RICHARDS BAY COMBINED CYCLE POWER PLANT (CCPP) AND ASSOCIATED INFRASTRUCTURE NEAR RICHARDS BAY

KwaZulu-Natal Province

Scoping Report

August 2017

savannah environmental

t +27 (0)11 656 3237 f +27 (0)86 684 0547

e info@savannahsa.com w www.savannahsa.com

Prepared for:

Eskom Holdings SoC Ltd (Eskom)
1 Maxwell Drive,
Sunninghill,
Johannesburg

Prepared by:

savannah environmental

t +27 (0)11 656 3237 f +27 (0)86 684 0547 e info@savannahsa.com w www.savannahsa.com
First Floor, Block 2, 5 Woodlands Drive Office Park, Cnr Woodlands Drive & Western Service Road, Woodmead, 2191

PROJECT DETAILS

Title	:	Environmental Impact Assessment Process: Scoping Report for the Richards Bay Combined Cycle Power Plant (CCPP) and Associated Infrastructure near Richards Bay.
Authors	:	Savannah Environmental (Pty) Ltd Lisa Opperman Tebogo Mapinga Jo-Anne Thomas Gabriele Stein
Client	:	Eskom Holdings SoC Ltd (Eskom) Mpho Muswubi
Report Revision	:	Revision 0
Date	:	August 2017

When used as a reference this report should be cited as: Savannah Environmental (2017) Scoping Report for the Richards Bay Combined Cycle Power Plant (CCPP) and Associated Infrastructure near Richards Bay, KwaZulu-Natal Province.

PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

Eskom Holdings SoC Ltd (Eskom) proposes to develop a Combined Cycle Power Plant (CCPP) and associated infrastructures, with a generating capacity of up to 3000MW. The proposed project is to be known as the Richards Bay CCPP. The Project site is to be located in the Richards Bay Industrial Development Zone (IDZ) Phase 1D, approximately 6km south west of Richards Bay and 4km south west of Alton which falls within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province. The facility will have a maximum capacity of 3000MW, to operate with natural gas as the main fuel resource and diesel as a back-up resource.

Eskom Holdings SoC Ltd (Eskom) has appointed Savannah Environmental as the independent environmental consultant to undertake the Environmental Impact Assessment (EIA) for the proposed project. The EIA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This Scoping Report represents the findings of the Scoping Phase of the EIA process and contains the following chapters:

- **Chapter 1** provides background to the proposed project and the environmental impact assessment process.
- **Chapter 2** outlines the strategic legal context for energy planning and the proposed project.
- **Chapter 3** provides a description of the proposed project, including feasible alternatives identified and considered.
- **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA Process.
- **Chapter 5** describes the existing biophysical and socio-economic environment affected by the proposed project.
- **Chapter 6** provides a description and evaluation of the potential issues and impacts associated with the proposed project.
- **Chapter 7** provides the conclusions of the Scoping report.
- **Chapter 8** presents the Plan of Study for the EIA Phase.
- **Chapter 9** provides a list of all references used in the compilation of the Scoping Report.

The Scoping Report is available for review from **21 August 2017 – 20 September 2017** at the following locations:

- Richards Bay Public Library
- www.savannahSA.com

Please submit your comments by **20 September 2017** to:
Gabriele Stein of **Savannah Environmental** PO Box 148, Sunninghill, 2157 Tel: 011 656 3237 Fax: 086 684 0547 Email: gabriele@savannahsa.com

Comments can be made as written submission via fax, post or email.

EXECUTIVE SUMMARY

Eskom Holdings SoC Ltd (Eskom) proposes to develop a Combined Cycle Power Plant (CCPP) and associated infrastructures, with a generating capacity of up to 3000MW. The proposed project is to be known as the Richards Bay CCPP. The Project site is to be located in the Richards Bay Industrial Development Zone (IDZ) Phase 1D, approximately 6km south west of Richards Bay and 4km south west of Alton which falls within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province.

The purpose of the project is to reduce transmission losses from generation facilities supplying KwaZulu-Natal, by having a generation centre in KwaZulu-Natal. In addition, the project is planned to aid in reducing Eskom's carbon footprint per unit of electricity produced, as power plants using natural gas emit approximately half the carbon of coal-fired power plants while using considerably less water, thus supporting Government's commitment to reduce carbon emissions.

In response to the need for a supply of clean and modern forms of electricity at an affordable price, Eskom Holdings SoC Ltd is proposing the construction of the Richards Bay CCPP. The Richards Bay CCPP and associated infrastructure is proposed to be constructed on Portion 2 of Erf 11376 and Portion 4 of Erf 11376 within the Richards Bay IDZ Zone 1D. The facility will operate with natural gas as the main fuel resource and diesel as a back-up resource. The main infrastructure associated with the facility includes the following:

- Gas turbines for the generation of electricity through the use of natural gas or diesel.
- Heat recovery steam generators (HRSG) to produce steam.
- Steam turbines for the generation of additional electricity through the use of steam generated by the HRSG.
- Condensers for the conversion of steam back to water.
- Bypass stacks associated with each gas turbine.
- Exhaust stacks.
- A water treatment plant for the treatment of potable water and the production of demineralised water.
- A water pipeline and water tank.
- Dry-cooled system or Once-Through-Cooling system technology.
- Closed Fin-fan coolers to cool lubrication oil for the gas and steam turbines.
- A gas pipeline and a gas pipeline supply conditioning process facility.
- Diesel off-loading facility and storage tanks.
- Ancillary infrastructure including access roads, warehousing and buildings, storage facilities, generators and 132kV and 400kV switchyards.
- A power line[1] to connect the Richards Bay CCPP to the national grid for the evacuation of the generated electricity.

1 The development of the power line does not form part of this EIA process.

The Richards Bay CCPP will be a baseload and mid-merit[2] (20% - 70%) system.

Potential impacts associated with the development of the Richards Bay CCPP are expected to occur during both the construction and operation phases. The conclusion of the findings of the Scoping Study is that the potential impacts identified to be associated with the construction and operation of the Richards Bay CCPP are anticipated to be at a site or localised level, with few impacts extending from a local to national extent which includes both positive and negative impacts. The following provides a summary of the findings of the specialist studies undertaken:

» *Ecology:* The construction of the Richards Bay CCPP will impact on ecological features located within the project site. The main potential impacts expected during the construction phase include the loss of critically endangered ecosystems (limited extent), a loss of CBA irreplaceable areas (limited extent), a potential loss of red listed/protected flora and fauna species, the generation of construction noise and emissions which could impact on the ecology of the area, and soil and water contamination. Potential impacts associated with the operation of the Richards Bay CCPP include impacts on species due to alterations in the night time light conditions, disturbance or damage to adjacent habitats due to movement within the area during the construction and operation, degradation of habitat quality and the alteration of drainage regimes.

» *Wetland and Aquatic Features:* Wetlands features are located within the project site. The development of the Richards Bay CCPP could potentially result in a loss of wetlands, altered hydrology, impaired water quality, loss of ecological services and sedimentation and erosion. The wetlands located within the project site are considered to be in a largely natural state and ecologically important.

» Geo-hydrological features and surface waterbodies: During the construction phase groundwater and surface water waterbodies can be affected as a result of on-site accidental spills and leaks due to the presence of construction vehicles and/or fuel storage areas, and migration of the spilled liquids to the surrounding surface water bodies. During the operation phase groundwater and surface water waterbodies, including the Nseleni River, Nsezi dam, Voor River, Bhizolo Stream and an unnamed dam (receptors), could be impacted due to possible leakage of diesel and/or chemicals from storage facilities and/or pipelines and form emergency backup generators leaks (sources).

» *Soils and Agricultural Potential:* The development of the Richards Bay CCPP will impact on the soils and agricultural potential of the project site. The land capability of the project site is classified as Class III which refers to the area being of a moderate agricultural potential. The main potential impacts include loss of agricultural land and/or loss of agricultural potential, disturbances including compaction, physical and chemical alteration of the soils, potential loss of stockpiled topsoil, increased risk of soil erosion, sedimentation and an increase in the stormwater runoff.

[2] Mid-merit electricity generation capacity refers to the generation of electricity which is adjusted according to the fluctuations in demand in the national grid. Baseload electricity generating capacity refers to the generation of electricity continuously for all hours of the day and night in order to satisfy the minimum demand required in the national grid.

» *Archaeological Resources:* The construction phase of the Richards Bay CCPP may impact on archaeological resources due to the construction activities which include excavation. Stone Age sites are expected to occur in the project site and could be impacted by the development. The impacts of the construction activities on the archaeological resources include potential damage to and destruction of archaeological sites.

» *Palaeontological Resources:* Loss of palaeontological heritage could occur during the construction phase of the Richards Bay CCPP. Construction activities including excavation of new bedrock which could comprise of sensitive palaeontological resources could result in the damage and destruction of the resources or sealing in fossils below the ground surface making these no longer be available for scientific consideration. Any fossils occurring in the project site are potentially scientifically and culturally significant and any negative impact on them would be of high significance. The destruction or inadvertent relocation of any affected fossils will be permanent and irreversible. During a field survey of the proposed development footprint, no fossiliferous outcrops were found.

» *Air Quality and climate change:* The construction of the Richards Bay CCPP has the potential to impact on the ambient air quality of the area through elevated daily PM_{10} concentrations due to background PM_{10} and the proximity of the project site to other particulate emission sources. During the operation phase, the Richards Bay CCPP is likely to contribute NO_X, CO, and VOCs to the existing baseline concentrations (including greenhouse gasses). Climate change impacts associated with the development of the CCPP relates to the combustion of natural gas at the CCPP plant which will produce greenhouse gas emissions that will contribute to the global phenomenon of anthropogenic climate change. Climate change is projected to effect many environmental changes across the globe. The Richards Bay CCPP will contribute substantially to South Africa's national emissions inventory.

» *Noise:* The operation of the Richards Bay CCPP will increase the noise levels in the vicinity of the plant. The site visit did not identify any potential noise-sensitive receptors close to the project site. It is therefore unlikely that the project would result in a noise impact on potential noise-sensitive receptors in the area. It was concluded that the scoping level assessment is sufficient and a full Environmental Noise Impact Assessment is not required or recommended.

» *Visual:* Impacts from a visual perspective are expected to occur during the construction and operation phases of the Richards Bay CCPP. The project site is located adjacent to existing heavy industrial development and within an area where further heavy industry is planned (IDZ Phase 1D). It is therefore possible that the development could intensify existing industrial impacts. It is however highly unlikely to significantly add to the current area of industrial influence within the surrounding landscape. It is also likely to be possible to partly mitigate any additional influence by ensuring that the development occurs in as close a proximity to existing heavy industry as possible. Analysis has also indicated that affected surrounding landscapes are not likely to be highly sensitive to possible change associated with the proposed development.

» *Socio-economic aspects:* The construction of the Richards Bay CCPP will result in both positive and negative impacts. During the construction phase the positive impacts will include an increase in the production and GDP-R of the national and local economies, temporary employment opportunities, skills development and household income leading to improved standard of living. These impacts are expected to be of medium significance. Negative impacts expected during the construction phase

include a change in the demographics of the area due to an influx of jobseekers, increased pressure on basic services and social and economic infrastructure, and an increased demand in housing within the broader area. Positive and negative impacts are expected to occur with the operation of the Richards Bay CCPP. Positive impacts include a sustainable increase in the production and GDP-R of the national and local economies, long-term employment opportunities, skills development, household income that will improve the standard of living within the area, increased government revenue streams and improved electricity security. The negative impact expected during operation is the deterioration of quality of public health due to combined emissions from the operating CCPP. From the above identified potential impacts it is concluded that the positive impacts outweigh the negative impacts from a social perspective.

» *Cumulative Impacts:* The project site is located adjacent to existing heavy industrial development and within an area where further heavy industry is planned. The project site is located within the Richards Bay Industrial Development Zone Phase 1D and has been allocated for the development of a gas facility. Due to the development plans for the site and its location within the IDZ it is considered unlikely that it would be used for agricultural purposes. Other similar facilities within the area include the Mondi Richards Bay Facility located directly adjacent to the project site and a gas to power facility which has been authorised to be developed within Phase 1F of the IDZ.

No environmental fatal flaws or impacts of very high significance were identified to be associated with the development of the Richards Bay CCPP on the identified project site at this stage in the process. **Figure 1** provides an environmental sensitivity map of the scoping phase. This conclusion must however be confirmed through a detailed investigation of the development footprint within the EIA Phase of the process.

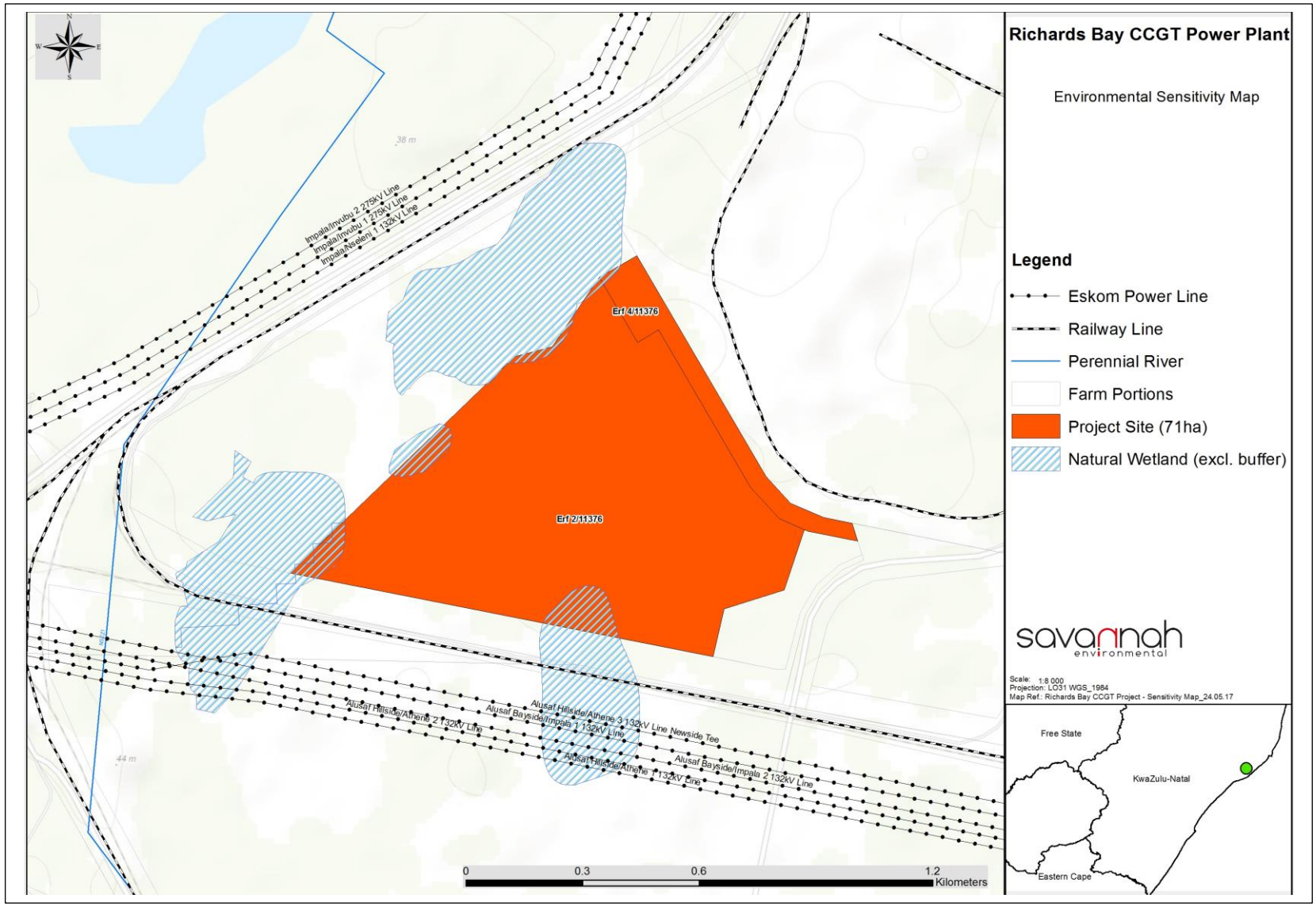

Figure 1: Richards Bay CCPP Scoping Phase Environmental Sensitivity Map

TABLE OF CONTENTS

APPENDICES LIST

CHAPTER 1: INTRODUCTION

Eskom Holdings SoC Ltd (Eskom) proposes to develop a Combined Cycle Power Plant (CCPP) and associated infrastructures, with a generating capacity of up to 3000MW. The proposed project is to be known as the Richards Bay CCPP. The Project site (71ha in extent) is to be located in the Richards Bay Industrial Development Zone (IDZ) Phase 1D, approximately 6km south west of Richards Bay and 4km south west of Alton which falls within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province.

The purpose of the project is to reduce transmission losses from generation facilities supplying KwaZulu-Natal, by having a generation centre in KwaZulu-Natal. In addition, the project is planned to aid in reducing Eskom's carbon footprint per unit of electricity produced, as power plants using natural gas emit approximately half the carbon of coal-fired power plants while using considerably less water, thus supporting Government's commitment to reduce carbon emissions.

As the project has the potential to impact on the environment, an Environmental Impact Assessment process is required to be completed in support of an application for Environmental Authorisation prior to the commencement of construction and operation of the project. The nature and extent of the Richards Bay CCPP, as well as potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this Scoping Report.

This Scoping Report consists of the following chapters:

- **Chapter 1** provides background to the proposed project and the environmental impact assessment process.
- **Chapter 2** outlines the strategic legal context for energy planning and the proposed project.
- **Chapter 3** provides a description of the proposed project, including feasible alternatives identified and considered.
- **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA Process.
- **Chapter 5** describes the existing biophysical and socio-economic environment affected by the proposed project.
- **Chapter 6** provides a description and evaluation of the potential issues and impacts associated with the proposed project.
- **Chapter 7** provides the conclusions of the Scoping report.
- **Chapter 8** presents the Plan of Study for the EIA Phase.
- **Chapter 9** provides a list of all references used in the compilation of the Scoping Report.

1.1 Legal Requirements as per the EIA Regulations for the undertaking of a Scoping Report, 2014 (as amended)

This Scoping report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (and amended on 07 April 2017) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998). This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(a)(i) the details of the EAP who prepared the report and (ii) the expertise of the EAP to carry out scoping procedures; including a curriculum vitae	The details of the EAP and the expertise of the EAP have been included in section 1.4 and **Appendix A**.
(b) the location of the activity, including (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties	The location of the project site proposed for the development of the Richards Bay CCPP is included as **Figure 1.1** and **Figure 1.2** and in **Appendix B**. The details of the affected properties including the property names and numbers, as well as the SG-codes are included in Table 1.1.
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken	The locality of the project site is illustrated on a locality map included as **Figure 1.1** and **Figure 1.2** and in **Appendix B**. The corner point co-ordinates of the project site are included in **Appendix B**.

1.2 Project Overview

As a fast emerging economy, South Africa needs to balance the competing need for continued economic growth with its social needs and the protection of the natural environment. South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. Approximately 92% of South African electricity comes from coal-fired power stations, with Eskom being the dominant electricity producing company.

The Integrated Resource Plan (IRP) 2010[3] developed by the Department of Energy states a need for a diversified energy mix to meet the requirements of the country's need for economic and social growth. The IRP (2010) considers natural gas to have significant potential to add to the energy mix. It is envisaged that the gas-derived electricity will be through open-cycle gas turbines (OCGT) and combined cycle gas turbines (CCGT), which should generate 3.9GW and 2.4GW, respectively. While the above-mentioned supply is the target for 2030, the IRP asserts that CCGT technologies and an LNG terminal needs to be built urgently so that the first CCGT capacity is available by 2020 to assist with electricity supply in the short run. The IRP recognises that Gas Fired Combined Cycle Gas Turbines (CCGTs) present the most significant potential for developing the gas market in South Africa.

The update of the IRP of 2016 (currently in draft format) calls for a higher allocation of energy generating capacities to Open Cycle Gas Turbine and Combined Cycle Gas Turbine facilities than the IRP 2010. Open Cycle Gas Turbines have been allocated 5.4 GW and Combined Cycle Gas Turbines have been allocated 7.3 GW by the year 2030.

3 An updated IRP is currently out for comment and review which has not been promulgated.

In response to the need for a supply of clean and modern forms of electricity at an affordable price, Eskom Holdings SoC Ltd is proposing the construction of the Richards Bay CCPP. The Richards Bay CCPP and associated infrastructure is proposed to be constructed on Portion 2 of Erf 11376 and Portion 4 of Erf 11376 within the Richards Bay IDZ Zone 1D (refer to **Figure 1.1**, **Figure 1.2** and **Table 1.1**).

The facility will have a maximum capacity of 3000MW, to operate with natural gas as the main fuel resource and diesel as a back-up resource. The main infrastructure associated with the facility includes the following:

- Gas turbines for the generation of electricity through the use of natural gas or diesel.
- Heat recovery steam generators (HRSG) to produce steam.
- Steam turbines for the generation of additional electricity through the use of steam generated by the HRSG.
- Condensers for the conversion of steam back to water.
- Bypass stacks associated with each gas turbine.
- Exhaust stacks.
- A water treatment plant for the treatment of potable water and the production of demineralised water.
- A water pipeline and water tank.
- Dry-cooled system or Once-Through-Cooling system technology.
- Closed Fin-fan coolers to cool lubrication oil for the gas and steam turbines.
- A gas pipeline and a gas pipeline supply conditioning process facility.
- Diesel off-loading facility and storage tanks.
- Ancillary infrastructure including access roads, warehousing and buildings, storage facilities, generators and 132kV and 400kV switchyards.
- A power line[4] to connect the Richards Bay CCPP to the national grid for the evacuation of the generated electricity.

The Richards Bay CCPP will be a baseload and mid-merit[5] (20% - 70%) system.

More details regarding the proposed project are included within Chapter 3 of this Report.

Table 1.1: A detailed description of the preferred project site identified for the development of the Richards Bay CCPP

Province	Kwa-Zulu Natal
District Municipality	King Cetshwayo District Municipality
Local Municipality	City of uMhlathuze Local Municipality
Ward number(s)	26

4 The development of the power line does not form part of this EIA process.

5 Mid-merit electricity generation capacity refers to the generation of electricity which is adjusted according to the fluctuations in demand in the national grid. Baseload electricity generating capacity refers to the generation of electricity continuously for all hours of the day and night in order to satisfy the minimum demand required in the national grid.

Nearest town(s)	Alton, Richards Bay, Arboretum, Empangeni, Ichubo
Farm name(s) and number(s)	Erf 11376
Portion number(s)	» Portion 2 » Portion 4
SG 21 Digit Code (s)	» N0GV04210001137600002 » N0GV04210001137600004
Current zoning	Industrial Use – The affected properties are located within the Richards Bay Industrial Development Zone Phase 1D and has been reserved for gas to power development
Current land use	Communal Grazing

1.3 Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Richards Bay CCPP is subject to the requirements of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. This section provides a brief overview of the EIA Regulations and their application to this project.

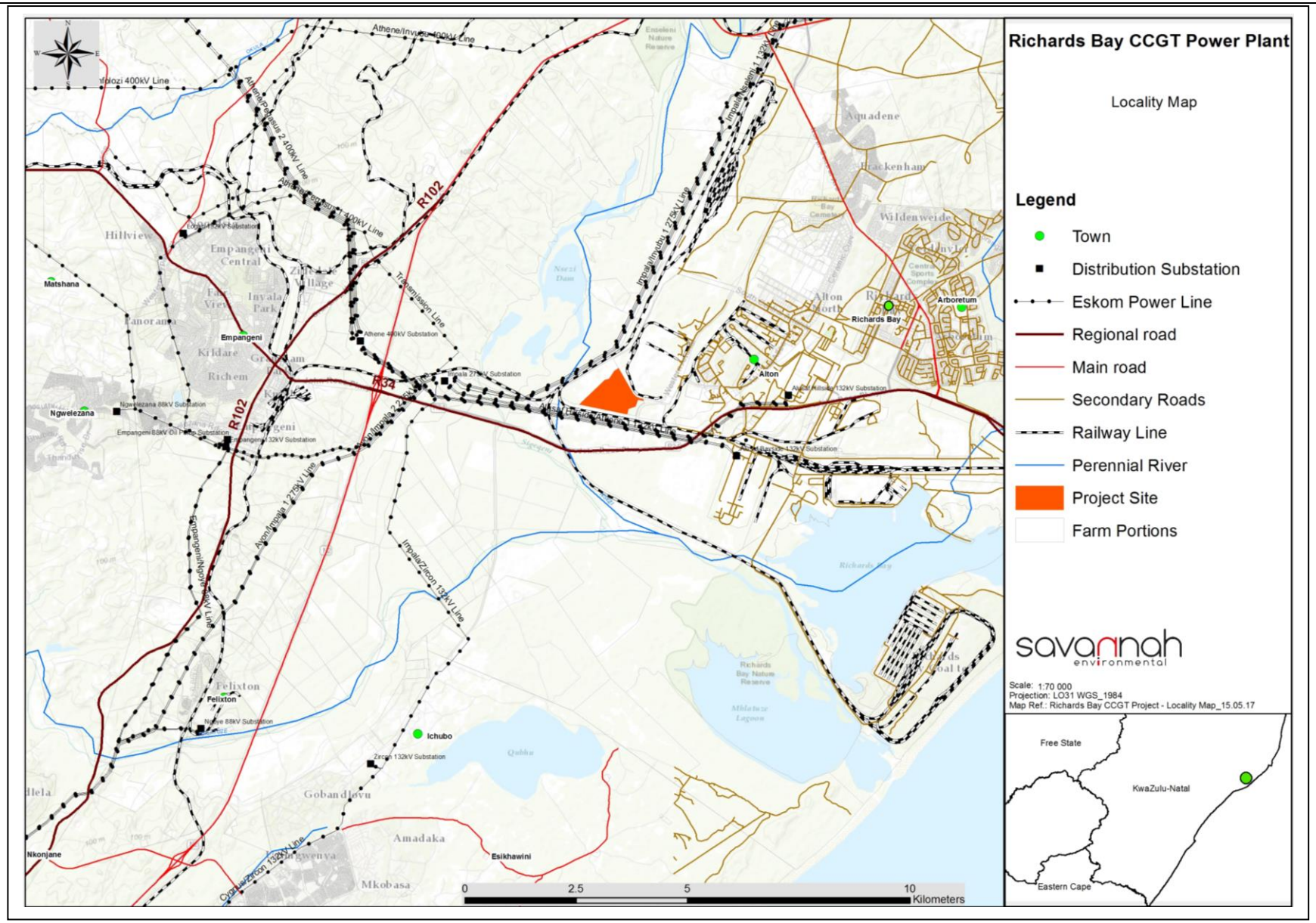

Figure 1.1: Locality map showing the area proposed for the establishment of the Richards Bay CCPP within the Richards Bay area (**Appendix B1**)

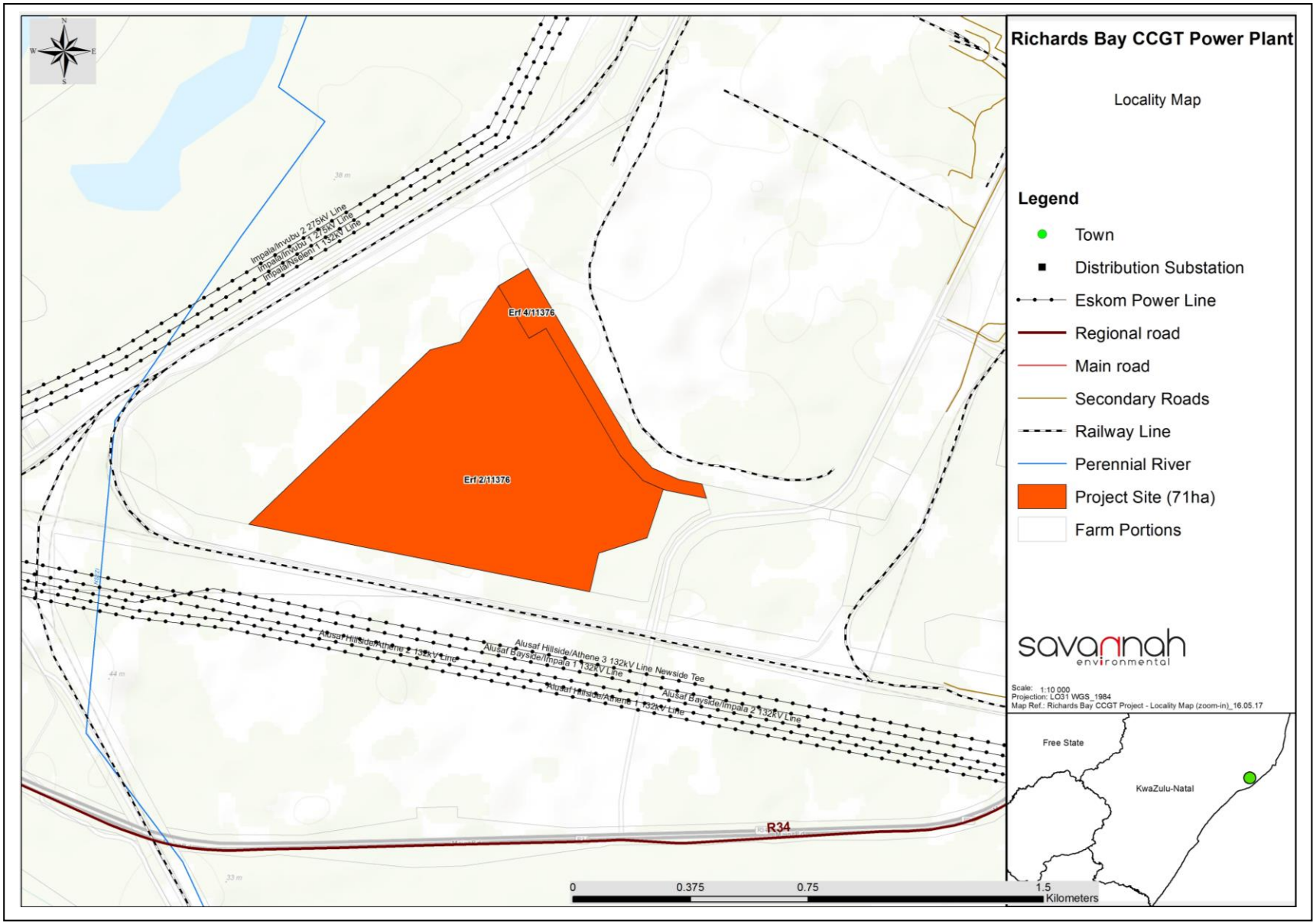

Figure 1.2: Locality map showing the affected properties within the preferred project site

NEMA is the national legislation that provides for the authorisation of 'listed activities'. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these activities must be considered, investigated, assessed and reported on to the competent authority that has been charged by NEMA with the responsibility of granting environmental authorisations. As this is a proposed electricity generation project and thereby considered to be of national importance, and Eskom is a State-owned Company, the National Department of Environmental Affairs (DEA) is the competent authority[6] and the KwaZulu-Natal Department of Agriculture, Environmental Affairs and Rural Development (EDTEA) will act as a commenting authority.

The need to comply with the requirements of the EIA Regulations ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental specialist studies are required in accordance with the EIA Regulations to provide the competent authority with sufficient information in order to make an informed decision. Eskom Holdings SoC Ltd has appointed Savannah Environmental as the independent environmental consulting company to conduct an EIA process for the proposed project.

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be fore-warned of potential environmental issues, and allows for the resolution of issues reported on in the Scoping and EIA Reports as well as a dialogue with interested and affected parties (I&APs).

The EIA process comprises two phases – i.e. Scoping and Impact Assessment - and involves the identification and assessment of environmental impacts though specialist studies, as well as public participation. The process followed in these two phases is as follows:

- The **Scoping Phase** includes the identification and description of potential impacts associated with the proposed project through a desktop study and consultation with affected parties and key stakeholders. This phase considers the broader site in order to identify and delineate any environmental fatal flaws, no-go or sensitive areas. Following the public review period of the Scoping report, this phase culminates in the submission of a final Scoping Report and Plan of Study for EIA to the competent authority for acceptance and approval to continue with the EIA phase of the process.
- The **EIA Phase** involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase considers a proposed development footprint and includes detailed specialist investigations (including field surveys) as well as public consultation. Following a review period of the EIA report by stakeholders, this phase culminates in the submission of a Final EIA Report and an Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to the competent authority for review and decision-making.

[6] In terms of Government Notice 779 of 01 July 2016, the DEA is the competent authority for all applications relating to the IRP.

1.4 Details of the Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA

Savannah Environmental was contracted by Eskom Holdings SoC Ltd as an independent consulting company to undertake the required Environmental Impact Assessment (EIA) for the proposed project, as required by the NEMA EIA Regulations of December 2014 (as amended on 07 April 2017). Neither Savannah Environmental, nor any of its specialist sub-consultants on this project are subsidiaries of / or affiliated to Eskom Holdings SoC Ltd. 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 staff and sub-consultants have acquired considerable experience in environmental assessment and environmental management over the last 11 years, 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. Savannah Environmental has successfully completed various EIAs for power generation projects for Eskom and various Independent Power Producers.

The Savannah Environmental team includes:

- Jo-Anne Thomas – the principle Environmental Assessment Practitioner (EAP) for this project. She is a registered Professional Natural Scientist (in the practice of environmental science) with the South African Council for Natural Scientific Professions. She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past nineteen (19) years. She has successfully managed and undertaken EIA processes for electricity generation projects throughout South Africa.
- Tebogo Mapinga - is a Principal Environmental Manager and Project Manager for this project. She holds a BSc degree with ten (10) years of experience in the environmental field in both public and private sectors. Her competencies lie in environmental impact assessments, compliance monitoring and public participation for small and large scale projects.
- Lisa Opperman - the principle author of this report. She holds a Bachelor degree with Honours in Environmental Management and has two (2) years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects. She is currently involved in several EIAs for renewable energy projects across the country.
- Gabriele Stein – the public participation consultant for this project. She has ten (10) years of consulting experience in public participation and social research. Her experience includes the design and implementation of public participation programmes and stakeholder management strategies for numerous integrated development planning and infrastructure projects. Her work focuses on managing the public participation component of Environmental Impact Assessments and Basic Assessments undertaken by Savannah Environmental.

Curricula vitae for the Savannah Environmental project team consultants are included in **Appendix A**. In order to adequately identify and assess potential environmental impacts as well as evaluate alternatives, 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**.

CHAPTER 2: STRATEGIC CONTEXT FOR ENERGY PLANNING

2.1 Legal Requirements as per the EIA Regulations for the undertaking of a Scoping Report, 2014 (as amended)

This chapter of the Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(e) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are considered in the assessment process;	The policy and legislative context for the development of the CCPP has been considered throughout this chapter on a national, provincial and local level. The specific legislation associated with the development is considered in Table 2.1.

2.2 National Policy and Planning Context

Development and expansion of electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the Department of Energy (DoE). The hierarchy of policy and planning documentation that support the development of energy projects such as electricity generation facilities is illustrated in Figure 2.1.

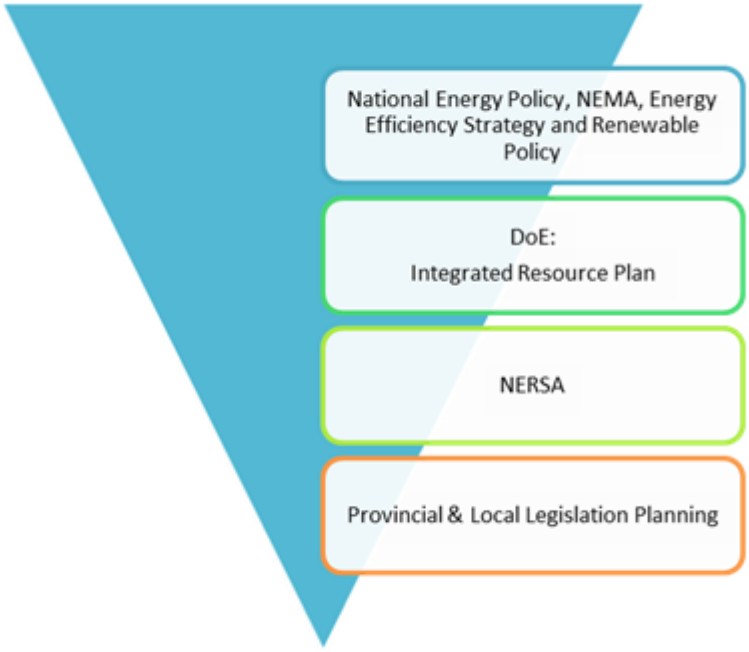

Figure 2.1: Hierarchy of electricity policy and planning documents

These policies are discussed in more detail in the following sections, along with the provincial and local policies and plans that have relevance to the proposed development.

2.2.1 The National Energy Act (2008)

The National Energy Act was promulgated in 2008 (Act No 34 of 2008). One of the objectives of the Act was to promote diversity of supply of energy and its sources. The National Energy Act aims to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors. The Act provides the legal framework which supports the development of power generation facilities.

2.2.2 White Paper on the Energy Policy of South Africa, 1998

The South African Energy Policy, published in December 1998 by the Department of Minerals and Energy (DME) identifies five key objectives, namely:

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

In order to meet these objectives and the developmental and socio-economic objectives in South Africa, the country needs to optimally use the available energy resources. The South African Government is required to address what can be done to meet these electricity needs both in the short- and long-term. The White Paper identifies key objectives for energy supply, such as increasing access to affordable energy services, managing energy-related environmental impacts and securing energy supply through diversity.

The White Paper on Energy Policy (1998) promotes diversification of generation technologies in the South African energy mix, and recognises natural gas as an attractive option for South Africa. It also provides the basis for the development of the Integrated Energy Plan (IEP).

2.2.3 United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP) 21 – Paris Agreement

Climate change is one of the major global challenges of the 21st century that require global response. The adverse impacts of climate change include persistent drought and extreme weather events, rising sea levels, coastal erosion and ocean acidification, further threatening food security, water, energy and health, and more broadly efforts to eradicate poverty and achieving sustainable development. Combating climate change would require substantial and sustained reductions in greenhouse gas (GHG) emissions, which together with adaptation, can limit climate change risks. The convention responsible for dealing with climate change is the United Nations Framework Convention on Climate Change (UNFCCC).

The UNFCCC was adopted in 1992 and entered into force in 1994. It provides the overall global policy framework for addressing the climate change issue and marks the first international political response to climate change. The UNFCCC sets out a framework for action aimed at stabilizing atmospheric concentrations of GHGs to avoid dangerous anthropogenic interference with the climate system.

The UNFCCC has established a variety of arrangements to govern, coordinate and provide for oversight of the arrangements described in the documentation. The oversight bodies take decisions, provide regular guidance, and keep the arrangements under regular review in order to enhance and ensure their effectiveness and efficiency. The Conference of Parties (COP), established by Article 7 of the Convention, is the supreme body and highest decision-making organ of the Convention. It reviews the implementation of the Convention and any related legal instruments, and takes decisions to promote the effective implementation of the Convention.

COP 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. This Agreement is open for signature and subject to ratification, acceptance or approval by States and regional economic integration organizations that are Parties to the Convention from 22 April 2016 to 21 April 2017. Thereafter, this Agreement shall be open for accession from the day following the date on which it is closed for signature. The agreement can only enter into force once it has been ratified by 55 countries, representing at least 55% of emissions.

This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:

(a) Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.
(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low GHG emissions development, in a manner that does not threaten food production.
(c) Making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development.

In order to achieve the long-term temperature goal set out in Article 2 of the Agreement, Parties aim to reach global peaking of GHG emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.

The Paris Agreement requires all Parties to put forward their best efforts through "nationally determined contributions" (NDCs) and to strengthen these efforts in the years ahead. This includes requirements that all Parties report regularly on their emissions and on their implementation efforts. In 2018, Parties will take stock of the collective efforts in relation to progress towards the goal set in the Paris Agreement and to inform the preparation of NDCs. There will also be a global stocktake every 5 years to assess the collective progress towards achieving the purpose of the Agreement and to inform further individual actions by Parties.

In working towards this goal, advanced economies have already included renewables in their energy mix and have planned to increase their use in order to meet their mitigation goals: Japan aims to derive 22 – 24% of its electricity production from renewable sources by 2030 and the European Union plans for them to

reach 27% of its final energy consumption. Developing countries are also playing their part, including South Africa which has included a goal of 17.8GW of renewables by 2030 within the IRP.

South Africa signed the Agreement in April 2016, and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. The Agreement came into force on 04 November 2016, thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55% of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary.

2.2.4 National Climate Change Response Policy 2011

South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively.

2.2.5 Integrated Energy Plan

The development of a national Integrated Energy Plan (IEP) was envisaged in the White Paper on Energy Policy of 1998 and the Minister of Energy, as entrenched in the National Energy Act of 2008, is mandated to develop and publish the IEP on an annual basis. The IEP takes existing policy into consideration and provides a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development.

The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple aims, some of which include:

- To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector.
- To guide the selection of appropriate technologies to meet energy demand (i.e. the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels).
- To guide investment and the development of energy infrastructure in South Africa.
- To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

Eight key objectives for energy planning were identified:

- Objective 1: Ensure the security of supply
- Objective 2: Minimise the cost of energy
- Objective 3: Promote the creation of jobs
- Objective 4: Minimise negative environmental impacts from the energy sector

» Objective 5: Promote the conservation of water
» Objective 6: Diversify supply sources and primary sources of energy
» Objective 7: Promote energy efficiency in the economy
» Objective 8: Increase access to modern technology

The IEP recognises that the use of natural gas presents the most significant potential in the energy mix. The use of natural gas in Combined Cycle Gas Turbines (CCGT) in the electricity sector positions it as a viable option in the energy mix. Co-operation with neighbouring countries also needs to be pursued and partnerships developed for joint exploitation and beneficiation of natural gas within the region. The short-term and long-term infrastructure requirements to enable the uptake of a natural gas market should be analysed

2.2.6 Integrated Resource Plan, 2010 - 2030

The Integrated Resource Plan for Electricity (IRP) 2010 – 2030 promulgated in 2011 argues that the development of the electricity generation sector can support the growth of the national economy (Department of Energy, 2013). The IRP calls for a diversified energy mix, in terms of new generation capacity. The plan asserts that natural gas presents the greatest significant potential in the energy mix. It is envisaged that the gas-derived electricity will be through open-cycle gas turbines (OCGT) and combined cycle gas turbines (CCGT), which should generate 3.9GW and 2.4GW, respectively. While the above-mentioned supply is the target for 2030, the IRP asserts that CCGT technologies and an LNG terminal needs to be built urgently so that the first CCGT capacity is available by 2020 to assist with electricity supply in the short run. The IRP recognises that Gas Fired Combined Cycle Gas Turbines (CCGTs) present the most significant potential for developing the gas market in South Africa. The advantages of developing CCGT plants have been listed as:

» Relatively short construction and commissioning lead times;
» Low capital costs per unit of capacity;
» Increased efficiency using simple and proven technology; and
» Operational flexibility as they can be ramped up or down to suit the system demand on an hourly or daily basis (Department of Energy, 2013).

The 2016 IRP[7] includes a higher allocation of energy generating capacities from OCGT and CCGT than the IRP 2010 (i.e. 5.4 GW for OCGT and 7.3 GW for CCGT by 2030). This suggests that if the IRP 2016 is promulgated in its current form, the proposed project will still be in line with the government plans concerning the energy mix.

2.2.7 National Development Plan, 2030

The National Development Plan (NDP, 2030) aims to address parts of the South African triple development challenges of poverty and inequality by 2030. The Plan is informed by the New Growth Path Framework

[7] The 2016 IRP has not been promulgated as yet and it is still under public review. The final IRP is expected in the last quarter of 2017.

(NGPF) and states that the diversification of energy such as liquefied natural gas imports and the associated infrastructure is imperative as it could provide economic and environmentally positive alternatives for power production (National Planning Commission, 2011). Furthermore, the plan states that combined cycle gas turbines provide flexibility in the power system and complements variable supply from renewable energy sources. It is envisaged that by 2020, liquefied natural gas infrastructure will be in place to power the first combined cycle gas turbines (National Planning Commission, 2011).

2.2.8 New Growth Path Framework (NGPF), 2011

The vision of the NGPF is to ensure that jobs and sustainable employment are at the centre of economic policy (Department of Economic Development, 2011). The key problem issues in the country are mass joblessness, poverty, and inequality. The lack of access to energy is identified as a major concern for the growth of the economy. Therefore, increased access to energy would have a profound effect on curbing poverty and unemployment. The framework states that public investment can create 250 000 jobs per annum in energy, transport, water, communications infrastructure and housing. These jobs are said to be in four activities, the construction of new infrastructure; the operation of new facilities; expanded maintenance; and the manufacture of components for the infrastructure programme (Department of Economic Development, 2011).

2.2.9 Industrial Policy Action Plan (IPAP), 2016 / 2017 – 2018 / 2019

The Industrial Policy Action Plan (IPAP) 2016/2017 – 2018/2019 represents a significant step forward in scaling up the country's efforts to promote long-term industrialisation and industrial diversification. It has been recognised that the Southern African region is fast transforming into an oil and gas jurisdiction led by major on and offshore gas finds in Mozambique, Tanzania, Botswana and Namibia. From a South African perspective, the scale of the find in neighbouring Mozambique (estimated at between 200-250tcf) is of particular significance. Accordingly, the plan states that a key industrial growth path is gas-based industrialisation (Department of Trade and Industry, 2016).

In this quest, the development of the long-term strategic framework to leverage the opportunities presented by regional oil and gas resources was created. The core purpose of this intervention is to put in place the necessary institutional infrastructure to implement the long-term strategic programme and maximise the multiplier effects of recently discovered and potentially forthcoming Southern African natural gas resources (Department of Trade and Industry, 2016).

2.2.10 Gas Utilisation Master Plan (GUMP)

The Gas Utilisation Master Plan (GUMP) was created to assist in achieving the objectives of the IRP by driving the development of the gas-to-power industry in South Africa. According to the GUMP, the social economic advantages of establishing a large gas-to-power industry include job creation (during construction and operation), industrial development, the potential to use LNG instead of diesel, and a source of cheaper energy. South Africa's gas-to-energy development plan spans 30 years, in which gas supply is envisaged to include local indigenous supply as well as imports through pipelines and by ship.

The GUMP identifies challenges facing the development of the gas industry in South Africa. These are: limited domestic supply; no immediate gas demand as yet; lack of gas infrastructure (no LNG import terminal yet); no gas master plan. It is envisaged that by the time construction of the proposed

development is complete, more gas infrastructure will be available, such as the LNG import terminal at the Richards Bay port. However, the proposed development itself contributes towards gas infrastructure and, therefore, helps alleviate one of the challenges facing the industry. GUMP identifies that there are potential gas reserves in the Karoo basin, deep offshore, and at the Ibhubesi basin. Through the local pipeline infrastructure, the gas-fired power station in Richards Bay could acquire local gas cheaply if the infrastructure to obtain it is developed. However, as identified, the lack of said infrastructure is currently a constraint. The timing of the development will likely fall in-line with the development of other gas-related infrastructure such as the LNG port in Richards Bay and the extension of gas pipelines from Mozambique. Therefore, the proposed project supports the implementation of GUMP.

2.3 Provincial Policy and Planning Context

2.3.1. KwaZulu-Natal Provincial Growth and Development Plan (PGDP) (2016)

The KwaZulu-Natal Provincial Growth and Development Plan (PGDP) aims to curb poverty, inequality and achieve shared growth. The PGDP has identified spatial marginalisation as one of the key issues to be addressed through ensuring economic opportunities that will meet the majority of the population's needs. The plan states that alternative sources of energy are a priority and must be realised. This energy is anticipated through gas and diesel turbines which were anticipated to be on-line in 2016 (Provincial Planning Commission, 2016).

2.3.2 KwaZulu-Natal Provincial Growth and Development Strategy (PGDS) 2011-2030 (Version 29.2-September 2013)

The Provincial Growth and Development Strategy (PGDS) for KZN addresses the triple challenge of poverty, inequality and unemployment. The KZN provincial government's vision is for the province to maximize its position as a gateway to South and Southern Africa, as well as its human and natural resources to create a safe, healthy and sustainable environment by 2030; eliminating poverty, inequality, unemployment and the current disease burden in the province. Through the seven strategic goals the KZN PGDS aims to achieve its vision by 2030, including:

1) Job creation (expanded and sustained economic output is the fundamental driver for job creation)
2) Human resource development (he human resource capacity of KZN is relevant and responsive to the growth and development needs of the province)
3) Human and community development (reduce poverty and inequality in KZN)
4) Strategic infrastructure (strategic infrastructure provides for social and economic growth and development needs of KZN)
5) Environmental sustainability (reduce global greenhouse gas emissions and create social-ecological capacity to adapt to climate change)
6) Governance and policy (effective and efficient government systems)
7) Spatial equity (increased spatial access to goods and services)

The proposed CCPP will result in the creation of job opportunities, human resource development, and strategic infrastructure for social and economic growth which will contribute towards reducing poverty and inequality in KZN. This development will therefore assist the province in achieving the aims of the PGDS to some extent.

2.3.3 KwaZulu-Natal Provincial Spatial Economic Development Strategy (2016)

The Provincial Spatial Economic Development Strategy (PSEDS) serves as a framework for the prioritisation of spatial economic development initiatives in the province. It is meant to capitalise on complementarities and facilitate consistent and focused decision making. In addition, the purpose of the strategy is to ensure that investment occurs in the sectors that provide the greatest socio-economic return to investment (Department of Economic Development, 2016).

Figure 2.2 demonstrates that the preferred project site within the Richards Bay area is located in an area demarcated as having economies of scale. Economies of scale are achieved when the number of units produced or the volume of services sold are at such a large scale that it allows for the reduced production costs, ultimately increasing the competitiveness of the product or service. High demand for the product or a service is a prerequisite for economies of scale; this implies that the area where the CCPP is to be built has a high demand for selected goods and services, including electricity. The area is already highly industrialised and hosts an IDZ, which continuously seeks new investments in ICT, agro-businesses, and metals beneficiation. Therefore, the project is to be located in a potentially high economic growth region.

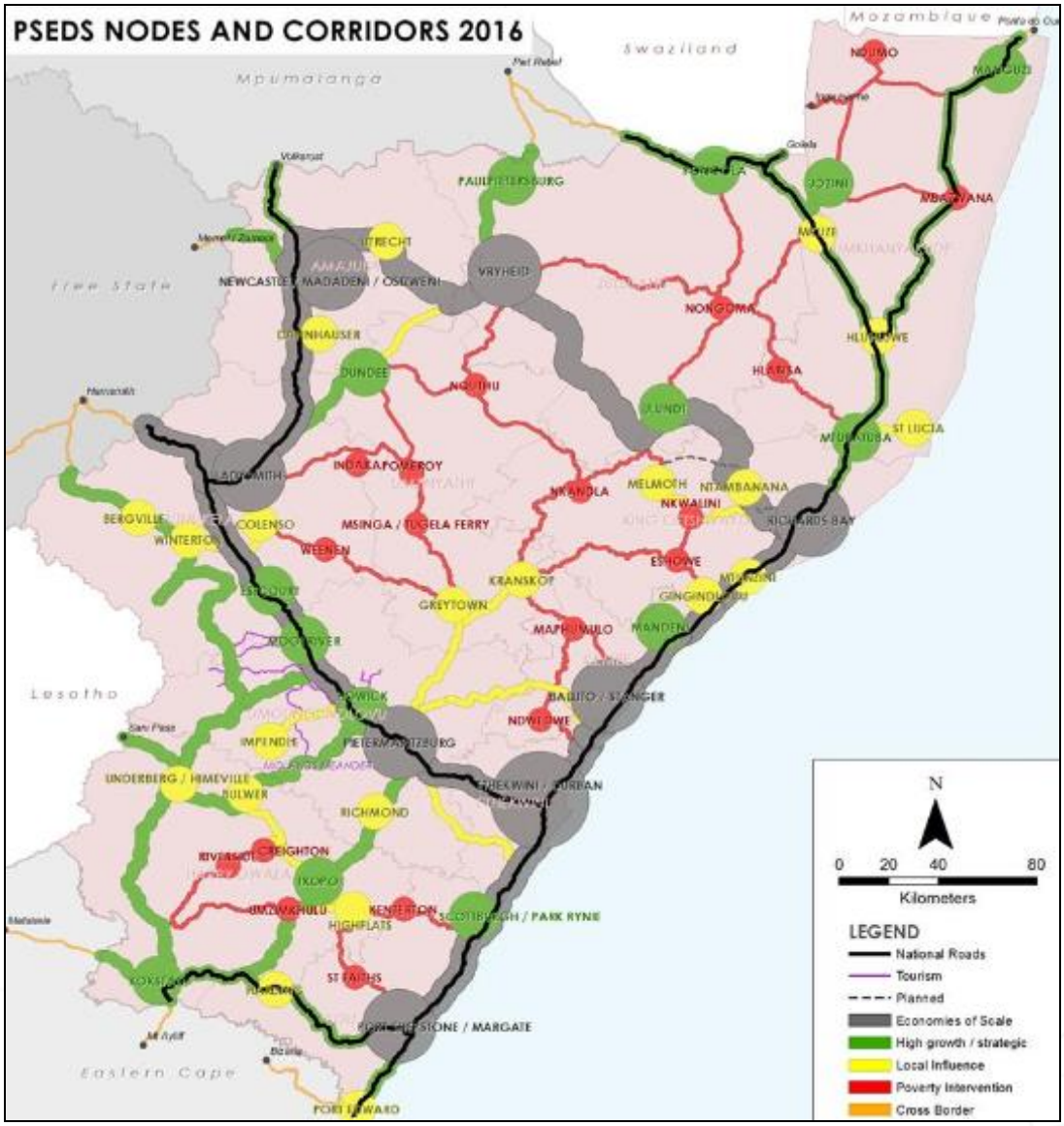

Figure 2.2: KZN Spatial Economic and Development Strategy nodes and corridors

The development of the CCPP will drive economic growth, infrastructural transformation and development. The area for development is seen as a favourable area for investment and development.

2.3.4. KwaZulu-Natal Department of Economic Development and Tourism Strategic Plan 2013/14- 2017/18

The strategic focus for the KZN DEDT during the 2013/14 – 2017/18 planning period will be building a resilient KZN provincial economy that can respond to global factors, stimulating provincial economic development, alignment of functions and purpose of all economic development entities as well as building a vibrant organisation. The vision of the strategic plan is 'leading the attainment of inclusive growth for job creation and economic sustenance.' The mission of the strategic plan is to 1) develop and implement strategies that drive economic growth; 2) be a catalyst for economic transformation and development; 3) provide leadership and facilitate integrated economic planning and development; and 4) create a favourable environment for investment. The main objectives of the strategy that relate to the proposed project are as follows:

- To facilitate the creation of new markets;
- To drive growth of the KZN provincial economy;
- To enhance sector and industrial development through Trade, Investment and Exports Logistics, ICT, Manufacturing, Green economy, agri-business, Tourism, Creative Industries, Maritime, Aerotropolis, Aviation;
- To investigate and develop viable alternative energy generation options.

2.3.5 KwaZulu-Natal Provincial Spatial Development Framework (PSDF)

The KZN Provincial Spatial Development Strategy has been developed in order to achieve the goals and objectives of the PGDS in a targeted and spatial co-ordinated manner. Spatially, it is vital to consider general accessibility as a cross-cutting variable which impacts all three pillars of sustainable development and as a result the four main spatial variables informing the provincial spatial development framework include:

- Environmental Sensitivity;
- Economic Potential;
- Social Needs; and
- Urban Accessibility.

The PSDF spatial variables were considered collectively and a ranking order to key elements used to formulate a composite Provincial Spatial Development Framework which identifies Broad Provincial Spatial Planning Categories such as:

- Conservation Corridors;
- Biodiversity Priority Areas;
- Areas of Economic Value adding;
- Areas of Economic support;
- Areas of Agricultural Development;
- Areas of High Social Need; and
- Mandated Service Delivery Areas.

Areas of Economic Support resemble a region of good economic potential in more than just one of the key provincial economic sectors. Typical interventions in these areas would include economic prioritisation of development, labour force interventions (e.g. skills development), key economic infrastructure investment and area promotion. The development of the CCPP will contribute towards economic value, economic support and economic growth in the area.

2.3.6 KwaZulu-Natal Climate Change Response and Sustainable Development Plan

In September 2012, the KwaZulu-Natal Provincial Government became the first provincial government to establish a Climate Change and Sustainable Development Council, which boosts multi-stakeholder membership (http://www.theclimategroup.org/who-we-are/our-members/the-province-of-kwazulu-natal). The Council has set up three Working Groups, namely Policy and Regulatory Alignment Working Group; Adaptation and Mitigation Working Group and Renewable Energy Working Group.

The province is in the early stages of developing the Climate Change Response and Sustainable Development Plan which is guided by, among others, the national strategy and the KwaZulu-Natal Growth and Development Strategy which has among its goals environmental sustainability as well as:

» Provision of 100% energy access in KZN Province by 2030, i.e. an additional 600 000 households or some 3 million people.
» Implementation of a number of significant renewable energy and energy efficiency projects.

The development of the Richards Bay CCPP will promote access to energy through the use of a fuel resource other than coal. The use of natural gas in the development of the Richards Bay CCPP offers reduced emissions than compared to the use of coal for electricity generation. The implementation of the CCGT technology will also ensure efficiency in terms of the use of natural gas as a fuel resource.

2.4 Local Policy and Planning Context

The strategic policies at the district and local level[8] have similar objectives for the respective areas, namely to accelerate economic growth, create jobs, uplift communities and alleviate poverty. The proposed development is considered to align with the aims of these policies, even if contributions to achieving the goals therein are only minor.

2.4.1. uThungulu District Municipality Integrated Development Plan (IDP), 2016/17

The vision for the uThungulu District Municipality Integrated Development Plan IDP 2016/17 is to be "an economically viable district with effective infrastructure that supports job creation through economic growth, rural development and promoting of our heritage" (uThungulu DM, 2016; 12). As indicated in the vision, one of the goals is infrastructure development and service delivery. In addition, the plan further

[8] The uThungulu District Municipality was renamed King Cetshwayo District Municipality in July 2016.

states that a combined strategy between the District Municipality and Eskom is urgently required to form an integrated and sustainable electricity service delivery within the district. The Richards Bay Industrial Development Zone (RBIDZ) is identified as a catalytic project (uThungulu DM, 2016). The objective is to promote economic growth in the District and improve the socio-economic conditions of residents.

A catalytic project is defined as a project of significant scale and scope that will make a substantial impact and contribution to the achievement of the vision and goals of the Province. The Richards Bay Industrial Development Zone (IDZ) is defined as a game changer in the context of catalytic projects. The proposed CCPP will be located in the IDZ Phase 1D (Provincial Planning Commission, 2016).

2.4.2 uThungulu District Growth and Development Plan, 2015

The uThungulu District Growth and Development Plan (DGDP) has an integral role in the integration and alignment of the goals of the NDP at national level and PGDP at provincial level. Therefore, the purpose of the DGDP is to translate the Provincial Growth and Development Plan into a detailed implementation plan at a district level (Uthungulu DM, 2015). One strategic intervention identified by the plan is the implementation of the roll-out programme for alternative sources of energy supply in the district where the gas-fixed electricity generation is classified as alternative energy supply. The proposed project will therefore assist with this programme.

2.4.3 uMhlathuze Municipality Integrated Development Plan (IDP), 2016

The objective of the IDP is to promote economic growth in the District and improve the socio-economic conditions of residents (uMhlathuze LM, 2016). The unsustainable use of resources, including energy, will ultimately compromise the Municipality's energy security. Challenges similar to these prompted the IDP to focus on sustainable solutions to the energy crisis. Therefore, the aim is to reduce the demand for energy and simultaneously investigate alternative energy sources.

The development of the Richards Bay CCPP will assist with the energy security within the area. The development will also create employment opportunities which will strengthen the current socio-economic conditions of the area, as well as improve the standard of living.

2.4.4 Richards Bay Industrial Development Zone (RBIDZ), 2016

The purpose of the RBIDZ is to utilise the competitive advantage of the Richards Bay area to attract sustainable investments that stimulate economic growth, job creation, beneficiation of resources and the empowerment of people. Amongst other industrial efforts, the RBIDZ has assumed a role in stewarding the establishment of an energy production hub (Richards Bay IDZ SOC, 2016). In addition, energy is one of the economic comparative advantages and these are key maritime opportunity areas for gas-to-power facilities. In this quest, there are ongoing collaborations with the Department of Energy to ensure that the province of KwaZulu-Natal contributes significantly to the diversification of the energy mix and the supply of clean and affordable electricity. Furthermore, these efforts will produce diversified energy generation capacity.

2.5 Conclusion

The findings of the review of the relevant policies and documents pertaining to the energy sector indicate that the Richards Bay CCPP is supported at a national, provincial, and local level, and that the development will contribute towards the various targets and policy aims.

2.6 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 energy generation projects 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. As energy development is a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process for the project and the related statutory environmental assessment process.

2.6.1. Regulatory Hierarchy

At **National Level**, the main regulatory agencies are:

- *Department of Energy (DoE):* This Department is responsible for policy relating to all energy forms, and is responsible for forming and approving the Integrated Resource Plan (IRP) for Energy supply within the country.
- *National Energy Regulator of South Africa (NERSA):* This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue licenses for the development to generate electricity.
- *Department of Environmental Affairs (DEA):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. The DEA is the competent authority for the development, and charged with granting the relevant environmental authorisation.
- *National Department of Agriculture, Forestry, and Fisheries (DAFF):* This Department is responsible for activities pertaining to subdivision and rezoning of agricultural land. The forestry section is responsible for the protection of tree species listed under the National Forests Act (Act No 84 of 1998).
- *South African National Roads Agency (SANRAL):* This Agency is responsible for the regulation and maintenance of all national routes.
- *Department of Water and Sanitation:* This Department is responsible for water resource protection, water use licensing and permits.
- *Department of Mineral Resources (DMR):* Approval from the DMR may be required to use land surface contrary to the objects of the Act in terms of Section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002). In terms of the Act approval from the Minister of Mineral Resources is required to ensure that the proposed activities do not sterilise a mineral resource that might occur on the project site.

At the **Provincial Level**, the main regulatory agencies are:

- *Provincial Government of KwaZulu-Natal – KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs:* This Department is the commenting authority for this project.
- *Amafa / Heritage KwaZulu Natali*: This department identifies, conserves and manages heritage resources throughout the KwaZulu-Natal Province.

» *Ezemvelo KZN Wildlife*: Ezemvelo KZN Wildlife is the provincial agency mandated to carry out biodiversity conservation and associated activities in the province of KwaZulu-Natal.

At the **Local Level,** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the KwaZulu-Natal Province, both the local and district municipalities play a role. The local municipality is the City of uMhlathuze Local Municipality which forms part of the King Cetshwayo District Municipality.

2.6.2. 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 of December 2014, published under Chapter 5 of NEMA (as amended in GNR R326 in Government Gazette No 40772 of April 2017)
» International guidelines – the Equator Principles and the International Finance Corporation and World Bank Guidelines.

Several other Acts, standards or guidelines have also informed the project process and the scope of issues evaluated in the scoping report, and are to be addressed in the EIA. A listing of relevant legislation is provided in **Table 2.1**. A more detailed review of legislative requirements applicable to the Richards Bay CCPP will be included in the EIA phase.

Table 2.1: Initial review of the relevant environmental policies, legislation, guidelines and standards applicable to the CCPP EIA

Legislation	Applicable Sections
	National Legislation
Constitution of the Republic of South Africa (Act No 108 of 1996)	» Bill of Rights (S2) » Environmental Rights (S24) – i.e. the right to an environment which is not harmful to health and well-being » Rights to freedom of movement and residence (S22) » Property rights (S25) » Access to information (S32) » Right to just administrative action (S33) » Recognition of international agreements (S231)
National Environmental Management Act (Act No 107 of 1998)	» National environmental principles (S2), providing strategic environmental management goals and objectives of the government applicable throughout the Republic to the actions of all organs of state that may significantly affect the environment » NEMA EIA Regulations (GN 324 – 327 of December 2014, as amended in April 2017) » The requirement for potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority (S24 – Environmental Authorisations) » Duty of Care (S28) requiring that reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not possible, to minimise & rectify pollution or degradation of the environment » Procedures to be followed in the event of an emergency incident which may impact on the environment (S30) » Appeals against decisions made by authorities (S43)
Environment Conservation Act (Act No 73 of 1989)	» National Noise Control Regulations (GN R154 dated 10 January 1992)
National Noise Control Regulations (of 10 January 1992)	» In terms of Section 25 of the ECA, the national noise-control regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) were promulgated. The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. » Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996, legislative responsibility for administering the noise control regulations was devolved to provincial and local authorities. Provincial Noise Control Regulations exist in the Free State, Western Cape and Gauteng provinces.
National Heritage Resources Act (Act No 25 of 1999)	» Stipulates assessment criteria and categories of heritage resources according to their significance (S7) » Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35) » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36)

Legislation	Applicable Sections
	» Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (S38) » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44)
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	» Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) » A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011). » This Act also regulates alien and invader species (GN 37885).
National Environmental Management: Air Quality Act (Act No 39 of 2004)	» S18, S19 and S20 of the Act allow certain areas to be declared and managed as "priority areas". » Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. » The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act. » Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan. » Government Gazette 33064 of 31 March 2010 provides a list of activities which require an Air Emissions License and provides the thresholds that need to be complied with
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur. » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048).
National Water Act (Act No 36 of 1998)	» Under S21 of the Act, water uses must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation.

Legislation	Applicable Sections
	» In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of the project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring. » National Government is the public trustee of the Nation's water resources (S3) » Entitlement to use water (S4) – entitles a person to use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire-fighting and recreational use, as set out in Schedule 1 » Duty of Care to prevent and remedy the effects of pollution to water resources (S19) » Procedures to be followed in the event of an emergency incident which may impact on a water resource (S20) » Definition of water use (S21) » Requirements for registration of water use (S26 and S34) » Definition of offences in terms of the Act (S151) » GA 509 of 2016 provides the requirements for impeding or diverting the flow of water in a watercourse (section 21(c)) or altering the bed, banks, course or characteristics of a watercourse (section 21(i))
National Environmental Management: Waste Act (Act No 59 of 2008)	» The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. » In terms of the regulations published in terms of this Act (GN 921 of November 2013), a Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities in support of an application for Waste Management Licenses. » The storage of waste must be undertaken in terms of the relevant norms and standards.
National Forests Act (Act No 84 of 1998)	» According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister'. » GN 908 of 21 November 2014 provides a list of protected tree species.
The Hazardous Substances Act No. 15 of 1973	» This Act was promulgated to provide for the control of substances which may cause injury or ill-health to, or death of, humans by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature. » The Hazardous Substances Act also provides for matters concerning the division of such substances or products into groups in relation to the degree of danger, the prohibition and control of the importation, manufacture, sale, use, operation, application and disposal of such substances and products.
Major Hazardous Installation Regulations	» The regulations make the employer responsible for the health and safety of his employees as well as the public in or in the vicinity of the workspace where the installation has taken place.
	Provincial Legislation

Legislation	Applicable Sections
KwaZulu-Natal Systematic Conservation Plan (KZNSCP, 2012)	» The process of conservation planning involves extensive mapping of vegetation types, transformation, species data, ecological processes and threats.
UThungulu District Municipality: Biodiversity Sector Plan (2014)	» The IDP identifies key issues which have to be focused on by the municipality and the public. » Development strategies need to be established for addressing the key issues
uMhlathuze Local Municipality Land Use Scheme Regulations (2014)	» A "Scheme" is a statutory document which divides the municipality into zones on order to guide and manage development. » The objectives of a scheme can be summarized as follows: ∗ To designate desirable land uses and provide clarity on what may or may not occur on a property, and what may be considered at the discretion of the municipality; ∗ To promote the certainty of land use which protects property values and creates investor confidence; ∗ To promote and protect the amenity within areas and neighbourhoods; ∗ To resolve conflict between different land uses, and to control negative impacts; ∗ To balance the interests of individuals with those of the public; ∗ To enable the coordinated and efficient use of land; ∗ To enable the efficient movement of persons and goods; ∗ To promote the economy; ∗ To protect natural resources or ecosystem services, including high potential agricultural resources; ∗ To protect unique areas or features; ∗ To protect cultural resources and places of religious and cultural significance; ∗ To manage land generally, including change of land use and building type; ∗ To provide a statutory basis for public involvement; ∗ To provide a means of enforcement ∗ To ensure the retention of land for future uses, etc
	Guideline Documents / Standards / Plans
South African National Standard (SANS) 10328, Methods for environmental noise impact assessments in terms of NEMA No. 107 of 1998	» Prediction of impact that noise emanating from a proposed development would have on occupants of surrounding land by determining the rating level. » Noise limits are based on the acceptable rating levels of ambient noise contained in SANS 10103.
South African Bureau of Standards (SABS)	» Four South African Bureau of Standards (SABS) scientific standards are considered relevant to noise from a Power Station. They are: ∗ SANS 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'. ∗ SANS 10210:2004. 'Calculating and predicting road traffic noise'.

Legislation	Applicable Sections
	* SANS 10328:2008. 'Methods for environmental noise impact assessments'. * SANS 10357:2004. 'The calculation of sound propagation by the Concave method'. » The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. The recommendations that the standards make are likely to inform decisions by authorities, but non-compliance with the standards will not necessarily render an activity unlawful per se.
SANS 69 - South African National Standard - Framework for setting & implementing national ambient air quality standards, SANS 1929 - South African National Standard - Ambient Air Quality - Limits for common pollutants.	» The South African Bureau of Standards (SABS), through a technical committee, developed ambient air quality limits based on international best practice for particulate matter less than 10 µm in aerodynamic diameter (PM10), dust fallout, sulphur dioxide, nitrogen dioxide, ozone, carbon monoxide, lead and benzene. » These ambient limits were derived from international best practice and what was regarded to be achievable in the South African context, taking both the natural environment and socio-economic status into account. The SANS limits informed the newly promulgated SA Standards
IFC Air Emissions and Ambient Air Quality. Environmental, Health and Safety Guidelines. Washington DC, International Finance Corporation	» The World Bank group through the IFC has emission guidelines for power plants. These guidelines are applicable to new facilities. Please note that the emission values are normalised to 6% excess oxygen, while the South African standards are normalised to 10% excess oxygen.
The Equator Principles (June 2003)	» The Equator Principles (EPs) are a voluntary set of standards for determining, assessing and managing social and environmental risk in project financing. Equator Principles Financial Institutions (EPFIs) commit to not providing loans to projects where the borrower will not or is unable to comply with their respective social and environmental policies and procedures that implement the EPs. » The Equator Principles were developed by private sector banks. The banks choose to model the Equator Principles on the environmental standards of the World Bank and the social policies of the International Finance Corporation (IFC).

CHAPTER 3: SCOPE OF THE PROPOSED PROJECT

The Richards Bay CCPP components and infrastructure presented in this chapter are indicative at this stage and aimed at enabling the reader to obtain an understanding of the proposed project.

3.1 Legal Requirements as per the EIA Regulations for the undertaking of a Scoping Report, 2014 (as amended)

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	The need and desirability for the development of the proposed CCPP has been included in Section 3.2.
(g)(i) details of all the alternatives considered;	The details of all alternatives considered for the development of the CCPP are included in Section 3.4.
(g)(ix) the outcome of the site selection matrix	The outcome of the site selection process undertaken for the identification of the preferred project site is included in Section 3.4.1.
(g)(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such	No project site or technology alternatives are being considered for the development of the CCPP. The motivation behind the exclusion of the alternatives have been included in Section 3.4.

3.2 Need and Desirability for the Proposed Gas to Power Station

Historically, coal has provided the primary fuel resource for electricity generation in South Africa over an extended period of time. Consequently, Eskom, who is the main electricity generating company, generates approximately 92% of the country's electricity from coal resources, resulting in a large carbon footprint.

Taking into consideration the ever increasing attention being placed on climate change and the management thereof throughout the world, Eskom has accepted the challenge of sustainable development and taking into consideration the social issues associated with their current coal operations. Eskom therefore aims to investigate and use opportunities locked up in technology and fuel alternatives for the generation of electricity to enable the implementation of efficient energy usage and energy generation, as well as the efficient usage of other scarce natural input resources required for electricity generation such as water.

Other aspects being considered by Eskom in terms of energy generation is a decline in the performance of coal and the ageing of electricity infrastructure. There is also a call for alternative flexible fuel resources for the generation of electricity to diversify the energy mix.

Eskom therefore recognises the need for change and desirability within the national grid, specifically the need to make use of alternative energy resources and the diversification of the energy mix. This need is

supported by national policies, specifically the Integrated Resource Plan (IRP). The IRP 2010 developed by the Department of Energy states a need for a diversified energy mix to meet the requirements of the country's need for economic and social growth. The IRP (2010) considers natural gas to have greatest significant potential to add to the energy mix. It is envisaged that the gas-derived electricity will be through open-cycle gas turbines (OCGT) and combined cycle gas turbines (CCGT), which should generate 3.9GW and 2.4GW[9], respectively. While the above-mentioned supply is the target for 2030, the IRP asserts that CCGT technologies and an LNG terminal needs to be built urgently so that the first CCGT capacity is available by 2020 to assist with electricity supply in the short run. The IRP recognises that Gas Fired Combined Cycle Gas Turbines (CCGTs) present the most significant potential for developing the gas market in South Africa.

In order to consider and enable sustainable growth and development in the national grid, Eskom has taken the initiative to investigate, consider and develop a 3000MW Combined Cycle Gas Turbine (CCGT) Power Plant. Eskom considers the development of this plant to be a necessity due to the following:

- The CCPP will add baseload or mid-merit capacity to the South African national grid, which will ensure that the supply demand in the country is met enabling economic and social growth.
- Avoidance of transmission investment and a reduction in transmission losses through the development of a power generation facility in close proximity to a supply centre (i.e. Richards Bay).
- The CCPP will provide a flexible back-up generation solution for renewable energy.
- The use of natural gas as an energy resource for the generation of electricity emits approximately half of the carbon that would have been emitted by coal due to higher efficiencies of CCGT power plants. The operation of a CCGT Power Plant also uses considerably less water than coal-fired power stations. Therefore, the development of the Richards Bay CCPP will reduce Eskom's carbon footprint, supporting the South African commitment towards a reduction in carbon emissions.
- Provide support to the Government's energy objective in terms of diversifying the energy mix of South Africa.

3.3 Description of the Proposed Project

The Richards Bay CCPP involves the construction of a gas-fired power station which will provide baseload or mid-merit power supply[10] to the electricity grid. The mid-merit power supply will be between a range of 20% to 70% of the total electricity supply produced by the Richards Bay CCPP. The power station will have a capacity of up to 3000MW, to be operated on natural gas, with diesel as a back-up fuel. The natural gas is to be supplied via a gas pipeline to the CCPP from the supply take-off point at the Richards Bay Harbour. The LNG terminal infrastructure at the port does not form part of the scope of this assessment.

The main infrastructure associated with the facility includes the following:

[9] This has been increased to 5.4 GW from OCGT and 7.3 GW CCGT by the year 2030 in the IRP 2016 which is currently under review.
[10] Mid-merit electricity generation capacity refers to the generation of electricity which is adjusted according to the fluctuations in demand in the national grid. Baseload electricity generating capacity refers to the generation of electricity continuously for all hours of the day and night in order to satisfy the minimum demand required in the national grid.

- Gas turbines for the generation of electricity through the use of natural gas or diesel.
- Heat recovery steam generators (HRSG) to produce steam.
- Steam turbines for the generation of additional electricity through the use of steam generated by the HRSG.
- Condensers for the conversion of steam back to water.
- Bypass stacks associated with each gas turbine.
- Exhaust stacks.
- A water treatment plant for the treatment of potable water and the production of demineralised water.
- A water pipeline and water tank.
- Dry-cooled system or Once-Through-Cooling system technology.
- Closed Fin-fan coolers to cool lubrication oil for the gas and steam turbines.
- A gas pipeline and a gas pipeline supply conditioning process facility.
- Diesel off-loading facility and storage tanks.
- Ancillary infrastructure including access roads, warehousing and buildings, storage facilities, generators and 132kV and 400kV switchyards.
- A power line[11] to connect the Richards Bay CCPP to the national grid for the evacuation of the generated electricity.

Table 2.1 provides details of the proposed CCPP, including the main infrastructure and services.

Table 2.1: Details of the CCPP located near Richards Bay

Component	Description/ Dimensions
Location of the site	Portion 2 and Portion 4 of Erf 11376 located within the Richards Bay IDZ Phase 1D, KwaZulu-Natal
Landowner	The affected properties are owned by the City of uMhlathuze Local Municipality
Municipal Jurisdiction	King Cetshwayo District Municipality and the City of uMhlathuze Local Municipality
Electricity Generating capacity	3000MW
Proposed technology	» Combined Cycle Gas Turbines (CCGT) Power Plant with an anticipated configuration of 2:2:1 (Gas Turbine: HRSG: Steam Turbine)
Extent of preferred project site	» 71ha
Extent of the Richards Bay CCPP development footprint	» Up to 60ha (only considering the Power Plant, excluding associated infrastructure)
Extent of the associated infrastructure development footprint	» ~11ha
Stack dimensions	» Exhaust and Bypass Stack heights will be a minimum of 40m (one exhaust stack per HRSG and one additional bypass stack for each gas turbine) and a diameter of ~7.2m.

11 The development of the power line does not form part of this EIA process.

Component	Description/ Dimensions
Fuel storage	» Storage tanks will be required for diesel to be used as a back-up fuel which will have capacity for an 8-hour operation. » Other dangerous goods will also be stored and handled on site, including flammable oils (i.e. lubricant oils, solvents etc.) and chemicals for the water treatment plant. » Four LPG tanks with a storage capacity of up to 6.5m^3 each will be required for the storage of dangerous goods. The total storage capacity required for dangerous goods is 26m^3.
Site access	» Main access to the project site will be via the Western Arterial which leads from the John Ross Highway into the industrial area. Direct access to the site is possible via the use of gravel roads surrounding the project site.
Grid connection	» The CCPP will be connected to the national grid via a power line and will require single circuit sections for crossing over existing 132kV and 275kV line along the route. The power plant will connect into the Athene Substation located approximately 12km west of the project site[12].
Associated infrastructure	» Internal roads » Internal water, air, diesel and gas pipelines » Control and electrical buildings, including a central control room » Warehousing and administrative buildings » Firefighting systems » Storage facilities for fuel, gas, diesel and chemicals » Emergency back-up generators
Services required	» Waste disposal - all waste material generated from the development will be collected by a contractor and the waste will be disposed of at a licensed waste disposal site off site. This service will be arranged with the municipality when required. » Sanitation – during construction, all sewage waste will be collected by a contractor to be disposed of at a licensed waste disposal site. This service will be arranged with the municipality when required. During operation, the facility will be connected to the municipal sewer system. » Water– Water is to be sourced from the uMhlathuze Municipality Water Works. The construction phase of the Richards Bay CCPP will require 37,290 m^3 of water for a period of 36 months. Water volumes of approximately 1 825 000m^3 per annum are expected to be required for the operation of the project. » Electricity: the electricity requirements for this facility are to be obtained from the municipality. This service will be arranged with the municipality when required. No agreement or confirmation for the above services has been obtained as yet.
Raw-Water Storage Reservoir	» Water storage facilities for process water and fire-fighting purposes will be located on site

[12] The development of the power line for the Richards Bay CCPP does not form part of this EIA process and application for Environmental Authorisation. The development of the power line will be assessed in a separate EIA process.

3.4 Project Alternatives

3.4.1 Site Alternatives

Richards Bay has been identified by Eskom as the preferred area for the development of a CCPP due to its location in relation to Mozambique. Mozambique has sufficient natural gas to enable the availability of natural gas to be piped to South Africa.

Eskom identified 6 potential sites in the greater Richards Bay area for the development of the proposed CCPP. Following consideration of various technical and landowner issues, 4 sites were taken forward into an environmental screening study namely Site 4A; Site 5, Site 6 and Site 7 (refer to **Figure 3.1**). The identified project sites are located between approximately 100m and 12km from the east coast and near Richards Bay. The sites are also located in close proximity to Port Richards Bay which is located central to all four potential project sites. Accessibility to the sites is possible via various routes, however the main route within the area is the national road, N2. Regional roads also provide access which includes the R34 and the R619 which is linked to the N2. Smaller secondary roads within the area provide direct access to the sites which are linked either to the N2 or the regional roads, i.e. R34 and R619.

The Environmental Screening and Site Selection Study approach followed served as a site risk assessment tool from an environmental acceptability perspective – that is, a process to highlight or red-flag potential environmental issues of concern within each of the potential project sites prior to initiating a full EIA process for the preferred project site. This study was informed by a site visit, specialist screening studies and sensitivity mapping. The consideration of technical factors such as proximity to the electricity grid, access to water supplies, fuel supply, etc. was not included in the site assessment.

The specialist input into the screening and site selection process included the following fields:

- Terrestrial and aquatic (including wetlands, hydrology and flood line) Ecology;
- Agricultural, land capability and soil considerations;
- Geo-hydrological and geo-technical considerations;
- Heritage and palaeontological resources;
- Socio-Economic considerations;
- Noise, traffic and visual aspects;
- Air quality considerations; and
- Marine aspects.
-

Table 2.2 provides an indication of the specialist field considered, and the rating awarded to each site in terms of the suitability of the development within that specialist field.

Table 2.2: Summary of the site screening considerations and comparison of the four potential project sites

Field of Study	Site 4a	Site 5	Site6	Site 7
Terrestrial Ecology	Preferred	Not preferred	Acceptable	Acceptable
Wetland	Not preferred	Preferred	Preferred	Acceptable
Aquatic Ecology	Not preferred	Preferred	Preferred	Acceptable
Hydrological and Floodline	N/A	N/A	N/A	N/A
Geotechnical	Acceptable	Not preferred	Not preferred	Preferred
Ground Water	Acceptable	Acceptable	Preferred	Acceptable
Archaeology	Acceptable	Not preferred	Not preferred	Preferred

Palaeontology	Acceptable	Acceptable	Acceptable	Acceptable
Socio-Economic	Not preferred	Not preferred	Not preferred	Preferred
Noise	Not preferred	Acceptable	Acceptable	Preferred
Traffic	Acceptable	Not preferred	Not preferred	Preferred
Air Quality	Not preferred	Acceptable	Preferred	Not preferred
Visual	Acceptable	Acceptable	Not preferred	Preferred
Agricultural, Land Capability and Soils	Acceptable	Not preferred	Not preferred	Preferred
Marine	Preferred	Not preferred	Acceptable	Preferred

All identified, feasible alternatives were assessed in terms of social, biophysical, economic and technical factors. In order to achieve this, the 'funnel down' process was followed during site selection specifically in order to allow the environmental sensitivity investigation to inform the site selection process. In determining the preferred site, the sites were considered in line with the mitigation hierarchy:

1. First, avoidance of adverse impacts as far as possible by use of preventative measures (in this instance a sensitivity analysis assisted in the identification of a project site and the avoidance of identified ecological and aquatic sensitive areas).
2. Second, minimisation or reduction of adverse impacts to 'as low as practicable' (in this instance minimisation of impact on identified ecological and aquatic sensitive areas through facility micro-siting and implementing mitigation).
3. Third, remedy or compensation for adverse residual impacts, which are unavoidable and cannot be reduced further (in this instance, the implementation of mitigation, or consideration of acceptable loss).

Considering this mitigation hierarchy and the findings of the screening assessment, the following conclusions were drawn:

» **Site 7** is considered to be the **most preferred** alternative considered within this Environmental Screening and Site Selection Study. No fatal flaws from an environmental perspective were identified at this stage in the process. Mitigation in terms of air quality through appropriate design of the facility will however be required.
» **Site 4a** is not preferred from an environmental perspective as the impacts on the aquatic ecology and wetlands may present an impact of high significance if these areas cannot be avoided. Appropriate mitigation to minimise impacts on sensitive social receptors, specifically regarding noise and air quality will be required. No fatal flaws from an environmental perspective were identified at this stage in the process.
» **Site 6** is not preferred from an environmental perspective, mainly due to the presence of potentially significant archaeological features and impacts on agricultural land, the loss of which cannot be mitigated. Appropriate mitigation to minimise impacts on social impacts, specifically in terms of visual impacts and access, will be required. No fatal flaws from an environmental perspective were identified at this stage in the process.
» **Site 5** is not preferred from an environmental perspective, mainly due to the presence of potentially significant archaeological features and impacts on agricultural land, the loss of which cannot be mitigated. From a social perspective, specifically in terms of access (where the recommendation was that this site not be considered further), this site is not preferred. Issues in these instances could be

addressed through mitigation and appropriate design. No fatal flaws from an environmental perspective were identified at this stage in the process.

It was therefore concluded that Site 7 is the preferred site from an environmental perspective. This site is considered to be feasible from a technical perspective due to its location in relation to the Port of Richards Bay (where the fuel supply is expected to be available), access to the grid, extent of the property, i.e. 71ha, and access from the surrounding area. It was therefore concluded that Site 7 be taken forward for detailed investigation through the EIA process.

Site 7 is located within the IDZ Phase 1D (refer to **Figure 3.2**) and includes Portion 2 and Portion 4 of Erf 11376 (refer to **Figure 3.3**). These properties have been allocated to Eskom by the IDZ. This is referred to as the preferred project site throughout this Scoping Report. The areas of sensitivity identified within the project site to date as well as any additional sensitivities identified through the scoping study will be considered by Eskom in their facility layout in order to minimise any environmental impacts that the development of the Richards Bay CCPP will have on the project site and the surrounding areas.

It must be noted that only two properties of Phase 1D of the IDZ is included in the project site. The most western property of Phase 1D has been declared as an offset area by the uMhlathuze Local Municipality and Ezemvelo KwaZulu-Natal Wildlife within which no development is allowed to take place due to sensitive environmental features which consists of a mosaic of the Kwambonambi Grassland and coastal wetland systems (**Appendix Q**)[13]. This offset is considered to be relevant to the development of the Richards Bay CCPP as the offset is located directly adjacent to the project site.

[13] The offset was implemented as part of the development of Pulp United within the site, however the development of Pulp United is no longer valid and will not be taking place in Phase 1D of the IDZ.

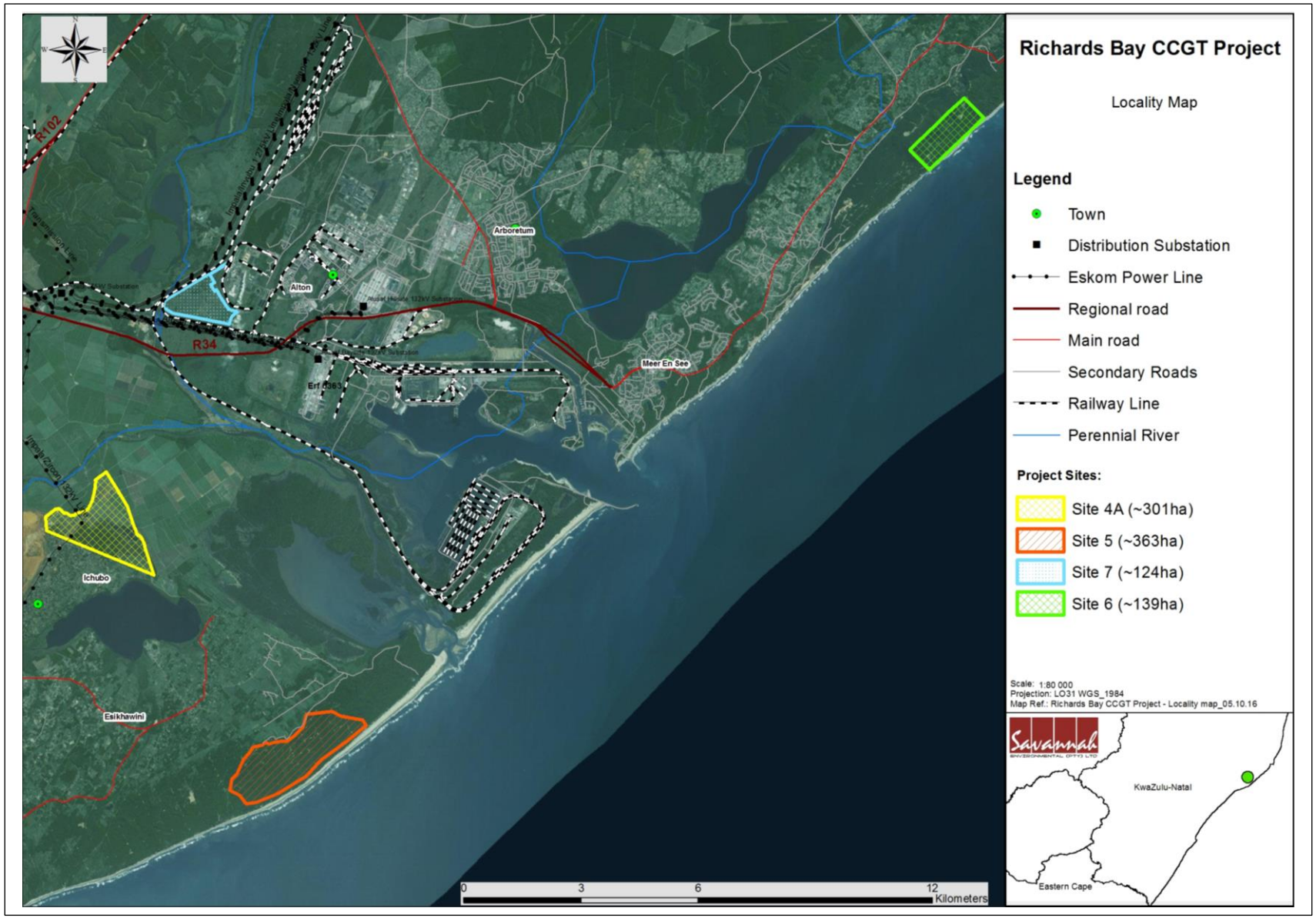

Figure 3.1: The four potential sites near Richards Bay considered during the environmental screening study

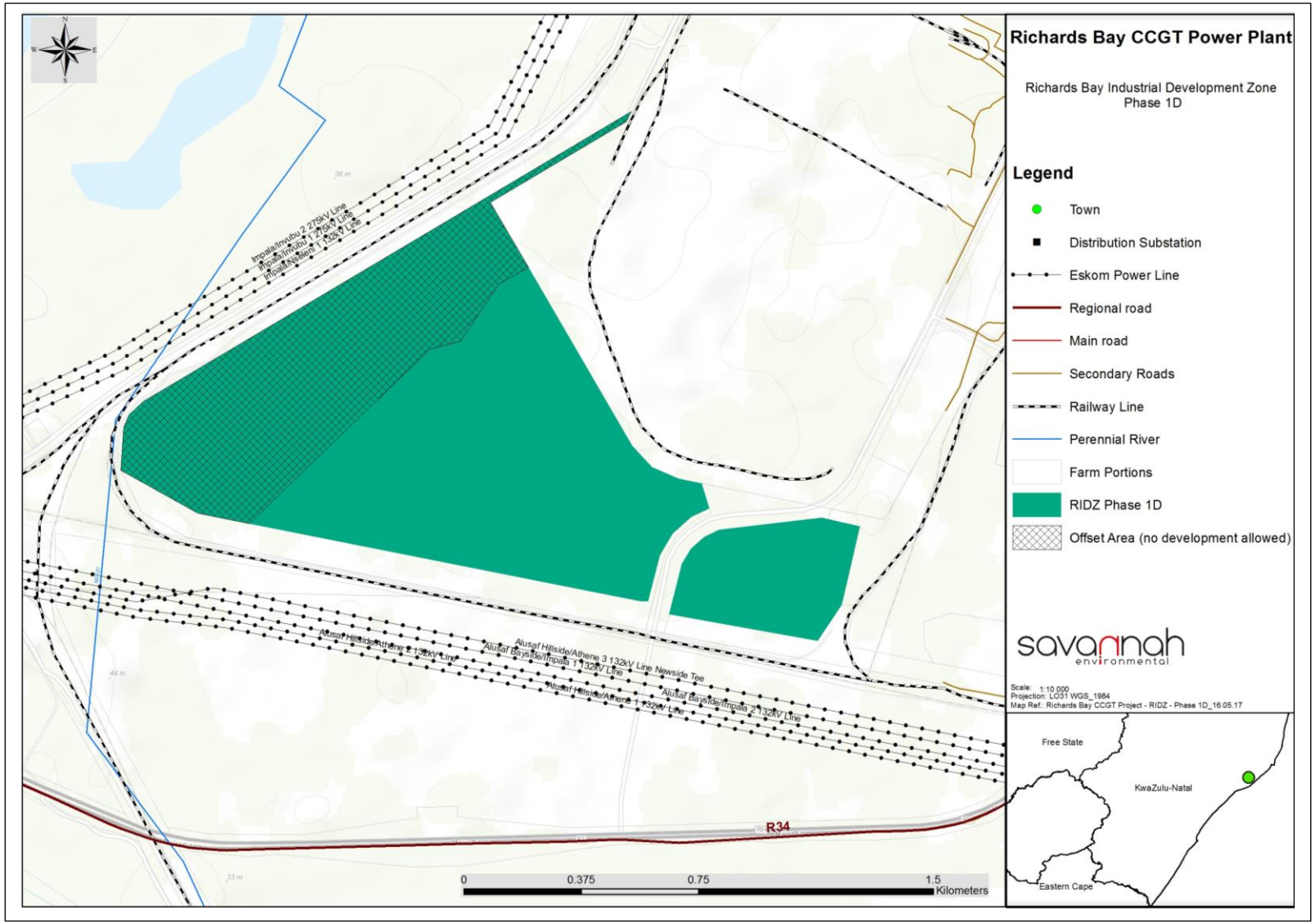

Figure 3.2: Phase 1D of the Richards Bay Industrial Development Zone (uMhlathuze Local Municipality)

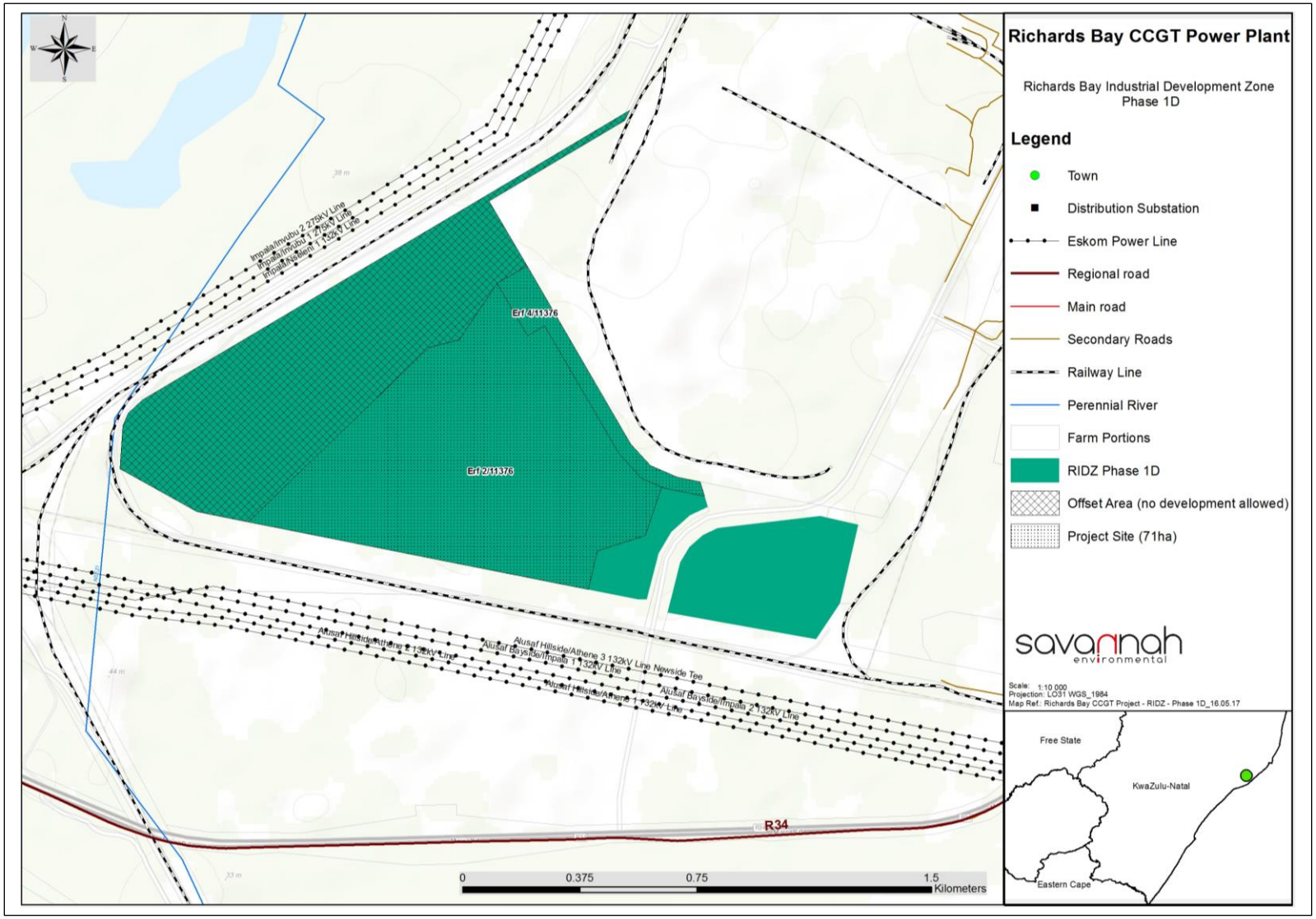

Figure 3.3: RBIDZ Phase 1D - land allocated to the project site for the development of the Richards Bay CCPP is indicated as the dotted area.

3.4.2 Technology Alternatives

The development of a Combined Cycle Gas Turbine (CCGT) Power Plant has been identified by Eskom as the most feasible technology alternative for the generation of electricity within the Richards Bay area. The use of this technology has been included in the IRP, 2010, which has been considered as a necessity to be developed within South Africa by 2030 to meet the electricity supply demands and to ensure the significant inclusion of natural gas as an energy resource within the national grid, therefore promoting a diversified energy mix. As such, no power generation technology alternatives are being considered for this development within the Richards Bay area.

CCGT Power Plants are designed to use water for cooling at the back-end of the thermal cycle. There are different types of cooling technologies available (discussed below for comparative purposes).

3.4.2.1 Cooling Technology alternatives

Dry Cooling
Dry cooling by air cooled condensers (ACC) consists of large sections of finned air cooled heat exchangers (with mechanical draft), and the exhaust steam passes through the heat exchangers forming condensate. This arrangement uses no cooling water, and therefore requires no makeup for evaporation losses. ACC cooling can reduce the total make-up water demand considerably, leaving only the process consumption and service water as major users, but is limited by its sensitivity to ambient temperature.

Once-through cooling system
A once-through cooling system uses water which is circulated through pipes to absorb heat from the steam in the system, known as condensers, and then discharges the water with a higher temperature to a local storage area (i.e. like a dam, ocean etc.). The implementation of the system however results in disruptions to the local environment.

Dry cooled technology is the cooling technology that is preferred for the development of the Richards Bay CCPP, due to the location of the site which will not be able to house the extensive piping required for once-through cooling. This is also consistent with the Department of Water and Sanitation requirements, which require a reduction in use of water. Therefore no alternative technology is considered.

3.4.3 The 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of not constructing the proposed CCPP on the project site within the RBIDZ Phase 1D. This alternative will be further assessed within the EIA phase of the process as required in terms of the EIA Regulations.

3.5. Gas-to-Power Generation Technology

A CCGT power plant uses a gas turbine generator to generate electricity and the waste heat is used to make steam to generate additional electricity via a steam turbine. The CCGT power plant is one of the most efficient power generating facilities to convert either gas or diesel fuel to mechanical power or electricity. In other words gas or diesel is burnt in a gas turbine producing both electrical power via a coupled generator and fairly hot exhaust gases. This hot exhaust gas passes through a water-cooled heat

exchanger to produce steam, which can be turned into electric power with a coupled steam turbine and generator. Refer to **Figure 3.4** below for an illustration of a typical CCGT Power Plant.

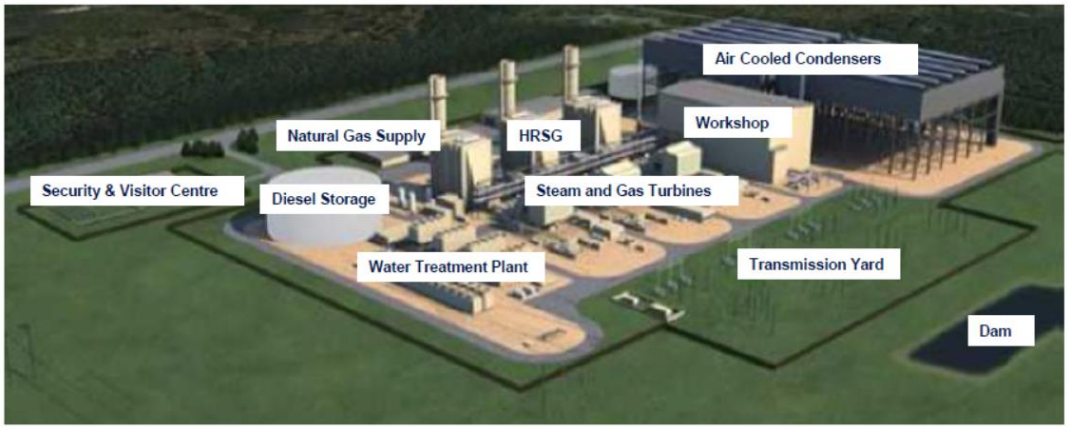

Figure 3.4: Aerial view of a typical Combined Cycle Gas Turbine Power Plant

The general process followed by the operation of a CCGT power plant which increases energy efficiency of a power resource and electrical output is described below (refer to **Figure 3.5**).

1. A gas turbine burns fuel, which will be either natural gas or diesel.
   - The gas turbine compresses air and mixes it with fuel which is combusted to produce high temperature and pressure combustion gases. The high temperature combustion gases pass through a gas turbine resulting in the rotation of the turbine blades.
   - The rotational movement of the turbine blades at a high speed drives a generator which converts a portion of the energy produced by the rotational blades into electricity. The bypass stack associated with the CCGT will also provide operational flexibility that allows the gas turbine to operate in isolation of the rest of the plant.

2. A heat recovery system captures exhaust heat.
   - The exhaust waste heat generated from the gas turbine enters the Heat Recovery Steam Generator (HRSG).
   - The HRSG captures exhaust heat from the combustion gases to produce high temperature and pressure steam.

3. Delivery of additional electricity through the operation of a steam turbine.
   - Steam produced from the HRSG is delivered to the steam turbine that sends its energy to the generator drive shaft, where it is converted into additional electricity making the power plant energy efficient.

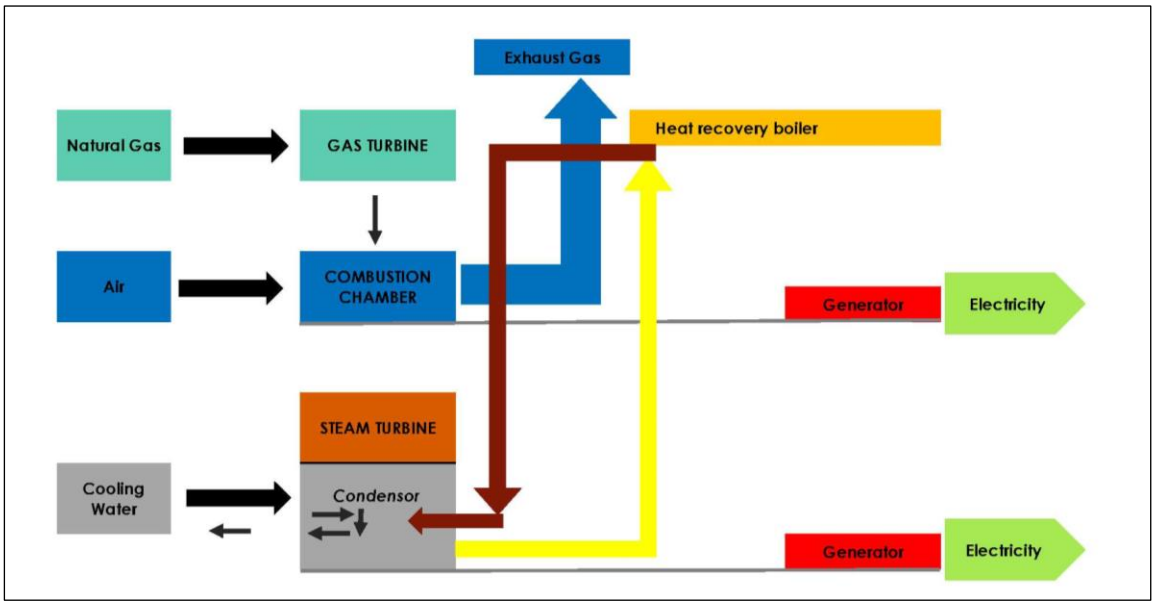

Figure 3.5: Schematic of a typical Combined Cycle Gas Turbine Power Plant

The estimated number of gas turbines for the proposed development is between 4 and 8 with an expected capacity of between 278 and 500MW each. There will be between 1 and 2 turbine halls depending on the final layout. Between 3 and 4 steam turbines with an expected capacity of between 150 and 250MW will be developed. Each gas and steam turbine will include its own generator, and as such there will be a total of up to 12 generators utilised.

3.6 Life-cycle Phases of the Combined Cycle Gas Turbine Power Plant

3.6.1 Construction Phase

Construction of the proposed gas-to-power power plant is expected to take approximately 36 months. The construction activities involve the following:

- Prior to initiating construction, a number of surveys will be required including, but not limited to, geotechnical survey, site survey and confirmation of the power station footprint.
- Access roads will need to be established to the site, specifically taking into consideration the use of abnormal vehicles.
- Site preparation activities will include clearance of vegetation and excavations for foundations. These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled and/or spread on site.
- Thereafter civil works will take place which involves concrete works for structures such as foundation, the production unit (which houses the turbines, generator and so forth), stacks, cooling towers (if applicable), substation and associated infrastructure.
- Mechanical and electrical work will then follow.
- Ancillary infrastructure such as guard house, admin building, workshops and a warehouse will be established.
- As construction is completed in an area, and as all construction equipment is removed from the site, the site will be rehabilitated where practical and reasonable.

Employment opportunities to local community members will be available during the construction phase of the project. Between 500 and 1000 temporary positions will be available over the 36 month construction phase and between 80 and 100 employment opportunities will be for permanent positions which will transition into the operation phase of the development. Employment opportunities will include highly skilled, skilled and semi-skilled positions, however, highly skilled positions will be limited. Employees will not reside on the project site and will be accommodated in the Richards Bay area.

3.6.2 Operation Phase

Prior to the operation of the power station, testing and trials will need to be undertaken. The proposed facility will create between 80 and 100 permanent employment positions (dependent on final generation technology chosen) that will be retained for more than 25 years. The permanent employment positions will include highly skilled, skilled and semi-skilled positions.

In order to operate a gas to power plant, resources are required (input), and processes and outputs occur from the electricity generation process. For combustion, fuel (natural gas) and air will be required. Water is required in the power generation process – it is converted to steam for energy conversion (from thermal energy to mechanical energy). Approximately 5000m^3 per day or 1 825 000m^3 per annum will be required for the operation of the CCPP. The output of the process is electricity. The power station will operate during mid-merit operations for 16 hours a day and 5 days a week.

It is anticipated that there will be full time security, maintenance and control room staff required at the site.

3.6.3 Decommissioning Phase

The lifespan of the proposed Richards Bay CCPP will be more than 25 years. Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life or if it is no longer required. Upgrade of the CCPP technology could be possible after 25 years should updated gas to power plant technology become available. However, the lifespan of the Richards Bay CCPP could be extended depending on the condition of the gas and steam turbines and the HRSG.

It is most likely that decommissioning activities of the infrastructure of the facility discussed in this EIA process would comprise the disassembly and disposal of the infrastructure. Decommissioning activities will involve disassembly of the production units and ancillary infrastructure, demolishing of buildings, removal of waste from the site and rehabilitation to the desired end-use.

Future use of the site after decommissioning of the Richards Bay CCPP could possibly form part of an alternative industry that would be able to utilise some of the existing infrastructure associated with the CCPP. This would however be dependent on the development plans of the area at the time.

CHAPTER 4: APPROACH TO UNDERTAKING THE SCOPING PHASE

In terms of the EIA Regulations of December 2014 (published in terms of the National Environmental Management Act (NEMA; No. 107 1998), as amended, the construction and operation of the proposed facility is a listed activity requiring environmental authorisation. This Scoping process for the proposed Richards Bay CCPP is being undertaken in accordance with the Section 24 (5) of the National Environmental Management Act (No 107 of 1998). In accordance with these Regulations, this Scoping process aims at identifying and describing potential issues associated with the proposed project, and defining the extent of studies required within the EIA phase. This was achieved through an evaluation of the proposed project involving desk-top specialist inputs, as well as a consultation process with the Interested and Affected Parties (I&APs), including the decision making authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant organs of state departments, ward councillors and other key stakeholders. This chapter serves to outline the process which was followed during the Scoping Phase of the EIA process.

4.1 Legal Requirements as per the EIA Regulations for the undertaking of a Scoping Report, 2014 (as amended)

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(d) a description of the scope of the proposed activity, including (i) all listed and specified activities triggered and (ii) a description of the activities to be undertaken, including associated structures and infrastructure	All relevant listed activities triggered by the development of the CCPP and a description of the activities which form part of the development of the CCPP have been included in section 4.1 and Table 4.1.
(g)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs	The details of the public participation process undertaken as part of the EIA process for the CCPP has been described and is included in section 4.3.2.
(g)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them	A summary of the issues raised by I&APs has been included in section 4.3.2. A Comments and Responses report including all comments and responses will be included in Appendix C8.

4.2. Relevant Listed Activities

In terms of the EIA Regulations, 2014, of GN R324, GN R325 and GN R327, the following 'listed activities' are triggered by the proposed facility:

Table 4.1: Listed activities triggered by the Richards Bay CCPP

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice) :	Describe each listed activity as per project description
GN 327, 08 December 2014 (as amended on 07 April 2017)	9(i)(ii)	The development of infrastructure exceeding 1000 meters in length for the bulk transportation of water or storm water (i) with an internal diameter of 0.36 meters or more; or (ii) with a peak throughput of 120 litres per second or more

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice) :	Describe each listed activity as per project description
		The development of the Richards Bay CCPP will require the construction of a water pipeline exceeding 1000 meters in length. The pipeline will have an internal diameter of more than 0.36 meters and will have a peak throughput exceeding 120 litres per second.
GN 327, 08 December 2014 (as amended on 07 April 2017)	12(ii)(a)(c)	The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more where such development occurs (a) within a watercourse or (c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse. ***Wetlands occur within the project site which will be affected by the development of the Richards Bay CCPP. The development will be located within watercourses, as well as within 32 meters of a watercourse.***
GN 327, 08 December 2014 (as amended on 07 April 2017)	19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal, or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse. ***The development of the Richards Bay CCPP will require the infilling or depositing of material and the excavation, removal or moving of soils of more than 10 cubic meters from the wetlands located within the project site.***
GN 327, 08 December 2014 (as amended on 07 April 2017)	24(ii)	The development of a road (ii) with a reserve wider than 13.5 meters, or where no reserve exists where the road is wider than 8 meters. ***The Richards Bay CCPP will require the construction of new access roads which will have a width of 8 meters or more.***
GN 325, 08 December 2014 (as amended on 07 April 2017)	2	The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where the electricity output is 20 megawatts or more. ***The Richards Bay CCPP will have a generating capacity of up to 3000MW and will use natural gas as a fuel resource (and diesel as an alternative), both of which are non-renewable resources.***
GN 325, 08 December 2014 (as amended on 07 April 2017)	4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic meters. ***Storage containers will be required for the development of the Richards Bay CCPP to store dangerous goods such as lubricant oils and diesel. The combined capacity of the containers will be more 500m^3.***

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice) :	Describe each listed activity as per project description
GN 325, 08 December 2014 (as amended on 07 April 2017)	6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of the national or provincial legislation governing the generation or release of emissions, pollution or effluent. ***An Air Emissions Licence is required to be obtained for the development of the Richards Bay CCPP in terms of the NEM: Air Quality Act.***
GN 325, 08 December 2014 (as amended on 07 April 2017)	7	The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods (i) in gas form, outside an industrial complex, using pipelines, exceeding 1 000 metres in length, with a throughput capacity of more than 700 tons per day; ***The development of the CCPP requires the construction of a gas pipeline of more than 1000 meters in length for the transportation of the gas to the project site. The daily throughput capacity will be more than 7000 tons per day.***
GN 325, 08 December 2014 (as amended on 07 April 2017)	15	The clearance of an area of 20 hectares or more of indigenous vegetation. ***The development of the CCPP requires the clearance of up to 71ha of indigenous vegetation.***
GN 324, 08 December 2014 (as amended on 07 April 2017)	4(d)(viii)	The development of a road wider than 4 meters with a reserve less than 13.5 meters (d) KwaZulu-Natal in (viii) Critical Biodiversity Areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The development of the Richards Bay CCPP will require the development of internal road wider than 4 meters. The project site is located within a Critical Biodiversity Area (CBA) as per the KwaZulu-Natal Biodiversity Sector Plan, 2014.***
GN 324, 08 December 2014 (as amended on 07 April 2017)	12(d)(iv)(v)	The clearance of an area of 300 square meters or more of indigenous vegetation (d) KwaZulu-Natal iv) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment, 2004; and (v) within Critical Biodiversity Areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The development of the Richards Bay CCPP will require the***

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice) :	Describe each listed activity as per project description
		clearance of up to 71ha of indigenous vegetation. The project site is located within a Critical Biodiversity Area (CBA) as per the KwaZulu-Natal Biodiversity Sector Plan, 2014 and is located within a critically endangered ecosystem due to the presence of the Kwambonambi Hygrophilous Grassland.
GN 324, 08 December 2014 (as amended on 07 April 2017)	14(ii)(a)(c)(d)(vii)	The development of (ii) infrastructure or structures with a physical footprint of 10 square meters or more where such development occurs (a) within a watercourse or (c) within 32 meters of a watercourse, measured from the edge of a watercourse (d) KwaZulu-Natal in (vii) in Critical Biodiversity Areas or ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***Wetlands occur within the project site which will be affected by the development of the Richards Bay CCPP. The development will be located within watercourses, as well as within 32 meters of a watercourse. The project site is also located within a Critical Biodiversity Area (CBA) as per the KwaZulu-Natal Biodiversity Sector Plan, 2014.***
GN 324, 08 December 2014 (as amended on 07 April 2017)	18(d)(viii)	The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 kilometre (d) KwaZulu-Natal (viii) Critical Biodiversity Areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The current gravel road network surrounding the project site will be widened by more than 4 meters. The project site is also located within a Critical Biodiversity Area (CBA) as per the KwaZulu-Natal Biodiversity Sector Plan, 2014.***

On the basis of the above listed activities, a Scoping and an EIA process is required to be undertaken for the development. This process is to be undertaken in two phases as follows:

- The Scoping Phase includes the identification and description of potential issues associated with the proposed project through a desktop study and consultation with I&APs through a public participation process. Areas of sensitivity within the project site are identified and delineated in order to identify any environmental fatal flaws, and sensitive or no go areas. Following the review period of the Scoping report, this phase culminates in the submission of the Scoping Report and Plan of Study for EIA to the DEA.
- The EIA Phase involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative) identified in the Scoping Phase. This phase includes detailed specialist investigations and a public participation process. Following the review period of the EIA report, this phase culminates in the submission of a EIA Report and an Environmental Management

Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to DEA for review and decision-making.

4.3. Objectives of the Scoping Phase

This Scoping Phase aims to:

- Identify, describe and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed facility (including design, construction, operation and decommissioning) within the site through a desk-top review of existing baseline data and desk-top specialist studies.
- Identify potentially sensitive environmental features and areas within the broader site in order to inform the preliminary design process of the facility.
- Define the scope of studies to be undertaken within the EIA process.
- 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 are to, through a consultative process:

- Identify the policies and legislation relevant to the project.
- Motivate the need and desirability of the proposed project, including the need and desirability of the activity in the context of the preferred location.
- Identify and confirm the preferred project and technology alternative.
- Identify and confirm the preferred site.
- Identify the key issues to be addressed in the EIA phase.
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the project will impose on the preferred site through the life of the project, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site.
- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

4.4. Overview of the Scoping Phase

Key tasks undertaken within the scoping phase included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of the completed application for authorisation to the competent authority (i.e. the National DEA) in terms of Regulations 5 and 16 of the EIA Regulations 2016, as amended in April 2017 (GNR326).
- Undertaking a public participation process throughout the Scoping phase in accordance with Chapter 6 of GNR326 in order to identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of GNR326.
- Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of GN R326.

» Preparation of a Comments and Responses Report detailing key issues raised by I&APs as part of the Scoping phase.

The tasks are discussed in detail below.

4.4.1. Authority Consultation and Application for Authorisation

In terms of Government Notice 779 of 01 July 2016, the National Department of Environmental Affairs (DEA) is the competent authority for all energy related projects. As the project is located within the KwaZulu-Natal Province, the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (DEDTEA) is the commenting authority for the project. Consultation with these authorities will be undertaken throughout the Scoping phase. To date, this consultation has included the following:

» Submission of the application for authorisation to DEA;
» Submission of the Scoping Report for review by I&APs, the Organs of State and the competent and commenting authorities.

A record of all authority correspondence undertaken prior to and within the Scoping Phase is included in **Appendix C4 and Appendix C5**.

4.4.2. Public Participation Process

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations under NEMA, specifically the EIA Regulations. The sharing of information forms the basis of the public participation process and offers the opportunity to Interested and Affected Parties (I&APs) to become actively involved in the EIA Process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

During the Scoping Phase
» identify issues of concern and suggestions for enhanced benefits;
» verify that their issues have been recorded;
» assist in identifying reasonable alternatives; and
» contribute relevant local information and knowledge to the environmental assessment.

During the EIA Phase
» contribute relevant local information and knowledge to the environmental assessment;
» verify that their issues have been considered in the environmental investigations; and
» comment on the findings of the environmental assessments.

During the decision-making phase:
» to advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process therefore aims to ensure that:
» Information that contains all the relevant facts in respect of the application is made available to I&APs for review.

» Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the Richards Bay CCPP project.
» Adequate review periods are provided for I&APs to comment on the findings of the Scoping and EIA Reports.

In order to ensure effective participation, the public participation process includes the following:
» Distribution of project related information in the form of notification letters and a background information document at the outset of the EIA process.
» Identification of stakeholders and I&APs, including:
  - all organs of state which have jurisdiction in respect of the activity to which the application for environmental authorisation relates;
  - owners, person in control of and occupiers of the site where the activity is to be undertaken or to any alternative site where the activity is to be undertaken;
  - owners, person in control of, and occupiers of land adjacent to the site where the activity is to be undertaken or to any alternative site where the activity is to be undertaken;
  - the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - the municipality which has jurisdiction in the area; and
  - any other I&AP as required by the competent authority.
» Placement of site notices at the project site.
» Placement of advertisements in a local and a regional newspaper.
» Compilation of an I&AP database which is updated throughout the Scoping and EIA process.
» On-going consultation with all registered I&APs regarding the progress in the EIA process through stakeholder consultation via notification letters, telephone calls and consultation meetings.
» Release of the Scoping and EIA reports for 30-day review periods.

The following sections detail the tasks which were undertaken as part of the public participation process within the Scoping Phase to date.

i. Stakeholder identification

The first step in the public participation process is to initiate the identification of potential I&APs. I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the study area and a registration process involving the completion of a registration and comment sheet. Key stakeholders and affected and surrounding landowners have been identified and registered on the project database. Other stakeholders are required to formally register as stakeholders or interested and affected parties (I&APs) for the EIA process. An initial list of stakeholders identified and registered is listed in **Table 4.2**.

Table 4.2: List of Stakeholders identified during the Scoping Phase

Organs of State
National Government Departments
Department of Agriculture, Forestry and Fisheries (DAFF)
Department of Energy (DoE)
Department of Mineral Resources (DMR)
Department of Public Works (DPW)

Department of Rural Development and Land Reform (DRDLR)
Department of Water and Sanitation (DWS)
Government Bodies and State Owned Companies
National Energy Regulator of South Africa (NERSA)
Sentech
South African Civil Aviation Authority (CAA)
South African National Roads Agency Limited (SANRAL)
Square Kilometre Array: Southern Africa (SKA)
Telkom SA Ltd
Provincial Government Departments
KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA)
Amafa / Heritage KwaZulu Natali
Ezemvelo KZN Wildlife
Local Government Departments
King Cetshwayo District Municipality
City of uMhlathuze Local Municipality
Non-Governmental Organisations
BirdLife South Africa
Wildlife and Environment Society of South Africa (WESSA)
Endangered Wildlife Trust (EWT)
Richards Bay Clean Air Association
Landowners
Affected landowners » City of uMhlathuze Local Municipality
Neighbouring landowners » City of uMhlathuze Local Municipality » Mondi » Transnet Ltd

ii. Register of Interested and Affected Parties

As per Regulation 42 of the EIA Regulations, 2014 (as amended in April 2017), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a listing of the recorded parties). The register of I&APs contains the names, contact details and addresses of:

- all persons who requested to be registered on the database in writing;
- all organs of state which hold jurisdiction in respect of the activity to which the application relates; and
- all persons who submitted written comments or attended meetings during the public participation process.

While I&APs have been encouraged to register their interest in the EIA process from the onset, the identification and registration of I&APs will be on-going for the duration of the EIA process. The register of I&APs will be updated throughout the EIA process, and will act as a record of the parties involved in the public participation process.

iii. Adverts and Notifications

The EIA process, commencing in May 2017, was announced with an invitation to the organs of state, potentially affected and neighbouring landowners and general public to register as I&APs and to actively participate in the EIA process. This was achieved via the following:

- Placement of site notices announcing the EIA process at visible points along the boundary of the project site, in accordance with the requirements of the EIA Regulations. Further notices have been placed at the Richards Bay Public Library. Photographs and the GPS coordinates of the site notices are contained in **Appendix C2**.
- Placement of advertisements announcing the EIA process for the project and inviting members of the public to register themselves as I&APs on the project database and announcing the availability of and inviting comment on the Scoping Report have been placed in The Mercury and the Zululand Observer on 21 August 2017, at the commencement of the 30-day review period. The tear sheets of the newspaper adverts are contained in **Appendix C2**.
- Compilation of a background information document (BID) for the project in order to provide information regarding the Richards Bay CCPP and the EIA process (refer to **Appendix C3**). The BID has been distributed to identified stakeholders and I&APs, with additional copies made available at public venues within the surrounding areas of the project site. The BID is also available electronically on the Savannah Environmental website.
- Distribution of EIA process notification letters notifying registered I&APs of the Richards Bay CCPP and of the availability of the Scoping Report for review, and stakeholder reply forms to organs of state, potentially affected and neighbouring landowners as well as stakeholders/I&APs via email and registered post on 11 August 2017. The evidence of this process notification is contained in **Appendices C4 and C5**. I&APs have been encouraged to view the Scoping Report and submit written comment. CD and hard copy versions of the Scoping Report have been circulated to Organs of State via courier at the commandment of the view period. The evidence of distribution of the Scoping Report will be included in the Scoping Report which will be submitted to the DEA.

iv. Public Involvement and Consultation

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 have been and will continue to be provided to I&APs to note their issues. I&APs are being consulted through the following means:

- **Presentation to the Richards Bay IDZ Environmental Review Committee:** The details of the project and EIA process are planned to be presented at the Richards Bay IDZ Environmental Review Committee (ERC). Members of the ERC will be afforded the opportunity to provide comment on the project and Scoping Report. Comments and issues raised by the ERC members will be recorded as part of the process.
- **Focus group meetings**: Focus group meetings will be held with key government departments, stakeholders and landowners on 30-31 August 2017. The purpose of these focus group meetings is to introduce the project and EIA process, to facilitate comments on the EIA process and Scoping Report, as well as to record any issues or concerns raised by stakeholders regarding the project. The meetings that are planned to be held are listed in Table 4.3. The minutes of these meetings will be included in the final Scoping Report that will be submitted to the DEA for review and acceptance.

» **Public meetings:** Two public meetings will be held. One meeting will take place on 30 August 2017 at 18:00 pm at the New Life Church in Richards Bay and the other on 31 August 2017 at 09:00 am at the Richards Bay Public Library. The aim of these public meetings is to provide I&APs with information regarding the proposed project (including technical details, project process and timeframes), to provide a summary of the Scoping Report, to invite comment on the proposed project and Scoping Report, and to discuss any issues of concern raised. The public meetings have been advertised in The Mercury and the Zululand Observer on 21 August 2017. Registered I&APs have been notified of the public meeting in writing.
» **One-on-one consultation meetings** for example with directly affected or surrounding landowners
» **Telephonic** consultation sessions
Written, faxed or e-mail correspondence

Comments received during the 30-day review period will be included in **Appendix C6** and minutes of all meetings held during the review period will be included in **Appendix C7**.

Table 4.3: Summary of Public Participation Process

Scoping Phase	Activity	Date
	The EIA process was advertised in The Mercury and Zululand Observer newspapers.	21 August 2017
	Placement of site notices, on-site and in public places.	To be placed during the Scoping Phase
	Distribution of process notification letters (including notification of the availability of the Scoping Report) and background information documents to organs of state departments, ward councillors, landowners within the study area, neighbouring landowners and stakeholder groups.	11 August 2017
	Distribution of Scoping Report	21 August 2017
	Review period for the Scoping Report for public comment.	21 August 2017 – 20 September 2017
	Public Meetings & Focus Group Meetings » Richards Bay IDZ Environmental Review Committee » City of Mhlathuze Local Municipality » KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs » Richards Bay Clean Air Association » Adjacent Landowners – Mondi and Transnet	30 – 31 August 2017

v. Identification and Recording of Issues and Concerns

A Comments and Response Report will be compiled to include all comments received during the 30-day review period. Additional comments received during the Scoping phase of the process, including those received in the review period of the Scoping report will be included in Comments and Responses Report within the Final Scoping Report. The Comments and Responses Report will be included as **Appendix C8**.

4.5. Review of the Scoping Report and Public Meeting

The Scoping Report will be made available for review from **21 August 2017 – 20 September 2017** at the following locations:

» Richards Bay Public Library
» www.savannahSA.com

Two public meetings will be held. One meeting will take place on 30 August 2017 at 18:00 pm at the New Life Church in Richards Bay and the other on 31 August 2017 at 09:00 am at the Richards Bay Public Library to ensure that all I&APs have the opportunity to attend a public meeting and raise any comments or queries.

4.6. Identification and Evaluation of Issues

Through the screening and site selection process undertaken by Eskom in April 2017, issues of concern were raised from an environmental and social perspective. During this Scoping phase the initial issues identified during the screening phase were further investigated from a desktop level and inputs from the following specialists were obtained regarding specific issues of potential concern.

Table 4.3: Specialist consultants appointed to evaluate the potential impacts associated with the Richards Bay CCPP

Specialist	Area of Expertise	Refer Appendix
Ross Goode and Anita Reuentebach of Afzelia Environmental Consultants	Terrestrial Ecology	Appendix D
Andrew Hustled and Wayne Jackson of Afzelia Environmental Consultants	Wetland and Aquatic Ecology	Appendix E
Flip Kriger of Afzelia Environmental Consultants	Hydrology and flood lines	Appendix F
John Kalala Ngeleka of Afzelia Environmental Consultants	Geo-Hydrology	Appendix G
Wayne Jackson of Afzelia Environmental Consultants	Soils and Agricultural Potential	Appendix H
Jaco van der Walt of Heritage Contracts and Archaeological Assessments	Archaeology	Appendix I
Elize Butler of the National Museum of Bloemfontein	Palaeontology	Appendix J
Terri Bird of AirShed Planning Professionals	Air Quality	Appendix K
Morne de Jager of Enviro Acoustic Research cc	Noise	Appendix L
Jon Marshall of Afzelia Environmental Consultants	Visual	Appendix M
Elena Broughton of Urban Econ Development Economists	Socio-Economic	Appendix N

In order to evaluate issues and assign an order of priority, the following methodology was used to identify the characteristics of each potential issue/impact for each of the proposed project components:

» Identify the **nature** of the potential impact, which includes a description of what causes the effect, what will be affected and how it will be affected
» Identify the **extent** of the potential impact, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional
» Identify **sensitive receptors** that may be impacted on by the proposed facility and the **types of impacts** that are most likely to occur.
» Evaluate the **significance** of potential impacts in terms of the requirements of the EIA Regulations.
» Identify the potential impacts that will be **considered further** in the EIA Phase.

4.7. Finalisation of the Scoping Report

The final stage in the Scoping Phase will entail the capturing of responses from stakeholders and I&APs on the Scoping report in order to finalise and submit the Scoping report for consideration. It is the final Scoping report upon which the decision-making environmental authorities provide comment, recommendations, and acceptance to undertake the EIA Phase of the process.

4.8 Assumptions and Limitations of the EIA Process

In conducting this Scoping report, the following general assumptions have been made:

- It is assumed that the project site identified represents a technically suitable site for the establishment of the Richards Bay CCPP and associated infrastructure.
- It is assumed that the developer has considered all technical considerations including technology for the development.
- This Scoping report has been prepared based on information available at the time of undertaking the study. More detailed information will be available for consideration in the EIA phase of the process.

Refer also to the specialist studies contained in **Appendices D – N**.

CHAPTER 5: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This section of the Scoping Report provides a description of the environment that may be affected by the Richards Bay CCPP. This information is provided in order to assist the reader in understanding the receiving environment within which the proposed development is situated. Features of the biophysical, social and economic environment that could directly or indirectly be affected by, or could affect, the proposed development have been described. This information has been sourced from existing information available for the area (refer to Chapter 9 for list of references), and aims to provide the context within which this EIA process is being conducted.

5.1 Legal Requirements as per the EIA Regulations for the undertaking of a Scoping Report, 2014 (as amended)

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(g)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The environmental attributes associated with the development of the Richards Bay CCPP is included as a whole within this chapter. The environmental attributes that are assessed within this chapter includes the following:
	» The regional location of the project site is described in Section 5.2.
	» The climatic conditions of the Richards Bay area is described in Section 5.3.
	» Biophysical characteristics of the project site and the surrounding areas are described in Section 5.4. This includes the topography, hydrology, geology, soils, agricultural potential, geo-hydrology and ecology of the project site.
	» Visual considerations are described in Section 5.5
	» The air quality of the area is considered in Section 5.6
	» Ambient noise levels of the area are described in Section 5.7.
	» Heritage resources, including the palaeontology and archaeology of the project site are described in Section 5.8.
	» Social and economic characteristics of the Richards Bay area are described in Section 5.9

5.2 Regional Setting: Location of the Project Site

The KwaZulu-Natal Province is situated in the north of South Africa. The province shares the boundaries with the Mpumalanga, Free State and Eastern Cape Provinces. The proposed development falls under the jurisdiction of the City of uMhlathuze Local Municipality and within the greater King Cetshwayo District Municipality in the KwaZulu-Natal Province. The City of uMhlathuze Local Municipality is situated on the coast of the Indian Ocean in KwaZulu-Natal, South Africa. It is one of five local municipalities that form part of the King Cetshwayo District Municipality. In 2002 Richards Bay and Empangeni, as well as the surrounding rural and tribal areas merged to form the "City of uMhlathuze" covering an area of approximately 800 km² and supporting approximately 334 4459 people.

The proposed development site falls within the Richards Bay Industrial Development Zone (IDZ) Phase 1D. Phase 1D is located 6km south west from Richards Bay Central and is also located west and directly adjacent to IDZ zone Phase 1C. Other IDZ zones are also located in close proximity to the site, including phases 1B, 1E and 1A, with Phase 1F being located north of the site. Refer to **Figure 5.2**.

The project site is currently vacant and is being used for communal cattle grazing with a cattle boma and an informal dwelling located in the northern sections of the site. Mondi Richards Bay is located directly north east of the project site. The project site has been reserved for the development of a gas to power plant by the Richards Bay IDZ. The zoning of the project site is also classified as industrial use. The broader area is characterised by intense past land-use modifications from agriculture, mining, tourism, residential, recreational and industrial development activities. The study area within the IDZ Phase 1D is bordered by mixed-use of industrial developments as well as open areas. Railway lines are located along the northern and southern boundaries of Phase 1D, adding to the industrial nature of the area and project site. Natural features also occur within the surrounding areas, including Lake Nsezi, located approximately 3km north-west of the project site. Agricultural activities, mainly relating to plantations are located ~2km south-west of the project site.

The site for the proposed Richards Bay CCPP is situated west of the Western Arterial and to the north of the regional road (R34), which is also known as the John Ross Highway. A gravel road also traverses the project site.

5.3 Climatic Conditions

The Richards Bay area is characterised by a subtropical climate. Summers are warm and wet, and winters are mild, moist to dry and do not experience frost conditions. The average annual rainfall of the area is 1128mm, with an average annual temperature of 21.5 °C. Day time temperatures peak from January to March at 29°C. Day time highs in winter from June to August are 23°C, with minimum temperatures of 12°C. Long-term climatic data has been summarised in **Figure 5.1** below.

Figure 5.1: Average minimum and maximum temperatures and monthly rainfall for Richards Bay (adapted from http://en/climate-data.org).

5.4 Biophysical Characteristics of the Study Area

5.4.1 Topography and Hydrology

The project site is considered to be relatively flat with maximum and minimum elevations of between 253 and 30m above sea level. The slope of the area is no more than 4% and the site is mostly south facing (refer to **Figure 5.3)**.

The project site is located on the Maputaland Coastal Plain which is characterised by relatively flat to slightly undulating paeleodune fields. The majority of these areas feature approximately north/south orientated drainage systems linked with the dune-slacks and depressions created in these historic windblown landscapes (**Appendix F**).

Figure 5.2: Context of the Richards Bay CCPP project site in relation to the Richards Bay IDZ zones (Thorn-Ex, 2011)

Figure 5.3: Relief of the Richards Bay CCPP project site

5.4.2 Geology, Soils and Agricultural Potential

The geology of the area is mainly yellowish redistributed sand, with small areas of alluvium. According to the land type database (Land Type Survey Staff, 1972 - 2006) the project site falls within the Hb75 land type. It is expected that, the dominant soils in the crest and midslope positions will be soils of the Fernwood and Villafontes forms. The soils that dominated the footslopes and the valley bottoms are the Fernwoods and Champagne soil form. **Figure 5.4** provides an illustration of the associated land type within the project site.

The average land capability for the land type is Class III (moderate cultivation). Class III land would pose moderate limitations to agriculture with some erosion hazard, and would require special conservation practice and tillage methods. The farming method for this capability would require the rotation of crops and ley (50%).

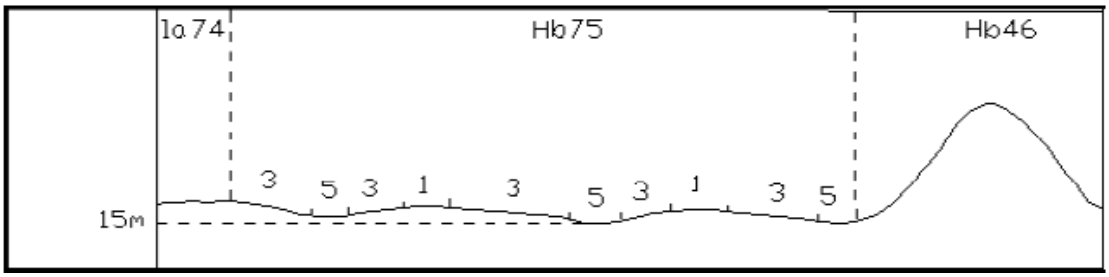

Figure 5.4: Land type HB75 terrain form A1

5.4.3 Geo-hydrology

Richards Bay's groundwater occurs within the inter-granular primary aquifer in the semi consolidated and unconsolidated materials deposited during the Tertiary and Quaternary periods. Depths of boreholes measured within the Richards Bay area varies from 30 and 45 metres below ground level (mbgl) and the aquifer testing conducted indicated the hydraulic conductivity ranging from 0.5 to 5 m/d. The effective groundwater recharge is estimated to range from 450 to 750mm/year. Generally, it is expected that the groundwater table mimics the surface topography.

5.4.4 Ecological Profile

Due to high levels of infrastructural and agricultural development in areas surrounding the project site, connectivity between natural habitat and ecosystems has already been severely compromised, with only small fragmented pockets of natural and/or semi-natural habitat remaining in most instances. Exotic vegetation has also replaced large areas of natural habitat to a large extent. Therefore, from a biodiversity perspective, connectivity is poor.

Protected and other conservation areas:

Protected areas to be considered include National Parks, Provincial Nature Reserves, Local Authority Nature reserves, Wildlife Management Areas, Private Nature Reserves, Important Bird Areas (IBA) Areas, Game Farms, Game Reserves, Nationally Protected Forest Patches and NPAES focus areas. The following protected areas are located within a 30 km radius of the project site (refer to **Figure 5.5**):

» Richards Bay Nature Reserve and IBA located 5.1 km to the south east

» Enseleni Nature Reserve located 7.8 km to the north
» Ngoye Nature Reserve and IBA located 23.3 km to the south west
» Thukela NPAES focus area located 22.9 km to the west

Figure 5.5: Protected and other conservation areas in relation to the project site

Threatened Ecosystems:

The project site is located in the 'Critically Endangered' Kwambonambi Hygrophilous Grassland ecosystem (refer to **Figure 5.6**).

The Kwambonambi Hygrophilous Grasslands ecosystem lies inland, but adjacent to the Kwambonambi Dune Forest ecosystem. It incorporates the hygrophilous grasslands behind the primary dune system as well as swamp forests, including the Richards Bay surrounds up to the lower Umfolozi Flats.

This ecosystem contains six threatened or endemic plant and animal species, including one amphibian species, *Hyperolius pickersgilli*, four millipede species, *Centrobolus fulgidus*, *Centrobolus richardi, Centrobolus rugulosus* and *Doratogonus zuluensis*; one plant species, *Kniphofia leucocephala*; and six vegetation types viz. KwaZulu-Natal Coastal Forest, KwaZulu-Natal Dune Forest, Mangrove Forest, Maputaland Wooded Grassland, Maputaland Coastal Belt and Swamp Forest.

Approximately 8% of the original extent of this ecosystem is protected in the Enseleni Nature Reserve, Richards Bay Game Reserve, Nhlabane Nature Reserve and isiMangaliso Wetland Park (Goodman, 2007).

This ecosystem is listed under Criterion F in the National List of Ecosystems which categorises it as priority areas for meeting explicit biodiversity targets as defined by a systematic biodiversity plan, including DAFF's

systematic biodiversity plans for the Forest biome. Typically, development in 'Critically Endangered' ecosystems, especially those with large footprints, should avoid conflict with or negative impacts on threatened ecosystems.

Figure 5.6: The extent of 'Critically Endangered' ecosystems in relation to the project site.

Sensitive Aquatic Ecosystems:

No watercourses are present within the project site. Four natural, Indian Ocean Coastal Belt wetlands with a wetland condition of AB (i.e. percentage natural cover >75%, therefore in natural or good condition), and a NFEPA ranking of 2, not classified as an ecological priority areas, (wetlands with the majority of its area within a sub-quaternary catchment that has sightings or breeding areas for threatened wattled cranes, grey crowned cranes and blue cranes) are however present. Refer to **Figure 5.7**.

Figure 5.7: The extent of the wetland areas in relation to the project site

Provincial and District Level conservation Priorities:

The proposed project site includes areas designated as a Critical Biodiversity Area (CBA type 3; KZNSCP, 2012). This rating is due to the potential presence of a number of threatened invertebrates such as molluscs, millipedes and orthopterans and threatened vegetation types, i.e. the Maputaland Coastal Grassland and *Ficus trichopoda* Swamp Forest. Refer to **Figure 5.8 (A)**.

On a district scale, almost the entire project site falls within a CBA: Irreplaceable area. Land-use management objectives for these areas are limited to no biodiversity loss in order to maintain these areas in a natural state, therefore the proposed land-use activities are not compatible with the aims of the land-use objectives of the CBA: Irreplaceable areas (KZNBSP, 2014). Refer to **Figure 5.8 (B)**.

Figure 5.8: Critical Biodiversity Areas located within the project site.

» A – CBA type 3 due to vegetation type (KZNSCP, 2012).
» B – CBA: Irreplaceable area (KZNBSP, 2014).

Vegetation:

Vegetation types that historically covered the project site include Alluvial Wetlands, Subtropical Freshwater Wetlands and Maputaland Wooded Grassland. Alluvial wetlands vegetation covered a small area to the west of the project site. This vegetation type typically supported an intricate complex of macrophytic vegetation, marginal reed belts as well as extensive flooded grasslands, ephemeral herblands and riverine thickets. Subtropical Freshwater Wetlands ordinarily occurred in low lying areas and were dominated by reeds, sedges, rushes and water logged meadows dominated by grasses.

The dominant vegetation type identified within the project site is the Maputaland Wooded Grassland. This vegetation type is typically supported by coastal sandy grasslands rich in geoxylic suffritices, dwarf shrubs, small trees and very rich herbaceous flora.

Important taxa of Maputaland Wooded Grasslands include the following species:
» Geoxylic suffritices: *Parinari curatellifolia, Salacia kraussii, Ancylobotrys petersiana, Diosporys galpinii, Eugenia capensis, Syzigium cordatum*.
» Gramminoids: *Diheteropogon amplectens, Themeda triandra, Aristida stipitata subsp. gracilifllora, Bewsia biflora, Cyperus obtusiflorus, C. tenax, Digitaria natalensis, Eustachya paspaloides, Setaria sphacealata, Sporobolus fimbriatus, S. subulatus, Urelytrum agropyroides*.
» Herbs: *Chamaecrista plumose*.
» Geophytic herb: *Cyrtanthus galpinii*.
» Low shrubs: *Helichrysum krausii, Agathisanthemum bojeri, Crotalaria monteiroi var. monteiroi*
» Small trees and tall shrubs: *Acridocarpus natalitius var. linearifolius, Dichrostachys cinerea subsp. nyassana, Diospyros lycioides subsp. sericea, Hyphaene coriacea, Terminalia sericea.*

Biogeographically important taxa include the following:
» Geoxylic suffritices: *Eugenia albanensis, Gymnosporia markwaardii*.
» Graminoids: *Abildgaardia hygrophila, Cyperus natalensis*.
» Herbs: *Helichrysopsis septentrionale, Oxygonum robustum, Tricliceras mossambicense*.
» Tall shrubs: *Grewia microthyrsa*.
» Woody climers: *Albertisia delagoensis, Cissampelos hirta*.

Endemic taxa expected to be present in the broader area include:
» Geoxylic suffritices: *Ochna sp. nov., Syzygium cordatum*.
» Succulent herb: *Aloe sp. nov.* (Strey 5100 PRE).
» Geophytic herb: *Brachystelma vahrmeijeri*.

Table 5.1 provides a summary of the vegetation types which occur in the project site and **Figure 5.9** provides a map of the associated vegetation types located within the project site.

Table 5.1: Summary of the vegetation types that occur in the project site proposed for the Richards Bay CCPP

KZN Vegetation Biome	KZN Vegetation Type	Conservation Status
Wetland	Alluvial Wetlands: Subtropical Alluvial Vegetation: Lowveld Floodplain Grassland: Tall Reed Wetland	Vulnerable

	Freshwater Wetlands: Subtropical Freshwater Wetlands	Vulnerable
Indian Ocean Coastal Belt	Maputaland Wooded Grassland	Endangered

Figure 5.9: Vegetation map of the project site indicating the extent of the present vegetation types

Flora species of Conservation Concern

Although the project site is in poor ecological condition, some natural vegetation is still present and the presence of Red Listed/Protected flora species is still possible. Based on geographic distribution, altitude and climate, several flora species of conservation concern (SCC) have a Medium to High Probability of occurring wihtin the project site.

The following species have a high probability of occurrence:

- *Cyrtanthus contractus* N.E.Br.
- *Scadoxus membranaceus* (Baker) Friis and Nordal
- *Aloe ecklonis* Salm-Dyck
- *Aloe marlothii* A.Berger subsp. *orientalis* Glen and D.S.Hardy
- *Ekebergia capensis* Sparrm.
- *Asparagus falcatus* L.
- *Senecio erubescens* Aiton var. *erubescens*
- *Monsonia praemorsa* E.Mey. ex R.Knuth

The following species have a medium probability of occurrence:

- *Crinum macowanii* Baker
- *Crinum stuhlmannii* Baker
- *Scadoxus multiflorus* (Martyn) Raf. subsp. *katharinae* (Baker) Friis and Nordal
- *Protorhus longifolia* (Bernh.) Engl.

- *Sclerocarya birrea* (A.Rich.) Hochst. subsp. *caffra* (Sond.) Kokwaro
- *Asparagus densiflorus* (Kunth) Jessop
- *Trachyandra asperata* Kunth var. *asperata*
- *Kniphofia leucocephala* Baijnath
- *Trachyandra saltii* (Baker) Oberm. var. *saltii*

Invasive Plant Species

Invasive alien plants (IAPs) are widely considered as a major threat to biodiversity, human livelihoods and economic development. Several areas, specifically towards the southern project site boundary, are infested by alien invasive plant species such as *Lantana camara* and *Psidium guajava*. *L. camara is* listed as a category 1b IAP and *P. guajava* as a category 3 IAP in KwaZulu-Natal Province.

Faunal Communities:

Mammals

The project site offers three major mammal habitats, i.e. terrestrial, arboreal and wetland/aquatic. Terrestrial is by far the biggest, but is unfortunately in a bad ecological state of repair as a result of overgrazing and alien plant invasions. Similarly, wetland/aquatic habitat is in poor ecological condition, and entirely isolated, which has zoogeographical repercussions. Arboreal habitat is represented by a few scattered trees.

A total of 50 mammal species potentially occur within the broader area and the project site. It should be noted that potential occurrence is interpreted as to be possible over a period of time as a result of environmentally induced expansion and contractions of population densities and ranges which simulates migration.

The majority of the species of the resident diversity are common and widespread, all with wide habitat tolerances. The reason for their survival success lies predominantly in their remarkable reproductive success and wide habitat tolerance.

Several of the bat species listed, for example the Little free-tailed bat, Angola free-tailed bat, Egyptian free-tailed bat, Egyptian slit-faced bat, Cape serotine, Banana bat and Dusky pipistrelle, shows remarkable adaptivity by expanding their distribution ranges and population numbers significantly by capitalising on the roosting and feeding opportunities offered by near-by manmade structures.

Mongooses and genets are reticent in habits and manage to persist as long as prey densities remain above the nutritional requirements. Adaptive traits such as behavioural plasticity enable vervet monkeys to persist in apparently unsuitable environments, even at small spatial scales.

Table 5.2 lists the mammal observed in the project site during the screening phase site visit. All species observed are considered to be abundant and widespread.

Table 5.2: Mammals observed during the initial site visit.

Common Name	Scientific Name	Observation Indicator	Habitat
Marsh mongoose	*Atelerix paludinosus*	Tracks	Wetlands
Slender mongoose	*Herpestes sanguineus*	Sighting	Grassveld/road

Eight Red Listed or Protected mammal species have a medium - high probability of occurring in the project site. The African Striped weasel, Botswana Long-eared bat, Hairy Slit-faced bat and Vervet monkey have a high probability of occurrence. The Lesser Woolly bat, Sundevall's Leaf-nosed bat, Swamp Musk shrew and Thomas's House bat have a medium probability of occurrence.

Herpetofauna

The project site offers three major reptile habitats, i.e. terrestrial, arboreal and fossorial. Terrestrial and fossorial is by far the biggest, but is unfortunately in a bad ecological state of repair as a result of alien plant invasions, trampling and overgrazing.

For frogs, suitable environmental conditions, especially breeding sites, are critically important and most species tend to be located in very specific microhabitats such as pools, ponds, streams, marshlands, rocky outcrops and open grassveld. The project site offers two frog habitats, namely grassveld and aquatic. However, both these habitat types are degraded and frog species richness is expected to be low.

A total of 48 reptile and 38 frog species potentially occur within the broader area and project site. Majority of the reptile and frog species of the resident diversity is common and widespread. No reptiles and frogs were observed during the screening site visit.

No Red Listed/Protected reptile species are expected to be present within the project site, however Red Listed/Protected frog species with a medium – high probability of occurrence could be present. Frog species with a high probability of occurrence includes the Striped Caco and the Whistling Rain frog. Frog species with a medium probability of occurrence includes the Pickersgill's Reed frog and the Spotted Shovel Nosed frog.

Avifauna

Two bird microhabitats are present within the project site, including grassveld and inland water. The grassveld microhabitat cover is low and sparse, and generally in a poor ecological state as a result of overgrazing and alien plant invasions. The inland water microhabitat is represented by small wetlands/depressions covered with duckweed, some fringed sparsely by reeds. Several areas surrounding the wetlands/depressions are trampled by watering cattle.

The project site falls within the distributional range of 341 bird species. During the screening site visit, the presence of 11 species was confirmed. All the observed species are widespread and abundant throughout their distributional range. The species observed include the Bee-eater European, Bee-eater White-fronted, Bishop Southern Red, Bulbul Dark-capped, Canary Yellow-fronted, Flycatcher Southern Black, Kingfisher Brown-hooded, Kite Yellow-billed, Swallow Lesser Striped, Weaver Yellow, Widowbird Fan-tailed.

Several species of conservation concern have a medium – high probability of occurring in the project site, or to be occasional visitors.

Species with a high probability of occurrence includes:

- Bishop Yellow-crowned
- Canary Brimstone
- Egret Cattle
- Flycatcher Fiscal

- Guineafowl Helmeted
- Lapwing Black-winged
- Owl Barn
- White-eye Cape

Species with a medium probability of occurrence includes:
- Bittern Little
- Buttonquail Kurrichane
- Buzzard Steppe
- Eagle Long-crested
- Eagle-owl Spotted
- Egret Little
- Egret Yellow-billed
- Falcon Amur
- Waxbill Orange-breasted

5.5 Visual Considerations

It is possible that landscape change due to the proposed development could impact the character of an important landscape. Landscape character can be derived from specific features relating to the urban or rural setting and may include key natural, historic or culturally significant elements.

Landscape Character is a composite of a number of influencing factors including:
- Landform and drainage;
- Nature and density of the development; and
- Vegetation patterns.

Landform and Drainage
The project site is located on a wide coastal plain close to Richards Bay. Landform close to the coast to the east and south east of the study area is a high dune cordon that largely blocks views of the sea from inland areas. The coastal plain is generally set at a level of between 5 and 30m amsl and at its highest the dune cordon rises to between 50 and 60m amsl.

Due to a generally high water table and highly permeable soils within the coastal plain, there are numerous drainage pans even within higher areas of the coastal plain.

In the vicinity of Richards Bay the coastal plain is approximately 13 to 14 km wide. Inland of this, a small range of hills run approximately parallel to the coast rising to between 80 to 120m amsl effectively blocking views between the coastal plain and areas further inland.
A large proportion of the coastal plain is comprised of flood plain areas for watercourses that flow through the area. Due to the landform many water courses in the area terminate in closed lagoons. The development of the port of Richards Bay has altered this system to allow the main river within the region, the Mhlatuze, to flow directly into the Indian Ocean. The natural lagoon has been protected however in that the river flows through the lagoon and then through a tidal gate into the port. The Mhlatuze Lagoon forms the basis of the Richards Bay Game Reserve which is an important nature reserve.

Landcover

Major landcover types in the vicinity of the proposed site include urban development, plantation, cultivation, natural areas and industrial development.

Major urban centres have developed within the coastal plain including Richards Bay, Empangeni and Esikhwini, all of which are in relative close proximity to the proposed site.

Forestry plantations extend to the east, the north east and the south west of Richards Bay within the coastal plain. There are also smaller sections of forestry plantation on the coastal dune cordon close to and within areas of natural dune vegetation. Forestry plantation is important from a visual perspective because as the trees develop they provide a significant amount of screening. Once mature however, trees within large areas of plantation are felled immediately opening up views to surrounding areas. Within larger plantation areas felling of mature blocks does not generally tend to expose views of areas outside forestry areas. This is due to the fact that the areas are comprised of a large number of blocks with trees at various stages of development.

There are two types of cultivation present within the area including traditional areas and large scale intensive sugar cane production. Traditional areas under cultivation is made up of small-scale agricultural units for cultivating vegetables and small areas of sugar cane with groups of houses and kraals located relatively evenly throughout the area. It also includes numerous structures and boundary trees and other woody vegetation that provide a degree of screening. Intensive sugar cane production provide a degree of screening particularly as cane matures before harvesting. Screening potential however is relatively limited particularly as the majority of roads and urban development have occurred on slightly higher land resulting in a clear overview of cultivated areas at all times.

Natural areas are generally located inland of the coastal plain as well as within a narrow band adjacent to the coast that is generally comprised of the dune cordon and areas surrounding lagoons.

Richards Bay is known as an industrial centre. The main industrial areas in the vicinity of the project site include large-scale, heavy industrial installations, loading and unloading of bulk cargo, a major coal terminal and major dune mining. From a visual perspective these elements all add to the perception that the area around and particularly to the south of Richards Bay is an industrialised landscape.

Visual Receptors

Visual Receptors are defined as "individuals and / or defined groups of people who have the potential to be affected by the proposal". Sensitive area receptors, linear receptors and point receptors have been identified within the area.

Area receptors include:

- Urban areas of Esikhawini which is located approximately 6.5km to the south west of the project site. Residential areas particularly may be sensitive to change in view;
- The Richards Bay Game Reserve is located approximately 4.5km to the south east of the project site; and
- The popular public recreational area on the northern edge of the Port which is located approximately 9km to the east of the project site.

Linear receptors include:

- The N2 Freeway which runs approximately 3.9km inland and to the west of the project site. This road is a key regional route and is important for both tourism and business. In the vicinity of Richards Bay, it runs on elevated ground just inland of the coastal plain and therefore an overview of the coastal plain looking towards the project site is possible.
- The R34 is the main route into Richards Bay from the south. It links the N2, Empangeni and inland areas to the urban area and the port. This road is duelled over a proportion of its length. It is the main access route that carries a high proportion of business and tourism related traffic. As it crosses flood plain areas it is slightly elevated which does enable views over lower sections of the coastal plain. As it approaches Richards Bay it is located on slightly elevated land that is surrounded by natural vegetation. This vegetation and the landform results in only partial views over the coastal plain being possible. This road traverses close to the project site which is located within an area that is planned for industrial development and close to existing major industrial uses.
- The P106 is the main route between the R34 / Richards Bay and Esikhwini. This road crosses the flood plain of the Mhlatuze River that is largely planted with sugar cane. Whilst it is set at a relatively low level, panoramic views over the flood plain are possible. This road joins the R34 in close proximity to the project site. This road is largely a local distributor providing access for local residents and businesses. It is unlikely to carry a large number of tourists although it does provide access to the southern side of the Richards Bay Game Reserve.

Point receptors include:

- Isolated homesteads and small rural settlements most of which are likely to be associated with agricultural uses. There are no isolated homesteads in the vicinity of the project site. There are however a number of homesteads located in higher areas inland of the coastal plain.
- A service station on the N2 overlooking the coastal plain. This facility is used by many local and regional travellers as a rest and refuelling stop. A large proportion of these travellers are likely be travelling for tourism related reasons.

5.6 Air Quality

Meteorological mechanisms direct the dispersion, transformation and eventual removal of pollutants from the atmosphere. The extent to which pollution will accumulate or disperse in the atmosphere is dependent on the degree of thermal and mechanical turbulence within the earth's boundary layer. This dispersion comprises vertical and horizontal components of motion. The stability of the atmosphere and the depth of the surface-mixing layer define the vertical component. The horizontal dispersion of pollution in the boundary layer is primarily a function of the wind field. The wind speed determines both the distance of downwind transport and the rate of dilution as a result of plume 'stretching'. The generation of mechanical turbulence is similarly a function of wind speed, in combination with surface roughness. The wind direction, and variability in wind direction, determines the general path pollutants will follow, and the extent of crosswind spreading. The pollution concentration levels therefore fluctuate in response to changes in atmospheric stability, to concurrent variations in the mixing depth, and to shifts in the wind field.

Sources of air pollution in the region

The identification of existing sources of emission in the region and the characterisation of existing ambient pollutant concentrations is fundamental to understand the current air quality of the area. Source types present in the area and the pollutants associated with such source types are noted with the aim of

identifying pollutants, which may be of importance in terms of cumulative impact potentials. The source types include:

- Stack, vent and fugitive emissions from industrial operations;
- Fugitive emissions from industrial, mining, commercial and miscellaneous operations;
- Vehicle tailpipe emissions;
- Biomass burning (veld fires, forest fires and sugar cane burning);
- Waste treatment facilities (i.e. water treatment plants, landfills, incinerators etc.); and
- Various miscellaneous fugitive dust sources (agricultural activities, wind erosion of open areas, vehicle-entrainment of dust along paved and unpaved roads).

Figure 5.10 provides the location of the main industries and mines within the Local Municipality.

Figure 5.10: Location of all the main industries and mines within the City of uMhlathuze Local Municipality

Industrial Sources

Most of industrial sources within the region are located within Richards Bay. These industrial operations have a substantial influence on ambient concentrations in Richards Bay.

Mining sources

Mining operations within the Richards Bay area almost exclusively include mineral sand mining activities. Only two mines are operational within the municipal boundaries namely Tronox Hillendale, and Hlanganani Sandwork Operations. There might be other smaller sandwork operations within the municipality. The Tronox Hillendale Mine is nearing the end of its life, and the proposed Fairbreeze Mine to the south of Hillendale, will provide the mineral concentrate for the smelter once the Hillendale operations have ceased. The Zulti South Mining Lease Area is a proposed mineral sand mine to be located northeast of Mtunzini, covering an area of 20 km in length by a maximum of 2 km in width. The operations will include opencast dry mining of dune sand and processing to produce heavy mineral concentrate (HMC).

Mining operations represent potentially significant sources of fugitive dust emissions, where the particulate emissions are the main pollutant of concern. Fugitive dust sources associated with sand mining activities include materials handling activities, vehicle-entrainment by haul trucks and wind-blown dust from tailings impoundments and stockpiles.

Transport related emissions

Vehicles, railroad, shipping and the airport are included in this category. The main source of concern in the area is vehicle tailpipe emissions. The main national and provincial highways and roads include the N2 from Durban in the south to north of Empangeni. Various main and secondary roads link the rural and urban areas within the municipality.

Biomass burning

Crop-residue burning and general wild fires (veld fires) represent significant sources of combustion-related emissions associated with agricultural areas and forestry. Major pollutants from veld fires are particulates, CO and VOCs. The extent of NOX emissions depend on combustion temperatures, with minor quantities of sulfur oxides released. Emissions are greater from sugar cane burning than for savannas due to sugar cane areas being associated with a greater availability of existing material to be burned.

Miscellaneous sources

Various miscellaneous fugitive dust sources, including: agricultural activities, wind erosion of open areas, vehicle-entrainment of dust along paved and unpaved roads are found in the area.

Measured Baseline Ambient Air Quality

The Richards Bay Clean Air Association (RBCAA) operates 12 ambient monitoring stations, measuring meteorological parameters and ambient SO_2, TRS and PM10 concentrations. Hourly data from all stations was provided by the RBCAA for the period June 2013 to June 2016.

PM_{10} Ambient Concentrations

The daily PM_{10} concentrations – for the data period provided (June 2013 to July 2016) – indicate non-compliance with the daily PM10 NAAQS at Brackenham and CBD stations during 2015, where daily average concentrations measured exceeded 75 µg/m³ on more than four occasions during the year. The number of exceedances at Mtunzini remains the same. Annual average PM10 concentrations were compliant with the NAAQS at all stations and similarity between years at each station is noted. Interpretation of compliance the 2013 and 2016 data (for daily and annual averages) is cautioned as the data sets provided were incomplete and represent approximately 50% of the year or less

SO_2 Ambient Concentrations

Hourly SO_2 concentrations recorded at seven RBCAA stations complied with the hourly NAAQS for all years in the data set. Scorpio AQMS had the largest number of hourly exceedances, 48 hours in 2013 and 5 hours in 2014. The NAAQS allows for 88 hours exceeding the limit concentration per year (350 µg/m³). The Harbour West AQMS recorded 2 hours (in 2014) and CBD 1 hour (in 2016) exceeding the hourly limit concentration. No hourly exceedances were measured at the other stations during the June 2013 to July 2016 period. The Scorpio AQMS recorded non-compliance with the daily SO2 NAAQS (125 µg/m³) in 2013 due to 9 days recording averages in excess of the limit concentration (4 days are allowed). Although the daily average SO_2 concentrations exceeded the limit concentration at Scorpio for two days during 2014 no further daily exceedances at the Scorpio (or other AQMS) have been recorded. Annual average SO_2 at all stations was compliant with the NAAQS with a slight trend towards improvement at all stations.

5.7 Noise

Potential noise sensitive receptors using topographical maps have been identified which could be affected by the development of the Richards Bay CCPP. Two potential noise-sensitive developments were identified during the site screening process and the status of these locations was confirmed during the site visit. The site visit defined the status of the potential noise-sensitive receptors as the Richards Bay Shooting Sport Club and the Mondi Sport Centre, locations not used for residential purposes.

The current environmental sound character was determined through a methodology used to measure ambient sound levels as defined by the South African National Standard SANS 10103:2008. A number of single measurements were collected to gauge the ambient sound character and levels around the project site while being able to hear and possibly identify noise sources.

All the 10-minute measurements indicated an area with a potential to be quiet, although traffic on the roads as well as natural (birds, insects and wind-induced noises) did increase the noise levels.

The measured data indicate that the area has significantly elevated noise levels mainly due to a constant noise from the existing Mondi paper mill located adjacent to the project site, with noises from trains significantly impacting on the ambient sound levels in the area. Traffic on the R34 (John Ross Highway) also impacts on an area of up to 500m from the roads. Considering the measurements, and measurements conducted in the last few years at similar areas, acceptable rating levels for the area would be typical of an industrial noise district.

5.8 Heritage features of the region

5.8.1 Heritage and archaeology

The Later Stone Age is well represented in KwaZulu-Natal with an abundance of rock art, like the rock paintings at Giants Castle and Kamberg in the Drakensburg Mountains. Rock art sites have been also been documented in the areas around Estcourt, Mooi River and Dundee. Several caves in KZN contain significant archaeological deposits like the well-known Middle Stone Age site of Sibudu Cave on the coast of KwaZulu-Natal, which shows evidence for early forms of cognitive human behavioural patterns. Another well-known cave called Border Cave is situated some 40 kilometres to the north east of the project site at the Ingodini Border Cave Museum Complex. The site was first investigated by Raymond Dart in 1934; here excavations exposed a thick deposit of archaeological material dating from the Iron Age overlaying Middle Stone Age artefacts. Later excavations, by Beaumont in the early 1970's, revealed a complete MSA sequence succeeded by Early and Later Iron Age deposits. For the project site, a single Stone Age site is on record and was identified within the western periphery of the site. This site has a field rating of 3B as per the Pietermaritzburg Museum database and is considered to be of low significance.

Extensive field based heritage surveys adjacent to the project site recorded a high frequency of heritage sites. These studies showed that the dune systems closer to the sea is of heritage significance. The project site has previously been disturbed and it is expected that identified impacts on heritage resources in this area can be mitigated.

5.8.2 Palaeontology (Fossils)

Cenozoic deposits of aeolian, estuarine, fluvial, lacustrine and marine origin are extensively developed along the coastal plains of the southern African subcontinent. These deposits are overall thin due to buoyancy and erosion, although thick Cenozoic deposits have accumulated offshore in extensional rift basins as sediment funnels at river mouths. The onshore Cenozoic deposits overlie a broad coastal plain in southern Mozambique and northern KwaZulu-Natal with a maximum width of approximately 60km which narrows progressively southwards.

The Cenozoic deposits consist of five coastal Groups namely the Maputuland, Algoa, Bredasdorp, Sandveld and West Coast Groups

The Maputuland Group forms a thin blanket of Tertiary and Cretaceous sequences that are distributed from Mozambique southwards to Durban.

The largest portion of the Uloa Formation consists of approximately 5 metres of unbedded calcirudite, known as the "Pecten Bed", due to the wealth of the bivalve Aeqipectenuloa. Gastropods, brachiopods, coralline algae, corals, polyzoa, foraminifera and echinoids are present, as well as isolated teeth of the extinct giant shark Carcharodon megalodon.

No fossils have been recorded from the Muzi Formation. The Bluff Formation has local fossiliferous zones whereas the Berea Formation, as well as the Masotcheni Formation and recent alluvial and sand deposits, and do not contain significant fossil remains.

The Port Durnford Formation contains a sequence of carbonaceous muds and sand, comprising fossils of terrestrial vertebrates for example antelope, buffalo, elephant, hippopotamus, rhinoceros as well as marine fossils including crustaceans and fish, foraminifera, marine moluscs and fragments of turtles and crocodiles.

The project site is completely underlain by the Tertiary and Cretaceous successions of the coastal plains of KwaZulu-Natal of the Maputuland Group (Late Caenozoic Era) which is approximately 18 000 year old. The largest portion of the Uloa Formation is known for the wealth of the bivalve Aeqipectenuloa. Gastropods, brachiopods, coralline algae, corals, polyzoa, foraminifera and echinoids are present, as well as isolated teeth of the extinct giant shark, *Carcharodon megalodon*. The Port Durnford Formation, which is also present, includes fossils of terrestrial vertebrates such as antelope, buffalo, elephant, hippopotamus, rhinoceros as well as marine fossils and fragments of turtles and crocodiles.

5.9 Social and Economic Characteristics of the Project Site and Surrounding Areas

The KwaZulu-Natal Province is one of the country's most popular tourist destinations and was founded in 1994 when Zulu Bantustan of KwaZulu merged with the Natal Province. It is South Africa's third smallest province with an area of over 94 000km². The province house the second largest population with over 10 million inhabitants, which was nearly 20% of the country's total population.

The King Cetshwayo District Municipality is a Category C municipality. This denotes that the municipality has a municipal executive and legislative authority in an area that includes more than one municipality (Africa S. o., 1996). The district is subdivided into five local municipalities namely, the City of uMhlathuze

Local Municipality, the uMlalazi Local Municipality, the Mthonjaneni Local Municipality, the Nkandla Local Municipality, and the uMfolozi Local Municipality.

The uMhlathuze Local Municipality is a Category B municipality, which means it shares municipal executive and legislative authority with a category c municipality within whose area it falls. It is the smallest local municipality of the five municipalities in the King Cetshwayo District Municipality. The main economic sector in the municipality is manufacturing, which makes up 45.9%. Lastly, the municipality housed a population of over 360 000 in 2011.

In 2015, The City of uMhlathuze Local Municipality's economy was valued at R23 422 million in current prices. The Local Municipality contributes 69% to the economy of the King Cetshwayo District Municipality and 5% to the economy of KwaZulu-Natal. Over a period of 10 years (2005-2015), the municipality's economy grew at a positive Compounded Annual Growth Rate (CAGR) of 2% per year. This is similar to the district and provincial growth of 2.4% and 2.9%, respectively. The economic sectors with equal and the greatest contribution to the GDP-R of KwaZulu-Natal are Manufacturing and Finance and Business Services. Similarly, manufacturing is the highest contributing economic sector in uMhlathuze Local Municipality. Electricity, gas and water is the economic sector with the least contribution to the GDP-R of the municipality. Between 2008 and 2010 most economic sectors experienced a decrease in GDP-R as a result of the economic crisis. However, Construction, Trade, Finance and Business Services and General Government did not have a decline in GDP-R during that period.

The City of uMhlathuze has a negligible access to water backlog of 2%. Most (89%) of the households in uMhlathuze obtain water from the uMhlathuze Municipality. The key challenges include a water loss that is on average 30%. However, water loss has been reduced by 18%. In addition, severe drought conditions have resulted in water sources running completely dry. Lastly, the water extracted from drilled boreholes is of inadequate quality.

The City of uMhlathuze Local Municipality is a licensed electricity provider, however in rural areas, electricity is still supplied by Eskom. The uMhlathuze Municipality does not have electricity backlogs in its area of supply, while a few backlogs exist in the areas within the municipality that are directly serviced by Eskom. The municipality solely operates on infills for new customers. Most of the households use electricity for lighting, cooking and heating. The minority use wood and gas amongst other alternative energy sources for lighting, cooking and heating.

The municipal housing backlog is estimated at 10 000 urban greenfield low income housing, 50 000 social and community residential units, and over 6 000 rural housing, including slum clearance. About 5 100 informal dwellings were identified in 2011. The key challenge in the uMhlathuze Local Municipality is the shortage of suitably located land for housing development. Nonetheless, the establishment of rental housing units in Richards Bay and Empangeni has been prioritised.

CHAPTER 6: SCOPING OF ISSUES ASSOCIATED WITH THE RICHARDS BAY CCPP

The potential impacts of the proposed Richards Bay CCPP (i.e. construction, operation and decommissioning phases) are identified, described and evaluated in this chapter in accordance with the requirements of the EIA Regulations. In accordance with the objectives of the scoping study (as defined in Chapter 3 of this report), this has been informed by a review of existing baseline information and desk-top investigations. This has been undertaken with the aim of determining the feasibility of undertaking the development within the project site, and identifying issues which will be assessed further and confirmed in the EIA phase.

The majority of the environmental impacts are expected to occur during the construction phase with developments of this nature. Environmental issues associated with construction and decommissioning activities of the development are similar and include, among others:

» Impacts on ecology, including wetlands, fauna and flora within and around the site.
» Impacts on underground-water, soil and agricultural potential of the development footprint.
» Impacts on heritage resources, including archaeological and palaeontological resources, within the development footprint.
» Impacts on the social aspects of the affected communities within and around the project site.

Environmental issues specific to the operation of the Richards Bay CCPP could include, among others:

» Impacts on ambient noise levels in the area.
» Impacts on ambient air quality and climate change of the area.
» Impacts on the social and visual aspects of the affected communities within and around the project site.

The sections which follow provide a summary of the findings of the scoping study undertaken for the construction and operation phases of the proposed Richards Bay CCPP. Impacts associated with the decommissioning phase are expected to be similar to those associated with construction and are therefore not repeated. Impacts of the Richards Bay CCPP are described and evaluated, and recommendations are made regarding further studies required within the EIA phase of the process.

6.1 Legal Requirements as per the EIA Regulations for the undertaking of a Scoping Report, 2014 (as amended)

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(g)(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts (aa) can be reversed (bb) may cause irreplaceable loss of resources and (cc)	The potential impacts associated with the construction and operation of the Richards Bay CCPP has been identified and assessed within Section 6.3.

Requirement	Relevant Section
can be avoided, managed or mitigated.	
(g)(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives	The methodology used in identifying the potential impacts and risks is included in Section 6.2.
(g)(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The positive and negative impacts associated with the development of the Richards Bay CCPP have been included in Section 6.3.
(g)(viii) the possible mitigation measures that could be applied and level of residual risk	Recommendations regarding the development of the Richards Bay CCPP have been included in Section 6.3.

6.2. Methodology for the Impact and Risk Assessment during the Scoping Phase

The following methodology was used to describe and evaluate the main issues and potential risks and impacts associated with the Richards Bay CCPP during the scoping phase:

- The identification of potential sensitive environments and receptors that may be impacted on by the development and the types of impacts (i.e. direct, indirect and cumulative) that are most likely to occur. This was achieved through a review of existing baseline information and desk-top investigations to define sensitivities.
- Description of the nature, significance, consequence, extent, duration and probability of potential impacts, as well as the degree to which these impacts are reversible, may cause irreplaceable loss of resources and can be avoided, managed or mitigated during the construction and operation phases.
- The identification of potential risks to the development and the environment, and identification of 'No-Go' areas within the broader area and project site, where applicable.
- The compilation of a summary of the potential impacts that will be considered further in the EIA Phase through specialist assessments.

6.3. Impacts during the Construction Phase

6.3.1 Potential Impacts on Ecology

The following impacts on the ecology within the project site and the surrounding area could potentially occur during the construction phase of the Richards Bay CCPP (**Appendix D**):

Loss of 'Critically Endangered' ecosystems
Critically Endangered ecosystems have been identified within the project site (Kwambonambi hygrophilous grassland). The Kwambonambi Hygrophilous Grassland within the project site is severely degraded by overgrazing and alien plant invasions with few natural plant species remaining. Regional connectivity is impaired as a result of extensive agricultural and industrial developments on properties adjacent to the project site. Therefore impacts on the receiving environment in its current state are expected to be low.

Loss of CBA: Irreplaceable areas
Due to the poor ecological state of the project site, this area is not considered to be representative of a CBA area. The project site is severely degraded by overgrazing and alien plant invasions with few natural plant species remaining. Regional connectivity is impaired as a result of extensive agricultural and industrial developments on properties adjacent to the project site. Therefore impacts on the receiving environment in its current state are expected to be low.

Loss of Red Listed/Protected flora species
Several Red Listed/Protected flora species potentially occur within the project site. Vegetation clearance to accommodate infrastructure may therefore result in the destruction of several Red Listed/Protected flora species. The project site offers suitable habitat to two provincially protected trees, one tree species protected by the National Forest Act and Red Listed plant species. A comprehensive flora survey will have to be undertaken to verify the presence/absence of any Red Listed/Protected flora species in the project site, and within a 200 m radius of the project site.

Loss of Red Listed/Protected fauna species
Several Red Listed/Protected fauna species potentially occur within the project site. Fauna species will directly be affected by the overall loss of habitat as a result of vegetation clearance during the construction phase. The project site offers suitable habitat to several threatened, provincially protected and endemic mammalian, amphibian and avian species. A comprehensive survey on available habitat and species composition of the project site will have to

be undertaken to verify the presence/absence of threatened and protected fauna species. These surveys must include focal species surveys for the 'Critically Endangered' Pickersgill's Reed Frog, the 'Vulnerable' Spotted Shovel-nosed frog and the 'Endangered' Grey Crowned Cranes.

Soil and water contamination

Different types of effluents, solid waste and hazardous material associated with the construction activities may contaminate the water and soil resources in the project site.

Impact

Potential impacts on ecology are expected to be largely limited to the construction phase of the development. The project site is severely degraded by overgrazing and alien plant infestations. However, several wetland areas are present. Although these areas are in poor ecological conditions, the 'Critically Endangered' Pickersgill's Reed Frog and the 'Vulnerable' Spotted Shovel-nosed frog may occur in these areas. Furthermore, these areas have also been identified as a possible breeding site for the 'Endangered' Grey Crowned Cranes. Therefore, these areas should be regarded as sensitive. Focal species surveys will have to be conducted in order verify the presence/absence of these species in the project site.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of 'Critically Endangered' ecosystems	Direct impacts: » Fragmentation of 'Critically Endangered' ecosystems; » Loss of biodiversity; » Environmental degradation » Loss of habitat for Red Listed/Protected fauna/flora species. Indirect impacts: » Alterations to population dynamics and biotic interactions of species.	National/Regional	None identified at this stage
Loss of CBA areas	Direct impacts: » Fragmentation of CBA areas; » Loss of biodiversity; » Environmental degradation; » Loss of habitat for Red Listed/Protected fauna/flora species. Indirect impacts: » Alteration to population dynamics and biotic interactions of species.	Regional	None identified at this stage
Loss of Red Listed/Protected flora species	Direct impacts: » Complete destruction of Red Listed/Protected plant	National/Regional	None identified at this stage

	species; » Loss of genetic variation within a species; » Isolation and fragmentation of local populations; » Illegal collection of protected species. Indirect impacts: » Negative change in the conservation status of a species.		
Loss of Red Listed/Protected fauna species	Direct impacts: » Loss/displacement of species; » Inadvertent killing of slow-moving animals during earthworks; » Illegal collection and/or poaching; » Loss of genetic variation; » Isolation of local populations. Indirect impacts: » Alterations to population dynamics and biotic interactions. » Negative change of a species' conservation status.	National/Regional	Wetland margins and wetlands due to the presence of frog species.
Soil and water contamination	» Untreated wastewater and other effluents from the construction activities may contaminate water resources in the project site; » Disposal of hazardous and non-hazardous waste may potentially cause groundwater pollution and deteriorate habitat quality on adjacent areas.	Regional/Local	None identified at this stage
Description of expected significance of impact Impacts on ecological resources are likely to occur at the extent of the site and the broader area. As a result of the largely disturbed nature of the site, it is unlikely that the development would result in any irreplaceable loss of resources and the consequences of the impacts are expected to be limited. Impacts can be minimised through the implementation of appropriate mitigation measures.			
Gaps in knowledge & recommendations for further study » Although the project site is in poor ecological condition, some natural vegetation is still present. Subsequently, this area may also provide habitat to a number of threatened and protected fauna and flora species. Detailed fauna and flora field investigations must be conducted during the EIA phase to identify any Red Listed/Protected fauna and flora species within the project site. » Several Red Listed/Protected flora species potentially occur within the project site. The project site offers suitable habitat to two provincially protected trees, one tree species protected by the National Forest Act and Red Listed plant species. ∗ A comprehensive flora survey must be undertaken during the EIA phase to verify the presence/absence of any Red Listed/Protected flora species in the			

project site, and within a 200 m radius of the project site.

- Surveys must take place during the summer season (beginning of November to the end of April). If the area has been burnt, the survey must take place after vegetation has recovered.
- Reports must include the details of type and condition of plant communities.
- The location and extent of all vegetation types in the project site (even if in a poor/degraded condition) must be delineated.
- Transformed areas must be identified and broadly categorized, including agriculture, infrastructure etc.
- The extent of the above various areas to be indicated in hectares or square metres.
- For the identified vegetation types, the conservation status and ecological condition must be indicated.
- Surveys must take place during the flowering season of species historically recorded on site, and or/confirmed or predicted to occur on site.
- The report must evaluate whether the site contains the habitat requirements and is within range for the recolonisation of species predicted to occur in the site, but which were not recorded as being present at the time of the survey.
- The location and extent of all red list, protected and endemic plant populations in the project site must be mapped, or the population extent may also be determined according to habitat preference (methodology for this must be included in the report).
- The conservation status and condition of the populations must be indicated.

» The project site offers suitable habitat to several threatened, provincially protected and endemic mammalian, amphibian and avian species. A comprehensive survey on available habitat and species composition of the project site must be undertaken during the EIA phase to verify the presence/absence of threatened and protected fauna species.

Recommendations with regards to general field surveys

» Surveys must encompass the site and all adjacent properties with indigenous vegetation within a 500 m radius of the project site.
» The report must differentiate between identified habitats
» Details on the status/condition of habitats identified during the survey.
» Provide the conservation status and viability of the species utilising or are predicted to utilize these habitats. The rehabilitation potential must also be indicated, even if a species is not present.
» An evaluation of whether the project site contains viable habitat for the recolonisation or re-introduction of the species predicted to occur in the project site (historically), but which were not recorded as being present during the surveys, as well as the rehabilitation potential if habitat is degraded.
» The location of all sitings and the location and extent of red list, protected and endemic species populations in the project site must be mapped, or the population extent may also be determined based on habitat preference (methodology for this must be included in the report).
» The location and extent of all known and predicted habitats (breeding, foraging, roosting, aestivation and hibernation) in the project site must be mapped. The condition of these habitats must be clearly indicated (e.g. primary, degraded, and transformed).

Specific recommendations with regards to amphibian and reptiles:

» Amphibians and reptiles must be surveyed along transects or within plots of fixed areas. General survey methods may include active searches as well as trapping including the use of drift fences and pitfall traps. Specific techniques must be determined by the Specialist and a clear methodology provided in the

report.
- Diurnal and nocturnal surveys are required to provide a complete picture of the amphibian and reptile communities.
- Focal surveys to maximise the chance of detecting the Critically Endangered Pickersgill Reed Frog and the Vulnerable Spotted Shovel Nosed frog are required. Monitoring techniques such as nocturnal surveys and call monitoring at the wetland areas to check for the presence of Pickersgill's reed frog and the Spotted Shovel nosed frog, as well as standard Y-shape trap arrays must be considered. The Y-shaped trap arrays will also increase the likelihood of capturing the 'Near Threatened' swamp musk shrew. Surveys should be conducted after good summer rains have fallen within the project site under investigation.
- Where suitable foraging and aestivation habitat occurs in the project site the nearest suitable breeding habitat must be identified. Potential dispersal connections between wetlands in the region will also need to be indicated.
- Information from the Geotechnical and Hydrological reports will be required for the impact assessments during the EIA phase.

6.3.2 *Potential Impacts on Wetlands and Aquatic Features*

The following potential impacts are expected to occur within the project site and on the wetland and aquatic features present during the construction phase (**Appendix E**):

- Loss of wetlands;
- Altered hydrology of the catchment area and watercourses;
- Impaired water quality;
- Loss of ecological services; and
- Sedimentation and erosion.

Impact
Wetlands within the project site are considered to be largely in a natural state and ecologically important, the loss of these systems is considered to be significant. If the loss of these systems is avoidable, any changes to the status and functioning of these systems resulting from indirect impacts are considered to be major negative impacts as a result of the project. If it is required that the entire extent of the project site is to be developed, the loss of wetland areas are unavoidable. These systems will be lost during the construction phase of the project, with the loss considered to be permanent throughout the operation phase. The loss of wetlands cannot be mitigated, and as a result a form of wetland offset would need to be implemented by the IDZ.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Development of the facility will result in the loss of wetlands	» Loss of wetland and the accompanying ecological and services.	Local	All wetland areas to be treated as No-Go areas. A

	» Wetlands are under threat due to development and change in land uses. » The cumulative loss of wetlands is considered to be high due to the development of the area and local land uses. » The loss of wetlands is permanent and does not include rehabilitation or offset programmes		buffer zone will be determined for the project. The buffer area should also be regarded as a No-Go area
Altered hydrology of the catchment area and receiving watercourses	» Altered attenuation properties resulting in likely scouring and erosion due to increased flows. » Development and land uses have contributed to altered hydrology regimes » The increase in hardened surfaces and loss of surface roughness could contribute to altered flows	Local	All wetland areas to be treated as No-Go areas. A buffer zone will be determined for the project. The buffer area should also be regarded as a No-Go area
Impaired water quality of the water resources	» Impact on the functioning of the wetlands, and the associated biota dependent on the system » The quality of water resources is expected to be impaired » Leaks, spills, waste and erosion all impact on water quality » No formal discharge of dirty or treated water	Local	All wetland areas to be treated as No-Go areas. A buffer zone will be determined for the project. The buffer area should also be regarded as a No-Go area
Loss of ecological services	» Loss of ecological services, notably the maintenance of biodiversity and water quality enhancement services » The development of the area, local land uses and poor local protection of wetlands has resulted in the systems being impacted on	Local	All wetland areas to be treated as No-Go areas. A buffer zone will be determined for the project. The buffer area should also be regarded as a No-Go area
Sediment and erosion of the watercourses	» Impact on the potential of the system to provide services, and loss of habitat quality and quantity. » Sedimentation of the local systems is likely, primarily due to agricultural practices and clearing for development » The clearing of areas and soil stockpiles may contribute to sedimentation	Local	All wetland areas to be treated as No-Go areas. A buffer zone will be determined for the project. The buffer area should also be regarded

			as a No-Go area
Description of expected significance of impact Impacts on wetlands and aquatic features are likely to occur at the extent of the site and the local area. The most significant impact resulting from the project is the potential loss of wetland areas due to the development of the power plant on these systems. The significance of the impact of the Richards Bay CCPP will be of a medium-high significance.			
Gaps in knowledge & recommendations for further study » No layout alternatives were available for the scoping study, therefore the likely extent and significance of impacts is based on expected impacts only, and is not an accurate indication for this stage of the project.			

The most western property of Phase 1D of the IDZ has been declared as an offset area by the uMhlathuze Local Municipality and Ezemvelo KwaZulu-Natal Wildlife within which no development is allowed to take place due to sensitive environmental features which consists of a mosaic of the Kwambonambi Grassland and coastal wetland systems (**Appendix Q**)[21]. This offset is considered to be relevant to the development of the Richards Bay CCPP as the offset is located directly adjacent to the project site and has to be considered when assessing the remaining wetland features within the project site. With the implementation of the offset area, the remaining wetlands within the project site can be considered as acceptable loss.

6.3.3 Potential Impacts on Geo-hydrological Features and Surface Waterbodies

The following potential impacts were identified to be associated with the construction of the Richards Bay CCPP on the geo-hydrological features present (**Appendix G**):

» During the construction phase, a potential impact exists on groundwater and surface water bodies including the Nseleni River, Nsezi dam, Voor River and Bhizolo Stream and an unnamed dam (receptors) as a result of on-site accidental fuel spills and leaks (sources) from construction vehicles and/or

[21] The offset was implemented as part of the development of Pulp United within the site, however the development of Pulp United is no longer valid and will not be taking place in Phase 1D of the IDZ.

fuel storage areas. Fuel spills can either migrate off-site to surrounding surface water bodies by means of rain surface runoff or seep into the groundwater by means of rain water seepage (pathways).

» During the construction phase, a potential impact exists for identified receptors as a result of leachate from construction waste disposal areas (sources) and infiltration through soil (pathway) of dirty water from ablution facilities (sources).

Impact

During the construction phase groundwater and surface water waterbodies can be affected as a result of on-site accidental spills and leaks due to the presence of construction vehicles and/or fuel and chemical storage areas.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential impact on surface water bodies due to on-site accidental fuel spills and leaks/leachate and infiltration of dirty water.	Contamination of the surface waterbodies surrounding the project site through the transportation of the contaminants via surface water runoff	Local	None identified at this stage
Potential impact on groundwater due to on-site accidental fuel spills and leaks/ leachate and infiltration of dirty water.	Contamination of the groundwater located within the area of the project site	Local	None identified at this stage

Description of expected significance of impact

Impacts on geo-hydrological features are likely to occur at the extent of the project site and the local area. The significance of the construction phase impacts will be low, subject to the implementation of appropriate mitigation measures.

Gaps in knowledge & recommendations for further study

» A hydrological survey will be undertaken during the EIA phase.
» The scoping hydrological sensitivity map will be verified and refined in the EIA phase.
» An assessment of hydrological impacts associated with the construction phase will be undertaken in the EIA phase.
» Site-specific hydrological issues in terms of nature, extent, duration, probability, severity and significance will be assessed in the EIA phase.
» Mitigation measures to manage the impacts of the construction will be provided in the EMPr.
» The three monitoring boreholes will form a groundwater monitoring network including a background monitoring borehole, impact monitoring borehole as early warning of groundwater contamination and an interception monitoring borehole for plume off-site migration.
» Groundwater levels should be monitored from monitoring boreholes in order to determine the local groundwater flow direction and the hydraulic gradient.
» It is also suggested that surface water monitoring of the Nsezi dam, Nseleni River, Voor River and Bhizolo stream in the vicinity of the Richards Bay CCPPt is undertaken to assess any impact during the construction phase and when the CCPP is operational.
» It is recommended that solid waste be collected and disposed of at an appropriate municipal waste disposal site.
» It is recommended to conduct aquifer testing at the site within EIA phase to determine the aquifer transmissivity.

6.3.4 Impacts on soil and agricultural potential

The following potential impacts were identified to be associated with the construction of the Richards Bay CCPP on the soil and agricultural potential present within the project site (**Appendix H**):

- Loss of agricultural land with a moderate agricultural potential in terms of cultivation;
- Erosion, compaction and sedimentation;
- Loss of topsoil; and
- Disturbance of soil.

Impact

Potential impacts associated with the proposed development include:

- Loss of agricultural land and/or loss of agricultural potential.
- Potential disturbances include compaction, physical removal and potential pollution. The exposed soil surfaces have the potential to erode easily if left uncovered which could lead to the loss of the soil resource.
- Physical and chemical states of soils that are excavated for the installation of foundations will be altered negatively;
- Potential loss of stockpiled topsoil and other materials through erosion if not appropriately protected;
- Implementation of insufficient stormwater control measures may result in localised high levels of soil erosion, possibly creating dongas or gullies;
- Increased erosion could result in increased sedimentation which could impact on water quality and ecological processes;
- The additional hardened surfaces created during construction could increase the amount of stormwater runoff, which has the potential to result in erosion;
- Physical disturbance of the soil and vegetation removal may result in soil erosion/loss; and
- Erosion and potential soil loss from construction activities and areas where naturally dispersive soils occur.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Development of the Richards Bay CCPP will result in soil erosion and the loss of Agricultural potential	» Loss of a non-renewable soil resource » Erosion and sedimentation » Loss of natural vegetation cover	Local	None identified at this stage

Description of expected significance of impact

The impact of the Richards Bay CCPP on the soil and agricultural potential within the project site will be local in extent. The significance of the impact will be confirmed once the Class III land capability has been confirmed.

Gaps in knowledge & recommendations for further study

- The Class III land capability would need to be confirmed during the site visit.
- No layout alternatives were made available for the scoping study, therefore the likely extent and significance of impacts is based on expected impacts only, and is not an accurate indication for this stage of the project.

6.3.5 Impacts on heritage (archaeological) resources

The following impacts can be expected during construction to heritage resources with the development of the Richards Bay CCPP (**Appendix I**):

- Direct impacts to heritage resources including damage and destruction of sites.
- Indirect impacts including impacts on the cultural landscape and sense of place of the area.
- Residual risks for the proposed project include depletion of the archaeological record of the wider region.

Impact
The construction of the proposed Richards Bay CCPP could directly impact on graves, archaeological sites and historical sites. Indirect impacts and residual impacts relating to the cultural landscape and sense of place and the and the depletion of the archaeological record of the wider region are also associated with the development of the CCPP.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance and destruction of archaeological sites, historical sites and graves.	Construction activities could cause irreversible damage or destroy heritage resources and depletion of the archaeological record of the area.	Local	None identified at this stage

Description of expected significance of impact
Significance of sites, mitigation and significance of possible impact can only be confirmed after the field work has been conducted, but based on previous work in the area Stone Age find spots can be expected, and the significance of the impact could be medium-low. A section of the project site was previously surveyed (van Schalkwyk 2013) and no heritage constraints or further mitigation was recommended.

Gaps in knowledge & recommendations for further study
The entire project site has not been subjected to a heritage resource survey and it is assumed that information obtained for the wider region is applicable to the site. To address these gaps, it is recommended that a field study should be conducted to confirm the presence of heritage resources after which mitigation measures will be recommended (if needed).

6.3.6 *Impacts on palaeontological resources*

Impacts on palaeontological resources could occur during the construction phase of the project and relate mainly to the loss of resources (**Appendix J**). There is a possibility that gastropods, brachiopods, coralline algae, corals, polyzoa, foraminifera and echinoids are present, as well as isolated teeth of the extinct giant shark *Carcharodon megalodon*. Terrestrial vertebrates include antelope, buffalo, elephant, hippopotamus, rhinoceros as well as marine fossils including crustaceans and fish and fragments of turtles and crocodiles.

Impact The construction phase of the development will include excavation of new bedrock which may comprise of sensitive palaeontological resources. The impact will therefore be the possible destruction of the resources.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Loss of fossil features/artefacts	Construction of the Richards Bay CCPP will permanently modify the existing topography and may disturb damage, destroy or permanently seal-in fossils at or below the ground surface and which are then no longer available for scientific research or as cultural heritage.	Local	None identified
Description of expected significance of impact Regardless of the sparse and sporadic occurrence of fossils in this biozone a single fossil can have major scientific importance as many vertebrate fossil taxa are known from a single fossil. During a field survey of the development footprint no fossil heritage was detected. It is therefore considered that the construction and operation of the Richards Bay CCPP and associated infrastructure is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. The significance will be low.			
Gaps in knowledge & recommendations for further study Due to a lack of fossil heritage located within the project site no further study is required for the EIA phase.			

6.3.7 *Impacts on ambient air quality*

The potential impacts on air quality associated with the development of the Richards Bay CCPP include (**Appendix K**):

» Elevated (and potentially non-compliance with NAAQS) daily PM_{10} concentrations during the construction phase due to background PM_{10} and the proximity to other particulate emission sources.

Impact Elevated ambient concentrations of particulate and gaseous atmospheric pollutants as a result of construction activities.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Fugitive PM_{10} emissions	Elevated PM_{10} concentrations as a result of bulk earthworks, concrete works, welding, and vehicle exhaust emissions.	Local	None identified at this stage
Gaseous pollutant emissions	Elevated NO_X, SO_2, VOC concentrations as a result of vehicle exhaust emissions	Local	None identified at this stage
Description of expected significance of impact The construction phase impacts will be of a local extent and of short-term duration. The significance of the impacts will be determined during the EIA Phase.			
Gaps in knowledge & recommendations for further study The duration and scale of construction activities is unknown at this stage. Construction impacts will be assessed during the EIA phase. Relevant information required includes: expected fuel use; vehicle types, activity patterns and on-site road usage; and, full extent of bulk earthworks.			

6.3.8 Impacts on ambient noise levels

The construction activities associated with the development of the Richards Bay CCPP will increase the ambient noise levels in the area (**Appendix L**).

Construction activities that will have an impact include:

- Additional traffic to and from the site, as well as traffic on the site;
- Site preparation, including the site clearing and levelling, development of internal site roads and security fencing;
- Establishment of contractors camp, storage and laydown areas;
- Earthworks, possible blasting (if hard rock is encountered) and piling activities;
- Development of the foundations;
- Laying of pipelines and establishment of the switchyard; and
- Construction of infrastructure and facilities.

Impact Noise generated during the construction will be low and insignificant when considering the temporary nature of the construction activities, the industrial developmental character of the area, the lack of any potential noise sensitive receptors in the vicinity of the project site and the limited extent of the potential construction noises.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Noise generated during the construction of the Richards Bay CCPP.	The project site is located within an area with a lack of noise receptors and which has an industrial character.	Local	None
Description of expected significance of impact The significance of noise impacts will be low during the construction phase and will be of a local extent due to the location of the development and the nature of the construction phase noise.			
Gaps in knowledge & recommendations for further study The scoping level assessment is sufficient and a full Environmental Noise Impact Assessment is not required or recommended.			

6.3.9 Visual Impacts

The following potential visual impacts have been identified for the construction of the Richards Bay CCPP (**Appendix M**):

- The proposed development could negatively impact on the landscape character of the area;
- The proposed development could have a negative impact on urban areas;
- Whilst the area around Richards Bay is developed, this is not highly obvious from the coast or out to sea as a result of an extensive coastal dune system that appears relatively natural despite including areas of forestry plantation is present. Development of the proposed site is unlikely to alter this situation;
- There are eight protected areas within the approximate limit of visibility of the development;
- The proposed development could be visible from routes throughout the area;
- The proposed development could impact negatively on local homesteads;
- The recreational uses on the northern side of the port could be negatively impacted by further industrialisation of the landscape;
- A service station on the N2 that overlooks the coastal plain to the south of Richards Bay. This facility is used by many tourists as a rest and refuelling stop; and
- Lighting associated with the development could extend existing light pollution.

Impact The proposed development could negatively impact on the visual character of the affected area (LCA).			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Industrialisation and degradation of a sensitive	The project site is located adjacent to existing heavy industrial	Immediately surrounding	None identified at

landscape.	development and within an area where further heavy industry is planned (IDZ Phase 1D). It is therefore possible that the development could intensify existing industrial impacts. It is however highly unlikely to significantly add to the current area of industrial influence within the surrounding landscape. It is also likely to be possible to partly mitigate any additional influence by ensuring that the development occurs in as close a proximity to existing heavy industry as possible. Analysis has also indicated that affected surrounding landscapes are not likely to be highly sensitive to possible change associated with the proposed development.	area	this stage
Possible increase in visibility of industry from urban areas	The main urban area of Richards Bay is located on the opposite side of an existing heavy industrial area to the proposed development. It is therefore highly unlikely to be visible from this area. Views of the development will be possible from Esikhawini which is a residential settlement approximately 6.7km to the south of the project site. This is a relatively dense settlement and views are only likely to be possible from the northern edge. It is also highly likely that vegetation located on the fringe of the settlement will largely screen views of the development. Empangeni is located approximately 6.2km to the west of the project site. While the ZTV mapping indicates that views may be possible from parts of the urban area, views of the development are likely to be broken by landform and additional screening is likely to be provided by vegetation. The development will also be seen at a distance and with heavy industry as a backdrop. It is therefore highly unlikely that the development will impact on Empangeni.	Immediately surrounding area	None identified at this stage
The proposed development could negatively impact on coastal recreation areas. The issue relates to an increase in visibility of industry from	These areas are generally located in the order of 10km to the east of the project site. Existing industry, numerous areas of vegetation and the coastal dune system are all likely to screen	No impact	None identified at this stage

coastal recreation areas.	views of the development from these areas. There is likely to be no impact on coastal recreation areas associated with development of this site due to both distance and landform.		
The proposed development could negatively impact on protected areas and in particular the Richards Bay Game Reserve. The impact relates to a possible increase in industrial development being visible to protected areas. It is possible that this could reduce enjoyment of these areas by visitors.	The development could result in a small impact on the reserve. If visible, only the upper elements are likely to be visible (stacks) and it will be seen in the context of existing industry. The Richards Bay Game Reserve is the only protected area that is likely to be affected. The project site is approximately 4.5km from the Richards Bay Game Reserve. The land between the reserve and the site is generally low lying although it rises close to the site. The proposed development could slightly extend the amount of industrial development that may be visible from within the Reserve. Areas of vegetation on higher land close to the project site are likely to soften / screen the lower sections of the development. Vegetation within the Reserve is also likely to screen / soften views of the development. If the development is visible it is likely that only the higher elements will be obvious. It is likely to be possible to partly mitigate any additional influence by ensuring that the development occurs in as close a proximity to existing heavy industry as possible and towards the east of the project site.	Immediately surrounding area	None identified at this stage
The proposed development could negatively impact on views from local roads. Those likely to be affected include the N2, the R34 and the P106. The development could result in an increase in the extent of industry that is visible from local roads.	The R34 is the closest road to the project site located approximately 1km to the south of the southern site boundary. From sections of this road panoramic views across the site will be possible. For the most part however, the project site will be seen against the backdrop of other heavy industry. The project site does however extend further west than existing industrial development meaning that development of western portions will extend the visual influence of industry further to the west along the road. From the N2, which at its closest is approximately 4km from the	Immediately surrounding area	None identified at this stage

	project site, where ever the development is positioned within the site it will be seen against the backdrop of existing heavy industry. Development is therefore unlikely to extend the visual influence of industrial development along the road. The P106 runs in approximately a north / south alignment joining the R34 approximately 1.3km to the south west of the project site. People travelling from Esikhawini along the road towards the R34 are likely to have a clear view of development within the site. If development should occur on the eastern portion of the project site it is likely to be seen against the backdrop of other heavy industry. If it should occur on the western portion of the site however, it is likely to slightly extend the influence of industry within the view. Whilst the R34 and the N2 are likely to carry a proportion of recreational and tourism related traffic, the sections of road that are likely to be affected are not likely to be sensitive to the change in view although from a municipal perspective it is possibly beneficial to minimise the visual impact of industry on residents and visitors.		
Visual impact on Homesteads. There are two types of homestead that are potentially affected including; » Rural homesteads that are associated with agricultural activities that are largely located inland of the coastal plain, these homesteads are generally isolated; and » Traditional homesteads within rural settlement areas that are located immediately inland of the coastal belt to the north and south of Richards Bay, these homesteads are generally distributed	Due to distance, it is highly unlikely that traditional homesteads will be affected. It is possible that a small number of rural homesteads (4 – 5) that are located to the west of the N2, and at closest 3.5km from the project site, may be affected. However the proposed development will be seen at a distance and is likely to be viewed against the backdrop of existing industry. The affected homesteads also appear to be generally surrounded by mature vegetation which is likely to soften or screen external views. The affected homesteads are therefore not expected to be sensitive to the possible change in view.	Regional impact due to the distance from which the development is likely to be visible.	None identified at this stage

relatively evenly throughout traditional areas.			
Visual impact on recreational uses on the northern side of the port of Richards Bay. Currently when in this area, views of heavy industry are not obvious as they are largely mitigated by existing vegetation and distance. The issue relates to an increase in industry within the view from this area.	The project site is approximately 4.9km from recreational areas. It is possible that the development could increase the visual influence of industry from within the recreational area. However, there is a substantial amount of natural vegetation both around the recreational area and between the project site and the recreational area that is likely to provide substantial screening. This will mean that only higher sections of the development may be visible. If it is visible, the development is likely to be seen through existing major industrial operations that are located to the north west of the port.	Regional significance due to the distance from which the development could be visible as well as the regional importance of the recreational area	None identified at this stage
Visual impact on the N2 Service Station. This issue relates to an increase in industrialisation of the area which is currently predominantly rural.	Currently when at this facility, views of heavy industry to the south of Richards Bay are obvious. Due to distance only the larger / higher industrial structures are obvious. It is likely that the development could add industrial element to other sectors of the view. The project site is located approximately 4km from the service station. Where ever the development is positioned within the site it will be seen against the backdrop of existing heavy industry. The development is therefore unlikely to extend the visual influence of industrial development from this view point.	Immediately surrounding area	None identified at this stage
Light pollution changing the nature of the night time possibly causing nuisance for neighbouring uses and further industrialising the night time landscape. This issue relates to the lighting of a sensitive area. It could include the general lighting of a natural landscape that would otherwise be dark or light spill and glare that could affect adjacent properties and road users.	The only receptor that could potentially be sensitive is the R34. This road is approximately 1km from the project site. Because of this distance, it is unlikely that lighting will be problematic for road users.	Immediately surrounding area	None identified at this stage
Description of expected significance of impact There is likely to be minimal additional industrial influence on surrounding LCAs or sensitive visual receptors due to the fact that the development will be set within an industrial area and will be seen in the context of other heavy industries.			

Gaps in knowledge & recommendations for further study

» Confirmation of sensitivity of the LCAs from a site visit and consultation during the EIA process.
» A development layout and details of structure height is needed to assess the impacts as well as the identification of possible mitigation measures in any detail.
» Confirmation of sensitivity and location of the receptors from a site visit.

6.3.10 Impacts on the socio-economic environment

The development of the Richards Bay CCPP will have both positive and negative impacts during the construction phase. The section below provides more details of the associated potential impacts (**Appendix N**).

The potential positive impacts which could arise as a result of the construction activities include the following:

» Increase in the production and GDP-R of the national and local economies due to capital expenditure;
» Temporary employment creation in the local communities;
» Skills development; and
» Household income leading to improved standard of living.

The potential negative impacts which could arise as a result of the construction activities include the following:

» Change in the demographics as a result of an influx of workers and job seekers;
» Pressure on basic services and social and economic infrastructure; and
» Increased demand in housing within the area.

Impact:
Increase in production and GDP-R of the national and local economies due to capital expenditure.

Issue	Nature	Extent of Impact	No-Go Areas
Stimulation of national and local economies due to capital expenditure which will increase production and GDP-R.	A positive impact to production and GDP-R due to the investment made.	Local -National	None identified at this stage

Description of expected significance of impact The City of uMhlathuze Local Municipality makes the greatest contribution to the King Cetshwayo District Municipality. This impact will possibly be of medium significance (positive) due to injected investment, which will further improve the GDP of the City of uMhlathuze Local Municipality and the country in general.
Gaps in knowledge & recommendations for further study » Information on the total and a breakdown of capital expenditure and, local content, is required. » Duration of construction phase information is required.

Impact: Temporary employment creation in local communities and elsewhere in the country.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
Impact involves the creation of direct, indirect and induced employment opportunities related to the construction of the proposed plant.	Job creation will temporarily reduce unemployment as a result of the construction of the Richards Bay CCPP.	Local –National	None identified at this stage
Description of expected significance of impact Close to a third of the working age population is unemployed in the area. The impact may have medium significance (positive) due to the temporary nature of the impact.			
Gaps in knowledge & recommendations for further study » Information on the employment to be created locally and at other scales is required. » The duration of employment information is required.			

Impact: Skills development due to the creation of new employment opportunities.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
Skills will be created and/or enhanced for benefitting employees during the construction phase.	The impact is positive as it develops skills that are beneficial for future employment.	Local-Regional	None identified at this stage
Description of expected significance of impact A great portion of the City of uMhlathuze Local Municipality's employment is semi-skilled. This impact will be of medium significance (positive) due to the long-term			

benefits associated with skills development.
Gaps in knowledge & recommendations for further study » Information on the types of skills to be developed during construction is required.

Impact: Household income will lead to the improved standard of living for households directly or indirectly benefitting from employment opportunities.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
Income will be temporarily derived from the employment created during the construction phase.	The impact is positive as it improves the standard of living for the benefitting households.	Local-Regional	None identified at this stage
Description of expected significance of impact The average income earned in the City of uMhlathuze Local Municipality ranks the employed residents as middle-class. Just over 38%, however are classified as low-income earners. This impact may therefore be of medium significance (positive) due to the temporary income earned by employees.			
Gaps in knowledge & recommendations for further study » The employment to be created locally and at other scales information required. » The total amount to be spent on labour during construction is required. » The duration of employment information required.			

Impact: Change in demographics of the area due to the potential influx of workers and job seekers. Richards Bay is a landlocked town from an environmental preservation perspective. A portion of the greenfield sites cannot be developed; therefore, housing expansion areas are limited.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
A possible increase in population to the area with a dominant male influx of job seekers and migrant labour.	The impact is negative as it may increase social pathologies and proliferate informal settlements.	Local	Conservation land
Description of expected significance of impact Not all skills required for construction can be attained in the local communities. Richards Bay is largely a working town with many migrant workers. This status will			

increase and therefore this impact is potential of low significance (negative).
Gaps in knowledge & recommendations for further study Plans for the accommodation for migrant labour and procurement of local labour is required.

Impact: Pressure on basic services and social and economic infrastructure by migrant labour and job seekers. It must be noted that the project site is currently not serviced.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
Migrant labour and job seekers may increase pressure on service delivery and socio-economic infrastructure.	The impact is negative as it may place strain on adequate service delivery.	Local	None identified at this stage
Description of expected significance of impact Service provision is currently satisfactory with very limited backlogs. The influx of job seekers could possibly place pressure on service delivery. The impact could possibly be of low significance (negative).			
Gaps in knowledge & recommendations for further study Plans for the accommodation for migrant labour required.			

Impact: Increased demand for housing. The key challenge in the City of uMhlathuze Local Municipality is the shortage of suitably located land for housing development.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
The possible increase in population may result in an increased demand for housing.	The impact is negative due to the limited supply of developable land. In addition, the proliferation of informal settlements may emerge.	Local	Conservation land
Description of expected significance of impact The significance of the impact may be low (negative).			
Gaps in knowledge & recommendations for further study Plans for the accommodation for migrant labour required.			

6.4. Impacts during the Operation Phase

6.4.1 Potential Impacts on Ecology

The following impacts on the ecology within the project site and the surrounding area could potentially occur during the operation phase of the Richards Bay CCPP (**Appendix D**):

- Impacts on species caused by the permanent alterations in night time light conditions;
- Disturbance or damage to adjacent habitats and species caused by the movement of vehicles and personnel, dust, spillage of fuels, chemicals and noise;
- Degradation of habitat quality and adverse impacts on species due to airborne emissions from the Richards Bay CCPP;
- Impacts on habitats caused by alteration to drainage regimes.

Impact
Potential impacts on ecology are expected during the operation phase of the Richards Bay CCPP including the ecological functioning of the area.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impacts on species caused by the permanent alterations in night time light conditions.	Alteration of the natural variation in diurnal and nocturnal light intensities and spectral properties has the potential to disrupt the physiology, behaviour and ecology of herpetofauna and mammal species such as bats.	Local	None identified at this stage
Disturbance or damage to adjacent habitat and species caused by the movement of vehicles and personnel, dust, spillage of fuels, chemicals, noise.	Disturbance activities may cause fauna species to abandon the area. Air pollution harms fauna and flora as a result of exposure to contaminants and causes the destruction of their habitat, food and resources	Local	None identified at this stage
Degradation of habitat quality due to airborne emissions from the power plant operations and the release of greenhouse gas emissions	Air pollution harms flora and fauna through exposure to contaminants and destruction of their habitats, food and water sources.	Local/Regional	N/A
Impacts on habitat caused by the alteration of drainage regimes.	» Loss of habitat of fauna and flora species » Displacement of species » Habitat fragmentation	Local/Regional	None identified at this stage

Description of expected significance of impact
Impacts on ecological resources are likely to occur at the extent of the site and the broader area. Impacts can be minimised through the implementation of appropriate mitigation measures.
Gaps in knowledge & recommendations for further study
» No future studies required in terms of the impacts caused by permanent alternations in the night time light conditions. Site specific lay-out plans will however be needed in order to identify impacts and propose mitigation measures during the EIA phase. » A detailed site -layout plan will be required during the EIA phase in order to identify impacts and propose mitigation measures.

6.4.2 Potential Impacts on Wetlands and Aquatic Features

The following potential impacts are expected to occur within the project site and on the wetland and aquatic features present during the operation phase (**Appendix E**):

» Loss of wetlands;
» Altered hydrology of the catchment area and watercourses;
» Impaired water quality;
» Loss of ecological services; and
» Sedimentation and erosion.

Impact			
Wetlands within the project site are considered to be largely in a natural state and ecologically important, the loss of these systems is considered to be significant. If the loss of these systems is avoidable, any changes to the status and functioning of these systems resulting from indirect impacts are considered to be major negative impacts as a result of the project. If it is required that the entire extent of the project site is to be developed, the loss of wetland areas are unavoidable. These systems will be lost during the construction phase of the project, with the loss considered to be permanent throughout the operation phase. The loss of wetlands cannot be mitigated, and as a result a form of wetland offset would need to be implemented by the IDZ.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Development of the facility will result in the loss of wetlands	» Wetlands are under threat due to development and change in land uses. » The cumulative loss of wetlands is considered to be high due to the development of the area and local land uses.	Local	All wetland areas to be treated as No-Go areas. A buffer zone will be determined for the

	» The loss of wetlands is permanent and does not include rehabilitation or offset programmes		project. The buffer area should also be regarded as a No-Go area
Altered hydrology of the catchment area and receiving watercourses	» Development and land uses have contributed to altered hydrology regimes » The increase in hardened surfaces and loss of surface roughness could contribute to altered flows	Local	All wetland areas to be treated as No-Go areas. A buffer zone will be determined for the project. The buffer area should also be regarded as a No-Go area
Impaired water quality of the water resources	» The quality of water resources is expected to be impaired » Leaks, spills, waste and erosion all impact on water quality » No formal discharge of dirty or treated water	Local	All wetland areas to be treated as No-Go areas. A buffer zone will be determined for the project. The buffer area should also be regarded as a No-Go area
Loss of ecological services	» The development of the area, local land uses and poor local protection of wetlands has resulted in the systems being impacted on	Local	All wetland areas to be treated as No-Go areas. A buffer zone will be determined for the project. The buffer area should also be regarded as a No-Go area
Sediment and erosion of the watercourses	» Sedimentation of the local systems is likely, primarily due to agricultural practices and clearing for development » The clearing of areas and soil stockpiles may contribute to sedimentation	Local	All wetland areas to be treated as No-Go areas. A buffer zone will be determined for the project. The buffer area should also be regarded as a No-Go area
Description of expected significance of impact Impacts on wetlands and aquatic features are likely to occur at the extent of the site and the local area. The most significant impact resulting from the project is the			

potential loss of wetland areas due to the development of the power plant on these systems. The significance of the impact of the Richards Bay CCPP will be of a medium-high significance.
Gaps in knowledge & recommendations for further study » No layout alternatives were available for the scoping study, therefore the likely extent and significance of impacts is based on expected impacts only, and is not an accurate indication for this stage of the project.

The most western property of Phase 1D of the IDZ has been declared as an offset area by the uMhlathuze Local Municipality and Ezemvelo KwaZulu-Natal Wildlife within which no development is allowed to take place due to sensitive environmental features which consists of a mosaic of the Kwambonambi Grassland and coastal wetland systems (**Appendix Q**)[22]. This offset is considered to be relevant to the development of the Richards Bay CCPP as the offset is located directly adjacent to the project site and has to be considered when assessing the remaining wetland features within the project site. With the implementation of the offset area, the remaining wetlands within the project site can be considered as acceptable loss.

6.4.3 Potential Impacts on Geo-hydrological Features and Surface Waterbodies

The following potential impacts were identified to be associated with the operation of the Richards Bay CCPP on the geo-hydrological features present (**Appendix G**):

- During the operation phase, a potential impact exists on groundwater and surface water bodies including the Nseleni River, Nsezi dam, Voor River, Bhizolo Stream and an unnamed dam (receptors) due to possible leakage of diesel and/or chemicals from storage facilities and/or pipelines and from leaks from emergency backup generators (sources). With rain water seepage, hydrocarbon products (diesel or oils) can migrate through unconsolidated formations and the reach groundwater table or migrate off-site to surface water bodies by means of rain water runoff (pathways).
- During the operation phase, a potential impact exists on identified receptors due to waste water discharges from the water treatment plant and dam (sources) by means of water seepage and/or rain surface runoff (pathways).

[22] The offset was implemented as part of the development of Pulp United within the site, however the development of Pulp United is no longer valid and will not be taking place in Phase 1D of the IDZ.

Impact

During the operation phase groundwater and surface water bodies including the Nseleni River, Nsezi dam, Voor River, Bhizolo Stream and an unnamed dam (receptors) could be impacted due to possible leakage of diesel and/or chemicals from storage facilities and/or pipelines and from emergency backup generators leaks (sources).

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Potential impact on local groundwater due to possible leakage of diesel from storage facilities and/or pipelines and Emergency backup generators.	Groundwater within the local area can be contaminated through leakages of diesel and other contaminants.	Local	None identified at this stage
Potential impact on local surface water bodies due to possible leakage of diesel from storage facilities and/or pipelines and Emergency backup generators.	Surface waterbodies within the local area can be contaminated through leakages of diesel and other contaminants.	Local	None identified at this stage
Potential impact on groundwater due to waste water and solid waste discharges.	Waste water and solid waste generated by the Richards Bay CCPP could contaminate groundwater if not managed in a responsible manner.	Local	None identified at this stage
Potential impact on surface water bodies due to waste water and solid waste discharges.	Waste water and solid waste generated by the Richards Bay CCPP could contaminate surface water if not managed in a responsible manner.	Local	None identified at this stage

Description of expected significance of impact

Impacts on geo-hydrological features are likely to occur at the extent of the project site and the local area. The significance of the operation phase impacts will be low, subject to the implementation of appropriate mitigation measures.

Gaps in knowledge & recommendations for further study

- A hydrological survey will be undertaken during the EIA phase.
- The scoping hydrological sensitivity map will be verified and refined in the EIA phase.
- An assessment of hydrological impacts associated with the operational phase will be undertaken in the EIA phase.
- Site-specific hydrological issues in terms of nature, extent, duration, probability, severity and significance will be assessed in the EIA phase.
- Mitigation measures to manage the impacts of the operation will be provided in the EMPr.
- The three monitoring boreholes will form a groundwater monitoring network including a background monitoring borehole, impact monitoring borehole as early warning of groundwater contamination and an interception monitoring borehole for plume off-site migration.
- Groundwater levels should be monitored from monitoring boreholes in order to determine the local groundwater flow direction and the hydraulic gradient.

» Groundwater samples should be collected for groundwater quality assessment twice a year as well as a visual or olfactory inspection of boreholes. » It is also suggested that surface water monitoring of the Nsezi dam, Nseleni River, Voor River and Bhizolo stream in the vicinity of the CCPP is undertaken to assess any impact when the CCPP is operational. » Regular integrity tests on fuel storage tanks and pipelines is recommended to prevent leak occurrence. » It is recommended that solid waste be collected and disposed of at an appropriate municipal waste disposal site.

6.4.4 Impacts on soil and agricultural potential

The following potential impacts were identified to be associated with the operation of the Richards Bay CCPP on the soil and agricultural potential present within the project site (**Appendix H**):

» » Loss of agricultural land with a moderate agricultural potential in terms of cultivation;
» Erosion, compaction and sedimentation;
» Loss of topsoil; and
» Disturbance of soil.

Impact Potential impacts associated with the proposed development include: » Loss of agricultural land and/or loss of agricultural potential. » Potential disturbances include compaction, physical removal and potential pollution. The exposed soil surfaces have the potential to erode easily if left uncovered which could lead to the loss of the soil resource. » Physical and chemical states of soils that are excavated for the installation of foundations will be altered negatively; » Potential loss of stockpiled topsoil and other materials through erosion if not appropriately protected; » Implementation of insufficient stormwater control measures may result in localised high levels of soil erosion, possibly creating dongas or gullies; » Increased erosion could result in increased sedimentation which could impact on water quality and ecological processes; » The additional hardened surfaces created during construction could increase the amount of stormwater runoff, which has the potential to result in erosion; » Physical disturbance of the soil and vegetation removal may result in soil erosion/loss; and » Erosion and potential soil loss from construction activities and areas where naturally dispersive soils occur.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Development of the Richards Bay CCPP will	» Loss of a non-renewable soil resource	Local	None identified at

result in soil erosion and the loss of Agricultural potential	» Erosion and sedimentation » Loss of natural vegetation cover		this stage
Description of expected significance of impact The impact of the Richards Bay CCPP on the soil and agricultural potential within the project site will be local in extent. The significance of the impact will be confirmed once the Class III land capability has been confirmed.			
Gaps in knowledge & recommendations for further study » The Class III land capability would need to be confirmed during the site visit. » No layout alternatives were made available for the scoping study, therefore the likely extent and significance of impacts is based on expected impacts only, and is not an accurate indication for this stage of the project.			

6.4.5 Impacts on ambient air quality

The potential impacts on air quality associated with the development of the Richards Bay CCPP include (**Appendix K**):

» During the operation phase, the proposed CCPP is likely to contribute NO_X, CO, and VOCs to the existing baseline concentrations.
» The combustion of natural gas at the CCP will produce greenhouse gas emissions which will contribute to the global phenomenon of anthropogenic climate change.

Impact Elevated ambient concentrations of gaseous atmospheric pollutants as a result of operational activities.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Gaseous pollutant emissions	Emissions as a result of gas combustion in turbine units. Pollutants of concern are: NO_X, VOCs, SO_2, and PM_{10}.	Regional	None identified at this stage
Fugitive emissions of VOCs	Fugitive evaporative losses from large diesel storage tanks	Local	None identified at this stage
Description of expected significance of impact The operation phase impacts will be of a local extent. The significance of the impacts will be medium.			
Gaps in knowledge & recommendations for further study NO_X emissions are likely to be significant from the gas (and diesel) combustion during the operation phase. Ambient NO_X and NO_2 are not currently monitored by the Richards Bay Clean Air Association. Atmospheric dispersion modelling will be used during the EIA phase to assess the extent of the impact of the proposed facility and the cumulative impact, of the pollutants of concern, including NO_X.			

A Climate Change impact assessment will be undertaken during the EIA phase to determine the impact of the Richards Bay CCPP development on the climate.

6.4.6 *Impacts on ambient noise levels*

The operation activities associated with the development of the Richards Bay CCPP will increase the ambient noise levels in the area (**Appendix L**).

Impact Increases in noise levels at the closest receptors in the area. The industrial area is associated with a daytime $L_{R,d}$ acceptable rating level of 70 dBA (60 dBA at night). The area is therefore not sensitive in terms of acoustics. The site visit did not identify any potential noise-sensitive receptors close to the project site. .			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Increase in noise levels at receptors including disturbing noises.	» Due to existing high ambient sound levels at the site it is unlikely that the proposed project would increase ambient sound levels at any receptors in the area.	Local	None identified at this stage
Description of expected significance of impact The impact of ambient noise levels from the development of the Richards Bay CCPP will be local in extent and will be of a low significance.			
Gaps in knowledge & recommendations for further study The scoping level assessment is sufficient and a full Environmental Noise Impact Assessment is not required or recommended.			

6.4.7 *Visual Impacts*

The following potential visual impacts have been identified for the operation of the Richards Bay CCPP (**Appendix M**):

- The proposed development could negatively impact on the landscape character of the area;
- The proposed development could have a negative impact on urban areas;
- Whilst the area around Richards Bay is developed, this is not highly obvious from the coast or out to sea as a result of an extensive coastal dune system that appears relatively natural despite including areas of forestry plantation is present. Development of the proposed site is unlikely to alter this situation;
- There are eight protected areas within the approximate limit of visibility of the development;
- The proposed development could be visible from routes throughout the area;

- The proposed development could impact negatively on local homesteads;
- The recreational uses on the northern side of the port could be negatively impacted by further industrialisation of the landscape;
- A service station on the N2 that overlooks the coastal plain to the south of Richards Bay. This facility is used by many tourists as a rest and refuelling stop; and
- Lighting associated with the development could extend existing light pollution.

Impact The proposed development could negatively impact on the visual character of the affected area (LCA).			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Industrialisation and degradation of a sensitive landscape.	The project site is located adjacent to existing heavy industrial development and within an area where further heavy industry is planned (IDZ Phase 1D). It is therefore possible that the development could intensify existing industrial impacts. It is however highly unlikely to significantly add to the current area of industrial influence within the surrounding landscape. It is also likely to be possible to partly mitigate any additional influence by ensuring that the development occurs in as close a proximity to existing heavy industry as possible. Analysis has also indicated that affected surrounding landscapes are not likely to be highly sensitive to possible change associated with the proposed development.	Immediately surrounding area	None identified at this stage
Possible increase in visibility of industry from urban areas	The main urban area of Richards Bay is located on the opposite side of an existing heavy industrial area to the proposed development. It is therefore highly unlikely to be visible from this area. Views of the development will be possible from Esikhawini which is a residential settlement approximately 6.7km to the south of the project site. This is a relatively dense settlement and views are only likely to be possible from the northern edge. It is also highly likely that vegetation located on the fringe of the settlement will largely screen views of the development. Empangeni is located approximately 6.2km to the west of the	Immediately surrounding area	None identified at this stage

	project site. While the ZTV mapping indicates that views may be possible from parts of the urban area, views of the development are likely to be broken by landform and additional screening is likely to be provided by vegetation. The development will also be seen at a distance and with heavy industry as a backdrop. It is therefore highly unlikely that the development will impact on Empangeni.		
The proposed development could negatively impact on coastal recreation areas. The issue relates to an increase in visibility of industry from coastal recreation areas.	These areas are generally located in the order of 10km to the east of the project site. Existing industry, numerous areas of vegetation and the coastal dune system are all likely to screen views of the development from these areas. There is likely to be no impact on coastal recreation areas associated with development of this site due to both distance and landform.	No impact	None identified at this stage
The proposed development could negatively impact on protected areas and in particular the Richards Bay Game Reserve. The impact relates to a possible increase in industrial development being visible to protected areas. It is possible that this could reduce enjoyment of these areas by visitors.	The development could result in a small impact on the reserve. If visible, only the upper elements are likely to be visible (stacks) and it will be seen in the context of existing industry. The Richards Bay Game Reserve is the only protected area that is likely to be affected. The project site is approximately 4.5km from the Richards Bay Game Reserve. The land between the reserve and the site is generally low lying although it rises close to the site. The proposed development could slightly extend the amount of industrial development that may be visible from within the Reserve. Areas of vegetation on higher land close to the project site are likely to soften / screen the lower sections of the development. Vegetation within the Reserve is also likely to screen / soften views of the development. If the development is visible it is likely that only the higher elements will be obvious. It is likely to be possible to partly mitigate any additional influence by ensuring that the development occurs in as close a proximity to existing heavy industry as possible and towards the east of the project site.	Immediately surrounding area	None identified at this stage
The proposed development could negatively	The R34 is the closest road to the project site located	Immediately surrounding	None identified at

impact on views from local roads. Those likely to be affected include the N2, the R34 and the P106. The development could result in an increase in the extent of industry that is visible from local roads.	approximately 1km to the south of the southern site boundary. From sections of this road panoramic views across the site will be possible. For the most part however, the project site will be seen against the backdrop of other heavy industry. The project site does however extend further west than existing industrial development meaning that development of western portions will extend the visual influence of industry further to the west along the road. From the N2, which at its closest is approximately 4km from the project site, where ever the development is positioned within the site it will be seen against the backdrop of existing heavy industry. Development is therefore unlikely to extend the visual influence of industrial development along the road. The P106 runs in approximately a north / south alignment joining the R34 approximately 1.3km to the south west of the project site. People travelling from Esikhawini along the road towards the R34 are likely to have a clear view of development within the site. If development should occur on the eastern portion of the project site it is likely to be seen against the backdrop of other heavy industry. If it should occur on the western portion of the site however, it is likely to slightly extend the influence of industry within the view. Whilst the R34 and the N2 are likely to carry a proportion of recreational and tourism related traffic, the sections of road that are likely to be affected are not likely to be sensitive to the change in view although from a municipal perspective it is possibly beneficial to minimise the visual impact of industry on residents and visitors.	area	this stage
Visual impact on Homesteads. There are two types of homestead that are potentially	Due to distance, it is highly unlikely that traditional homesteads will be affected. It is possible that a small number of rural	Regional impact due to the distance from which	None identified at this stage

affected including; » Rural homesteads that are associated with agricultural activities that are largely located inland of the coastal plain, these homesteads are generally isolated; and » Traditional homesteads within rural settlement areas that are located immediately inland of the coastal belt to the north and south of Richards Bay, these homesteads are generally distributed relatively evenly throughout traditional areas.	homesteads (4 – 5) that are located to the west of the N2, and at closest 3.5km from the project site, may be affected. However the proposed development will be seen at a distance and is likely to be viewed against the backdrop of existing industry. The affected homesteads also appear to be generally surrounded by mature vegetation which is likely to soften or screen external views. The affected homesteads are therefore not expected to be sensitive to the possible change in view.	the development is likely to be visible.	
Visual impact on recreational uses on the northern side of the port of Richards Bay. Currently when in this area, views of heavy industry are not obvious as they are largely mitigated by existing vegetation and distance. The issue relates to an increase in industry within the view from this area.	The project site is approximately 4.9km from recreational areas. It is possible that the development could increase the visual influence of industry from within the recreational area. However, there is a substantial amount of natural vegetation both around the recreational area and between the project site and the recreational area that is likely to provide substantial screening. This will mean that only higher sections of the development may be visible. If it is visible, the development is likely to be seen through existing major industrial operations that are located to the north west of the port.	Regional significance due to the distance from which the development could be visible as well as the regional importance of the recreational area	None identified at this stage
Visual impact on the N2 Service Station. This issue relates to an increase in industrialisation of the area which is currently predominantly rural.	Currently when at this facility, views of heavy industry to the south of Richards Bay are obvious. Due to distance only the larger / higher industrial structures are obvious. It is likely that the development could add industrial element to other sectors of the view. The project site is located approximately 4km from the service station. Where ever the development is positioned within the site it will be seen against the backdrop of existing heavy industry. The development is therefore unlikely to extend the visual influence of industrial development from this view point.	Immediately surrounding area	None identified at this stage
Light pollution changing the nature of the night time possibly causing nuisance for	The only receptor that could potentially be sensitive is the R34. This road is approximately 1km from the project site. Because of	Immediately surrounding area	None identified at this stage

neighbouring uses and further industrialising the night time landscape. This issue relates to the lighting of a sensitive area. It could include the general lighting of a natural landscape that would otherwise be dark or light spill and glare that could affect adjacent properties and road users.	this distance, it is unlikely that lighting will be problematic for road users.		
Description of expected significance of impact There is likely to be minimal additional industrial influence on surrounding LCAs or sensitive visual receptors due to the fact that the development will be set within an industrial area and will be seen in the context of other heavy industries.			
Gaps in knowledge & recommendations for further study » Confirmation of sensitivity of the LCAs from a site visit and consultation during the EIA process. » A development layout and details of structure height is needed to assess the impacts as well as the identification of possible mitigation measures in any detail. » Confirmation of sensitivity and location of the receptors from a site visit.			

6.4.8 Impacts on the socio-economic environment

The development of the Richards Bay CCPP will have both positive and negative impacts during the operation phase (**Appendix N**). The section below provides more details of the associated potential impacts.

The potential positive impacts which could arise as a result of the operation activities include the following:

» Sustainable increase in the production and GDP-R of the national and local economies due to operations expenditure;
» Long-term employment opportunities;
» Skills development;
» Household income that will improve the standard of living;
» Increase in the government revenue stream; and
» Improved electricity security.
» Deterioration of quality of public health due to combined emissions from the CCPP operation

Impact: Sustainable increase in Production and GDP-R of the national and local economies due to operations expenditure.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
Increase in production and GDP-R of national and local economies.	A positive impact to production and GDP-R due to operational expenditure.	Local-National	None identified at this stage
Description of expected significance of impact The City of uMhlathuze Local Municipality makes the greatest contribution to the King Cetshwayo District Municipality. This impact will possibly be of medium significance (positive) due to the long-term of benefits and the size of operational expenditure, which will further improve the GDP of City of uMhlathuze Local Municipality.			
Gaps in knowledge & recommendations for further study » Data regarding operational expenditure, local content, and its breakdown per industry are required. » Duration of operation phase information required.			

Impact: Long-term employment creation in local communities and elsewhere in the country.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
It involves the creation of direct, indirect and induced opportunities related to the operation of the Richards Bay CCPP and associated infrastructure.	A positive impact on job creation will occur as a reduction in unemployment as a result of the operation of the Richards Bay CCPP will take place.	Local-Regional	None identified at this stage
Description of expected significance of impact The impact may have a medium significance (positive) due to the sustainability of the potentially notable number of jobs to be created.			
Gaps in knowledge & recommendations for further study » The employment breakdown that will be created locally and at other scales are required. » The duration of employment information required.			

Impact: Skills development due to the creation of employment opportunities.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**

Skills will be created and/or enhanced during the operations phase for employees.	The impact is positive as it develops skills that can be used in similar projects in future.	Local-Regional	None identified at this stage
Description of expected significance of impact A great portion of the City of uMhlathuze Local Municipality is semi-skilled. This impact will be of medium significance (positive) due to the long-term benefits of skills development for the employees.			
Gaps in knowledge & recommendations for further study Skills development programmes to be implemented during the operation phase.			

Impact: Household income will improve the standard of living for households directly or indirectly benefitting from employment opportunities.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
Income will be derived from the sustainable employment created during the operation phase.	The impact is positive as it improves the standard of living for the benefitting households for a sustainable period.	Local-Regional	None identified at this stage
Description of expected significance of impact This impact may be of medium significance due to the long-term income earned by employees.			
Gaps in knowledge & recommendations for further study » The employment to be created locally and at other scales information required. » The duration of employment information required.			

Impact: Increase in the government revenue stream due to local rates, payroll taxes, and income taxes.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
Payroll and income taxes during operation will increase government revenue.	The impact is positive as it will increase municipal and national fiscal revenue which can be used to the benefit of society.	Local-Regional	None identified at this stage
Description of expected significance of impact This impact may be of medium significance (positive) due to the long-term revenue derived by local and national government spheres.			
Gaps in knowledge & recommendations for further study The duration of the operation phase.			

Impact: Improved energy security and opportunities for local economic development due to increased supply of electricity			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
Alternative source of energy to provide electricity into the national grid.	The impact is positive as it will contribute to energy supply.	Local-National	None identified at this stage
Description of expected significance of impact This impact may be of medium to high significance (positive) due to the fact that it will create the necessary supply foe of electricity that can be procured by industries and businesses planning to locate in Richards Bay. Location of the electricity generating facility in close proximity to the demand will also assist in reducing transmission losses and improving energy security in the country.			
Gaps in knowledge & recommendations for further study None			

Impact: Potential deterioration of quality of public health due to combined emissions from the CCPP and existing industrial activity in zone of influence. There will be a potential health threat due to cumulative emissions.			
Issue	**Nature**	**Extent of Impact**	**No-Go Areas**
Emissions from the CCPP may deteriorate quality of health of employees and surrounding residents and workers.	The impact is negative as it will further contribute to potentially health threatening emissions.	Local	None identified at this stage
Description of expected significance of impact This impact may be of medium significance (negative).			
Gaps in knowledge & recommendations for further study Air quality impact assessment.			

6.5 Cumulative Impacts

Approach to Cumulative Effects Assessment

Cumulative impacts, in relation to an activity, refer to the impact of an activity that in-itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004). Boundaries must be set so analysts are not attempted to measure effects on everything. Therefore, the cumulative impacts associated with the Richards Bay CCPP have been viewed from two perspectives within this report:

- Cumulative impacts associated with the location and nature of the project, i.e. a CCPP located within the Richards Bay IDZ Phase 1D on Portion 2 and Portion 4 of Erf 11376;
- Cumulative impacts associated with other relevant approved or existing and proposed developments within the surrounding area of the proposed Richards Bay CCPP project site.

Refer to **Figure 6.1** for an illustration of other existing industrial developments located within the surrounding areas of the project site.

Cumulative effects are commonly understood as the impacts which combine from different projects and which result in significant change, which is larger than the sum of all the impacts (DEAT, 2004). The complicating factor is that the projects that need to be considered are from past, present and reasonably foreseeable future development. Cumulative effects can be characterised according to the pathway they follow. One pathway could be the persistent additions from one process. Another pathway could be the compounding effect from one or more processes. Cumulative effects can therefore occur when impacts are:

- additive (incremental);
- interactive;
- sequential; or
- synergistic.

Canter and Sadler (1997) describe a three step process for addressing cumulative effects in an EIA:

- delineating potential sources of cumulative change (i.e. GIS to map the relevant industrial development in close proximity to one another).
- identifying the pathways of possible change (direct impacts)
- indirect, non-linear or synergistic processes; and
- Classification of resultant cumulative changes.

The Richards Bay CCPP is proposed to be located in the Richards Bay Industrial Development Zone (IDZ) Phase 1D, approximately 6km south west of Richards Bay and 4km south west of Alton which falls within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province.

The project site and the greater Richards Bay area has been identified by City of uMhlathuze Local Municipality and the IDZ as an area of focus for the development of a gas to power facility. As the area is earmarked for the development of industrial industries, specifically relating to gas to power developments, as identified above, it can be expected that various industrial developments will take place in addition to the already industrial nature of the area. The closest existing industrial development located near the project site is Mondi Richards Bay, which is located directly adjacent to the north east of the site.

Cumulative impacts associated with the proposed project could relate to:

» Ecological Impacts;
» Visual and social impacts due to a more industrialised area; and
» Air quality impacts.

From a cumulative perspective it is anticipated that the development of the Richards Bay CCPP will not result in unacceptable risk or loss to the environment. This is supported by the fact that the site is located within the Richards Bay Industrial Development Zone Phase 1D and can therefore be considered as a site which would have been developed for some type of industry or entity specifically relating to gas to power generation. It is also considered unlikely that the site will be used for agricultural purposes due to its location within the IDZ and also due to the current land zoning of the site.

The cumulative impacts associated with the development of the Richards Bay CCPP will be assessed in details as part of the EIA Phase specialist reports and the EIA report.

Summary of the nature, significance, consequence, extent, duration and probability of cumulative impacts

» The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. Benefits to the local, regional and national economy through employment and procurement of services could be substantial. People from the City of uMhlathuze Local Municipality and nearby towns are most likely to benefit from job opportunities and economic benefits. These positive cumulative impacts will be of a medium significance.
» The potential negative cumulative impacts are considered to be probable, although the extent, duration, and magnitude of these impacts can be minimised to levels where this impact can be regarded as low significance through implementation of appropriate mitigation measures.
» The duration of the project is expected to be long-term and subsequently the impact is also expected to be long-term.
» The impact associated with the proposed development is expected to be local, affecting mainly the immediate environment and the surrounding areas.

Positive impacts including job creation and economic development are considered to be regional in extent.
Gaps in knowledge & recommendations for further study: » Each specialist study to be undertaken within the EIA Phase of the process will consider and assess the cumulative impacts of proposed, approved and authorised industrial developments within the area.

Figure 6.1: Cumulative map illustrating other industrial developments located within the vicinity of the Richards Bay CCPP project site (**Appendix B2**)

CHAPTER 7: CONCLUSIONS

Eskom Holdings SoC Ltd (Eskom) proposes to develop a Combined Cycle Gas Turbine (CCGT) Power Plant and associated infrastructures, with a generating capacity of up to 3000MW. The proposed project is to be known as the Richards Bay Combined Cycle Power Plant (CCPP). The Project site is to be located in the Richards Bay Industrial Development Zone (IDZ) Phase 1D, approximately 6km south west of Richards Bay and 4km south west of Alton which falls within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province.

This Scoping Study has been undertaken in accordance with the 2014 EIA Regulations, as amended in April 2017, published in Government Notice 40772, 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 Richards Bay CCPP, identifying potential issues associated with the development and defining the extent of studies required within the EIA phase. This was achieved through an evaluation of the Richards Bay CCPP, involving the project proponent, specialist consultants, and a consultation process with key stakeholders (including relevant government authorities) and interested and affected parties (I&APs). The public consultation process is comprehensive and every effort is being made to include representatives of all stakeholder groupings in the communities surrounding the project site and the Province.

Through a screening and site selection process undertaken by Savannah Environmental on behalf of Eskom in April 2017, a preferred site for further consideration in the EIA process was identified and issues of concern were raised from an environmental and social perspective. During this Scoping phase the initial issues identified during the screening process were further investigated through the review of existing information and desk-top evaluations of impacts and specialist inputs.

This chapter concludes the Scoping Report and provides an evaluation of the identified potential environmental risks and impacts associated with the construction and operation phases of the Richards Bay CCPP. Recommendations regarding investigations required to be undertaken within the EIA Phase of the process are provided within the Plan of Study for EIA, contained within Chapter 8 of this Scoping Report.

7.1. Legal Requirements as per the EIA Regulations for the undertaking of a Scoping Report, 2014 (as amended)

This chapter of the scoping report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(h)(xi) A concluding statement indicating the preferred alternatives, including the preferred location of the activity.	A concluding statement regarding the Scoping Phase of the Richards Bay CCPP is included within this chapter as a whole.

7.2 Conclusion drawn from the Evaluation of the Proposed Project

Potential impacts associated with the development of the Richards Bay CCPP are expected to occur during both the construction and operation phases. The conclusion of the findings of the Scoping Study is that the potential impacts identified to be associated with the construction and operation of the Richards Bay CCPP are anticipated to be at a site or localised level, with few impacts extending from a local to national extent which includes both positive and negative impacts. The following provides a summary of the findings of the specialist studies undertaken:

- *Ecology:* The construction of the Richards Bay CCPP will impact on ecological features located within the project site. The main potential impacts expected during the construction phase include the loss of critically endangered ecosystems (limited extent), a loss of CBA irreplaceable areas (limited extent), a potential loss of red listed/protected flora and fauna species, the generation of construction noise and emissions which could impact on the ecology of the area, and soil and water contamination. Potential impacts associated with the operation of the Richards Bay CCPP include impacts on species due to alterations in the night time light conditions, disturbance or damage to adjacent habitats due to movement within the area during the construction and operation, degradation of habitat quality and the alteration of drainage regimes. Impacts on ecological features are likely to occur at the extent of the site and the broader area surrounding the site. As a result of the largely disturbed nature of the site, it is expected that the development would not result in any irreplaceable loss of ecological features and the consequences of the impacts are expected to be limited. Impacts can be minimised through the implementation of appropriate mitigation measures.

- *Wetland and Aquatic Features:* Wetlands features are located within the project site. The development of the Richards Bay CCPP could potentially result in a loss of wetlands, altered hydrology, impaired water quality, loss of ecological services and sedimentation and erosion. The wetlands located within the project site are considered to be in a largely natural state and ecologically important. The loss of these systems is considered to be significant. If the loss of these systems is avoidable, any changes to the status and functioning of these systems resulting from indirect impacts are considered to be major negative impacts as a result of the project. The significance will be medium-high. It must be noted that an offset area directly adjacent to the project site has been implemented for wetlands and consultation has taken place between the IDZ and the Department of Water and Sanitation regarding the matter. The presence of the offset area (which is avoided by the CCPP) and the impact of the Richards Bay CCPP project on wetlands, while considering the implemented offset area, will be considered in the EIA phase by the specialist.

- Geo-hydrological features and surface waterbodies: During the construction phase groundwater and surface water waterbodies can be affected as a result of on-site accidental spills and leaks due to the presence of construction vehicles and/or fuel storage areas, and migration of the spilled liquids to the surrounding surface water bodies. During the operation phase groundwater and surface water waterbodies, including the Nseleni River, Nsezi dam, Voor River, Bhizolo Stream and an unnamed dam (receptors), could be impacted due to possible leakage of diesel and/or chemicals from storage facilities and/or pipelines and form emergency backup generators leaks (sources). The significance of the construction and operation impacts will be low, subject to the implementation of appropriate mitigation measures.

» *Soils and Agricultural Potential:* The development of the Richards Bay CCPP will impact on the soils and agricultural potential of the project site. The land capability of the project site is classified as Class III which refers to the area being of a moderate agricultural potential. The main potential impacts include loss of agricultural land and/or loss of agricultural potential, disturbances including compaction, physical and chemical alteration of the soils, potential loss of stockpiled topsoil, increased risk of soil erosion, sedimentation and an increase in the stormwater runoff. The significance of the impact will be determined during the EIA phase, after the site survey has been conducted.

» *Archaeological Resources:* The construction phase of the Richards Bay CCPP may impact on archaeological resources due to the construction activities which include excavation. Stone Age sites are expected to occur in the project site and could be impacted by the development. The impacts of the construction activities on the archaeological resources include potential damage to and destruction of archaeological sites, indirect impacts including impact on the cultural landscape and residual risks including the depletion of the archaeological record of the broader region. The impact is expected to be of a medium-low significance.

» *Palaeontological Resources:* Loss of palaeontological heritage could occur during the construction phase of the Richards Bay CCPP. Construction activities including excavation of new bedrock which could comprise of sensitive palaeontological resources could result in the damage and destruction of the resources or sealing in fossils below the ground surface making these no longer be available for scientific consideration. Any fossils occurring in the project site are potentially scientifically and culturally significant and any negative impact on them would be of high significance. The destruction or inadvertent relocation of any affected fossils will be permanent and irreversible. During a field survey of the proposed development footprint, no fossiliferous outcrops were found. Therefore the impact will be of a low significance. Due to the lack of fossil outcrops it is considered that the construction and operation of the development footprint and associated infrastructure is deemed appropriate and feasible and will not lead to detrimental impacts on the palaeontological resources of the area. No further study is required.

» *Air Quality and climate change:* The construction of the Richards Bay CCPP has the potential to impact on the ambient air quality of the area through elevated daily PM_{10} concentrations due to background PM_{10} and the proximity of the project site to other particulate emission sources. During the operation phase, the Richards Bay CCPP is likely to contribute NO_X, CO, and VOCs to the existing baseline concentrations (including greenhouse gasses). The impact is expected to be of a medium-low significance. Climate change impacts associated with the development of the CCPP relates to the combustion of natural gas at the CCPP plant which will produce greenhouse gas emissions that will contribute to the global phenomenon of anthropogenic climate change. Climate change is projected to effect many environmental changes across the globe. The Richards Bay CCPP will contribute substantially to South Africa's national emissions inventory.

» *Noise:* The operation of the Richards Bay CCPP will increase the noise levels in the vicinity of the plant. The site visit did not identify any potential noise-sensitive receptors close to the project site. It is therefore unlikely that the project would result in a noise impact on potential noise-sensitive receptors in the area. It was concluded that the scoping level assessment is sufficient and a full Environmental Noise Impact Assessment is not required or recommended.

» *Visual:* Impacts from a visual perspective are expected to occur during the construction and operation phases of the Richards Bay CCPP. The project site is located adjacent to existing heavy industrial development and within an area where further heavy industry is planned (IDZ Phase 1D). It is therefore possible that the development could intensify existing industrial impacts. It is however highly unlikely to significantly add to the current area of industrial influence within the surrounding landscape. It is also likely to be possible to partly mitigate any additional influence by ensuring that the development occurs in as close a proximity to existing heavy industry as possible. Analysis has also indicated that affected surrounding landscapes are not likely to be highly sensitive to possible change associated with the proposed development. The significance of the development of the Richards Bay CCPP on the visual aspects is expected to be low to negligible.

» *Socio-economic aspects:* The construction of the Richards Bay CCPP will result in both positive and negative impacts. During the construction phase the positive impacts will include an increase in the production and GDP-R of the national and local economies, temporary employment opportunities, skills development and household income leading to improved standard of living. These impacts are expected to be of medium significance. Negative impacts expected during the construction phase include a change in the demographics of the area due to an influx of jobseekers, increased pressure on basic services and social and economic infrastructure, and an increased demand in housing within the broader area. These impacts are expected to be of low significance. Positive and negative impacts are expected to occur with the operation of the Richards Bay CCPP. Positive impacts include a sustainable increase in the production and GDP-R of the national and local economies, long-term employment opportunities, skills development, household income that will improve the standard of living within the area, increased government revenue streams and improved electricity security. These impacts are expected to be of medium-high significance. The negative impact expected during operation is the deterioration of quality of public health due to combined emissions from the operating CCPP. The expected significance of the negative impact is medium. From the above identified potential impacts it is concluded that the positive impacts outweigh the negative impacts from a social perspective.

» *Cumulative Impacts:* The project site is located adjacent to existing heavy industrial development and within an area where further heavy industry is planned. The project site is located within the Richards Bay Industrial Development Zone Phase 1D and has been allocated for the development of a gas facility. Due to the development plans for the site and its location within the IDZ it is considered unlikely that it would be used for agricultural purposes. Other similar facilities within the area include the Mondi Richards Bay Facility located directly adjacent to the project site and a gas to power facility which has been authorised to be developed within Phase 1F of the IDZ.

No environmental fatal flaws or impacts of very high significance were identified to be associated with the development of the Richards Bay CCPP on the identified project site at this stage in the process. This conclusion must however be confirmed through a detailed investigation of the development footprint within the EIA Phase of the process.

7.3 Scoping Phase Sensitivity Analysis

Through the Scoping Phase a number of sensitive features within the project site have been identified which could be affected by the development of the Richards Bay CCPP (refer to **Figure 8.1**). Wetland features were identified within the project site. An offset area has been implemented by the Local

Municipality for the conservation of such areas, however the impacts on the wetland features still present within the project site will be assessed during the EIA phase and considered in terms of the offset area already implemented.

7.4 Risks Associated with the Richard Bay CCPP

A potential risk associated with the development of the Richards Bay CCPP will be potential conflict with the land-use of the area. Communal grazing is currently being undertaken within the project site. However, as the land is located within the identified Industrial Development Zone, and has been allocated for the purposes of the project, this conflict is considered to be negligible for this project.

The most significant risk associated with the project is the potential for increase in air quality impacts associated with the operation phase of the project. Detailed investigation of impacts of the Richards Bay CCPP on air quality will be required to be undertaken in order to confirm the significance of potential impacts and risks.

7.5 Recommendations

The findings of the Scoping Report were based primarily on a desktop assessment, and based on this assessment no environmental fatal flaws associated with the Richards Bay CCPP and associated infrastructure have been identified at this stage. Therefore, there is no reason why the project cannot be evaluated further in a detailed EIA study.

During the EIA phase more detailed environmental studies will be conducted in line with the Plan of Study contained in Chapter 8 of this report. These studies will consider the detailed layouts produced by Eskom and make recommendations for the implementation of avoidance strategies (if required), mitigation and management measures to ensure that the final assessed layout retains an acceptable environmental impact.

Figure 8.1: Sensitivity map illustrating the sensitive environmental features located within the Richards Bay CCPP project site (**Appendix B3**)

CHAPTER 8: PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

This Scoping Report includes a description of the nature and extent of the Richards Bay CCPP within the Richards Bay IDZ Phase 1D, details of the Scoping Study undertaken, and the issues identified, described and evaluated. This chapter provides the Plan of Study for the Environmental Impact Assessment (EIA) based on the outcomes of the Scoping Study and associated specialist investigations.

The EIA Phase of the study will include detailed specialist studies for those impacts recorded to be of potential significance, as well as on-going public consultation. The key findings of the Scoping Phase (which includes inputs from authorities, stakeholders, the public, the proponent and the EIA specialist team), together with the requirements of the NEMA EIA Regulations and applicable guidelines, are used to inform the Plan of Study for EIA.

8.1. Legal Requirements as per the EIA Regulations for the undertaking of a Scoping Report, 2014 (as amended)

This chapter of the Scoping Report includes the following information required in terms of Appendix 2: Content of the Scoping Report:

Requirement	Relevant Section
(h) a plan of study for the undertaking of the environmental impact assessment process to be undertaken	A plan of study for the undertaking of the EIA phase for the Richards Bay CCPP is included within Sections 8.2 to 8.8 of this chapter.

8.2 Aims of the EIA Phase

The EIA Study to be undertaken for the Richards Bay CCPP will aim to achieve the following:

- Provide an overall description of the social and biophysical environment affected by the development of the proposed project.
- Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed facility and associated infrastructure.
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
- Undertake a fully inclusive public involvement process to ensure that I&APs are afforded the opportunity to participate, and that their issues and concerns are recorded. This process will include consultation with I&APs, the public review of the EIA report for a 30-day period and the undertaking of focus group meetings and public meetings.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with each life-cycle stage of the development including design, construction, operation and decommissioning; and will aim to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed Richards Bay CCPP. A detailed facility layout will be assessed through detailed specialist studies. As required in terms of the EIA Regulations the assessment will include the consideration of the 'do nothing' alternative.

8.3 Authority Consultation

Consultation with the regulating authorities has been undertaken in the Scoping Phase and will continue throughout the EIA process. On-going consultation will include the following:

- Submission of a Scoping Report following a 30-day review period which will include all comments and issues raised during the review period as well as appropriate responses to the comments.
- Submission of an EIA Report for review and comment. The report will be made available for a 30-day review period.
- Submission of a Final EIA Report following a 30-day review period which will include all comments and issues raised during the review period as well as appropriate responses to the comments received.
- Consultation and an authority site visit (if required) in order to discuss the findings and conclusions of the EIA Report.

8.4 Consideration of Alternatives

The following project alternatives will be investigated in the EIA Phase:

- **The 'do nothing' alternative:** Eskom does not establish the Richards Bay CCPP on the proposed project site, i.e. Portion 2 and Portion 4 of Erf 11376.
- **Site-specific layout/design alternatives:** In terms of the position of the Richards Bay CCPP within the project site, and layout and/or design of the facility development footprint, particularly the layout of the gas and steam turbines and corridors/servitudes for associated infrastructure such as the access roads and the gas supply pipeline.
- **Cooling technology alternatives:** Two cooling technology alternatives are being considered for the Richards Bay CCPP namely dry cooling and once-through cooling.

8.5 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 and ground-truth the significance of these potential impacts is provided within **Table 8.1**. The specialists responsible for these studies are also reflected within this table. These specialist studies will consider the development footprint proposed for the Richards Bay CCPP and all associated infrastructure, as well as feasible and reasonable alternatives identified for the development.

Based on the findings of the Scoping assessment, the following issues were identified as not requiring further investigation within the EIA, and no further or detailed assessment is required:

- Impacts on noise – due to high ambient sound levels in the vicinity of the site and the absence of any potential noise-sensitive receptors within the area of potential influence there is a low risk for the occurrence of a noise impact during the construction and operation phases. This is supported by a high confidence in the findings by the specialist. Therefore, the findings of the scoping Noise Assessment (**Appendix L**) are considered to be sufficient and no further Environmental Noise Impact Assessment is required for the EIA Phase.
- Impacts on palaeontology – due to the lack of fossil outcrops within the project site and the low significance of the impact on the palaeontological resources no further study is required. Therefore, the findings of the Palaeontological Assessment (**Appendix J**) are considered to be sufficient and no further Environmental Noise Impact Assessment is required for the EIA Phase.

Table 8.1: Issues requiring further investigation during the EIA Phase and activities to be undertaken in order to assess the significance of potential impacts relevant to the Richards Bay CCPP

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Ecological Impact Assessment (terrestrial ecology including fauna and flora)	**Sensitivity Analysis and EIA assessment** Results from the scoping assessment found that the proposed project site falls within the distributional range of three vegetation types of conservation concern. However, the vegetation on the project site is in poor ecological condition, but some natural vegetation is still present. As a means to determine if species of conservation concern are still present on the project site, the following activities will be undertaken: » The location, extent and condition of all plant communities on site, and within a 200 m radius of the site will be identified and mapped as per the Sensitivity Mapping Rules for Biodiversity Assessments (EKZNW Guidelines for Biodiversity Impact Assessments, 2013); » All Red and Orange, as well as endemic plant species plant species, will be identified and accurately mapped out with a GPS (WGS84 datum; geographic coordinate system). Protective buffer zone widths, consistent with the Red List Plant Species Guidelines will be designated as sensitive on a sensitivity map; » A plant species list, including the number of forbs/herbs, grasses, shrubs and tree species will be provided for each plant community. Medicinal and exotic/invasive species will be indicated. *Mammal assessments* » During the site visit mammals will be identified by visual sightings through random transect walks, as well as indirect evidence from tracks, scats and runways. An assessment of the status and condition of potential and available habitat for mammalian species will be conducted. » A list of all mammal species observed in the project site will be provided. » The location of red list, protected and endemic mammal species/populations observed in the project site will be mapped as well as all suitable and predicted habitats for these animals in the project site and within a 500 m radius of the project site. » Species specific mitigation measures for identified species of conservation concern will be provided. » Details on the status/condition of habitats identified during the survey will be included in the report. » An evaluation of whether the project site contains viable habitat for the recolonization or re-introduction of the species predicted to occur in the project stie (historically), but which were not recorded as being present during the surveys, as well as the rehabilitation potential if habitat is degraded.	Ross Goode and Anita Reuentebach of Afzelia Environmental Consultants

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	Herpetofauna assessments » During the site visit reptiles will be identified by visual sightings through random transect walks. An assessment of the status and condition of potential and available habitat for reptile species will be conducted. Typical reptile habitats such as rocky outcrops, trees, under logs or stones will be systematically searched for the presence of reptile species. Potential dispersal connections between habitats will be investigated during random transect walks. » For frog assessments, focal habitats such as wetlands, drainage lines and grasslands will be searched systematically for approximately 2 hours. Searches will be conducted by slow wading or walking on adjacent banks while visually searching for adults. In addition to visual confirmation, frog calls will be recorded and compared with pre-recorded calls from du Preez & Carruthers (2009) as an additional means to identify frog species. Diurnal and nocturnal surveys will be conducted for the amphibian and reptile assessments. *Focal surveys for Pickersgill Reed frog and the Spotted shovel-nosed frog* » Focal surveys will include nocturnal surveys and call monitoring at wetland areas. In addition to call monitoring and visual surveys, a standard Y-shape trap design close to the wetlands will be used to increase the likelihood of encountering the spotted shovel-nosed frogs. The trap arrays have the additional benefit of increasing the likelihood of capturing shrew species of conservation concern. Traps will be left open for 2-3 nights, depending on the capture rate. » Where suitable foraging and aestivation habitat occurs in the project site the nearest suitable breeding habitat will be identified. Potential dispersal connections between wetlands in the project site, and on areas within a 500 m radius of the project site will also be indicated. **Assessment of Impacts for the EIA** The methodology described above will assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refer to the causes of the effect, what will	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Wetland and Aquatic Impact Assessment	**Sensitivity Analysis and EIA assessment** The impact assessment for the consideration of wetlands and aquatic features will include the following: » A site visit will be undertaken in order to confirm the presence and locations of wetlands within the project site; » Wetland and watercourse delineation will be undertaken; » Wetland health will be determined; » Wetland functionality and integrity will be confirmed; » The ecological importance and sensitivity of the wetlands will be confirmed; and » Recommendations for rehabilitation of any disturbed wetland areas identified will be undertaken. **Assessment of Impacts for the EIA** The methodology described above will assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	Andrew Hustled and Wayne Jackson of Afzelia Environmental Consultants
Geo-hydrological Impact Assessment	**Sensitivity Analysis and EIA assessment** The impact assessment of the project site from a geo-hydrological perspective will include:	John Kalala Ngeleka of Afzelia Environmental Consultants

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» A drill at least three monitoring boreholes at the project site. This is critical as soil profiles, borehole logs and local static water level are data gaps required to assess groundwater vulnerability and to discuss alternatives if applicable; and » The three monitoring boreholes will form a groundwater monitoring network including a background monitoring borehole, impact monitoring borehole as early warning of groundwater contamination and an interception monitoring borehole for plume off-site migration. **Assessment of Impacts for the EIA** The methodology described above will assists in the evaluation of the overall effect of a proposed activity on the environment. It will include an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Soils and Agricultural Potential Impact Assessment	**Sensitivity Analysis and EIA assessment** The following will form part of the impact assessment on the soil and agricultural potential of the project site: » Undertake a site investigation; » Assess and discuss historic climate statistics; » Assess and discuss geological information; » Assess and discuss the terrain features using 5 m contours; » Source best recent satellite or aerial imagery and georeferenced; » Assess and discuss current agricultural land use on site and comment on crop performance and estimated yields; » Conduct soil assessment;	Wayne Jackson of Afzelia Environmental Consultants

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Assess and discuss agricultural land potential (eight class scale); » Discuss the impact of the proposed land use change on loss of agricultural land production (If any); » Recommend best location for proposed development to reduce any impacts; » Compile informative reports and maps on current land use and agricultural land potential; and » Discuss the impact of the proposed land use change on loss of agricultural land production. The site visit will be undertaken as follows: » The site will be traversed by vehicle and on foot; » A soil auger will be used to determine the soil form and depth; » The soil will be hand augured to the first restricting layer or 1.2 m; » Soil survey positions will be recorded as waypoints using a handheld GPS/Samsung tablet; » Soil forms (types of soil) found in the landscape will be identified using the South African soil classification system (Soil Classification Working Group, 1991); » Landscape features such as existing open trenches were also helpful in determining soil types and depth; and » Current land use will be recorded as well as potential yields of existing crops An Impact assessment of the proposed development will be conducted and the recommendations will be used in the Environmental Management Programme (EMPr). **Assessment of Impacts for the EIA** The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction,	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	and operational phase will be drafted for inclusion in the project EMPr.	
Heritage Impact Assessment (archaeology)	**Sensitivity Analysis and EIA assessment** The impact assessment for the archaeological resources of the site will be assessed through the undertaking of the following: » A site visit will be undertaken with the aim of locating and identifying sites of significance through a non-intrusive pedestrian survey in the project site. The site visit will also aim to ground truth findings of the scoping study. The identified sites will be recorded, photographed and described. GPS points of significant sites will be documented using the WGS 84 datum point; » Should any significant sites be identified a study method for the particular site will be included; » Ensure that all requirements of the local South African Heritage Resources Agency (SAHRA) are met; and » Report on the results of the archaeological and cultural heritage survey adhering to minimum standards as prescribed by the SAHRA and approved by the Association for Southern African Professional Archaeologist (ASAPA). **Assessment of Impacts for the EIA** The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	Jaco van der Walt of Heritage Contracts and Archaeological Assessments
Air Quality Impact Assessment	**Sensitivity Analysis and EIA assessment** The impact assessment for air quality will include the following: » The compilation of a baseline emissions inventory for existing facilities within Richards Bay based on	Terri Bird of AirShed Planning Professionals

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	measured emissions in the RBCAA inventory; » The establishment of an emissions inventory by referring to NMES and emission factors for combustion processes, fuel storage and fugitive dust (construction); » Atmospheric dispersion simulations using the US EPA CALPro suite (CALMET and CALPUFF); » A human health risk and nuisance impact screening assessment based on dispersion simulation results; » A comprehensive air quality impact assessment report in the format prescribed by the Department of Environmental Affairs (DEA) in support of the Atmospheric Emission License (AEL) application. **Assessment of Impacts for the EIA** The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Visual Impact Assessment	**Sensitivity Analysis and EIA assessment** A key impact to be assessed comprises the visual impact that the Richards Bay CCPP will have on surrounding areas. Work will be undertaken in accordance with; » The Government of the Western Cape Guideline for Involving Visual and Aesthetic Specialists in EIA Processes, which is the only relevant local guideline, setting various levels of assessment subject to the nature of the proposed development and surrounding landscape; and » The Landscape Institute and Institute of Environmental Management and Assessment (UK) Guidelines for Landscape and Visual Impact Assessment which provides detail of international best practice (technical methodology).	Jon Marshall of Afzelia Environmental Consultants

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	A Level 4 Assessment based on the Western Cape Guideline is required. This will include: » Identification of issues raised in scoping phase, and site visit; » Description of the receiving environment and the proposed project; » Establishment of view catchment area, view corridors, viewpoints and receptors; » Indication of potential visual impacts using established criteria. » Inclusion of potential lighting impacts at night; » Description of alternatives, mitigation measures and monitoring programmes; » 3D modelling and simulations with and without mitigation. » Review by independent, experienced visual specialist (if require **Assessment of Impacts for the EIA** The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Socio-economic Impact Assessment	**Sensitivity Analysis and EIA assessment** The purpose of the impact assessment will be collect project data and undertake a modelling exercise with the purpose of determining not only direct effects of the project, but also its multiplier effects on the local and regional economies, as well the strategic importance of the project. The project data to be collected includes: » Construction Costs (CAPEX), Operational Costs (OPEX), and decommissioning costs » Intermediate inputs required and percent of imports of the total project spending » Distribution of procurement of intermediate inputs amongst local areas, provinces, and South Africa » Skills requirements	Elena Broughton of Urban Econ Development Economists

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Number of people to be employed during construction, operation, and decommissioning » Socio-Economic Development and enterprise development spending and initiatives to be implemented Project data will be used to model direct, indirect, and induced impacts. Modeling of impacts will be done using economic models developed on the basis of the provincial and national Social Accounting Matrices (SAMs). Impacts determined through the modeling exercise will include production, value added, employment, skills, household income, and government revenue. Differentiation will be made between impacts that are expected to take place within the local municipality, province and rest of the country. An analysis of socio- and macro-economic implications of the project on the ffected economies will also be undertaken. The results will be interpreted and unpacked to create a comprehensive description of socio-economic effects that are to be ensued by the project during various stages. For each phase of the project's lifecycle, the following groups of impacts will be examined: » Impacts directly associated with the construction, operation, and closure activities, where applicable » Secondary impacts that involve the changes in the economic activities in the environment directly or indirectly affected by the development » Cumulative impacts that take into account other projects or developments that are in the pipeline for the area A mitigation plan will be formulated whereby recommendations to reduce or eliminate the potential negative effects on the affected parties and enhance positive impacts will also be provided. **Assessment of Impacts for the EIA** The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Climate Change Impact Assessment	**Sensitivity Analysis and EIA assessment** The undertaking of the climate change impact assessment will include the following: » Analysis of the project: ∗ Determine the project boundaries; ∗ Calculate the carbon footprint of the project with respect to: 1. Direct emissions; 2. Upstream indirect emissions; and ∗ Setting the performance benchmark using the national GHG Emissions trajectory. » Analysis of alternatives: ∗ Review of alternatives for combined cycle gas turbine technology (dry, wet cooling, etc); ∗ Review of alternative technologies for peaking power plants; ∗ Review of alternative fuels; ∗ Review of alternative mitigation options (carbon capture and storage (CCS),etc); and ∗ Deploying a range of economic instruments to support the system of Desired Emissions Reduction Outcomes. » Impact assessment: ∗ Impact against the current Eskom baseline; and ∗ Impact against the identified alternatives. » Emission management during operations: ∗ Emission management plan for the operations phase. **Assessment of Impacts for the EIA** The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).	Robbie Louw, Harmke Immink and Sam Vosper of Promethium Carbon

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Traffic Impact Assessment	**Sensitivity Analysis and EIA assessment** The undertaking of the traffic impact assessment will include the following: » An assessment of the facility layout; » A site visit to the area (if required); » A site access and access road assessment; » Trip generation for both the construction and operation phases; » One 12 hour / peak hour traffic counts; » Trip distribution and trip assignment; and » Intersection or access analysis. **Assessment of Impacts for the EIA** The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refers to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme** For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	Steven Fautley of Techso

8.6 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:
  - local extending only as far as the development site area – assigned a score of 1;
  - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - will have an impact on the region – assigned a score of 3;
  - will have an impact on a national scale – assigned a score of 4; or
  - will have an impact across international borders – assigned a score of 5.
- 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 a score is assigned:
  - 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, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 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 (refer formula below) and can be assessed as low, medium or high.
- 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 determined by combining the criteria in the following formula:

S= (E+D+M) P; where

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).

As the developer has the responsibility to avoid and/or minimise impacts as well as plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts will be discussed. Assessment of mitigated impacts will demonstrate the effectiveness of the proposed mitigation measures.

The results of the specialist studies and other available information will be integrated and synthesised by the Savannah Environmental project team. The EIA Report will be compiled in terms of the requirements of the EIA Regulations and will include:

- The details and expertise of the **EAP** who prepared the report.
- The **location** of the activity and a locality map illustrating the location of the proposed activity.
- A **description** of the scope of the proposed activity including all listed activities triggered and a description of associated structures and infrastructure.
- The **policy and legislative** context within which the development is located and an explanation of how the development complies and responds to the legislation and policy context.
- The **need and desirability** of the proposed development of the activity in the context of the preferred location.
- A motivation for the **preferred development footprint** within the approved site.
- A description of the **process** followed to reach the proposed development footprint within the approved site, including:
  - details of the development footprint considered;
  - details of the public participation process undertaken in terms of Regulation 41 of the 2014 EIA Regulations, including copies of supporting documents;
  - a summary of issues raised by interested and affected parties and the manner in which the issues were incorporated;
  - the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
  - the impacts and risks identified including the nature, significance, consequence extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated;
  - the methodology used for determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks;
  - positive and negative impacts that the activity and alternatives will have on the environment and the community;

  - possible mitigation measures to be applied and the level of residual risk;
  - a motivation for not considering alternative development locations (if applicable);
  - a concluding statement indicating the preferred alternative development location; and
  - a full description of the process followed to identify, assess and rank impacts of the activity and associated infrastructure on the preferred location including all environmental issues and risks that have been identified and an assessment of the significance of each issue and risk and the extent to which the issue/risk can be avoided or mitigated.
- An **assessment** of the identified potentially significant impacts and risks.
- A summary of the **findings and recommendations** of any specialist report and an indication as to how these findings and recommendations have been included.
- An **environmental impact assessment** containing a summary of key findings, an environmental sensitivity map and a summary of the positive and negative impacts and risks of the proposed activity.
- **Recommendations** from specialist, the recording of proposed impact management **objectives** and the impact management **outcomes** for inclusion in the **EMPr** as well as inclusion as conditions of authorisation.
- The final **alternatives** which respond to the impact management measures, avoidance and mitigation measures identified.
- Any aspects which were **conditional** to the findings of the assessment.
- Description of the assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation measures proposed.
- An **opinion** as to whether the proposed activity should or should not be authorised and the conditions thereof.
- An undertaking under **affirmation** by the EAP in relation to the correctness of the information, the inclusion of comments and inputs from stakeholders and Interested and affected parties, the inclusion of inputs and recommendations from the specialists and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.
- Any specific information that may be required by the competent authority.

The EIA Report will be released to the public and relevant Organs of State for a 30-day 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 competent authority for decision-making.

8.7 Public Participation Process

A public participation process will be undertaken by Savannah Environmental during the EIA phase. Consultation with affected and adjacent landowners, key stakeholders and I&APs will be on-going throughout the EIA Phase. Through this consultation process, stakeholders and I&APs will be encouraged to verify that their issues were recorded in the Scoping Phase and to identify additional issues of concern or highlight positive aspects of the Richards Bay CCPP, and to comment on the findings of the EIA Phase. In order to accommodate the varying needs of stakeholders and I&APs within the broader area surrounding the project site, as well as capture their inputs, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA Phase of the process, through the following means:

- Focus group or public meetings will be held (pre-arranged and I&APs invited to attend).
- One-on-one consultation meetings will be held (for example with directly affected and surrounding landowners).

» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the public participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The EIA Report will be made available for a 30-day review period prior to finalisation and submission to the DEA for decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, public meetings and focus group meetings will be held during this public review period, depending on the specific needs of the stakeholders in the area.

8.8 Key Milestones of the Programme for the EIA

The envisaged key milestones of the programme for the EIA Phase are outlined in the following table (and include indicative dates):

Key Milestone Activities	Anticipated timeframe
Make Scoping Report available to the public, stakeholders and authorities for review and comment	21 August 2017 – 20 September 2017
Finalisation of Scoping Report, and submission of the Final Scoping Report to DEA	September 2017
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	November 2017
Undertake specialist studies and public participation process for the EIA Phase	November 2017 to January 2018
Make EIA Report and EMPr available to the public, stakeholders and authorities for review and comment	February 2018
Finalisation of EIA Report, and submission of the Final EIA Report to DEA	March 2018
Authority review period and decision-making (107 calendar days)	July 2018

CHAPTER 9: REFERENCES

Ecology Assessment

Alexander, G. & Marais, J. (2007) A Guide to the Reptiles of Southern Africa. Struik Nature, Cape Town.

Armstrong, A.J. (2001) Conservation status of herpetofauna endemic to KwaZulu-Natal. Journal of Herpetology 50(2): 79-96.

Animal Demography Unit, Department of Zoology, University of Cape Town. (2016) Summary Data of the Frogs of South Africa, Lesotho and Swaziland. Downloaded from: http://adu.org.za/frog_atlas.php; accessed on 11/07/2016".

Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J & de Villiers, M.S. (eds). (2014) Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland. Suricata 1. South African Biodiversity Institute, Pretoria.

Bishop, P.J. (2004) Hyperolius pickersgilli species account. In: Minter L.R., Burger M., Harrison J.A., Braack H.H., Bishop P.J. and Kloepfer D. (eds), Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland. , pp. 143-145. Smithsonian Institute, Washington DC.

Bowman, R.M. (2011) Distribution, Ecology and Biomonitoring Management of Pickersgill's Reed Frog (Hyperolius pickersgilli). North-West University, Potchefstroom.

Branch, W.R. Field Guide to Snakes and Other Reptiles of Southern Africa. Struik, Cape Town.

Driver, M., Raimondo, D., Maze, K., Pfab, M.F. & Helme, N.A. (2009) Applications of the Red List for conservation practitioners. In: D. Raimondo, L. Von Staden, W. Foden, J.E. Victor, N.A. Helme, R.C. Turner, D.A. Kamundi & P.A. Manyama (eds). Red List of South African Plants. Strelitzia 25:41-52. South African National Biodiversity Institute, Pretoria.

Du Preez, & Carruthers, V. (2009) A complete guide to the frogs of southern Africa. Struik Nature. Cape Town.

Ezemvelo KZN Wildlife (2014) UThungulu Biodiversity Sector Plan, V1.0. Unpublished Report by Ezemvelo KZN Wildlife, Biodiversity Conservation Planning Division, Ezemvelo KZN Wildlife, P. O. Box13053, Cascades, Pietermaritzburg.

Goodman, P.S. (2007) KwaZulu-Natal Terrestrial Conservation Plan (C-Plan), Version 4. Biodiversity Conservation Planning Division, Ezemvelo KZN Wildlife.

Healy, A., Nijman, V. (2014) Pets and pests: vervet monkey intake at a specialist South African Rehabilitation Centre.Animal Welfare 23: 353 – 360.

Mintner, L., Burger, M., Harrison, J., Braack, H.H., Bishop, P.J., Kloefper, D. (2004) Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland. SI/MAB Series # 9. Smithsonian Institution.

Monadjem, A., Taylor, P.J., Cotterill, F.P.D. & Schoeman, M.C. (2010) Bats of Southern and Central Africa. Wits University Press, Johannesburg.

Mucina, L., Rutherford, M.C. (2006). The Vegetation of South Africa, Lesotho and Swaziland. South African National Biodiversity Institute, Pretoria.

Nel, J. L., K. M. Murray, A. M. Maherry, C. P. Peterson, D. J. Roux, A. Driver, L. Hill, H. Van Deventer, N. Funke, E. Swartz, L. B. Smith-Adao, N. Mbona, L. Downsborough, and S. Nienaber. 2011. Technical report for the National Freshwater Ecosystem Priority Areas project. Report to the Water Research Commission, CSIR, WRC, SANParks, SANBI, SAIAB, Monash-South Africa, WRC Report No. 1801/2/11.

Newman, V. (rev) (2010) Newman's Birds of Southern Africa – Commemorative Edition. Struik Nature. Cape Town.

Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. & Manyama, P.A.(2009) Red List of South African Plants. Strelitzia 25. South African National Biodiversity Institute, Pretoria.

Perry, G., Buchanan, B.W., Fisher, R.N, Salmon, M., Wise, S.E. (2008) Effects of artificial night lighting on amphibians and reptiles in urban environments. Urban Herpetology 3: 239 – 256.

SANBI, 2015. Red List of South African Plants version 2015.1. Downloaded from Redlist.sanbi.org.

Schoeman, M. C. (2016), Light pollution at stadiums favors urban exploiter bats. Anim Conserv, 19: 120–130. doi:10.1111/acv.12220.

Schoeman, M.C., Waddington, K.J. (2011) Do deterministic processes influence the phenotypic patterns of animalivorous bat ensembles at urban rivers? African Zoology 46 (2): 288 – 301.

Shannon, G., McKenna, M.F., Angeloni, L.M., Crooks, K.R., Fristrup, K.M., Brown, E., Warner, K.A., Nelson, M.D., White, C., Briggs, J., McFarland, S., Wittemyer, G. (2015) A synthesis of two decades of research documenting the effects of noise in wildlife. Biological Reviews, 000-000.

Siebert, S.J., Siebert, F., du Toit, M.J. (2011). The extended occurrence of Maputaland Woody Grassland further south in KwaZulu-Natal, South Africa. Bothalia 41 (2), 341 – 350.

Skinner J.D. & Chimimba, C.T. (2005). The Mammals of the Southern African Subregion. Cambridge University Press.

Stone, E.L., Jones, G., Harris, S. (2009) Street lighting disturbs commuting bats. Current Biology 19 (13), 1123 – 1127.

Stuart , C., Stuart, T. (2001) A Field Guide to the Mammals of Southern Africa. Struik Publishers, Cape Town.

Tarrant, J., Armstrong, A.J. (2013) Using predictive modelling to guide the conservation of a critically endangered coastal wetland amphibian. Journal for Nature Conservation 21(5): 369-381.

Taylor ,P. J., Baxter, R., Power, R.J., Monadjem, A., Harvey. J., Child, M.R. (2016) A conservation assessment of Crocidura mariquensis. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Taylor, M.R., Peacock, F. & Wanless, R.M (eds) (2015) The 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. BirdLife South Africa. Cape Town.

Trenor, M. (2014) Contributing to the conservation of the critically endangered Pickersgill's Reed Frog (Hyperolius pickersgilli): baseline data on population estimates and sampling for population genetics. North-West University, Potchefstroom.

Van Wyk B., Wyk, P. (2013) Field guide to trees of South Africa. Struik Publishers. Cape Town.

Wetland and Aquatic Ecology Assessment

Department of Water Affairs and Forestry (DWS). (2005). A practical field procedure for identification and delineation of wetlands and riparian areas. Pretoria: Department of Water Affairs and Forestry.

Kotze, D.C., Marneweck, G.C., Batchelor, A.L., Lindley, D.C., and Collins, N.B. 2009. A Technique for rapidly assessing ecosystem services supplied by wetlands. Mondi Wetland Project.

Macfarlane, D.M., Kotze, D.C., Ellery, W.N., Walters, D., Koopman, V., Goodman, P. and Goge, C. 2007. A technique for rapidly assessing wetland health: WET-Health. WRC Report TT 340/08.

Nel JL, Murray KM, Maherry AM, Petersen CP, Roux DJ, Driver A, Hill L, Van Deventer H, Funke N, Swartz ER, Smith-Adao LB, Mbona N, Downsborough L and Nienaber S. 2011. Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

Ollis DJ, Snaddon CD, Job NM, and Mbona N. 2013. Classification System for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African Biodiversity Institute, Pretoria.

Geo-hydrology Assessment

DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Soils and Agricultural Potential Assessment

Land Type Survey Staff. (1972 - 2006). Land Types of South Africa: Digital Map (1:250 000 Scale) and Soil Inventory Databases. Pretoria: ARC-Institute for Soil, Climate, and Water.

Smith, B. (2006). The Farming Handbook. Netherlands & South Africa: University of KwaZulu-Natal Press & CTA.

Soil Classification Working Group. (1991). Soil Classification A Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.

Heritage Assessment

Archaeological Database Wits University Referenced 2009

Anderson, G. 2007. The archaeological survey of the Hillendale Mine.

Anderson, G. & Anderson, L. 2008. Archaeological Survey Of The Inhlansi Project For Nozelela Minerals Sands (Pty) Ltd. Numerous sites were recorded including burial, archaeological and oral history sites.

Anderson, G. & Anderson, L. 2008. Archaeological Survey Of The Proposed Alton Sewer Pipe Upgrade - No sites were recorded during the course of the survey along the pipeline deviation

Anderson, G. & Anderson, L. 2009. Heritage Survey Of The Proposed Expansion To The Transnet National Ports Authority, Richards Bay - A total of nine sites were recorded during the course of the survey. These sites date from the Cretaceous to the Late Iron Age.

Anderson, G. & Anderson, L. 2010. Heritage Survey Of The Proposed Richards Bay Central Industrial Area For Coastal & Environmental Services - The survey did not locate any heritage sites.

Anderson, G. 2013. The Archaeological Surveys and Excavations of the Zulti North Mining Lease For Richards Bay Minerals.

Huffman, T.N.1982. Archaeology and ethnohistory of the African Iron Age. Annual Review of Anthropology 11: 133-50.

Huffman, T.N. 2007. Handbook to the Iron Age: The Archaeology of Pre-Colonial Farming Societies in Southern Africa. University of KwaZulu-Natal Press, Scotsville.

Lewis-Williams, J.D., 1981. Believing and Seeing: Symbolic Meanings in southern San Rock Paintings. Academic Press, London.

Mason, J.R. 1962. The Prehistory of the Transvaal. Johannesburg: Witwatersrand University Press.

Mitchell, P. 2002. The Archaeology of Southern Africa. Cambridge: Cambridge University Press.

Mucina, L. & Rutherford,M.C. 2006. The vegetation map of South Africa, Lesotho and Swaziland. SANBI, Pretoria.

National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)

National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)

SAHRA Report Mapping Project Version 1.0, 2009

Van Schalkwyk, J. 2013. Cultural Heritage Resources Impact Assessment For The Proposed Swaziland Rail Link, Southern Section, Kwazulu-Natal Region. Unpublished report.

Van Schalkwyk, L. & Wahl, E. 2014. Application for Exemption from a Phase 1 Heritage Impact Assessment of Proposed Decommissioning of the Legacy Landfills at The Bayside Aluminium Smelter, Richards Bay, KwaZulu-Natal, South Africa

SAHRIS (Cited 2016)

Palaeontological Assessment

Almond, J., Pether, J, and Groenewald, G. 2013. South African National Fossil Sensitivity Map. SAHRA and Council for Geosciences. Schweitzer et al. (1995) pp p288

Johnson, M.R., Annhauser, C.R., and Thomas, R.J. 2006. The Geology of South Africa. GeolSoc S Africa. Council for Geoscience, Pretoria.

Macrae, C. 1999. Life etched in stone. Fossils of South Africa. 305 pp. The Geological Society of South Africa, Johannesburg.

MCcarthy, T & RubidgE, B. 2005. The Story of Earth Life: A southern African perspective on a 4.6-billion-year journey. Struik. Pp 333

Partridge, T.C. et al. 2006. Cenozoic deposits of the interior. In: M.R. Johnson, et. al. (eds). The Geology of South Africa. Geological Society of South Africa.

Wolmarans, L.G. and Du Preez, J.W. 1986. The Geology of the St Lucia Area. Explanation: Sheet 27.532 (1:250 000), Geological Survey of South. Africa.

Air Quality Assessment

Carslaw, D. (2014). The openair manual - open-source tools for analysing air pollution data. Manual for version 1.0. King's College London.

Carslaw, D., & Ropkins, K. (2012). openair - an R package for air quality data analysis. Environmental Modelling and Software, 27-28, 52 - 61.

DEA. (2014). Regulations regarding Air Dispersion Modelling. Department of Environmental Affairs, Government Gazette No. 37804, 11 July 2014.

Golder Associates (Pty) Ltd. (2015). 2014 Annual Ambient Air Quality Monitoring and Dispersion Modelling Report. Richards Bay : Richards Bay Clean Air Association.

Goldreich, Y., & Tyson, P. (1988). Diurnal and Inter-Diurnal Variations in Large-Scale Atmospheric Turbulence over Southern Africa. South African Geographical Journal, 48-56.

Haripursad, Y. (2007). Air Quality Management in the uMhlathuze Municipality using Air Dispersion Modelling. Durban: School of Environmental Sciences, University of KwaZulu-Natal.

Liebenberg-Enslin, H, & Petzer, G. (2006). Review of Spatial Development Framework for the City of uMhlathuze based on an Air Quality Investgation. City of uMhlathuze: City of uMhlathuze Department Integrated Development & Planning.

Liebenberg-Enslin, H., & Shackleton, N. (2016). Air Quality Impact Assessment for the Amendments to the Proposed Zulti South Mine by RB Mining in Kwa-Zulu Natal Province, South Africa. Durban: SRK.

Scire, J., Strimaitis, D., & Yamartino, R. (2000). A User's Guide for the CALPUFF Dispersion Model (Version 5). Concord, MA: Earth Tech, Inc. Report, Concord, MA, January 2000.

TCEQ. (2013, January 2). ESL: Texas Commission on Environmental Quality. Retrieved from Texas Commission on Environmental Quality Web Site: http://www.tceq.texas.gov/toxicology/esl/list_main.html

Tiwary, A., & Colls, J. (2010). Air pollution: measurement, monitoring and mitigation (3rd Edition ed.). Oxon: Routledge.

US EPA. (2000). AP42, 5th Edition, Volume 1, Chapter 3: Stationary Internal Combustion Sources, 3.1 Stationary Gas Turbines.

US EPA. (2000). AP42, 5th Edition, Volume 1, Chapter 3: Stationary Internal Combustion Sources, 3.1 Stationary Internal Combustion Sources.

US EPA. (2006). AP42, 5th Edition, Volume 1, Chapter 7: Liquid Storage Tanks, 7.1 Organic Liquid Storage Tanks.

US-EPA. (1996). Compilation of Air Pollution Emission Factors (AP-42). Research Triangle Park, NC: US Environmental Protection Agency.

Noise Assessment

Ann Linda Baldwin. Effect of Noise on Rodent Physiology. 2007.

Autumn, Lyn Radle. The effect of noise on Wildlife: A literature review. 2007.

Brüel & Kjær. Investigation of Tonal Noise. 2007.

Department of Transport. Calculation of Road Traffic Noise. 1988.

Sadler, 2011. Environmental Noise Impact Assessment for the proposed Palesa Extension Project – HCI Khusela Coal (Pty) Ltd. Digby Wells Environmental, Johannesburg

Environ. We Int. Sci. Tech. Ambient noise levels due to dawn chorus at different habitats in Delhi. 2001. Pg. 134.

European Commission Green Paper (Com (96) 540).

Everest and Pohlmann. Master Handbook of Acoustics. Fifth Edition. 2009.

International Finance Corporation. General EHS Guidelines – Environmental Noise Management.

J.C. Hartley. Can Bush Crickets Discriminate Frequency? University of Nottingham, 1991.

ISO 9613-2: 1996. Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.

H.C Bennet-Clark. The Scaling of Song Frequency in Cicadas. The Company of Biologist Limited. 1994.

Milieu. Inventory of Potential Measures for a Better Control of Environmental Noise. DG Environment of the European Commission. 2010

National Park Services. Soundscape Preservation and Noise Management. 2000. Pg.1.

Norton, M.P. and Karczub, D.G. Fundamentals of Noise and Vibration Analysis for Engineers. Kjær Second Edition. 2003.

SANS 10103:2008. The measurement and rating of environmental noise with respect to annoyance and to speech communication.

SANS 10210:2004. Calculating and predicting road traffic noise.

SANS 10328:2008. Methods for environmental noise impact assessments.

SANS 10357:2004. The calculation of sound propagation by the Concave method.

SANS 9614-3:2005. Determination of sound power levels of noise sources using sound intensity – Part 3: Precision method for measurement by scanning.

USEPA. Effects of Noise on Wildlife and other animals. 1971

Van Riet, W. Claassen, P. van Rensburg, J. van Viegen and L. du Plessis. 1998. Environmental potential atlas for South Africa. Pretoria.

Wei, B. L. (1969). Physiological effects of audible sound. AAAS Symposium Science, 166(3904). 533-535.

White Noise Reverse Alarms: www.brigade-electronics.com/products.

World Health Organization, 2009. Night Noise Guidelines for Europe.

World Health Organization, 1999. Protection of the Human Environment. Guidelines for Community Noise.

Visual Assessment

Guidelines for involving visual and aesthetic specialists in EIA processes.

Author; Bernard Oberhozer. Published by the Provincial Government of the Western Cape: Department of Environmental Affairs and Development Planning, 2005

Guidelines for landscape and visual impact assessment (third edition), authors; the Landscape Institute and Institute of Environmental Assessment and Management, published by E & FN Spon, 2013.

Methods of environmental impact assessment, edited by; Peter Morris and Riki Therivel, Oxford Brookes University, UCL Press, 2000.

The vegetation of South Africa, Lesotho and Swaziland (Strelitzia series; no. 19), Mucina, L. & Rutherford, M.C. (eds.), 2006, South African National Biodiversity Institute, Pretoria

Socio-economic Assessment

Africa, S. o. (1996). Constitution of the Republic of South Africa.

Brand South Africa. (2012). KwaZulu-Natal Province, South Africa.

Brand South Africa. (2012, April 11). KwaZulu Natal Province. Retrieved from Brand South Africa: www.brandsouthafrica.com

Department of Economic Development, T. a. (2016). Formulation of Provincial Spatial Economic Development Strategy, Corridor and Nodal Framework and Data Mapping.

Department of Economic Development. (2011). The New Growth Path Framework.

Department of Energy. (2011). Integrated Resource Plan 2010 - 2030.

Department of Energy. (2013). Integrated Resource Plan for Electricity 2010-2030 Update Report.

Department of Trade and Industry. (2016). Industrial Policy Action Plan 2016/17-2017/18.

Eskom. (2016). East Coast CCGT Project: 3000MW.

Local Government Handbook. (undated). City of uMhlathuze.

Mantshantsha. (2012, December 12). Eskom to Decommission Generating Units. Retrieved from Financial Mail: http://www.financialmail.co.za/economy/2012/12/12/eskom-to-decommission-generating-units

Mbambo, D. M. (2011). Planning for Public Transport and Road Freight Infrastructue improvements at local municipal lavel: Lessons learnt through the City of uMhlathuze Public Transport Amenities Study.

National Planning Commission. (2011). The National Development Plan, Vision for 2030.

Provincial Planning Commission. (2016). 2035 Provincial Growth and Development Plan, Building a Better Future Together.

Quantec. (2015). Census 2011.

Rchards Bay IDZ SOC. (2016). RBIDZ Annual Report 2015-2016.

South Africa. (undated, April 11). Richards Bay, KwaZulu-Natal. Retrieved from www.southafrica.net

Statistics South Africa. (2015). Census 2011.

Stats SA. (2015). Census 2011.

uMhlathuze LM. (2016). Final IDP Review 2016/17 "Last IDP Review for the Third IDP Generation".

uMhlathuze LM. (2016). SDF Review 2016/17 Review.

uThungulu DM. (2015). uThugulu Spatial Development Review.

Uthungulu DM. (2015). uThungulu District Municipality Growth and Development Plan.

uThungulu DM. (2016). Integrated Development Plan 2011/12- 2016/17 Final Review.