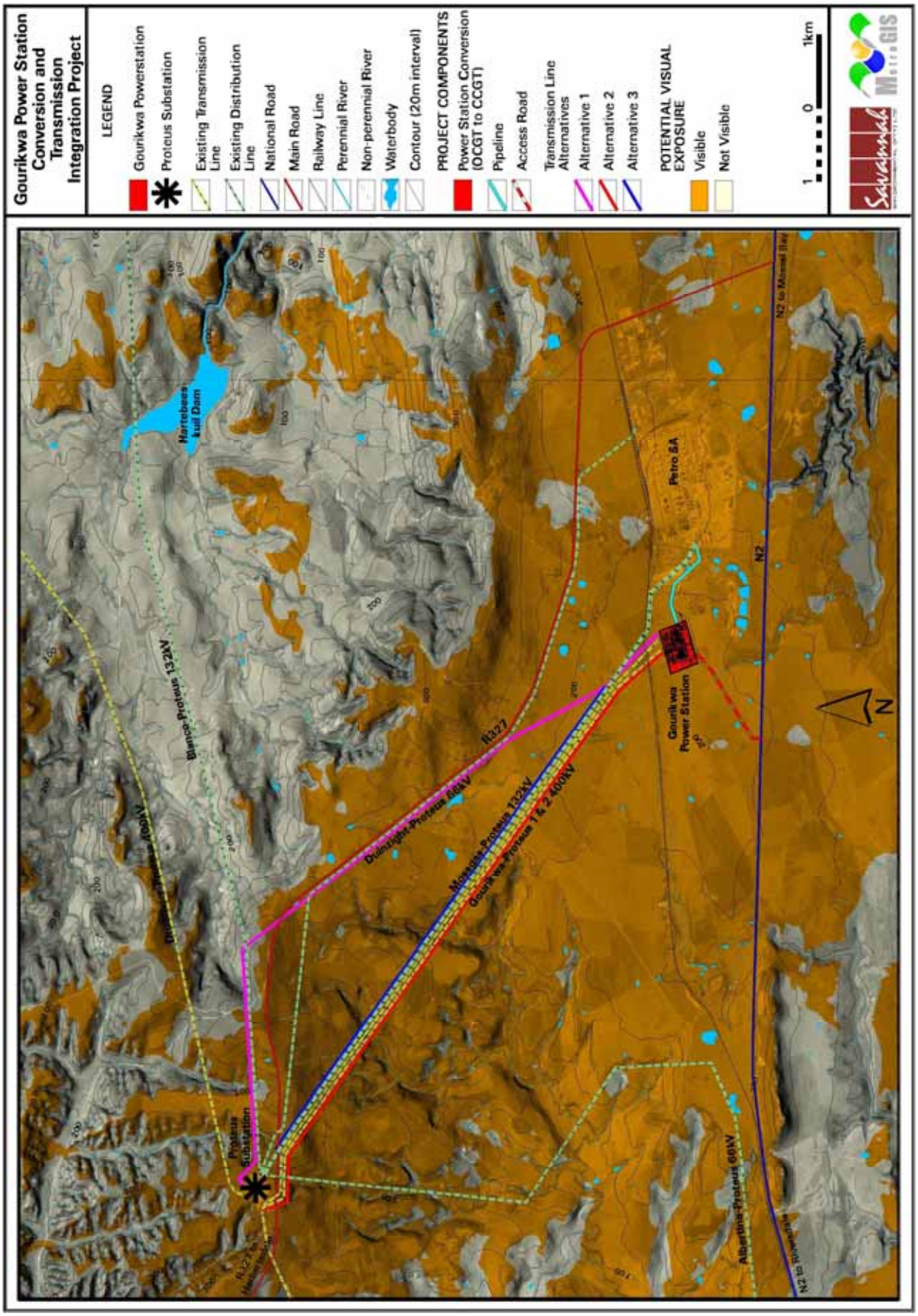



**Figure 7.3:** Potential visual exposure of transmission power line Alternative 2

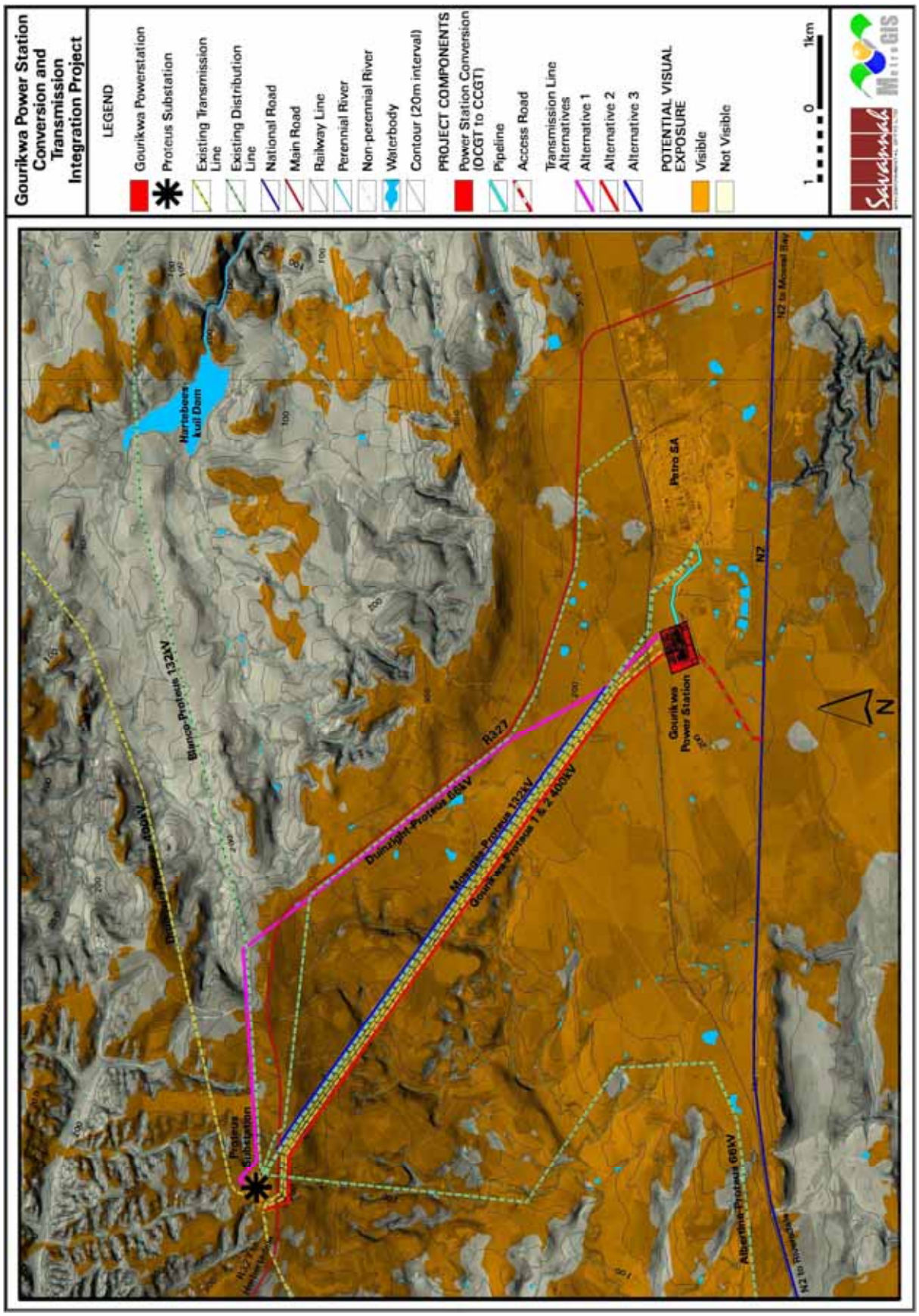



**Figure 7.4:** Potential visual exposure of transmission power line Alternative 3

The criteria used for the comparison includes:

» The length of the alignment
» The potential area of visual exposure within the study area
» The proximity and exposure to major roads (based on the distance the alignment traverses adjacent to major roads)
» The crossing of the transmission line over major elevated topographical units
» The potential consolidation of existing linear infrastructure (based on the distance the development corridor could be placed adjacent to (or even replace) existing power line infrastructure)

Table 7.1 provides a comparison of the identified alternatives in terms of the above criteria. Positive values were awarded for opportunities and negatives where constraints were identified.

**Table 7.1:** Comparative table of the proposed transmission power line alternatives

| Alter-native | Length (Total) | Visible area | Proximity to major roads | Major ridge crossings | Consolidation of existing infrastructure | Total value |
|---|---|---|---|---|---|---|
| **1** | 11.4km **(-1)** | 152km$^2$ **(-1)** | 4500m **(-1)** | 1 crossing **(-1)** | Average potential (6.8km along Dx lines) **(+1)** | **(-3)** Not pre-ferred |
| **2** | 10.2km **(0)** | 124km$^2$ **(+1)** | <50m **(+1)** | None **(0)** | High potential (10.2km along Tx/Dx lines) **(+2)** | **(+4)** Pre-ferred |
| **3** | 10km **(+1)** | 126km$^2$ **(0)** | 750m **(0)** | None **(0)** | High potential (10km along Tx/Dx lines) **(+2)** | **(+3)** Pre-ferred |

The preferred alternatives, based on the above criteria are **Alternatives 2 and 3**. These two alternative have very little to distinguish them from each other, but they are preferred over Alternative 1. They have smaller areas of potential visual exposure; they are relatively far removed from major roads and have the best ability to consolidate the linear infrastructure (existing vertically disturbed landscapes) within this region. This is due to the alignments running parallel to the existing transmission and distribution lines.

Alternative 1 is not preferred as a potential alignment for the Gourikwa to Proteus transmission line due to its close proximity to the R327 main road (a sensitive visual receptor) and its relatively large area of visual exposure. The visual

impacts envisaged for Alternative 1 would far exceed the potential visual impacts associated with Alternative 2 or 3.

**Figure 7.5:** View of existing transmission and distribution lines between the Gourikwa Power Station and the Proteus Substation

### *7.4.3. Conclusions and Recommendations*

**Alternative 2 and 3** are preferred over Alternative 1 from a visual perspective. The nominated preferred transmission line alternative should be assessed in order to determine its potential visual impacts. The cumulative visual impact of the construction of another transmission line adjacent to the existing transmission/distribution lines (especially at the Proteus Substation) should also be addressed in the visual impact assessment report.

## 7.5. Potential Impacts on the Social Environment

The study area is located in a predominantly rural area, with the dominant land use being agriculture. The study area is located approximately 15 km west of Mossel Bay adjacent to the PetroSA plant, within the Mossel Bay Municipality of the Eden District. The KwaNonqaba, Joe Slovo and Dana Bay communities are the closest situated to the study area. Farms surrounding the Gourikwa site to the north and west include:

| Farm | Owners/ Residents | Orientation |
|---|---|---|
| B&H Boerdery | Bennie & Hennie Pienaar | Located close to the Gourikwa Power Station, south of Alt 2 |
| Patrysfontein | Ignatius Muller & Quintus Muller | Crossed by Alt 1, 2 & 3 |
| Bartelsfontein | Henry Muller | Crossed by Alt 1 |
| Harterus | Jacques & Annelie De Villiers (tenants residing on property) | East of Alt 1 |
| Arum Valley | Gilbert Muller | South west of Alt 2 |
| Kleinberg | Lucas Muller | South west of Alt 2 |

The residences of Ignatius Muller and Quintus Muller on the farm Patrysfontein are both situated within 1 km of the existing Gourikwa-Proteus 400kV servitude (Alternative 1 for proposed transmission line).

### *7.5.1. Nature and Extent of Impacts*

Impacts on the social environment as a result of the proposed transmission power line will be associated with both the construction and operational phases.

» *Potential Impacts during the Construction Phase:*

***Temporary local employment opportunities***

Construction of the transmission power line will create a number of temporary employment opportunities in construction. Sourcing of construction workers from the local labour pool is likely to be limited to unskilled and semi-skilled workers due to the highly technical nature of the work to be undertaken. This impact can be maximised through an emphasis on local employment creation, where possible.

Impacts are expected to be of low to medium significance, regardless of the alterative selected. The significance of this impact will depend on the number of construction workers to be employed, either by Eskom itself or by contractors. This potential impact will be assessed within the EIA Phase.

***Impact on current land-users***

Current land uses that may be impacted by construction (and subsequent operation of) the proposed transmission power line include sheep, cattle and ostrich farming and wheat cultivation on the farm Patrysfontein. Potential impacts on livestock farming relate to the possibility of construction workers leaving gates open, as well as impacts to crops and harvesting if construction is undertaken during these periods. Impacts are expected to be of low to moderate significance.

» *Potential Impacts during the Operational Phase:*

***Impact on current land-use***

The proposed transmission line Alternatives 2 and 3 could potentially impact on the safety of livestock[16]. In addition, possible stock losses could be associated with maintenance teams that leave gates open.

An impact of existing transmission lines which was noted on the Farm Patrysfontein is that wheat crops on can no longer be effectively aerially sprayed. An additional line along this route could magnify this impact by increasing the affected area that cannot be sprayed. It was suggested by the Patrysfontein landowner that if a new transmission power line is required to be constructed over the property, that Alternative 2 to the left of the existing transmission line would be supported as it would have a reduced effect on farming practices.

Alternative 1 could potentially impact on an airstrip on land sold to Van Der Walt and Van der Walt developers. The existing airstrip is used mainly for flights for crop spraying. Plans are to upgrade this facility. While the existing transmission lines do not pose a significant impact, there is a concern about possible additional developments, and this impact may require further investigation.

Potential impacts on land use during the operational phase are expected to be of low to medium significance, depending on the alternative selected.

***Impact on Sense of Place[17]***

The proposed transmission power line across rural countryside may be expected to have an impact on the currently rural character of the area, and therefore potentially affect surrounding residents' 'sense of place'.

Impacts on sense of place and on residents of neighbouring farms would relate primarily to visual impacts. Residents on the Farm Patrysfontein currently within 1 km of the existing transmission lines along the route followed by Alignments 2 and 3 (Ignatius Muller and Quintus Muller) also note the corona generated by the existing lines to be an impact, particularly in misty conditions and at night.

[16] Mr Ignatius Muller of Patrysfontein noted that he has lost a number of sheep as a result of the existing lines on their property.

[17] The term sense of place has been defined and utilised in different ways by different people. To some, it is a characteristic some geographic places have and some do not, while to others it is a feeling or perception held by people (not by the place itself). It is often used in relation to those characteristics that make a place special or unique, as well as to those that foster a sense of authentic human attachment and belonging.

Due to the presence of the existing transmission power lines in the area, the impacts on sense of place are expected to be of low significance. Alternative 1, however, runs parallel to the R327 for part of its length, which is considered as a scenic route, and would impact on the overall aesthetics for the users of this route.

### *7.5.2. Comparison of Transmission Power Line Alternatives*

Given that all three alternative alignments traverse private properties and mostly adjacent to existing disturbances there is **no clearly preferred alternative** (amongst Alternatives 1, 2 and 3) from a social perspective. Overall social impacts associated with construction and operation of a new transmission power line are likely to be of low to moderate significance, and dependant on the final alignment.

**Alternative 1** minimises impacts on residents on the Farm Patrysfontein. This alternative, however, follows the R327 for part of its length, which is considered as a scenic route. In addition, this alternative may impact on an airstrip development next to the R327, which may need to be considered as part of the EIA.

Alternatives 2 and 3 follow the existing transmission and distribution lines across private properties, including the farm Patrysfontein. This will add cumulative impacts for those residents on the farm which live within 1 km of the existing lines. Impacts currently experienced which can be expected to increase are visual impacts and corona effects. Cumulative land use impacts relate to impacts on arable land as well as safety of livestock. It was suggested by the Patrysfontein landowner that if a new transmission power line is required to be constructed over the property, that Alternative 2 to the left of the existing transmission line would be supported as it would have a reduced effect on farming practices.

### *7.5.3. Conclusions and Recommendations*

There is no distinctly preferred alternative from a social perspective, as all alternatives will result in some degree of impact on the social environment. Alternative 1 could impact significantly on a planned airfield development on the farm Bartelsfontein, which could be regarded as a fatal flaw. Alternatives 2 and 3 will have cumulative inconvenience as well as land use impacts for residents situated in close proximity to the existing line. Alternative 2 would be preferred over Alternative 3 as the latter would impact on a planned pivot irrigation point on the farm Patrysfontein. **Alternative 2** is supported by the local landowners due to the perceived reduced cumulative effect on farming practices.

In order to assess the potential impacts on the social environment associated with the construction and operation of the proposed transmission power line, a detailed Social Impact Assessment (SIA) must be undertaken within the EIA phase of the project.

## 7.6. Nomination of Preferred Transmission Power Line Alternative

From the specialist studies undertaken within the Scoping Phase, **Alternative 2 or Alternative 3** are nominated as the most preferred alternative/s in terms of all aspects considered, as these alternatives would result in impacts of least significance impacts on both the social and biophysical environments. The alternative alignments have a lower impact on the overall environment as a result of consolidation of infrastructure of a similar nature and the minimisation of impacts on current and planned land use. Therefore, both Alternative 2 and Alternative 3 are nominated **for further investigation in the EIA Phase**.

**Alternative 1** is nominated as the least preferred alternative, and therefore this alternative is **excluded as an alternative for further investigation**.

## 7.7. Impacts associated with the 'Do-nothing' Alternative

The transmission power line is intrinsically linked to the additional power proposed to be generated at the Gourikwa power Station. The power line is required to evacuate the additional power generated from the power station to the National grid.

The 'do-nothing' alternative is the option of not constructing the proposed 400kV transmission power line between the Gourikwa Power Station and the Proteus Substation to transmit the additional power generated at this power station into the national electricity grid.

The 'do nothing' alternative will therefore result in the additional power generated from the CCGT units not having a means to be transmitted into the transmission network (and thereby rendering the power generated by the power station not available for use).

**The 'do nothing' alternative is therefore not considered to be a feasible alternative, and will not be considered further within the EIA phase.**

# CONCLUSIONS AND RECOMMENDATIONS CHAPTER 8

Eskom Holdings Limited (Eskom) is investigating the conversion of the five units at the existing Open Cycle Gas Turbine (OCGT) plant at the Gourikwa Power Station (located near Mossel Bay) to a Combined Cycle Gas Turbine (CCGT) plant in order to increase the generating capacity of this existing power station by approximately 400 MW. The proposed conversion involves the addition of CCGT units to the existing OCGT plant, and all components associated with the proposed conversion will be established on the same site as the existing Gourikwa Power Station. Infrastructure associated with the proposed power station conversion includes the construction of a water pipeline between PetroSA and the power station site (a distance of approximately 1,3 km), as well as the construction of a direct access road off the N2 national road (a distance of approximately 1,6 km in length). The proposed pipeline and access road fall outside of the existing power station boundaries.

Eskom is also proposing the construction of a 400kV transmission power line between the Gourikwa Power Station and the Proteus Substation (approximately 11 km to the north-west) to transmit the additional power generated at this power station into the national electricity grid.

The Scoping Study has been undertaken in accordance with the EIA Regulations published in Government Notice 28753 of 21 April 2006, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998). This Scoping Report aimed at detailing the nature and extent of the proposed Gourikwa Power Station conversion and integration project, identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project activities involving the project proponent, specialist consultants, and a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs). In accordance with the requirements of the EIA Regulations, feasible project-specific alternatives (including the “do nothing” option) have been considered and preferred alternatives nominated for consideration within the EIA process.

The conclusions and recommendations of this Scoping Report are the result of on-site inspections and desk-top evaluations of impacts identified by specialists, as well as the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholder groupings in the study area and the Province.

A summary of the conclusions and recommendations of the evaluation of the proposed Gourikwa Power Station Conversion and Transmission Integration

Project is provided below. Recommendations regarding the scope of investigations required to be undertaken within the EIA are provided within the Plan of Study for EIA (refer to Chapter 9).

## 8.1. Conclusions drawn from the Evaluation of the Proposed Power Station Conversion

Apart from the proposed direct access road and water pipeline, all components of the proposed power station conversion project (as discussed in Chapter 3) will be on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries.

Potential impacts associated with the proposed power station conversion project are expected to occur during both the construction and operational phases. In general, impacts are expected to be similar to those associated with the initial phases of the power station project (i.e. the initial three OCGT units currently in operation, and the additional two OCGT units currently under construction). New impact sources associated with the power station conversion project would include:

» **Visual impacts** as a result of the additional infrastructure associated with the conversion project to be added onto the existing power station (i.e. the heat recovery steam generator (HRSG), the 60 m high stacks, the 25 m - 30 m high air-cooled condensers, and the additional fuel storage tanks).
» **Air quality impacts** associated with the construction phase (dust emissions) and the operational phase (emissions from the power station).
» **Noise impacts** associated with the existing OCGT units as well as the additional CCGT components to be added onto the existing power station (i.e. air filters, the gas compressor, the gas turbine, the generator, the electricity transformers, the fans associated with the stacks, the heat recovery equipment, the steam generator, the steam turbine and the air-cooled condenser system associated with the dry-cooling system).
» **Impacts on the social environment** as a result of the creation of employment opportunities, influx of workers to the area, impacts on health and safety, and impacts on sense of place.

Impact sources associated with the proposed access road and water pipeline include:

» **Impacts on vegetation and ecology** as a result of the permanent loss of vegetation and habitats, and potential impacts on sensitive species within the footprint of the road and pipeline.

» **Impacts on heritage sites** as a result of the disturbance or destruction of heritage resources during the construction phase of the proposed road an pipeline.

No environmental fatal flaws have been identified to be associated with any of the components of the proposed power station conversion project at this stage of the project.

### *8.1.1. Nomination of Preferred Alternatives to be considered in the EIA Phase*

The proposed conversion which will involve adding additional components to the existing power generating units, will be on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries. Therefore, **no location alternatives** have been considered within this EIA process.

However, the following have been nominated for consideration within the EIA Phase:

» The use of **treated water, effluent and/or stormwater** from the PetroSA facility at the Gourikwa Power Station. The water is proposed to be piped to the power station from PetroSA via a new **~1,3 km water pipeline** proposed to be constructed parallel to the existing liquid fuel pipeline between the two facilities. Alternative routes for the fuel pipeline were previously investigated through an EIA process for the initial OCGT units at the power station (Ninham Shand, 2005). The fuel pipeline route constructed was considered to be the most appropriate and practical alignment from an environmental, technical and economic perspective. This alignment is now proposed to be mirrored though the construction of a parallel water pipeline.
» **Dry-cooling technology** (air-cooled condensers) at the power station to reduce water requirements.
» The construction of a new dedicated **access road** to the Gourikwa Power Station directly off the N2 national road. Alternative routes for access to the power station were previously investigated through an EIA process undertaken in 2005 (Ninham Shand, 2005). The route considered to be the most appropriate and practical alignment of the three alternatives considered in the previous EIA is now being re-considered through this EIA study.

### *8.1.2. Recommendations*

In order to assess the potential impacts on the environment associated with the construction and operation of the proposed power station conversion project, detailed specialist studies to address the above issues must be undertaken within

the EIA phase of the project. These studies must compare the impacts associated with the conversion project to the current situation and must assess the potential cumulative impacts associated with the project.

## 8.2. Conclusions drawn from the Evaluation and Comparison of the Proposed Transmission Power Line Alternatives

Three technically feasible alternative transmission power line alignment corridors (approximately 500 m in width) have been identified for investigation within the EIA process (refer to Figure 7.1). These proposed transmission power line routes traverse an area that is generally rural in nature comprising largely of agricultural smallholdings. The area has been fairly extensively transformed by agricultural practises (largely as a result of cultivation). No natural vegetation of any consequence remains within the cultivated areas.

Potential impacts associated with the proposed transmission power line are expected to occur during the construction and operational phases, and have been identified through this scoping process include:

» **Impacts on flora and ecology** as a result of the disturbance of habitats within the power line servitude and at tower footprints.
» **Impacts on avifauna** as a result of collisions with the earthwire, electrocution and disturbance of habitats within the power line servitude.
» **Impacts on heritage sites** as a result of disturbance or destruction during the construction phase, as well as due to visual impacts on heritage sites.
» **Visual impacts** to sensitive receptors in the surrounding area.
» **Impacts on the social environment** as a result of the impacts on land use and impacts on sense of place.

In general, the nature and extent of impacts identified is dependent on the alignment which is selected.

### *8.2.1. Nomination of a Preferred Transmission Power Line Alignment*

From the specialist studies undertaken within the Scoping Phase, **Alternative 2 or Alternative 3** are nominated as the most preferred alternative/s in terms of all aspects considered, as these alternatives would result in impacts of least significance impacts on both the social and biophysical environments. The alternative alignments have a lower impact on the overall environment as a result of consolidation of infrastructure of a similar nature and the minimisation of impacts on current and planned land use. Therefore, both Alternative 2 and Alternative 3 are nominated **for further investigation in the EIA Phase**.

**Alternative 1** is nominated as the least preferred alternative, and therefore this alternative is **excluded as an alternative for further investigation**.

### *8.2.2. Recommendations*

In order to assess the potential impacts on the environment associated with the construction and operation of the proposed power line project, detailed specialist studies to address the above issues must be undertaken within the EIA phase of the project. The Plan of Study for EIA (Chapter 9) describes what the specialist studies to be undertaken in the EIA phase will assess in order to appropriately inform decision-making.

# PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT CHAPTER 9

A detailed description of the proposed Gourikwa Power Station and Transmission Integration Project, the scoping process, as well as the issues identified and evaluated through the Scoping Phase have been included in the Scoping Report and provide the context for this Plan of Study for Environmental Impact Assessment (EIA).

This Plan of Study describes how the environmental impact assessment for the Gourikwa Power Station and Transmission Integration Project will proceed during the EIA phase. The EIA phase of the study includes detailed specialist studies for those potential impacts evaluated to be of significance. The key findings of the scoping process (which includes inputs from authorities, the public, the proponent and the EIA specialist team) have been used to inform this Plan of Study for EIA, together with the requirements of the NEMA EIA Regulations and associated guidelines.

It should be noted that no specific information requirements for the Scoping Report have been specified by DEAT in terms of Regulation 29(1)(j) of the EIA Regulations, besides the general requirement to meet Regulations 29 and 30 of Government Notice No. R385 of 21 April 2006.

## 9.1. Aims of the EIA

The EIA will aim to achieve the following:

» Provide an overall assessment of the direct, indirect and cumulative impacts on the social and biophysical environments affected by the proposed project.
» Assess potentially significant impacts associated with the Gourikwa Power Station conversion as well as the nominated preferred alternative transmission power line corridor.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public involvement process to ensure that I&AP are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with all phases of the project including design, construction and operation, and will aim to provide the environmental

authorities with sufficient information in order to make an informed decision regarding the project.

## 9.2. Authority Consultation

Consultation with the regulating authorities (i.e. DEAT and DEA&DP) has been undertaken through the scoping process and will continue throughout the EIA process. On-going consultation will include the following:

» Invitation to attend a feedback meeting during the review period of the Draft Scoping Report.
» Submission of a Final Scoping Report following a 30-day public review period (and consideration of comments received).
» A consultation meeting with DEAT and DEA&DP in order to discuss the findings of the Final Scoping Study and the issues identified for consideration in the EIA process.
» An opportunity to visit and inspect the site.
» Submission of a Final Environmental Impact Assessment Report following a 30-day public review period.
» A consultation meeting with DEAT and DEA&DP in order to discuss the findings and conclusions of the EIA Report.

## 9.3. Nomination of Preferred Alternatives to be assessed within the EIA

### *9.3.1. Power Station Conversion*

The proposed conversion will be on the site of the existing Gourikwa Power Station, and will not require any additional land take outside of the existing power station boundaries. Therefore, **no location alternatives** have been considered within this EIA process.

However, the following have been nominated for consideration within the EIA Phase:

» The use of **treated water, effluent and/or stormwater** from the PetroSA facility at the Gourikwa Power Station. The water will be piped to the power station from PetroSA via a new **~1,3 km water pipeline** proposed to be constructed parallel to the existing liquid fuel pipeline between the two facilities. Alternative routes for the fuel pipeline were previously investigated through an EIA process for the initial OCGT units at the power station (Ninham Shand, 2005). The fuel pipeline route constructed was considered to be the most appropriate and practical alignment from an environmental, technical and economic perspective. This alignment is now proposed to be mirrored though the construction of a parallel water pipeline.

» **Dry-cooling technology** (air-cooled condensers) at the power station to reduce water requirements.
» The construction of a new dedicated **access road** to the Gourikwa Power Station directly off the N2 national road. Alternative routes for access to the power station were previously investigated through an EIA process undertaken in 2005 (Ninham Shand, 2005). The route considered to be the most appropriate and practical alignment of the three alternatives considered in the previous EIA is now being re-considered through this EIA study.

### *9.3.2. Transmission power lines*

From the specialist studies undertaken within the Scoping Phase, **Alternative 2 or Alternative 3** are nominated as the most preferred alternative/s in terms of all aspects considered, as these alternatives would result in impacts of least significance impacts on both the social and biophysical environments. The alternative alignments have a lower impact on the overall environment as a result of consolidation of infrastructure of a similar nature and the minimisation of impacts on current and planned land use. Therefore, both Alternative 2 and Alternative 3 are nominated for further investigation in the EIA Phase.

## 9.4. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

A summary of the issues which require further investigation within the EIA phase, as well as the proposed activities to be undertaken in order to assess the significance of these potential impacts is provided within Table 9.1. The specialists involved in the EIA Phase are also reflected in Table 9.1.

**Table 9.1:** Summary of the issues which require further investigation within the EIA phase and activities to be undertaken in order to assess the significance of these potential impacts

| Issue | Activities to be undertaken in order to assess significance of impacts | Specialist |
|---|---|---|
| Air quality impacts<br>» Power station conversion | A specialist study will be undertaken to determine existing air quality and potential air pollution impacts as a result of the proposed conversion project, and to make recommendations for mitigation measures, and air quality monitoring (if deemed necessary). The main aims of the air quality study will be:<br>» The establishment of the dispersion potential of the area utilising localised meteorological data or data from the extended area.<br>» The establishment of an emissions inventory for dust, total suspended particulates, PM10 $SO_2$, NOx, CO and $CO_2$, in which emissions from all project-related activities are quantified under the following conditions:<br>* During construction<br>* Under normal operations<br>* During start-up and upset conditions.<br>» The estimation of the potential emission reductions due to fuel conversion from diesel to natural gas.<br>» The prediction of ambient air pollutant concentrations and dust fallout, in terms of dispersion modelling for each of the above-mentioned scenarios. Different climatic conditions for different times of the day and year will be utilised in order to determine the average and worst-case conditions.<br>» The assessment of the impacts based on comparisons of the resulting concentration against the pre-construction ambient conditions, as well as against relevant standards and guidelines.<br>» Detailed assessment considering direct, indirect and cumulative impacts for all phases of the project.<br>» Identification of emission reduction opportunities and cost-effective emission abatement strategies.<br>» Provision of recommendations regarding the optimum air quality monitoring positions and the establishment of an air quality monitoring programme, if necessary.<br>The selected proposed air pollution dispersion model is the new-generation AEROMOD View, which is a complete and powerful package incorporating into one interface the popular preferred U.S. EPA models: AEROMOD, ISCST3, ISC-PRIME, and AEROMOD-PRIME. Different emission scenarios will be generated for the construction and operational phases of the project. | Demos Dracoulides of DDA |

| Issue | Activities to be undertaken in order to assess significance of impacts | Specialist |
|---|---|---|
| Noise impacts<br>» Power station conversion | The noise impact assessment study of the EIA phase will:<br>» Determine the existing noise levels within and around the perimeter of the power station site, as well as within surrounding communities and sensitive receptors in the extended area.<br>» Create a representative noise model in order to simulate the noise propagation and determine the resulting noise levels due to the upgrade.<br>» Detailed assessment considering direct, indirect and cumulative impacts for all phases of the project based on South African legislation and international guidelines<br>» Identify potential noise emission reduction opportunities and cost-effective emission abatement strategies.<br>» Provide recommendations regarding the optimum noise monitoring positions and the establishment of a noise monitoring programme.<br>The baseline noise study will be based on noise measurements in accordance with the SANS 10103: 2004 and SANS 10328:2001, or equivalent national or international standards required by Eskom or DEAT.<br>The internationally recognised 3-dimensional software CADNAA for predicting noise contours from all the noise sources will be utilised in the noise study. This will enable different scenarios to be realised and tested to optimise layouts of potentially noisy activities, the plant and equipment and determine the resulting noise levels in the area. | Demos Dracoulides of DDA |
| Visual impacts<br>» Power station conversion<br>» Transmission power line | The specialist study to be undertaken in the EIA phase will include:<br>» Additional spatial analyses are to be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact.<br>» The site-specific issues (as detailed in the specialist visual scoping report) and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of impact.<br>» Specific areas of focus for the visual impact assessment of the power station conversion should include the additionally exposed areas and the potential cumulative visual impact of increased development.<br>» Detailed assessment considering direct, indirect and cumulative impacts for all phases of the project.<br>The detailed visual impact assessment will be informed by the DEA&DP Guidelines for visual specialist studies. | Lourens du Plessis of MetroGIS |

| Issue | Activities to be undertaken in order to assess significance of impacts | Specialist |
|---|---|---|
| Impacts on heritage sites<br>» Transmission power line | The specialist study to be undertaken in the EIA phase will:<br>» Require a detailed physical survey of the study area so that the locations of visible generally protected heritage can be recorded and the layout of the development adjusted where necessary.<br>» Include a detailed assessment considering direct, indirect and cumulative impacts for all phases of the project.<br>» Include an environmental management plan to include follow up heritage work such as monitoring of excavations or archaeological sampling.<br>The detailed heritage studies will be undertaken in accordance with the requirements of the DEA&DP specialist guidelines, as well as the requirements of Heritage Western Cape. | Tim Hart of the Archaeology Contracts Office, Department of Archaeology: University of Cape Town |
| Impact on vegetation<br>» Transmission power line | The specialist study to be undertaken in the EIA phase will:<br>» Assess local and regional impacts (direct and indirect) associated with the proposed power line infrastructure.<br>» Field survey of the final proposed road route to assess impacts and practical mitigation that can be implemented to reduce any identified botanical impacts of significance.<br>» Include a detailed assessment considering direct, indirect and cumulative impacts for all phases of the project.<br>» Make detailed mitigation suggestions for the planning, construction and operational stages, which will be included in the construction and operational phase EMPs.<br>The specialist study will be undertaken in accordance with the requirements of the DEA&DP guidelines for biodiversity studies. | Nick Helme of Nick Helme Botanical Surveys |
| Impact on avifauna<br>» Transmission power line | The specialist study to be undertaken in the EIA phase will:<br>» A ground survey of the avifauna present along the nominated preferred power line route, specifically to<br>* verify the presence or absence of key breeding species (including the Blue Crane) within the impact area of the transmission line<br>* identify areas within the proposed site that may be more sensitive to potential collisions.<br>» Include a detailed assessment considering direct, indirect and cumulative impacts for all phases of the project.<br>The specialist study will be undertaken in accordance with the requirements of the DEA&DP guidelines for biodiversity studies. | Jon Smallie of the EWT |

| Issue | Activities to be undertaken in order to assess significance of impacts | Specialist |
|---|---|---|
| Social Impact Assessment<br>» Power station conversion<br>» Transmission power line | The identification and assessment of social impacts will be guided by the specialist SIA Guidelines adopted by DEA&DP in the Western Cape. The SIA will assess impacts associated with the construction and operational phases of the power station and power line. The following criteria will be assessed:<br>» Temporary and on-going employment opportunities.<br>» Social investment.<br>» Influx of people.<br>» Impacts on health and safety<br>» Current land-uses<br>» Sense of Place | Liezl Coetzee of Southern Hemisphere |

Through the Scoping process, additional issues requiring further investigation were identified. These include:

» Risks associated with the storage of additional fuel on the power station site. A risk assessment for the additional fuel tanks proposed to be located at the power station site will be undertaken by Riscom.

## 9.5. Methodology for the Assessment of Potential Impacts

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

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

» the degree to which the impact may cause irreplaceable loss of resources.
» the *degree* to which the impact can be *mitigated.*

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

S=(E+D+M)P

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

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

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

Recommendations for mitigation will be made and significance ratings before and after mitigation will be indicated.

## 9.6. Integration and Preparation of the EIA Report

The results of the specialist studies and other available information will be integrated and synthesised by the Savannah Environmental project team. An EIA report will be compiled in accordance with the requirements of the EIA Regulations, and will include:

» Detailed description of the proposed activity
» A description of the property(ies) on which the activity is to be undertaken and the location of the activity on the property(ies)
» A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity
» Details of the public participation process conducted, including:
  * steps undertaken in accordance with the plan of study for EIA
  * a list of persons, organisations and organs of state that were registered as interested and affected parties

  - a summary of comments received from, and a summary of issues raised by registered I&APs, the date of receipt of these comments and the response to those comments
  - copies of any representations, objections and comments received from registered I&APs.
- A description of the need and desirability of the proposed project and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.
- An indication of the methodology used in determining the significance of potential environmental impacts.
- A description and comparative assessment of all alternatives identified during the environmental impact assessment process.
- A summary of the findings and recommendations of specialist reports.
- A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures.
- An assessment of each identified potentially significant impact.
- A description of any assumptions, uncertainties and gaps in knowledge.
- An environmental impact statement which contains:
  - a summary of the key findings of the environmental impact assessment
  - a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives.
- A draft environmental management plan
- Copies of specialist reports

The draft EIA Report will be released for a 30-day public review period. The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the final EIA Report, for submission to the authorities for decision-making.

## 9.7. Public Participation Process

A public participation process will be undertaken by Sustainable Futures ZA in conjunction with Savannah Environmental.

Consultation with key stakeholders and I&APs will be on-going throughout the EIA process. Through this consultation process, stakeholders and I&APs will be encouraged to identify additional issues of concern or highlight positive aspects of the project, and to comment on the findings of the EIA process.

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs regarding the project, various

opportunities will be provided for stakeholders and I&APs to be involved in the EIA phase of the process, as follows:

» Focus group meetings (pre-arranged and stakeholders invited to attend).
» One-on-one consultation meetings (for example with directly affected landowners).
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The draft EIA report will be made available for public review for a 30-day period prior to finalisation and submission to DEAT for review and decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a public feedback meeting will be held during this public review period.

## 9.8. Key Milestones of the programme for the EIA

The envisaged key milestones of the programme for the Environmental Impact Assessment (EIA) phase of the project are outlined in the table below.

| Key Milestone Activities | Proposed completion date[11] |
|---|---|
| Finalisation of Scoping Report | July 2008 |
| Authority acceptance of the Scoping Report and Plan of Study to undertake the EIA | August 2008 |
| Undertake detailed specialist studies and public participation process and compile Draft EIA Report and Draft EMP | August 2008 – October 2008 |
| Make Draft EIA Report and Draft EMP available to the public, stakeholders and authorities | October 2008 |

[11] Indicative dates only