Phakwe Richards Bay Gas Power 3 Combined Cycle Power Plant (CCPP), Richards Bay, KwaZulu-Natal Province

Scoping Report

November 2021

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PROJECT DETAILS

Title	:	Scoping Report for the Phakwe Richards Bay Gas Power 3 Combined Cycle Power Plant, Richards Bay, KwaZulu Natal.
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Client	:	Phakwe Richards Bay Gas Power 3 (Pty) Ltd
Report Revision	:	Report for 30 -day public review period
Date	:	November 2021

When used as a reference this report should be cited as: Savannah Environmental (2021) Phakwe Richards Bay Gas Power 3 CCPP, Richards Bay, KwaZulu-Natal Province.

PURPOSE OF THE SCOPING REPORT AND INVITATION TO COMMENT

Phakwe Richards Bay Gas Power 3 (Pty) Ltd has appointed Savannah Environmental as the independent environmental consultant to undertake the Scoping and Environmental Impact Assessment Process for the Phakwe Richards Bay Gas Power 3 CCPP. 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 has been compiled in accordance with Appendix 2 of the EIA Regulations, 2014 (as amended) and consists of the following sections:

This Scoping Report describes and assesses this proposed project and 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 in South Africa and the proposed project.
- **Chapter 3** provides a description of the gas to power technology.
- **Chapter 4** provides a description of the proposed project, including feasible alternatives identified and considered.
- **Chapter 5** outlines the need and desirability of the proposed project.
- **Chapter 6** describes the existing biophysical and socio-economic environment affected by the proposed project.
- **Chapter 7** outlines the process which was followed during the Scoping Phase of the EIA Process.
- **Chapter 8** provides a description and evaluation of the potential issues and impacts associated with the proposed project
- **Chapter 9** provides the conclusions of the Scoping report
- **Chapter 10** presents the Plan of Study for the EIA Phase
- **Chapter 11** provides a list of all references used in the compilation of the Scoping Report.

The Scoping Report is available for review from Friday **12 November 2021** to Monday **13 December 2021** at the following locations https://savannahsa.com/public-documents/energy-generation/

Please submit your comments by **Monday 13 December 2021** to:
Nicolene Venter PO Box 148, Sunninghill, 2157 Tel: 011-656-3237 Fax: 086-684-0547 Email: publicprocess@savannahsa.com

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

EXECUTIVE SUMMARY

Phakwe Richards Bay Gas Power 3 (Pty) Ltd (PRBGP3) proposes the development of a combined cycle (CC) gas to power plant, with a capacity of up to 2 000MW, on various erven within the Richards Bay IDZ Phase 1F, Richards Bay. The project site is located approximately 5km north-east of Richards Bay and 1km north of the suburb of Alton, within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province (**Figure 1**). The facility will be operated with natural gas or a mixture of natural gas and hydrogen.

The development of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure provides an opportunity to contribute to "just transition" of the energy mix through the development of a power station which will enable the generation of electricity through the use of a cleaner fuel resource, with less emissions (which will be reduced over time with the planned inclusion of green hydrogen in the fuel mix with natural gas and may eventually reach zero emissions when the percentage of green hydrogen reaches 100%, replacing completely the natural gas) than coal fired power stations, which can also support the uptake of renewable energy as part of the energy mix, while the process of decommissioning of coal based technology facilities are undertaken.

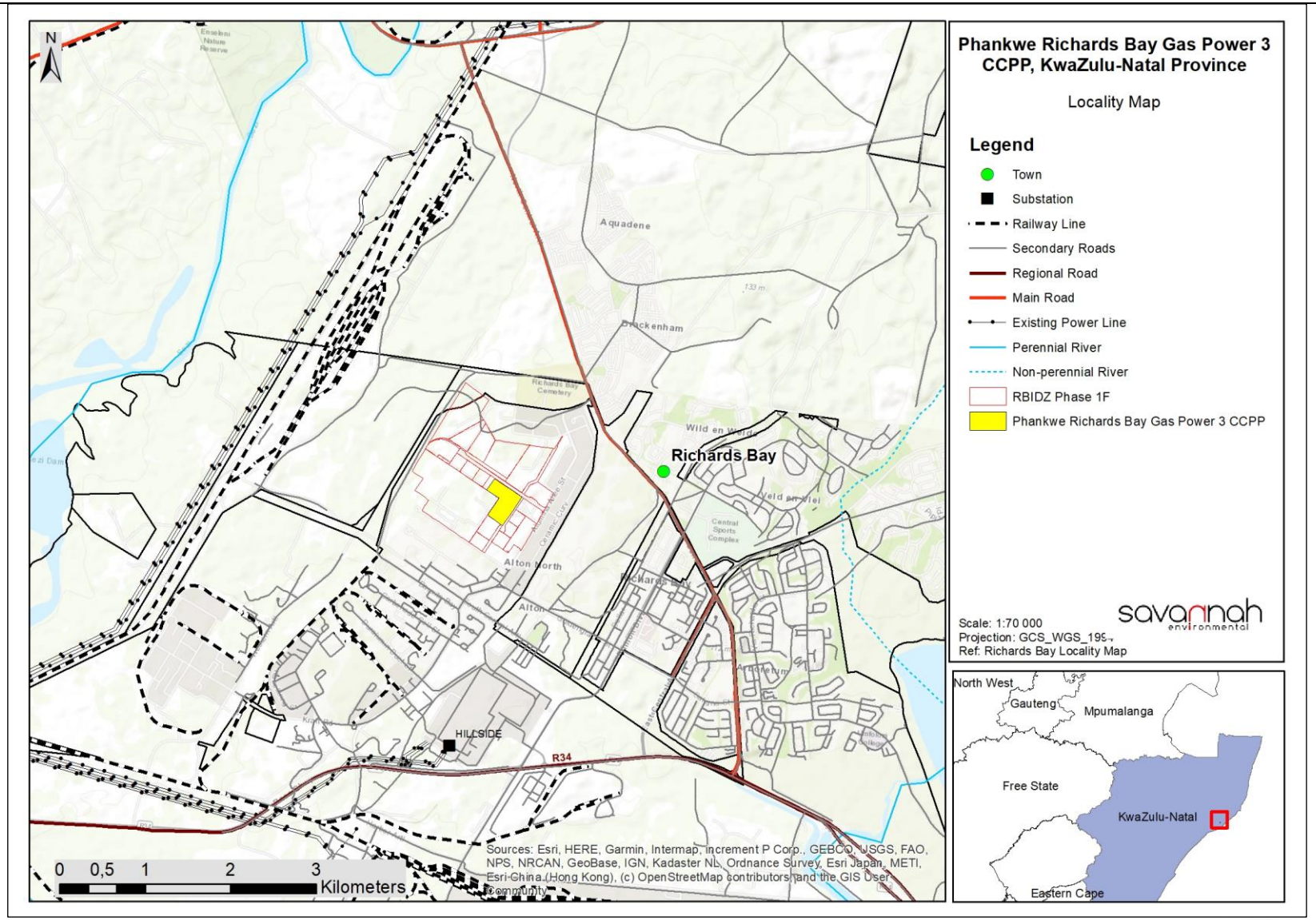

Figure 1.: Locality map showing the area proposed for the establishment of the 2000MW PRBGP3 CCPP within the Richards Bay IDZ 1F, in the Richards Bay area (**Appendix L**)

Potential impacts associated with the development of the Phakwe Richards Bay Gas Power 3 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 Phakwe Richards Bay Gas Power 3 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 primary impact arising at a national level will be the positive impact of critical additional energy generation. The issue of Climate change arises from an international perspective.

The following provides a summary of the findings of the specialist studies undertaken:

» ***Terrestrial Ecology:*** The project site for the Phakwe Richards Bay Gas Power 3 CCPP falls entirely within a NPAES focus area, the 'Critically Endangered' Kwambonambi Hygrophilous Grassland ecosystem, the 'Endangered' Maputaland Wooded Grassland vegetation type, and intersects with 'Vulnerable' Subtropical Freshwater wetlands and National and Provincial CBA areas. These findings are therefore in contradiction with local (uMhlathuze municipality) conservation planning objectives which zoned the project site for the development of noxious industries. During the preliminary site inspection undertaken during July 2020, it was determined that the site is already degraded and therefore not representative of the environmental sensitivities identified during the desktop assessment, and unlikely to support high levels of biodiversity. Nevertheless, several fauna and flora species of conservation concern may potentially be present, albeit probability of occurrence is regarded as Low for most of the species. The presence or absence of these species, and a better understanding of the environmental impacts the proposed development may have on fauna and flora species of conservation concern will investigated further during the EIA phase and mitigation measures recommended to minimise impacts.

» ***Wetland and Aquatic Features:*** A wetland assessment as part of the RBIDZ feasibility (SIVEST, 2010) noted that the loss of the wetland areas must be looked at holistically in the context of the conservation needs of all the IDZ sites assessed. In response to this, two sites were of distinctly higher quality, namely, IDZ 1C and the western portion of IDZ 1D as they have very high conservation significance and it was felt that these areas should be excluded from any development planning for the area and development should rather be focused on IDZ 1A, 1B, 1F and the eastern portion of 1D. The IDZ 1C and 1D are referred to as potential offset areas. A conceptual wetland offset plan was compiled in support of the EA. Richards Bay Industrial Development Zone SoC Ltd received Environmental Authorisation (EA) for the IDZ Phase 1F in September 2016 (DFFE Ref No.: 14/12/16/3/3/3/665). This EA included the infilling of some of the wetlands on site to release the land for development. The existing development within the area has altered the surface flow dynamics creating directional surface run-off across the project area and artificial pooling in some localities which has altered the hydrology of the area. A detailed assessment on the functioning of the wetlands systems and any other freshwater features within the project site and within the 500m regulated area of the site will be undertaken during the EIA phase and mitigation measures recommended to minimise impacts.

» ***Soils and Agricultural Potential:*** Although the project site is located within a naturally degraded industrial area, the land capability of the soils have been regarded as high sensitivity based on a desktop evaluation using the DFFE screening Tool. The delineation of soil forms and determination of soil sensitivity will be undertaken during the EIA phase and mitigation measures recommended to minimise impacts and mitigation measures recommended to minimise impacts.

» ***Heritage Resources (incl. Palaeontological and Archaeological):*** The heritage resources in the area proposed for development are sufficiently recorded, as the surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development. Regarding palaeontological resources, it is very unlikely that the proposed development will negatively impact on significant palaeontological heritage and as such, it is recommended that no further palaeontological studies are required. A Chance Finds Procedure must however be included within the EMPr for the project.

» ***Air Quality, Climate Change, and Health:*** The proposed Phakwe Richards Bay Gas Power 3 CCPP, with a generating capacity up to 2 000 MW, may result in 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. The impacts are likely to be local. During the operation phase, the proposed Phakwe Richards Bay Gas Power 3 CCPP, with a generating capacity up to 2 000MW, is likely to contribute NO_X, CO, and VOCs to the existing baseline concentrations. Cumulative impacts of SO_2 and PM emissions, although small, may result in cumulative impacts with possible non-compliance to already elevated baseline concentrations. The impacts are likely to be regional. Atmospheric dispersion modelling will be used to assess incremental and cumulative impacts on ambient pollutant concentrations during the EIA phase of assessment. Although the Phakwe Richards Bay Gas Power 3 CCPP proposes to progressively reduce carbon emission over time with the increased presence of green hydrogen as part of the fuel mix, climate change impacts associated with the development of the Phakwe Richards Bay Gas Power 3 CCPP relate to the combustion of fuel (natural gas) at the CCPP 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. It is expected that the Phakwe Richards Bay Gas Power 3 CCPP will contribute to South Africa's national emissions inventory. The significance of this impact must be quantified in the impact assessment phase of the project. The significance of health-related impacts as a result of air quality impacts must also be evaluated in the EIA phase.

» ***Noise:*** The construction and operation of the Phakwe Richards Bay Gas Power 3 CCPP will increase the noise levels in the vicinity of the plant. The site visit identified potential noise-sensitive receptors within 2000m to the project site. It is expected that the significant impacts on noise sensitive receptors could be of medium-low significance. No no-go areas for development were identified. It is recommended that the noise impact be investigated in more detail during the EIA phase, including further ambient sound measurements and recommendations for mitigation measures, where required.

» ***Visual:*** Impacts from a visual perspective are expected to occur during the construction and operation phases of the Phakwe Richards Bay Gas Power 3 CCPP on observers in close proximity to the proposed infrastructure and activities. The project site is located within the Richards Bay IDZ and adjacent to existing heavy industrial development. 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. The significance of the development of the Phakwe Richards Bay Gas Power 3 CCPP on the visual aspects is expected to be moderate. No no-go areas for development were identified. Potential visual impacts must be assessed in detail within the EIA Phase of the process and mitigation measures recommended where required.

» ***Socio-economic aspects:*** The construction of the Phakwe Richards Bay Gas Power 3 CCPP will result in both positive and negative impacts on the social environment. During the construction phase the positive impacts will include an increase in the production and GDP of the national and local economies, temporary employment opportunities, skills development and household income leading to improved standard of living. 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, an increased demand in housing within the broader area, and impacts on daily living and movement patterns as a result of increases in traffic. Positive and negative impacts are expected to occur with the operation of the Phakwe Richards Bay Gas Power 3 CCPP. Positive impacts include a sustainable increase in the production and GDP 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 potential impacts on air quality from the operating Phakwe Richards Bay Gas Power 3 CCPP, traffic and visual impacts. The significance of socio-economic impacts must be quantified through a detailed assessment in the EIA Phase of the process and mitigation and enhancement measures recommended where required.

» ***Traffic impacts:*** Impacts on traffic are expected during the construction phase of the facility. No impacts on traffic are expected during operation. The proposed site is deemed well located and connected for its purpose. The proposed access point, located on the access road located off Alumina Alley, will need to be upgraded to cater for the construction vehicles and abnormal load vehicles. The significance of the transport impact during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level. Traffic will return to normal levels after construction is completed. Impacts associated with traffic during the construction phase must be further assessed during the EIA phase and appropriate mitigation recommended where required.

» ***Cumulative Impacts:*** The project site is located within an existing industrial area of the Richards Bay IDZ, an area where further heavy industry is planned. Industrial developments directly adjacent to the project site include the Tata Steel facility. Other authorised gas to power projects have been permitted within the Richards Bay area, although none have yet commenced construction. As a result, there is the potential for cumulative impacts to occur. The significance of these impacts must be assessed within the impact assessment phase of the EIA process.

No environmental fatal flaws or impacts of very high significance were identified to be associated with the development of the Phakwe Richards Bay Gas Power 3 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.

Scoping Sensitivity Analysis

Through the Scoping Phase sensitive features within the project site and surroundings have been identified which could be affected by the development of the Phakwe Richards Bay Gas Power 3 CCPP (refer to **Figure 2**). These include wetland features and medium sensitivity vegetation (Maputaland Wooded Grassland) within the project site, as well as potentially sensitive noise and air quality receptors further afield (>2km). Regarding the wetland features, Richards Bay Industrial Development Zone SoC Ltd received

Environmental Authorisation (EA) for the IDZ Phase 1F in September 2016 (DFFE Ref No.: 14/12/16/3/3/3/665). This EA included the infilling of some of the wetlands on site to release the land for development. However, it has been recommended that the loss of the wetland areas must be considered holistically in the context of the conservation needs of all the IDZ sites assessed. The direct and indirect impacts on the site and surrounding sensitivities will be assessed in detail during the EIA phase.

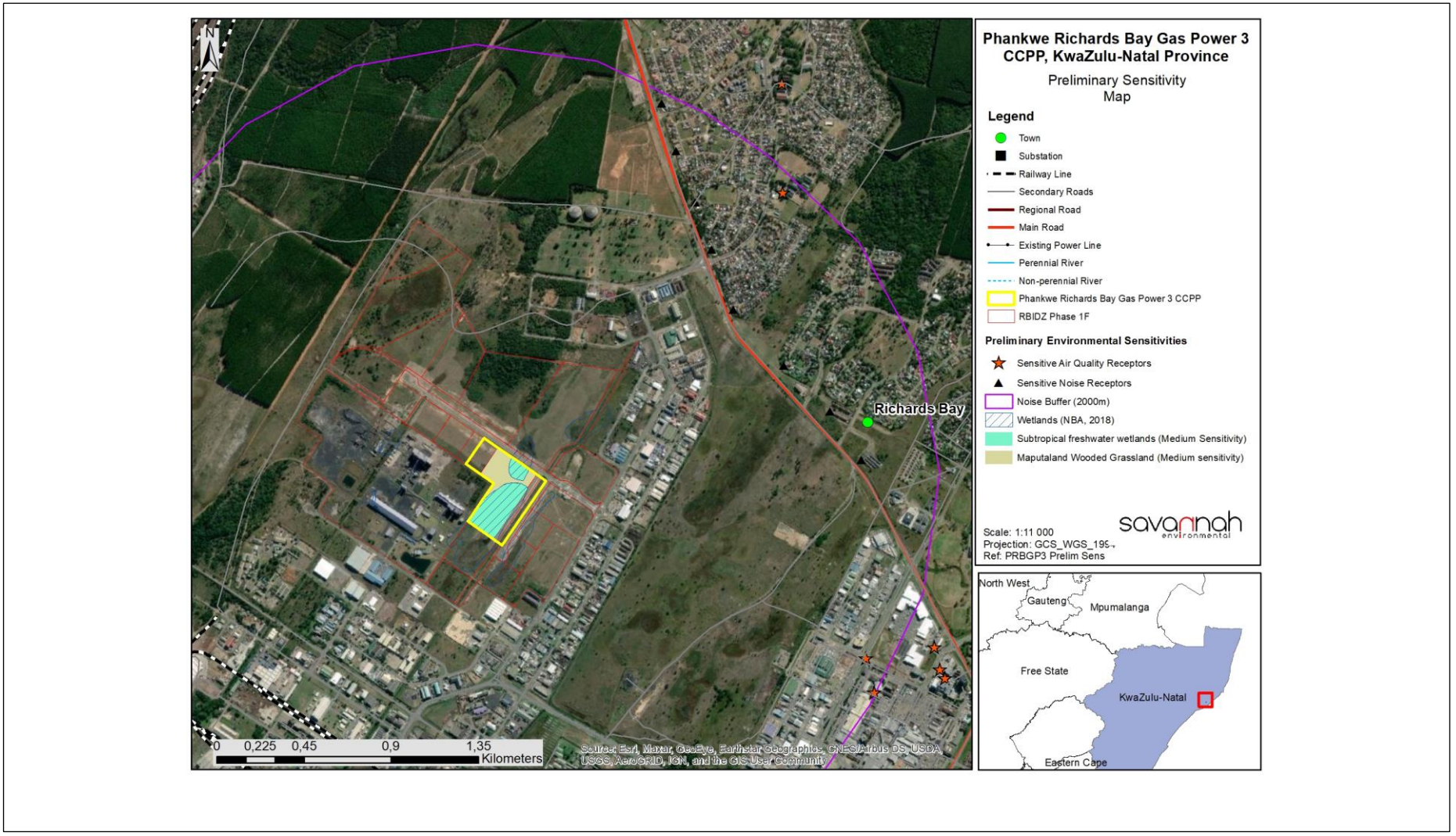

Figure 2: Sensitivity map illustrating the sensitive environmental features located within and around the Phakwe Richards Bay Gas Power 3 CCPP project sites (**Appendix L**)

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CHAPTER 1: INTRODUCTION

Phakwe Richards Bay Gas Power 3 (Pty) Ltd (PRBGP3) proposes the development of a combined cycle (CC) gas to power plant, with a capacity of up to 2 000MW, on various erven within the Richards Bay IDZ Phase 1F, Richards Bay. The proposed project is to be known as the Phakwe Richards Bay Gas Power 3 CCPP. The project site is located approximately 5km north-east of Richards Bay and 1km north of the suburb of Alton, within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province.

The Combined Cycle Power Plant and associated infrastructure is proposed in response to the provision for gas-to-power technology as part of the energy mix within the Integrated Resource Plan (IRP), 2019, and is planned to be bid into future procurement processes to be initiated by the Department of Mineral Resources and Energy (DMRE).

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 2000MW RPRBG3 CCPP and associated infrastructure, 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 in South Africa and the proposed project.
- **Chapter 3** provides a description of the gas to power technology.
- **Chapter 4** provides a description of the proposed project, including feasible alternatives identified and considered.
- **Chapter 5** outlines the need and desirability of the proposed project.
- **Chapter 6** describes the existing biophysical and socio-economic environment affected by the proposed project.
- **Chapter 7** outlines the process which was followed during the Scoping Phase of the EIA Process.
- **Chapter 8** provides a description and evaluation of the potential issues and impacts associated with the proposed project
- **Chapter 9** provides the conclusions of the Scoping report
- **Chapter 10** presents the Plan of Study for the EIA Phase
- **Chapter 11** 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)

The 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 Phakwe Richards Bay Gas Power 3 CCPP is included as **Figure 1.1**. 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**. The corner point co-ordinates of the project site are included in Table 1.1.

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, and that climate change concerns are addressed in planning the energy mix into the future. Approximately 91,2% of South Africa's electricity currently comes from coal-fired power stations, with Eskom being the main electricity producing company.[1]

The Integrated Resource Plan (IRP) 2019, developed by the Department of Mineral Resources and Energy (DMRE), states a need for a diversified energy mix to meet the requirements of the country's need for economic and social growth. The IRP (2019) considers natural gas to have significant potential to add to the energy mix, while also considering South Africa's commitment to reducing emissions to address climate change concerns on a global scale. In order to achieve this diversified mix and harvest the benefits of gas to energy, the IRP includes the allocation of 3000MW of new capacity using this technology.

[1] (https://www.usaid.gov/powerafrica/south-africa)

The Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure is proposed to be constructed on erven 16820, 16819,1/16674 and a subdivision of erf 17442 within the Richards Bay IDZ Zone 1F, and will occupy approximately 11.8ha.

The power plant will operate at mid-merit to baseload duty and will include the following main infrastructure:

- A number of gas turbines for the generation of electricity through the use of natural gas (liquid or gas forms), or a mixture of Natural gas and Hydrogen (in a proportion scaling up from 20% H2) as fuel source, operating all turbines at mid-merit or baseload (estimated 16 to 24 hours daily operation).
- Exhaust stacks associated with each gas turbine.
- A number of Heat Recovery Steam Generator (HRSG to generate steam by capturing the heat from the turbine exhaust.
- A number of steam turbines to generate additional electricity by means of the steam generated by the HRSG.
- The water treatment plant will demineralise incoming water from municipal or similar supply, to the gas turbine and steam cycle requirements. The water treatment plant will produce two parts demineralised water and reject one-part brine, which will be discharged to the R IDZ stormwater system.
- Steam turbine water system will be a closed cycle with air cooled condensers. Make-up water will be required to replace blow down.
- Air cooled condensers to condensate used steam from the steam turbine.
- Compressed air station to supply service and process air.
- Water pipelines and water tanks for storage and distributing of process water. (Potential sourcing of alternative water outside RB IDZ supply (Municipality))
- Water retention pond
- Closed Fin-fan coolers to cool lubrication oil for the gas turbines
- Gas generator Lubrication Oil System.
- Gas pipeline supply conditioning process facility. Please note, gas supply will be via dedicated pipeline from the proposed Transnet supply pipeline network of Richards Bay (the location of this network has not yet been confirmed) or, alternatively directly from the Regasification facilities at RB Harbour. The gas pipeline will be separately authorized.
- Site water facilities including potable water, storm water, waste water
- Fire water (FW) storage and FW system
- Diesel emergency generator for start-up operation.
- Onsite fuel conditioning including heating system.
- All underground services: This includes stormwater and wastewater.
- Ancillary infrastructure including:
  - Roads (access and internal);
  - Warehousing and buildings;
  - Workshop building;
  - Fire water pump building;
  - Administration and Control Building;
  - Ablution facilities;
  - Storage facilities;
  - Guard House;

- Fencing;
- Maintenance and cleaning area;
- Operational and maintenance control centre;

» Electrical facilities including:
- Power evacuation including GCBs, GSU transformers, MV busbar, HV cabling and 1x275kV or 400kV GIS Power Plant substation.
- Generators and auxiliaries;

» Service infrastructure including:
- Stormwater channels;
- Water pipelines
- Temporary work areas during the construction phase (laydown areas)

A dedicated pipeline to connect into an on-site gas receiving and conditioning station will provide the natural gas or the mixture of natural gas and Hydrogen. The pipeline will be connected to the proposed Transnet supply pipeline network of Richards Bay (the location of this network has not yet been confirmed), or it will extend directly to the Regasification facilities in the RB Harbour. A separate EIA process will be undertaken for the dedicated fuel-supply pipeline.

The grid connection infrastructure will include an Eskom portion of the 275kV or 400kV GIS interface Substation, Underground 275kV or 400kV power cabling connecting the Power Plant GIS substation and Eskom GIS Interface substation and an overhead 275kV or 400kV power line connecting the Eskom interface substation to the selected Eskom grid connection point. A separate EIA process will be undertaken for the grid connection infrastructure.

Table 1.1 provides a summary of proposed properties associated with proposed 2000MW PRBGP3 CCPP. A comprehensive description of the key infrastructure components associated with the development of the Phakwe Richards Bay Gas Power 3 CCPP is provided in **Chapter 4** of this Scoping Report.

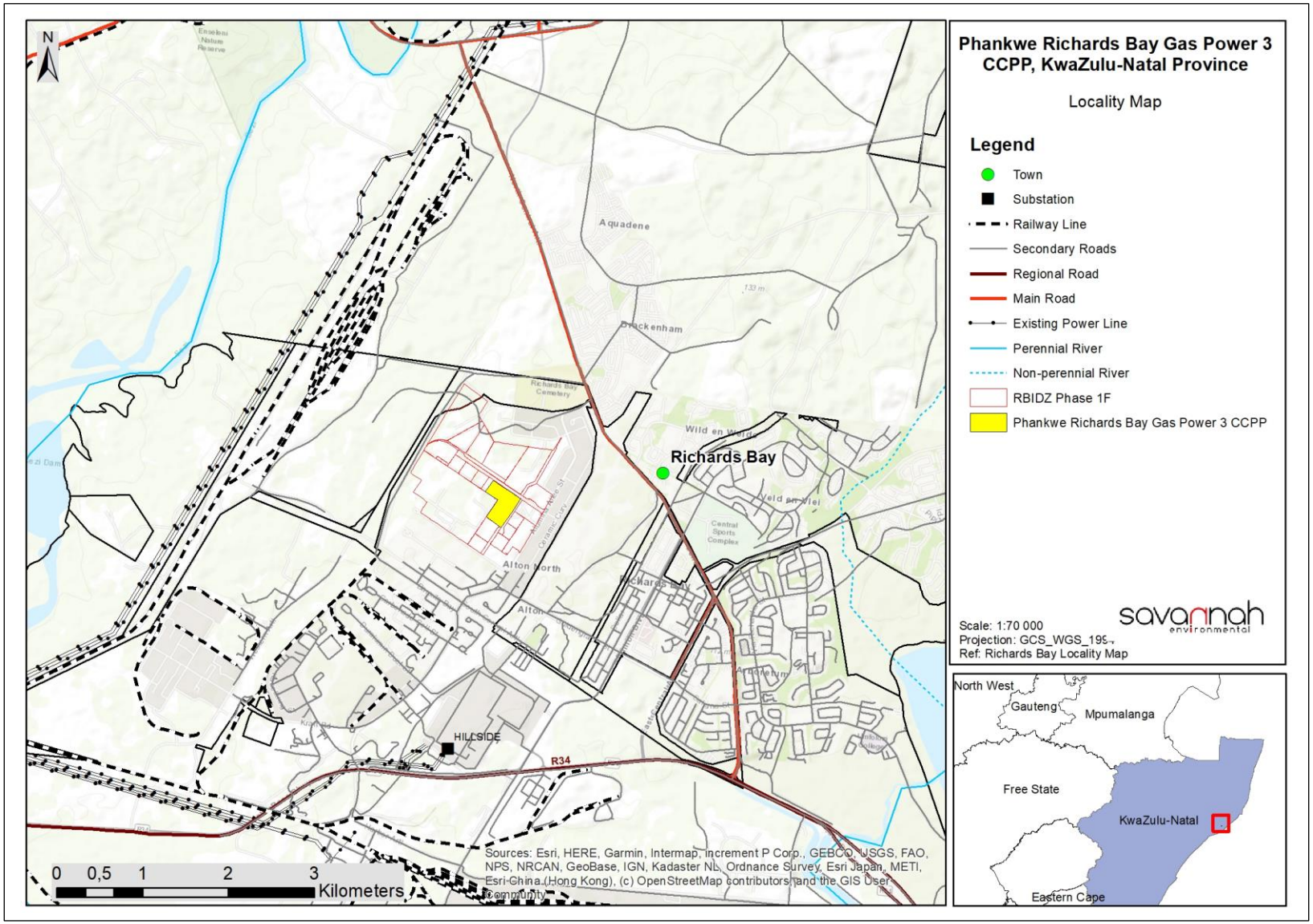

Figure 1.1: Locality map showing the area proposed for the establishment of the 2000MW PRBGP3 CCPP within the Richards Bay IDZ 1F, in the Richards Bay area (**Appendix L**)

Table 1.1: Summary of the preferred project site identified for the development of the Phakwe Richards Bay Gas Power 3 CCPP

Province	**KwaZulu-Natal**
District Municipality	King Cetshwayo District Municipality
Local Municipality	City of uMhlathuze Local Municipality
Ward number(s)	26
Nearest town(s)	Alton, Richards Bay, Arboretum, Empangeni, Ichubo
Farm name(s) and number(s)	» Erf 16820 » Erf 16819 » Erf 1/16674 » Subdivision of Erf 17442
SG 21 Digit Code (s)	N0GV04210001682000000 N0GV04210001681900000 N0GV04210001667400000 N0GV04210001744200000
Coordinate points for the proposed development site	28°44'31.5306"S, 32°1'39.4420"E 28°44'26.9614"S, 32°1'42.3432"E 28°44'31.6831"S; 32°1'51.9240"E 28°44'45.6445"S; 32°1'42.9759"E 28°44'43.0901"S; 32°1'38.0691"E 28°44'33.7688"S: 32°1'43.9819"E
Current zoning	Industrial
Current land use	Vacant / Industrial

1.3. Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Phakwe Richards Bay Gas Power 3 CCPPis subject to the requirements of the 2014 EIA Regulations, as amended in April 2017, 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.

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 deciding on environmental authorisations. In terms of GN R779 of 1 July 2016, the Minister of the Department of Forestry, Fisheries and the Environment (DFFE) is the Competent Authority for all activities relating to the IRP of 2010 – 2030 (and any updates thereto) that require environmental authorisation. The DFFE is therefore the Competent Authority for this project, 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 published under the NEMA ensures that proponents are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether 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. Phakwe Richards Bay Gas Power 3 (Pty) Ltd appointed Savannah Environmental as the independent environmental consulting company to conduct an EIA process for the proposed project and Application for Environmental Authorisation.

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 being undertaken for the proposed Phakwe Richards Bay Gas Power 3 CCPPcomprises two phases – i.e. Scoping and Impact Assessment - and involves the identification and assessment of environmental impacts through 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, as well as project alternatives in order to determine which should be assessed in more detail in the EIA Phase. 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), consideration of feasible alternatives and public consultation. Recommendations of practical and achievable mitigation and management measures are included in an Environmental Management Programme (EMPr) considering all phases of the project. Following the public review of the EIA report and EMPr, this phase culminates in the submission of a Final EIA Report and EMPr to the competent authority for review and decision-making.

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

In accordance with Regulation 12 of the 2014 EIA Regulations (GN R326), Phakwe Richards Bay Gas Power 3 has appointed Savannah Environmental (Pty) Ltd (Savannah Environmental) as the independent environmental consultant to undertake the Scoping and EIA process for the 2000MW PRBGP CCPP and its associated infrastructure. Neither Savannah Environmental nor any of its specialists are subsidiaries of/or are affiliated to Phakwe Richards Bay Gas Power 3. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed 2000MW PRBGP CCPP project.

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned) and is rated as a Level 2 Broad-Based Black Economic Empowerment (B-BBEE) Contributor. The company was established in 2006 with a clear objective to provide services to the infrastructure development sector. Savannah Environmental

benefits from the pooled resources, diverse skills and experience in the environmental field held by its team that has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa and neighbouring countries. Strong competencies have been developed in project management of environmental processes, as well as strategic environmental assessment and compliance advice, and the assessment of environmental impacts, the identification of environmental management solutions and mitigation/risk minimising measures.

The Savannah Environmental team has considerable experience in environmental impact assessments and environmental management and has been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa, including those associated with electricity generation and transmission.

The Savannah Environmental team comprises:

» **Jana de Jager.** She holds a Bachelor degree in Environmental Science, an Honours degree in Geography & Environmental Science and is currently undertaking her M.S.c in Ecological Water Requirements. She has 3.5 years of experience in the environmental management field. Her key focus is on undertaking environmental impact assessments, GIS mapping, public participation, environmental management plans and programmes. She is registered as a Candidate Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP).

» **Tebogo Mapinga.** She is an experienced professional with 14 years across the fields of environment and permitting in both the public and the private sector. She holds a BSc Degree (Major in Physiology and Zoology) from the University of Limpopo (Turfloop Campus). Her competencies lie in Environmental Impact Assessments, Basic Assessments, Environmental Screening, Environmental Management Plan. Compliance monitoring and obtaining permits for small- and large-scale projects. She is a member of the International Association for Impact Assessments (IAIA) and is a registered professional natural scientist as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP).

» **Jo-Anne Thomas.** She holds a Master of Science Degree in Botany (M.S.c Botany) from the University of the Witwatersrand and is registered as a Professional Natural Scientist (400024/2000) with SACNASP and a registered Environmental Assessment Practitioner (EAP) with EAPASA (2019/726). She has over 20 years of experience in the field of environmental assessment and management, and the management of large environmental assessment and management projects. During this time, she has managed and coordinated a multitude of large-scale infrastructure EIAs and is also well versed in the management and leadership of teams of specialist consultants, and dynamic stakeholders. She has been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPrs, environmental policy, strategy and guideline formulation, and integrated environmental management (IEM). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.

» **Nicolene Venter.** She is a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public

participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

Curricula Vitae (CVs) detailing Savannah Environmental team's expertise and relevant experience are provided 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 draft 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; (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report. (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments.	The policy and legislative context for the development of the Phakwe Richards Bay Gas Power 3 CCPP has been considered throughout this chapter on a national, provincial and local level. The specific environmental legislation and policies applicable to the development are considered in Table 2.1.

2.2 Energy Policy and Planning

The need to expand electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the DMRE. The legislative context, Policy and planning documentation that supports the development of a diversified mix of energy projects, such as gas to power plants are discussed in more detail in the following sections, along with the provincial and local policies and plans that have relevance to the development of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure. 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.

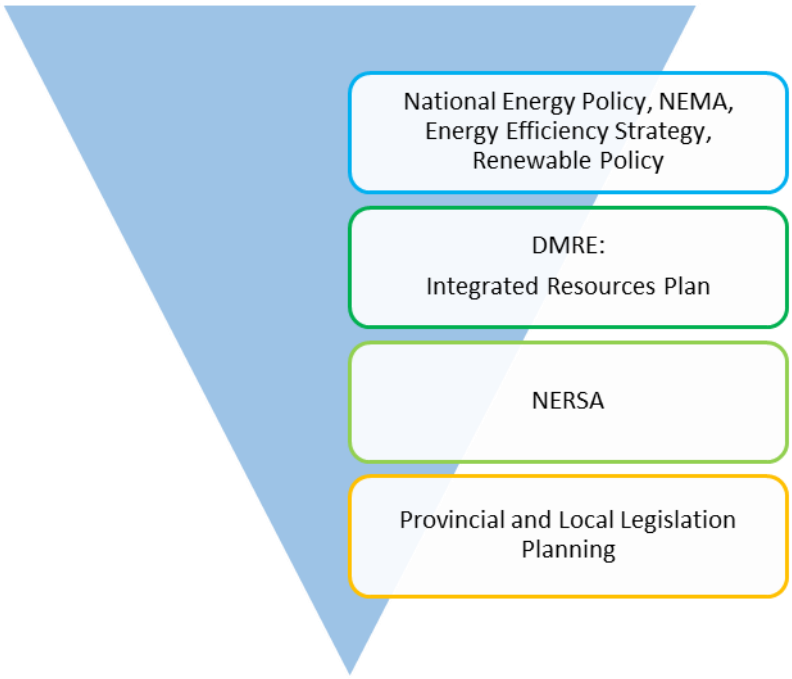

Figure 2.1: Hierarchy of electricity policy and planning documents

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project such as that being considered in this Scoping Report consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. As gas to energy developments are multi-sectoral (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process of a gas to power project and the related statutory environmental assessment process. 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.

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

- **Department of Mineral Resources and Energy (DMRE):** This Department is responsible for policy relating to all energy forms and for compiling and approving the Integrated Resource Plan (IRP) for electricity and, since merging with the Department of Mineral Resources (DMR), is also responsible for mining applications in terms of the provisions of the Mineral and Petroleum Resource Development Act (No. 28 of 2002) (MPRDA).
- **National Energy Regulator of South Africa (NERSA):** NERSA is responsible for regulating all aspects of the electricity sector and will ultimately issue licenses for IPP projects to generate electricity and for the construction and operation of fuel storage facilities linked to these IPP projects.
- **Department of Department of Forestry, Fisheries, and the Environment (DFFE):** This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the 2014 EIA Regulations (GN R326) as amended. DFFE is the competent authority for this project (as per GNR 779 of 01 July 2016), and is charged with granting the EA for the project under consideration. Furthermore, the Department is also responsible for issuing permits for the disturbance or destruction of protected tree species listed under Section 15 (1) of the National Forest Act (No. 84 of 1998) (NFA).

- **The South African Heritage Resources Agency (SAHRA):** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- **South African National Roads Agency Limited (SANRAL):** This Agency is responsible for the regulation and maintenance of all national road routes.
- **Department of Water and Sanitation (DWS):** This Department is responsible for effective and efficient water resources management to ensure sustainable economic and social development. This Department is also responsible for evaluating and issuing licenses pertaining to water use (i.e. Water Use Licenses (WUL) and General Authorisation).
- **The Department of Agriculture, Rural Development and Land Reform (DARDLD):** This Department is the custodian of South Africa's agricultural resources and is responsible for the formulation and implementation of policies governing the agriculture sector and the initiation, facilitation, coordination and implementation of integrated rural development programmes.

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

- **KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs (EDEAT):** This Department is the commenting authority for the Scoping and EIA process for the project.
- **Ezemvelo KZN Wildlife (EKZN):** is responsible for the management of nature conservation and protected areas in KwaZulu-Natal and issuing of other biodiversity and conservation-related permits.
- **AMAFA (KZN Heritage Authority):** This Department identifies, conserves and manage heritage resources throughout the KwaZulu-Natal Province.

At the **Local Level,** the local and district 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 includes the **uMhlathuze Local Municipality** which forms part of the **King Cetshwayo District Municipality**. In terms of the Municipal Systems Act (No. 32 of 2000), it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.

2.3 National Policy and Planning Context

2.3.1 The National Energy Act (No. 34 of 2008)

The purpose of the National Energy Act (No. 34 of 2008) is 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, while taking into account environmental management requirements and interactions amongst economic sectors, as well as matters relating to energy. The National Energy Act also provides for energy planning, increased generation and consumption of renewable energies, contingency energy supply, holding of strategic energy feedstocks and carriers, , appropriate upkeep and access to energy infrastructure. The Act provides measures for the furnishing of certain data and information regarding energy demand, supply and generation, and for establishing an institution to be responsible for promotion of efficient generation and consumption of energy and energy research.

The Act provides the legal framework which supports the development of power generation facilities, such as the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure.

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

The White Paper on the Energy Policy, published by the then Department of Minerals and Energy (DME) in December 1998 was developed so as to clarify government policy regarding the supply and consumption of energy for the next decade. It was intended to address all elements of the energy sector as practically as it could. The main objectives of the White Paper are the following:

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

In order to meet these objectives and the developmental and socio-economic objectives of South Africa, the country needs to optimally use 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 diversifying South Africa's electricity mix.

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).

2.3.3. The Electricity Regulation Act (No. 04 of 2006) (ERA)

The Electricity Regulation Act (No. 04 of 2006) as amended by the Electricity Regulation Act (No. 28 of 2007), replaced the Electricity Act (No. 41 of 1987), as amended, with the exception of Section 5B, which provides funds for the energy regulator for the purpose of regulating the electricity industry.

The ERA establishes a national regulatory framework for the electricity supply industry and made NERSA custodian and enforcer of the National Electricity Regulatory Framework. The ERA also provides for licences and registration as the manner in which the generation, transmission, distribution, reticulation, trading, and import and export of electricity is regulated.

2.3.4. The National Development Plan (NDP) 2030

The National Development Plan (NDP) 2030 offers a long-term plan for the country. It defines desired destinations where inequality and unemployment are reduced and poverty is eliminated so that all South Africans can attain a decent standard of living. Electricity is one of the core elements of a decent standard of living.

While the achievement of the objectives of the NDP requires progress on a broad front, three priorities stand out, namely:

» Raising employment through faster economic growth

- Improving the quality of education, skills development and innovation
- Building the capability of the state to play a developmental, transformative role

In terms of the Energy Sector's role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes:

- Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.
- Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.
- Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change.

In formulating its vision for the energy sector, the NDP took the IRP 2010 as its point of departure. Therefore, although electricity generation from coal is still seen as part of the energy mix within the NDP, the plan sets out steps that aim to ensure that, by 2030, South Africa's energy system looks very different to the current situation: coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources – especially wind, solar, and imported hydroelectricity – will play a much larger role.

2.3.5. Integrated Energy Plan (IEP), November 2016

The purpose and objectives of the Integrated Energy Plan (IEP) are derived from the National Energy Act (No. 34 of 2008). 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 in 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.

A draft version of the IEP was released for comment on 25 November 2016. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The development of the IEP is an ongoing continuous process. It is reviewed periodically to take into account changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst others.

The 8 key objectives of the integrated energy planning process are as follows:

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.

» 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 energy.

2.3.6. Integrated Resource Plan (IRP) for Electricity 2010 - 2030

The Integrated Resource Plan (IRP) for Electricity is a subset of the IEP and constitutes South Africa's National electricity plan. The IRP is an electricity infrastructure development plan based on least-cost electricity supply and demand balance, taking into account security of supply and the environment. The primary objective of the IRP is to determine the long term electricity demand and detail how this demand should be met in terms of generating capacity, type, timing and cost. The IRP also serves as input to other planning functions, including amongst others, economic development and funding, and environmental and social policy formulation.

The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development.

Following the promulgation of the IRP 2010–2030, implementation followed in line with Ministerial Determinations issued under Section 34 of the Electricity Regulation (Act No. 4) of 2006. The Ministerial Determinations give effect to planned infrastructure by facilitating the procurement of the required electricity capacity.

Since the promulgated IRP 2010–2030, the following capacity developments have taken place:

» A total 6 422 MW under the Renewable Energy Independent Power Producers Programme (REIPPP) has been procured, with 5 250 MW operational and made available to the grid.
» IPPs have commissioned 1 005 MW from two Open Cycle Gas Turbine (OCGT) peaking plants.
» Under the Eskom build programme, the following capacity has been commissioned:
  * 1 324 MW of Ingula pumped storage, 4 600 MW of Medupi, 2 400 MW of Kusile and
  * 100 MW of Sere Wind Farm.
» 18 000MW of new generation capacity has been committed to.

Besides capacity additions, a number of assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. In addition, environmental considerations such as South Africa's contribution to Greenhouse gases which contribute to climate change, local air quality and water availability have come to the fore.

These considerations necessitated the review and update of the IRP and ultimately the promulgation of a revised plan in October 2019. In terms of the IRP 2019, South Africa continues to pursue a diversified energy mix that reduces reliance on a single or a few primary energy sources. In the period prior to 2030, the system requirements are largely for incremental capacity addition (modular) and flexible technology, to complement the existing installed inflexible capacity. South Africa is a signatory to the Paris Agreement on

Climate Change and has ratified the agreement. In line with INDCs (submitted to the UNFCCC in November 2016), South Africa's emissions are expected to peak, plateau and from year 2025 decline. This protectory on emissions has been taken into consideration in the development of the IRP, 2019. The IRP specifically calls for a "just transition" of the energy sector to lower carbon emissions. The timing of the transition to a low carbon economy must be socially just and sensitive to the potential impact on jobs and local economies.

Following consideration of all these factors, the following Plan was promulgated.

	Coal	Coal (Decommis-sioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37,149		1 860	2,100	2 912	1 474	1 980	300	3 830	499
2019	2,155	-2,373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1,433	-557				114	300			
2021	1,433	-1403				300	818			
2022	711	-844			513	400 1,000	1,600			
2023	750	-555				1000	1,600			500
2024			1,860				1,600		1000	500
2025						1000	1,600			500
2026		-1,219					1,600			500
2027	750	-847					1,600		2000	500
2028		-475				1000	1,600			500
2029		-1,694			1575	1000	1,600			500
2030		-1,050		2,500		1000	1,600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33,364		1,860	4,600	5,000	8,288	17,742	600	6,380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

Installed Capacity
Committed/Already Contracted Capacity
Capacity Decommissioned
New Additional Capacity
Extension of Koeberg Plant Design Life
Includes Distributed Generation Capacity for own use

- 2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030.
- Koeberg power station rated/installed capacity will revert to 1,926MW (original design capacity) following design life extension work.
- Other/ Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility.
- Short term capacity gap is estimated at 2,000MW.

Figure 2.2: IRP 2019 as promulgated in October 2019[2]

Gas is considered a transition fuel globally and it provides the flexibility necessary to run a system like South Africa has in a cost-effective manner. It is cleaner than other fossil fuels. Therefore, the IRP 2019 provides for the development of 3000MW of new capacity from gas to power projects. The extent of the gas contained in the draft IRP is within the imposed emissions reduction trajectory.

[2] source: https://www.cliffedekkerhofmeyr.com/en/news/publications/2019/Corporate/energy-alert-22-october-The-Integrated-Resource-Plan-2019-A-promising-future-roadmap-for-generation-capacity-in-South-Africa.html

The development of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure provides an opportunity to contribute to "just transition" of the energy mix through the development of a power station which will enable the generation of electricity through the use of a cleaner fuel resource, with less emissions (however not zero emissions, unless fully replaced with green hydrogen as a fuel source – see Chapter 4) than coal fired power stations, which can also support the uptake of renewable energy as part of the energy mix, while the process of decommissioning of coal based technology facilities are undertaken.

2.3.7. New Growth Path (NGP) Framework, 23 November 2010

The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020. With economic growth and employment creation as the key indicators identified in the NGP. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. The framework identifies investments in five key areas namely: energy, transport, communication, water and housing. Sustaining high levels of public investment in these areas will create jobs in construction, operation and maintenance of infrastructure. . 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.

2.3.8. National Climate Change Bill, 2018

On 08 June 2018 the Minister of Environmental Affairs published the National Climate Change Bill ("the Bill") for public comment. The purpose of the Bill is to build an effective climate change response and ensure the long-term, just transition to a climate resilient and lower carbon economy and society. This will be done within the context of sustainable development for South Africa, and will provide for all matters related to climate change.

The National Climate Change Bill addresses issues related institutional and coordination arrangement across the three spheres of government namely national, provincial and local. It further highlights the need the spheres of government and entities, sectors as well business to respond to challenges of climate change. The bill further address the matters relating to, the national adaptation to impacts of climate change, greenhouse gas emissions and removals, and policy alignment and institutional arrangements. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The following objectives are set within the Bill:

a) Provide for the coordinated and integrated response to climate change and its impacts by all spheres of government in accordance with the principles of cooperative governance;
b) Provide for the effective management of inevitable climate change impacts through enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to building social, economic, and environmental resilience and an adequate national adaptation response in the context of the global climate change response;
c) Make a fair contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe and in a manner that enables economic, employment, social and environmental development to proceed in a sustainable manner.

2.3.9. 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.

2.3.10. National Climate Change Adaptation Strategy (South Africa), 2020

South Africa's National Climate Change Adaptation Strategy (NCCAS) supports the country's ability to meeting its obligations in terms of the Paris Agreement on Climate Change. It gives effect to the National Development Plan's vision of creating a low-carbon, climate resilient economy and a just society. The commitment to the Paris Agreement and its implementation is in line with the principles and provisions of the UNFCCC will ensure the balance between adaptation and mitigation, and adequate financial, technological and skills support for South Africa to enhance their efforts against climate change.

2.3.11. Strategic Integrated Projects (SIPs)

The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 36 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration. SIP 9 (In terms of Section 8(1)(a) read with Section 7(1) of the Infrastructure Development Act, as amended, 2014 (Act no. 23 of 2014)) of the energy SIPs support the development of the gas proposed power plant:

» SIP 9: Electricity generation to support socio-economic development: The proposed Phakwe Richards Bay Gas Power 3 CCPP is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2019 to meet the needs of the economy and address historical imbalances.

2.3.12. Industrial Policy Action Plan (IPAP), 2018 / 2019 – 2020 / 2021

The Industrial Policy Action Plan (IPAP) 2018/2019 – 2020/2021 represents a significant step forward in scaling up the country's efforts to promote long-term industrialisation and industrial diversification. It is recognised that Southern Africa is fast transforming into an oil and gas jurisdiction due to significant gas discoveries and developments in progress that create the potential for the expansion of imports of natural gas resources from Mozambique in particular, that will build on the volumes already being imported by via the ROMPCO pipeline from the Pande and Temane fields operated by Sasol. From a South African perspective, the scale of the gas reserves in Mozambique is of particular significance. Accordingly, the plan states that a key industrial growth path is gas-based industrialisation (Department of Trade and Industry, 2018).

The expansion of gas supply into the South African market - via the development of domestic resources and the expansion of volumes from Mozambique - should produce affordable gas prices capable of underpinning a significant natural gas-based reindustrialisation of the South African economy. In the longer term (15 years +) the main objective is a vibrant gas industry delivering affordable and secure gas supply to the heavy industry, manufacturing and transport sectors (Department of Trade and Industry, 2018).

2.3.13. 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 imported liquified natural gas (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. 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 as the facility intends to use, to natural gas and/or a mixtures of natural gas and hydrogen.

2.4. Provincial Policy and Planning Context

2.4.1. KwaZulu-Natal Provincial Growth and Development Plan (PGDP) (2019)

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 become a reality. This energy is anticipated through gas and diesel turbines which were anticipated to be on-line in 2016 (Provincial Planning Commission, 2016).

2.4.2. KwaZulu-Natal Provincial Growth and Development Strategy (PGDS) (2016)

The KZN's Provincial Growth and Development Strategy (PGDS) is concisely summarised in **Figure 2.3**. 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 maximise 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 2035; eliminating poverty, inequality, unemployment and the current disease burden in the province.

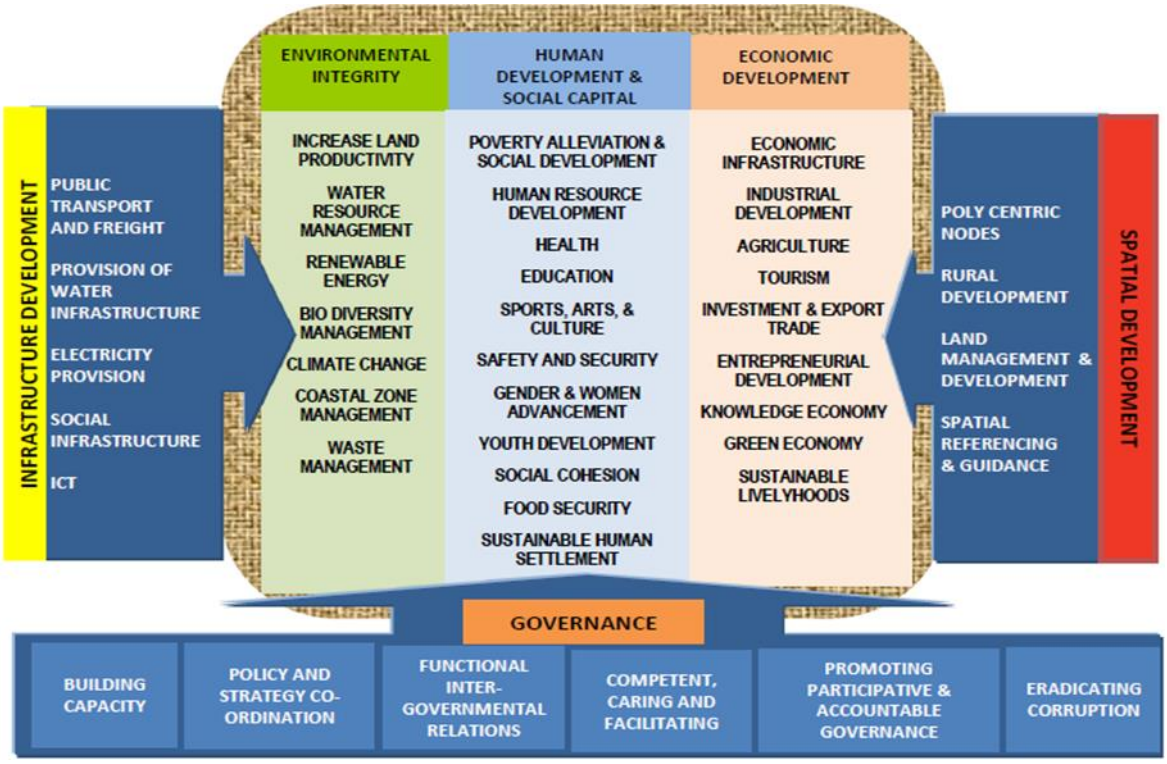

Figure 2.3: KZN Provincial Growth and Development Strategy

Through the seven strategic goals the KZN PGDS aims to achieve its vision by 2035, including:

1) Inclusive economic growth (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)

Of particular relevance to this project is "Strategic Objective 4.5: Ensure access to affordable, reliable, sustainable and modern energy for all. Sufficient electricity is available for the growth and development needs of KZN". The PGDS states that energy supply in the province, and country, is becoming increasingly expensive for both domestic and business/industrial consumers, and this is exacerbated by the lack of investment in electricity infrastructure (new and maintenance of existing infrastructure). It highlights that the province must prioritise alternative energy projects and/or programmes as a reliable supply of energy. Alternative energy supply or the green economy must become measurable within the Provincial Growth and Development Plan.

The proposed Phakwe Richards Bay Gas Power 3 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.

2.4.3. 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 2.4 demonstrates that the preferred project site within the Richards Bay area is located in an area demarcated as having economies of scale.

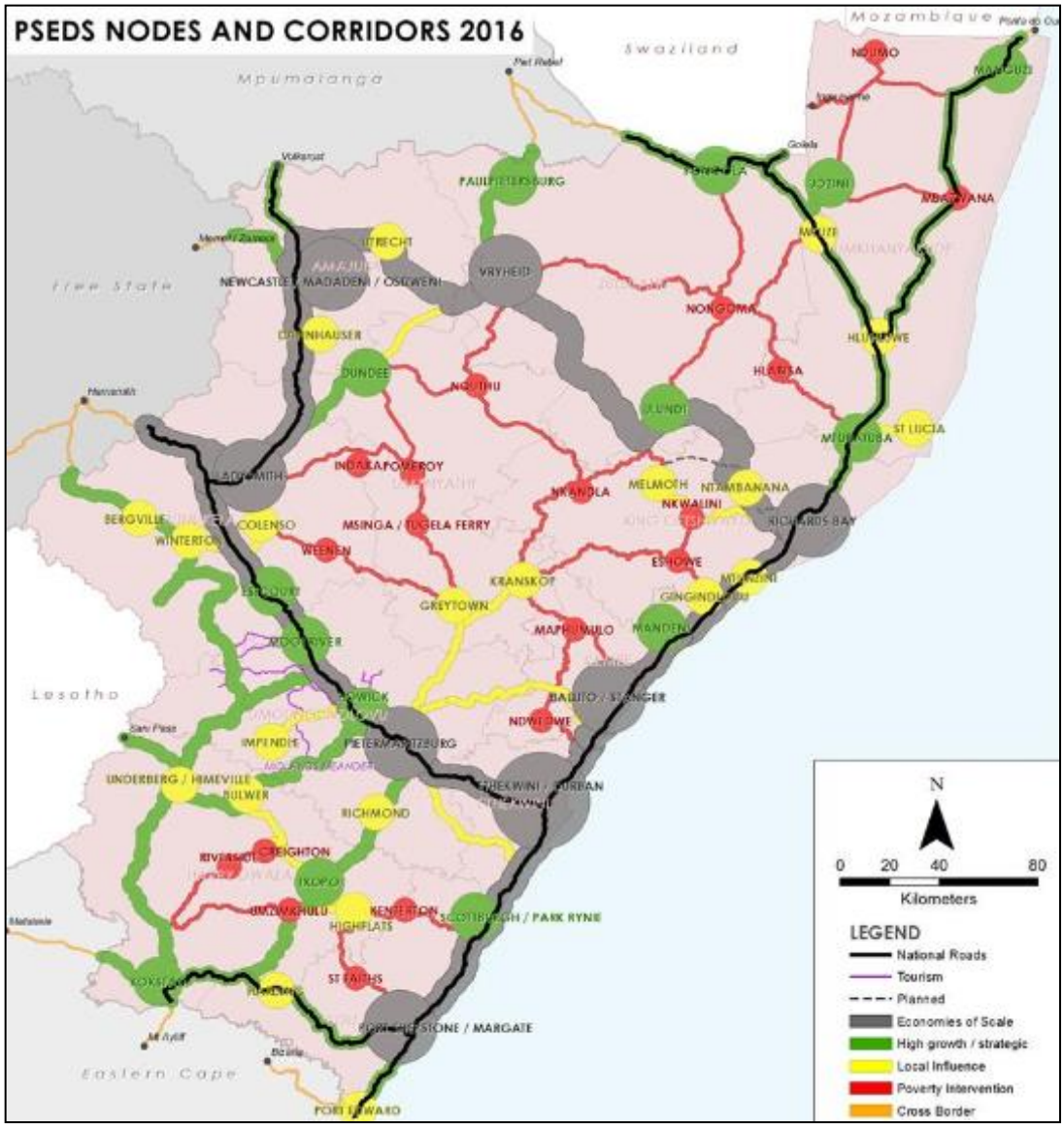

Figure 2.4: KZN Spatial Economic and Development Strategy nodes and corridors

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 Phakwe Richards Bay Gas Power 3 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 nearby, 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.

The development of the Phakwe Richards Bay Gas Power 3 CCPP will drive economic growth, infrastructural transformation and development. The area for development is seen as a favourable area for investment and development.

2.4.4. KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs Revised Strategic Plan 2015 - 2020

The strategic focus for the KZN EDTEA during the 2020 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.

2.4.5. 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 Phakwe Richards Bay Gas Power 3 CCPP will contribute towards economic value, economic support and economic growth in the area.

2.4.6. 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 Phakwe Richards Bay Gas Power 3 CCPP will promote access to energy through the use of a fuel resource other than coal. The use of natural gas (and eventually Hydrogen) in the development of the project offers reduced emissions when compared to the use of coal or diesel for electricity generation. The implementation of combined cycle technology will also ensure efficiency in terms of the use of natural gas as a fuel resource in the long-term once available.

2.4.7. 2012 KwaZulu-Natal Systematic Conservation Plan

In KwaZulu-Natal (KZN), the Critical Biodiversity Areas (CBA) map has been created as part a strategic planning strategy to ensure biodiversity conservation and persistence in the province. The KZN Provincial Conservation Assessment allows for the development of four defined categories necessary for the development of a Critical Biodiversity Area (CBA) map:

- CBA Mandatory are areas required to meet biodiversity targets for both biodiversity pattern and ecological process features, and no other options are available to meet this target.
- CBA Optimal are areas that are the most optimal to meet the biodiversity conservation targets while avoiding high cost areas as much as possible.
- Ecological Support Areas (ESAs) are areas not essential for directly meeting biodiversity targets but play an important role in supporting and sustaining the ecological functioning of the critical biodiversity areas.
- EGSAs deliver important ecosystem goods and services to the KZN province and the people living therein.

Provincial scale data layers (KZN CBA Irreplaceable version 26012016) identified CBA areas intersecting with the project site. During the Scoping assessment field work, the area was found to be degraded, with existing negative environmental impacts present. The terrestrial biodiversity is therefore not representative of the environmental sensitivities identified during the desktop assessment.

2.5. Local Policy and Planning Context

The strategic policies at the district and local level 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.

2.5.1. King Cetshwayo District Municipality Draft Integrated Development Plan (2020/21 – 2021/22)

The vision for the King Cetshwayo District Municipality Integrated Development Plan IDP 20/21 – 21/22 is to create a 'safe and healthy environment which promotes sustainable, radical, and inclusive economic and social development reinforced by service excellence' (KCDM, 2020: 34). As indicated in the vision, one of the goals is infrastructure development and service delivery. The Richards Bay Industrial Development Zone (RBIDZ) is identified as a catalytic project (KCDM, 2020: 69). 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 Phakwe Richards Bay Gas Power 3 CCPP will be located within the IDZ on a property zoned for industrial use, thereby contributing to and providing an extension of catalytic projects to the IDZ.

2.5.2. King Cetshwayo District Growth and Development Plan, 2015

The King Cetshwayo 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.

2.5.3. King Cetshwayo District Municipality Integrated Development Plan (2019/20 – 2021/22)

The KCDM IDP Vision is "By 2035 King Cetshwayo District Municipality will be cohesive; economically viable district, with sustainable strategic infrastructure; supporting job creation through radical economic transformation rural development and promotion of our heritage".

KCDM's mission is that it will serve its communities to create a prosperous district through:

- Provision of sustainable; quality water and sanitation services;
- Developing the economy through radical economic transformation and job creation;
- Promoting rural development; agrarian reform and food security;
- Co-ordinate planning, spatial equity and environmental sustainability; and,
- Promoting heritage, community participation, nation building and good governance.

The articulated vision of the KCDM is as follows:
By 2035, King Cetshwayo district is renowned for the vastly improved socio-economic status of its residents resulting from 15 years of sustained economic growth. The district is internationally recognized as a world leader in innovative and sustainable manufacturing based on the successful implementation of the RBIDZ initiative. This economic growth, together with the district rural development programme resulted in the creation of decent employment opportunities leading to the fastest growing household and individual income levels in the province and reducing the unemployment rate of the youth in the district by more than 50%. It also resulted in a significant decrease in the economic dependency ratio and improving the overall quality of life in the district. The economic growth is underpinned by a vastly improved information and telecommunication infrastructure network with the entire district having access to a wireless broadband service, all businesses, and more than 50% of households with access to a computer and internet service. By 2035, the district is characterised by a high-quality infrastructure network supporting both household needs and economic growth. All households are provided with access to appropriate water infrastructure, adequate sanitation, and sustainable energy sources. Improved access to health facilities and quality of health services provided resulted in continually improving health indictors in the district. The quality of the output from the primary and secondary education system has improved dramatically and all learners have access to fully equipped primary and secondary education facilities. Sustainable and coherent spatial development patterns have been successfully implemented through innovative spatial planning frameworks an effective land use management system implemented by highly skilled officials. Improved public sector management and skills levels resulted in sound local governance and financial management.

The KCDM IDP specifically emphasises that the national energy crises has far reaching implication on the supply and maintenance of infrastructure services to the district, notable the cost for stand by generators at pump stations as well as the running costs of such generators. The environmental costs of increased combustion into the atmosphere as a result of generator operations was also highlighted as a risk to be considered.

The proposed CCGPP will contribute to the 2035 vision of the District Municipality through the provision of sustainable and assured supply of electricity for supporting households and economic growth envisioned. Refer to Section 3: Need and Desirability for more details.

2.5.4. uMhlathuze Municipality Integrated Development Plan (IDP), 2019/2020

The City of uMhlathuze has produced the Integrated Development Plan (IDP), in order to further their vision: "The Port City of uMhlathuze offering improved quality of life for all its citizens through sustainable development." The IDP review highlights the Sustainable Development Goals (SDG) offer major improvements on the Millennium Development Goals (MDGs). The SDG framework addresses key systemic barriers to sustainable development such as inequality, unsustainable consumption patterns, weak institutional capacity, and environmental degradation that the MDGs neglected. As such, the City of uMhlathuze have outlined how their interventions will align with the SDGs. The following is of relevance to this proposed project:

Table 2.1: Extracts from the table within the IDP review that highlights the alignment between the SDGs and the City of uMhlathuze's Strategic Framework.

7.	Ensure access to affordable, reliable and modern energy for all.		• Energy Master Plan • Target reduction of 30% of coal powered stations by 2030 • 2000MW Gas to Power • Renewable Energy Efficiency initiatives • Waste to Energy Project • Energy infrastructure upgrade
13.	Take urgent action to combat climate change and its impacts.	Optimal management of natural resources and commitment to sustainable environmental management.	• Climate Change Action Plan • International Partnerships and collaborations (ICELI) • Adaptation and Mitigation Programme • Accelerating low emission development • Responding with adaption initiatives • Urban Air Quality Management • Signed Global Compact of Mayors • Gas to Power Project • Waste Water Reuse

The proposed Phakwe Richards Bay Gas Power 3 CCPP will assist in meeting the gas to power target of 2000MW, which in addition may also lead to a reduced dependence on electricity from the Highveld coal powered stations. LNG is also known to be a cleaner and more environmentally friendly alternative to coal and other fossil fuels. The option to include Hydrogen, once hydrogen is commercially available, in the gas mixture used as fuel will further reduce the carbon emissions of the Phakwe Richards Bay Gas Power 3 CCPP. This will also assist with reducing air quality and knock-on climate change impacts.

2.5.5. City of uMhlathuze Spatial Development Framework 2017/2018 – 2021/2022 (May 2017)

There are a number of existing natural and man-made phenomenon that have shaped and continue to shape the uMhlathuze Municipality spatial landscape. The area to the east of the Municipality is inundated with a system of wetlands and natural water features such as Lakes Cubhu, Mzingazi, Nsezi and Nhlabane. Major rivers include the Mhlathuze and Nsezi. The main access into the municipal area is via the N2 in a north south direction and in an east west direction the R34. Other significant roads in the area include the MR431 (that provides a northerly entry into Richards Bay from the N2) as well as the Old Main Road that straddles the N2 on its inland. Railway lines are prevalent in the municipal area but do not provide a passenger service, only a commercial/ industrial service is provided. The municipality has the benefit of about 45km of coastline

of which about 80% is in its natural state. Linked to its coastal locality is the Richards Bay deep-water port that has been instrumental in the spatial development of the area in the past and will impact on the areas the municipal area.

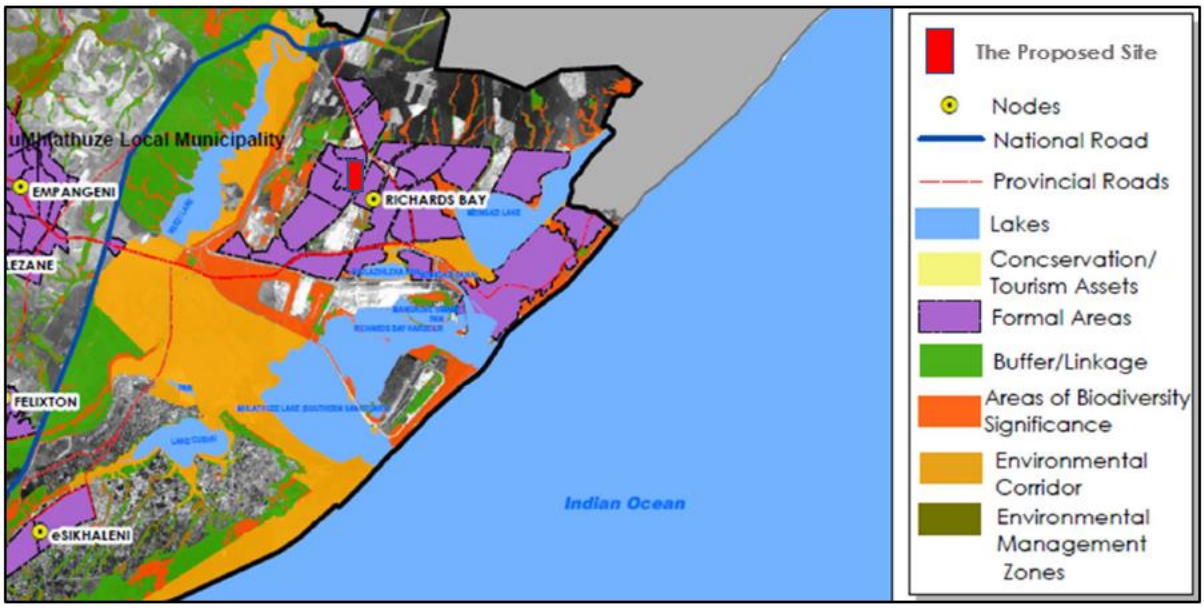

Figure 2.5: Extract from the Environmentally Sensitive Areas map within the uMhlathuze SDF (May 2017), depicting the area to the north-west of the port as "areas of biodiversity significance".

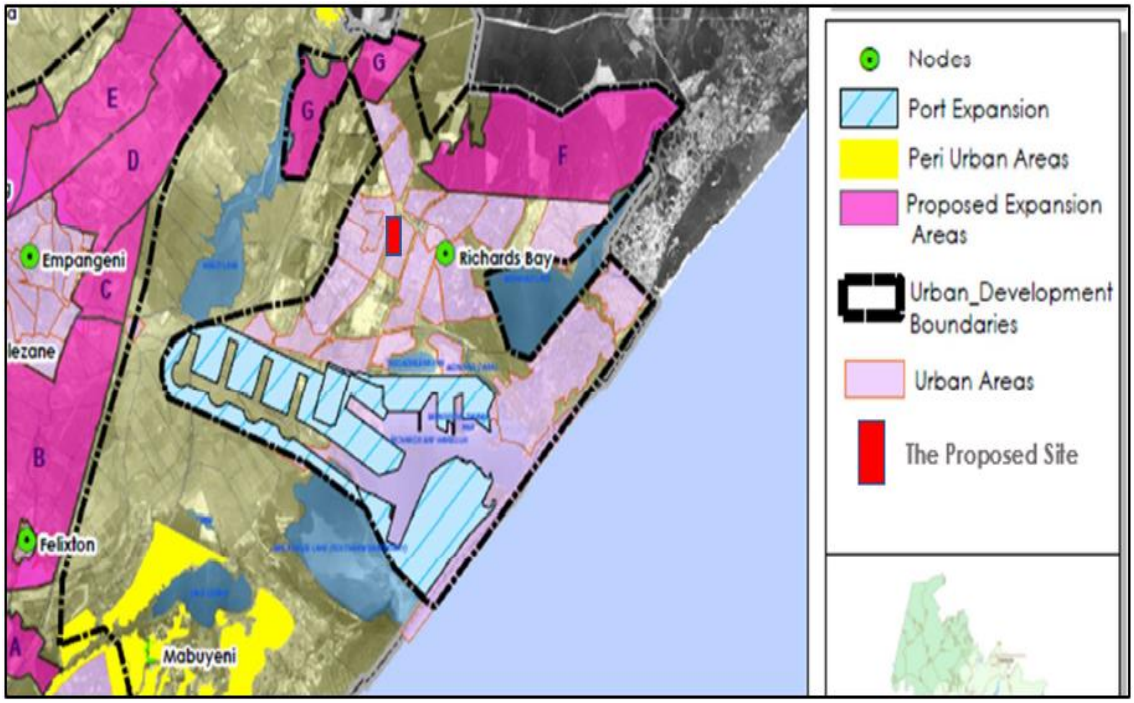

Figure 2.6: Extract from the Urban Development Plan map within the uMhlathuze SDF (May 2027), depicting the study are for this proposed development to be completely within the urban edge.

The SDF confirms that the proposed Phakwe Richards Bay Gas Power 3 CCPP falls within the urban development boundary of Richards Bay. Information retrieved from the City of uMhlathuze land use zoning

data layers (http://gis.umhlathuze.gov.za/), indicated that the project site is zoned for noxious industry development (**Figure 2.7**) and falls within Phase 1F of the IDZ.

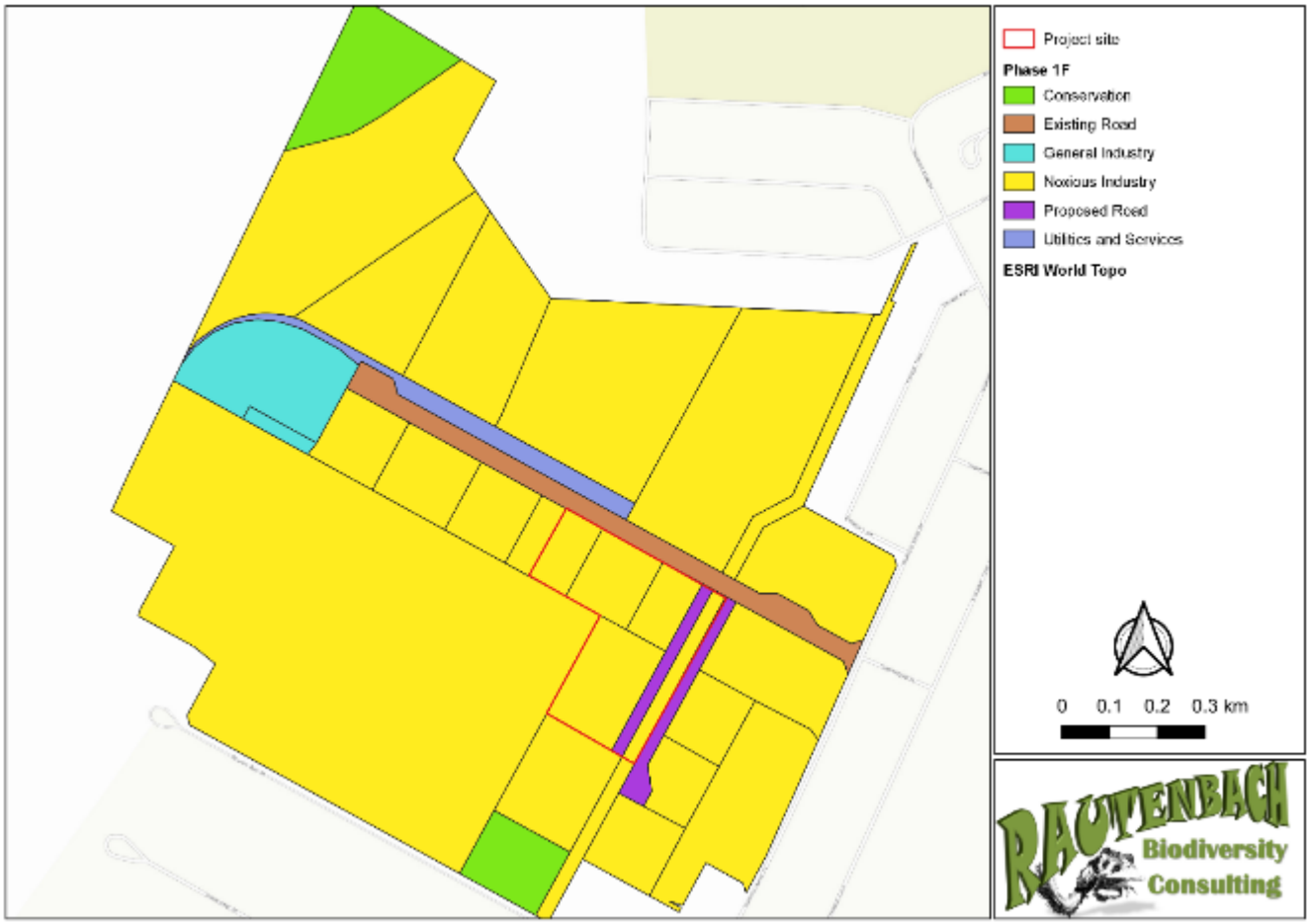

Figure 2.7: Land use zoning on Phase 1F.

2.6. Conclusion

The findings of the review of the relevant policies, programmes and documents pertaining to the energy sector indicate that the Phakwe Richards Bay Gas Power 3 CCPP is supported at a national, provincial, and local level, and that the development will contribute towards the various targets and policy aims.

CHAPTER 3: DESCRIPTION OF GAS TO POWER TECHNOLOGY

This chapter provides an overview of the of gas to power technology (i.e., combined cycle gas power plant), and the varying components associated with the technology.

3.1. Gas to Power Technology

CCPP is one of the most efficient power generating facilities to convert either gas or potentially a mixture of gas and hydrogen to mechanical power or electricity. CCPP can deliver high power output at efficiencies as high as 50%–60% with low emissions and produce 50% more electricity than a simple-cycle plant consuming the same amount of fuel (Ramireddy, 2012).[3] In addition, a benefit of using a blend of hydrogen gas as a fuel source for turbine operation is the reduction in carbon emissions pre-combustion (if green or similarly sourced hydrogen is used), as well as during combustion. The potential use of hydrogen therefore prevents locking in carbon emissions of gas power plants, which aids in the reduction of carbon emissions.[4]

A CCPP uses a gas turbine generator to generate electricity. Waste heat from this initial process is used to make steam to generate additional electricity via a steam turbine. In other words, gas or diesel is burnt in a gas turbine producing both electrical power via a coupled generator and hot exhaust gases. The 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.

The general operation of a CCPP is described below.

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 high pressure combustion gases. The 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 CCPP 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 high-pressure steam.
   - » The exhaust gases from the HRSG are dispersed via the exhaust stack.

[3] https://electrical-engineering-portal.com/an-overview-of-combined-cycle-power-plant
[4] Hydrogen as a fuel for gas turbines. A pathway to lower CO2. www.ge.com/power/future-of-energy

» Emissions in the exhaust gas is controlled by means of Selective Catalytic Reduction (SCR). The exhaust gas passes through catalysts located in the HRSG.

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.
» The spent steam from the steam turbine is sent to the Air Cooled Condensers (ACC) to convert the steam into water. The water is then sent to the HRSG to produce steam. This is a closed system with very little make-up water required, therefore saving water.

Combined cycle power plants may be either single shaft, wherein both of the gas turbine and steam turbine are connected to the same generator in a tandem arrangement, or multishaft, with each gas turbine and steam turbine driving a separate generator.

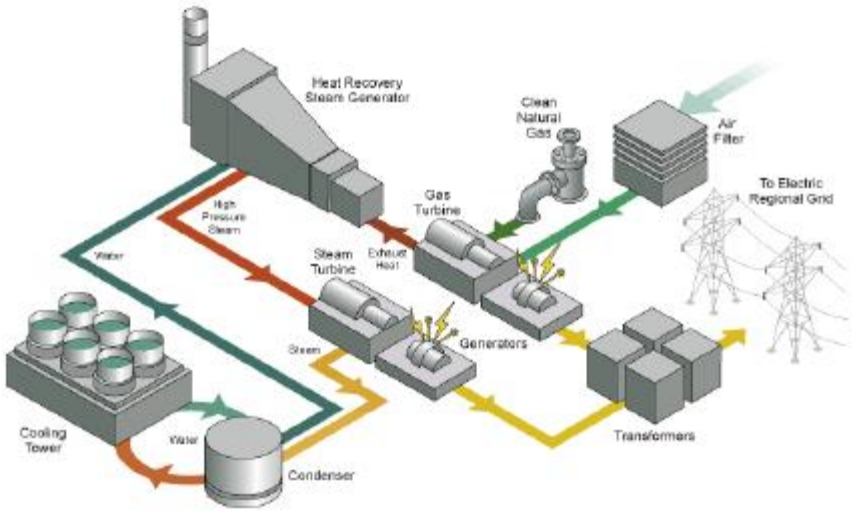

Figure 3.1: Schematic of Combined Cycle Gas-fired Power Generation Process

Table 3.1 details the potential advantages and disadvantages associated with CCPP, as determined by Ramireddy (2012).

Table 3.1: Potential advantages and disadvantages associated with CCPP

Potential Advantages	Potential Disadvantages
Fuel Efficiency	Location of development dependant of the availability and cost effectiveness of fuels.
Low capital costs	
Commercial availability	
Reduced emissions and fuel consumption*	

*Comparable with coal fired power plants

CHAPTER 4: PROJECT DESCRIPTION AND ALTERNATIVES

This chapter provides an overview of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure. The 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. These will be further refined in the EIA Phase of the process and confirmed through the final design prior to implementation.

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
(g)(i) details of all the alternatives considered;	The details of all alternatives considered for the development of the Phakwe Richards Bay Gas Power 3 CCPP are included in Section 4.3.
(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 4.4
(g)(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such	No project site alternatives are considered for the Phakwe Richards Bay Gas Power 3 CCPP. The motivation behind the exclusion of site alternative have been included in Section 4.4.

4.2 Description of the Proposed Project

The Phakwe Richards Bay Gas Power 3 CCPP involves the construction of a gas power station which will provide mid-merit or baseload power supply, estimated at 16 to 24 hours daily operation.[5] The power station will have an installed capacity of up to 2000MW, to be operated on natural gas or a mixture of natural gas and hydrogen. A dedicated pipeline to connect into an on-site gas receiving and conditioning station will provide the natural gas or the mixture of natural gas and Hydrogen.[6] The pipeline, which will be subject to a separate environmental authorisation process, will be connected to the proposed Transnet supply pipeline network of Richards Bay (the location of this network has not yet been confirmed), or it will extend directly to the Regasification facilities in the Richards Bay Harbour.

The power plant will operate at mid-merit or baseload duty and will include the following main infrastructure:

[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.
[6] The dedicated pipeline will be authorised through a separate environmental authorisation process.

- A number of gas turbines for the generation of electricity through the use of natural gas (liquid or gas forms), or a mixture of Natural gas and Hydrogen (in a proportion scaling up from 20% H2) as fuel source, operating all turbines at mid-merit or baseload (estimated 16 to 24 hours daily operation).
- Exhaust stacks associated with each gas turbine.
- A number of Heat Recovery Steam Generator (HRSG to generate steam by capturing the heat from the turbine exhaust.
- A number of steam turbines to generate additional electricity by means of the steam generated by the HRSG.
- The water treatment plant will demineralise incoming water from municipal or similar supply, to the gas turbine and steam cycle requirements. The water treatment plant will produce two parts demineralised water and reject one-part brine, which will be discharged to the R IDZ stormwater system.
- Steam turbine water system will be a closed cycle with air cooled condensers. Make-up water will be required to replace blow down.
- Air cooled condensers to condensate used steam from the steam turbine.
- Compressed air station to supply service and process air.
- Water pipelines and water tanks for storage and distributing of process water. (Potential sourcing of alternative water outside RB IDZ supply (Municipality))
- Water retention pond
- Closed Fin-fan coolers to cool lubrication oil for the gas turbines
- Gas generator Lubrication Oil System.
- Gas pipeline supply conditioning process facility. Please note, gas supply will be via dedicated pipeline from the proposed Transnet supply pipeline network of Richards Bay (the location of this network has not yet been confirmed) or, alternatively directly from the Regasification facilities at RB Harbour. The gas pipeline will be separately authorized.
- Site water facilities including potable water, storm water, waste water
- Fire water (FW) storage and FW system
- Diesel emergency generator for start-up operation.
- Onsite fuel conditioning including heating system.
- All underground services: This includes stormwater and wastewater.
- Ancillary infrastructure
- Electrical facilities
- Service infrastructure
- Fuel supply

Table 4.1 provides details of the proposed Phakwe Richards Bay Gas Power 3 CCPP, including the main infrastructure and services.

Table 4.1: Details of the Phakwe Richards Bay Gas Power 3 CCPP located near Richards Bay

Component	Description/ Dimensions
Location of the site	Erven 16820, 16819 1/16674 and a subdivision of Erf 17442 within the Richards Bay IDZ Phase 1F, KwaZulu-Natal
Landowner	Richards Bay Industrial Development Zone (IDZ), Phase 1F
Municipal Jurisdiction	King Cetshwayo District Municipality and the City of uMhlathuze Local Municipality
Electricity Generating capacity	2000MW (installed)

Component	Description/ Dimensions
Proposed technology	Combined Cycle Gas Turbine Technology with associated Balance of Plant
Extent of preferred project sites	11.8ha
Extent of the 2000MW PRBGP3 CCPP	Up to 11ha
Stack dimensions (Site elevation: 43 - 47 m above mean sea)	» Exhaust and bypass stack height will be a minimum of 45m (1 stack per Heat Recovery Steam Generator (HRSG) and one additional bypass for each gas turbine. » Diameter of each stack is expected to be approximately 8m
Fuel Sources	» Natural gas (LNG or similar) » Mixture of Natural gas and Hydrogen
Site access	The site will be accessed via existing roads within the IDZ Phase 1F (already approved through an EIA undertaken for the Phase 1F infrastructure) and internal access roads (width of up to 6m) which will be constructed.
Grid connection	» Onsite substation (275kV or 400kV) » The Phakwe Richards Bay Gas Power 3 CCPP will be connected to the national grid via a 275kV or 400kV Eskom Switching Station and underground transmission cables that will connect to the selected Eskom grid connection point A EIA process will be undertaken for the switching station and transmission line.
Water requirements	» The construction phase of the PRBGP3 plant will require 25 000m^3 of water for a period of 36-48 months. The average consumption will be approximately 550-700 m^3/month. Potable water is to be sourced from RB IDZ as part of the lease agreement conditions. » Water volumes of approximately 1 130 000 m^3 per annum are expected to be required for the operation of the plant. This amount to between 2790 and 3100 m^3/day which will be provided by the RB IDZ. Water provided by RB IDZ will be sourced from the uMhlathuze Municipality Water Works. If the potential construction of a Umhlathuze Water treatment plant makes industrial water available in the future, this water could be considered as an alternative source of water during the operation of the plant.
Associated infrastructure	» Temporary laydown areas; » Warehousing and buildings; » Workshop building; » Fire water pump building; » Administration and Control Building; » Ablution facilities; » Storage facilities; » Guard House; » Fencing; » Maintenance and cleaning area; » Operational and maintenance control centre
Services required	The proposed project will be located within the Richards Bay IDZ 1F under a long-term lease. The Zone Operator / Landlord (RBIDZ) is responsible for all services required by Phakwe Richards Bay Gas

Component	Description/ Dimensions
	Power 3 (Pty) Ltd (the tenant) under the long-term lease agreement. The RBIDZ lease agreement states: "Undeveloped land which is to be serviced by the Landlord to include bulk water, sewer, and electrical connections and a road external to the leased premises but within the RBIDZ. The Landlord will be responsible for the development of the Property as vacant developed land with services in place to the supply points installed by the Landlord near the boundary of the Property." In this regard, the following engineering services will be provided by the Landlord: » Water; » Sewage; » Roads; » Storm water; » Electricity; and » Refuse removal on a weekly basis by the uMhlathuze Municipality.
Raw/Process-Water Storage Reservoir	Water storage facilities will be located on site. This will include a raw water and fire water tank, demineralisation water tank and a tank for partially treated water.

4.3. Life-cycle Phases of the 2000MW PRBGP3 CCPP

4.3.1. Construction Phase

Construction of the Phakwe Richards Bay Gas Power 3 CCPP is expected to take up to 36 to 48 months to construct depending on the choice of technology and the lead time for equipment. 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 and location of exhaust stacks key components.
» Site preparation activities will include clearance of vegetation and excavations for foundations and internal roads. 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 engines/turbines, generator, engines and so forth), stacks, cooling towers (if applicable), substation and associated infrastructure.
» Civil works for water storage areas, water demineralisation processing plant and mechanical and electrical work will then follow.
» Ancillary infrastructure such as fuel storage facilities (if required), 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. It is estimated that during the construction period the construction staff complement will be ~600 people, with peaks of staff higher, with employment opportunities being provided for the local community as far as possible. The labour required includes 90% low skilled and semi-skilled and a 10% of skilled and highly skilled workforce. Employees will not reside on the project site and will be accommodated in the Richards Bay area.

4.3.2. Operation Phase

Prior to the operation of the power station, testing and trials will need to be undertaken. The proposed facility will create approximately 60 permanent employment positions that will be retained for the 20-year life of the project. The permanent employment positions will include highly skilled, skilled and semi-skilled positions.

The Phakwe Richards Bay Gas Power 3 CCPP is proposed to operate at mid-merit or baseload (estimated 16 to 24 hours daily operation). To operate a power plant of this nature, resources are required (input), and processes and outputs occur from the electricity generation process.

The amount of fuel to be consumed will depend on the degree to which the plant is used (i.e. base load or mid-merit – comparison). The maximum fuel consumption of the power plant will be approximately 116 million GJ per annum at base load and 77 million GJ per annum at mid-merit. The estimated volumes required are: 3 021 000 000m^3 at base load and 2 014 000 000 m^3 at mid-merit. The source of fuel is expected to be the Transnet dedicated LNG pipeline, from the Richards Bay harbour. Alternatively, fuel can be purchased from international suppliers. Where fuel is purchased from a party other than Transnet, it will be supplied to the power plant via a dedicated gas pipeline, also from the Richards Bay harbour.

The gas to power plant may consume water at volumes up to 1 130 000m^3 per annum at base load and 755 000m^3 per annum at mid-merit (note that the volume of water required will be dependent on the final design of the facility as well as on the technology supplier). Every effort is being made to reduce these volumes further, including the potential for recycling condensation from air cooled condensers if such equipment will form part of the final plant design. The volume of water required will be supplied via the Richards Bay IDZ water supply network that has an allotment from the local water authority. The Richards Bay IDZ has undertaken to provide the water to the site under its long-term lease agreement with Phakwe Richards Bay Gas Power 3 (Pty) Ltd. The Richards Bay IDZ has provided Phakwe Richards Bay Gas Power 3 (Pty) Ltd with a letter of confirmation that the volumes required would be supplied (refer to Appendix C).

Other small consumables include oils for plant lubrication and electrical insulation and selected other chemicals that are typically associated with such plants.

The plant will produce wastewater as an output of the demineralisation plant on site and the washing of turbines, blow down, as well as oily water. The wastewater will be contaminated with heavy metals and must be disposed of by a specialist contractor. The wastewater will be stored in a sump at each unit. Oily water will be collected from drains. The oily water will be sent to an oily water separator (one for the site). Oil that is separated from the water will be removed from the sump periodically by a specialist contractor. The grey water from the separator will be discharged into the RB IDZ's wastewater system which is a dedicated effluent discharge pipeline used by existing industrial users. It must however be noted that prior

to any discharge of grey water, the developer must obtain an oil contamination requirement from the RB IDZ to ensure that the oily water separator filter purchased is of the correct specifications. This will ensure that grey water discharged into the RB IDZ's system will not further contaminate the RB IDZ's wastewater system.

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

4.3.3. Decommissioning Phase

The lifespan of the proposed Phakwe Richards Bay Gas Power 3 CCPP will be at least 20 years from date of commissioning. 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 the initial 20 year operational life should an extension of operational life be required as the gas engines and turbines are common to have longer operational lives than 20 years. Should the project be decommissioned, the fuel supply infrastructure would similarly need to be decommissioned (natural gas or mixture of natural gas and hydrogen).

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, fuel storage tanks and pipelines, removal of waste from the site and rehabilitation to the desired end-use.

Future use of the site after decommissioning of the Phakwe Richards Bay Gas Power 3 CCPP could possibly form part of another energy generating project of an alternative industry that would be able to utilise some of the existing infrastructure associated with the plant. This would however be dependent on the development plans of the area at the time.

4.4 Project Alternatives

In accordance with the requirements of Appendix 2 of the 2014 Environmental Impact Assessment (EIA) Regulations (GNR 326), reasonable and feasible alternatives including site and technology alternatives, as well as the "do-nothing" alternative should be considered. Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors.

As per the definition of alternatives as per the Environmental Impact Assessment (EIA) Regulations (GNR 326); "alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:
(a) property on which or location where the activity is proposed to be undertaken;
(b) type of activity to be undertaken;
(c) design or layout of the activity;
(d) technology to be used in the activity; or
(e) operational aspects of the activity;
and includes the option of not implementing the activity;

Most guidelines use terms such as "reasonable", "practicable", "feasible" or "viable" to define the range of alternatives that should be considered. Essentially there are two types of alternatives:

» **Incrementally different** (modifications) alternatives to the project.
» **Fundamentally (totally) different** alternatives to the project.

4.4.1 Consideration of Fundamentally Different Alternatives

Fundamentally different alternatives are usually assessed at a strategic level, and project-specific EIAs are therefore limited in scope and ability to address fundamentally different alternatives. Electricity generating alternatives have been addressed as part of the IRP 2010 – 2030. In this regard, the need for a diversification of the technology mix for power generation has been considered, as detailed in Chapter 2. The fundamental energy generation alternatives were assessed and considered within the development of the IRP and the need for the development of both gas generated energy and highly flexible generation capacity has been defined. As detailed in Chapter 2, gas is considered a transition fuel globally and it provides the flexibility necessary to run a system like South Africa has in a cost-effective manner. It is cleaner than other fossil fuels. Therefore, the IRP 2019 provides for the development of 3000MW of new capacity from gas to power projects. The extent of the gas contained in the draft IRP is within the imposed emissions reduction trajectory.

Therefore, fundamental alternatives to the proposed project, including that of alternative energy development options, were not considered within the EIA report.

4.4.2 Consideration of Incrementally Different Alternatives

Incrementally different alternatives relate specifically to the project under investigation. "Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives to:

» The property on which, or location where the activity is proposed to be undertaken.
» The technology to be used in the activity.
» The design or layout of the activity.

In addition, the option of not implementing the activity (i.e. the "do-nothing" alternative) must also be considered.

These alternatives are discussed below.

4.4.3 Site Alternatives

Richards Bay has been identified by Phakwe Richards Bay Gas Power 3 (Pty) Ltd as the preferred area for the development of the Phakwe Richards Bay Gas Power 3 CCPP due to:

» it being located within an Industrial Development Zone (RBIDZ Phase 1F) on land designated for noxious industry development;
» it being appropriately sized (11.8ha) to accommodate a 2000MW CCPP and associated infrastructure (11ha);
» it being a location with existing large heavy industries and is specifically targeting the attracting of additional heavy industries through the Richards Bay Industrial Development Zone (RBIDZ), which

attraction of new industries has been hampered by the unavailability of power to support these planned developments;
- the location of the Port of Richards Bay in close proximity to the industrial areas for the importation of fuel to supply the project, including the future planned LNG import facilities;
- its location in relation to Mozambique, the current exclusive natural gas supplied to South Africa, and the potential to connect Richards Bay to the gas reserves in the north of Mozambique via a new natural gas pipeline which is in accordance with Governments long term energy planning;
- the existence of a large-scale electricity distribution and transmission network connecting to Richards Bay with a capacity of ~3,500MW to facilitate the evacuation of electricity production with the least investment in additional infrastructure.

Following consideration of various technical aspects, the sites for the and related infrastructure was deemed suitable for the project. No alternative sites have been identified.

4.4.4 Gas to Power Technology Alternatives

The development of a Combined Cycle Power Plant has been identified by Phakwe Richards Bay Gas Power 3 (Pty) Ltd 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, 2019, 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 detailed in Chapter 2, the development of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure provides an opportunity to contribute to "just transition" of the energy mix through the development of a power station which will enable the generation of electricity through the use of a cleaner fuel resource, with less emissions (however not zero emissions) than coal fired power stations, which can also support the uptake of renewable energy as part of the energy mix, while the process of decommissioning of coal based technology facilities are undertaken. In addition, by utilising fuel sources such hydrogen (whether 100% hydrogen or a as blend) for the operation of gas power facility, there may be a further reduction in carbon emissions related to power generation if green or similarly sourced hydrogen is used (see Section 4.7 below).

As such, no power generation technology alternatives are being considered for this development within the Richards Bay area.

4.4.5 Fuel Alternatives

Combined Cycle power technology as proposed for this project is ideally placed, and is able to operate using various fuel sources, depending on availability. The fuel type that is proposed for the proposed gas to power plant is natural gas (LNG, or another form of natural gas), or a mixture of natural gas and Hydrogen. The percentage of H2 in the mix would move up from an initial value of 20% progressively (to eventually 100%) over time depending on the progress of technology for burning higher % of H2 in the Gas turbines of the plant. The use of Hydrogen will be based on the availability of this fuel source at the required volumes and that the H2 price will be competitive for the commercial operation of the plant. As part of the development, it is proposed that the H2 used for the fuel source be produced by renewable energy resources (i.e., green hydrogen), which aids in lower carbon emissions pre-combustion. Furthermore, the

inclusion of H2 in the mixture of the fuel source lowers carbon emissions of the power plant during combustion, with the potential to reach zero emission when the fuel consists completely of H2, as is envisaged in the future for this facility.

No Diesel, Heavy Fuel Oil (HFO) and Light Fuel Oil (LFO) will be used, due to their high emissions.

No feasible fuel alternatives were identified for the proposed project.

4.4.6 The 'Do-Nothing' Alternative

The 'do-nothing' alternative is the option of not constructing the proposed Phakwe Richards Bay Gas Power 3 CCPP on the project site within the RBIDZ Phase 1F. This alternative will be further assessed within the EIA phase of the process as required in terms of the EIA Regulations.

CHAPTER 5: PROJECT NEED AND DESIRABILITY

Appendix 2 of the EIA Regulations, 2014 (as amended) requires the inclusion of 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. This Chapter provides an overview of the anticipated suitability of the Phakwe Richards Bay Gas Power 3 CCPP being developed at the preferred location from an international, national, regional, and site-specific perspective. It also provides an overview of the need and desirability of the project specifically.

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
(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 Phakwe Richards Bay Gas Power 3 CCPP is included in Section 5.2.

5.2 Need and Desirability for the Proposed Gas to Power Station

Appendix 2 of the 2014 EIA Regulations requires that a Scoping Report include a motivation for the need and desirability of a proposed development including the need and desirability of the activity in the context of the preferred location. The need and desirability of a development needs to consider whether it is the right time and right place for locating the type of land-use/activity being proposed. Need and desirability is therefore equated to the wise use of land, and should be able to answer the question of what the most sustainable use of land is.

This section of the report provides an overview of the anticipated suitability of the Phakwe Richards Bay Gas Power 3 CCPP being developed at the preferred project location from a national, regional, and site-specific perspective. It provides an overview of the need and desirability, and perceived benefits of the project specifically. Potential impacts associated with the project which have been identified to date during the Scoping Phase are described separately in **Chapter 8** of this Scoping Report.

5.2.1. Need and Desirability from a National Perspective

The Phakwe Richards Bay Gas Power 3 CCPP is proposed in response to a national government initiative, namely the requirement for the diversification of power generation technology within the IRP 2019 (as detailed within Chapter 2). As a result, the need and desirability of the project from a national perspective can largely be assimilated from the project's alignment with national government policies, plans and programmes which have relevance to energy planning and production (as discussed in detail in **Chapter 2**).

The promulgated IRP 2010–2030 identifies the preferred generation technologies required to meet expected demand growth up to 2030. It incorporates government objectives such as affordable electricity, reduced

greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development. In terms of the technology mix, 3000MW is allocated to gas to power technology up until 2030. The need for new gas to power generation has therefore been identified and assessed by government at a national scale considering the national energy requirements as well as international commitments in terms of addressing climate change issues.

The updated IRP 2019 further reconfirmed the allocation of 3000MW of gas to power technology up until 2030 as contained in IRP 2010 - 2030. The Phakwe Richards Bay Gas Power 3 CCPP is being developed in direct response to this new generation capacity. The implementation of the proposed project therefore has the potential to contribute positively towards the identified need at a national level, while simultaneously contributing to job creation and socio-economic development.

In addition to the policy considerations detailed above, Government has prioritised post COVID-19 turnaround plans and has compiled an Economic Reconstruction and Recovery Plan which was presented to Parliament in October 2020. According to this plan, the economic recovery will rely on a massive investment in infrastructure, including in energy, telecommunications, ports and rail. The core elements of the Economic Reconstruction and Recovery Plan are as follows:

1. Priority interventions for economic recovery: the plan sets out eight priority interventions that will ignite South Africa's recovery and reconstruction effort. These are the flagship initiatives that all of society will rally around to build a new economy (**Figure 5.1**).
2. Enabling conditions for growth: these are the growth-enhancing reforms and other preconditions for an inclusive, competitive and growing economy.
3. Macroeconomic framework: economic reconstruction and recovery requires careful mobilisation of resources to ensure fiscal sustainability.
4. Institutional arrangements: the plan focuses on execution, and is supported by enhanced institutional arrangements to ensure implementation and accountability.

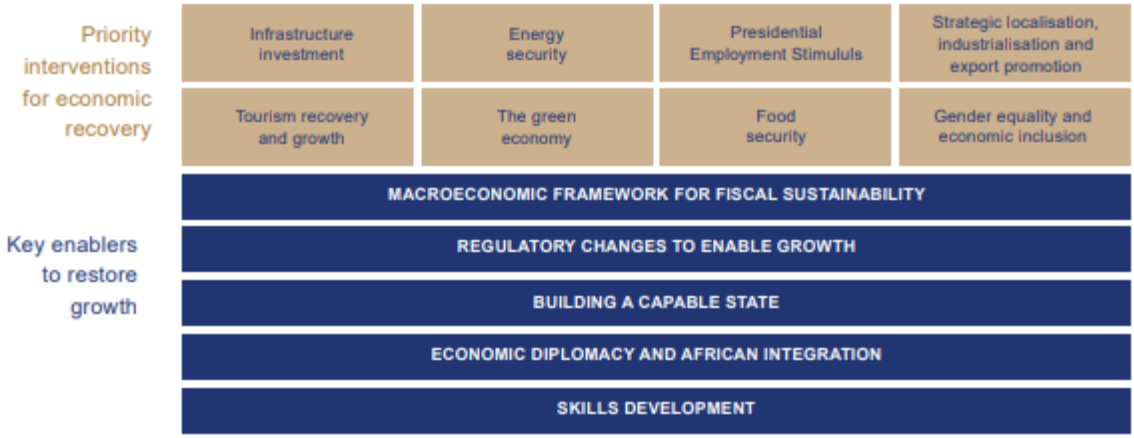

Figure 5.1: Core elements of the Economic Reconstruction and Recovery Plan (source: Building a new economy - Highlights of the Reconstruction and Recovery Plan, Presidency of the Republic of South Africa)

The plan recognises energy security as the most important prerequisite for the recovery agenda. One of the key commitments of the plan is therefore to achieve sufficient, secure and reliable energy supply within two

years by improving Eskom's performance and rapidly expanding generation capacity through a diverse energy mix. The development of the Phakwe Richards Bay Gas Power 3 CCPP is identified as a mechanism for securing additional power generation capacity as part of the Gas IPP programme. Furthermore, gas-fired and combined cycle power plants may also be regarded as a key technology to improve power production to meet demand, and for decarbonisation, as it reduces the carbon footprint of electricity compared with coal and oil-fired power plants. It may also complement the implementation of renewable energy sources, as it balances power supply from renewable sources and stabilises electricity grids.[7]

The Energy Sector Economic Recovery Strategy released by Business for South Africa (2020) has highlighted the need for alignment of the energy sector, with a combined solution for electricity, gas, and liquid fuels. A number of constraints are identified, which if addressed could facilitate the energy sector playing a dual role in driving South Africa's economic recovery, primarily as a catalyst for growth in the economy but also as a driver of direct and indirect jobs.

The need for new power generation from gas has therefore been identified and assessed by Government at a national scale considering the national energy. The Phakwe Richards Bay Gas Power 3 CCPP is proposed in specific response to these identified needs. As a result, the need and desirability of the project from a national perspective can largely be assimilated from the project's alignment with national. Considering the above, it can be concluded that the implementation of the proposed project has the potential to contribute positively towards the identified need at a national level (as detailed in the various government policies, plans, and programmes which have relevance to energy planning and production, as discussed in Chapter 2), while simultaneously contributing to job creation and socio-economic development.

5.2.2. Need and Desirability of the project from a Regional Perspective

According to the IEP (2016), if South Africa is to make the transition to a low carbon economy, it will become increasingly important to reduce dependence on fossil fuels and diversify energy resources to include other energy forms. The role that natural gas can play in the transition to a low carbon future should also be considered. Diversifying the energy mix is necessary in order to improve security of supply, while at the same time minimising environmental impact and facilitating regional development. The dominance of a single energy system, which is highly reliant on fossil fuels, inevitably places an excessive burden on the environment. This eventually weakens it through environmental fatigue, failure (permanent damage) or even catastrophe if the situation continues for too long. This inevitably poses a health and environmental risk.

South Africa's electricity generation mix has historically been dominated by coal. This can be attributed to the fact that South Africa has abundant coal deposits, which are relatively shallow with thick seams, and are therefore easy and comparatively cost effective to mine. In 2016, South Africa had a total generation capacity of 237 006GWh. Approximately 85.7% (equivalent to 203 054GWh) of this figure was generated by

[7] Gas key as South Africa transitions to clean energy. https://www.engineeringnews.co.za/article/gas-key-as-south-africa-transitions-to-clean-energy-2021-10-27

coal (predominantly located in Mpumalanga and Limpopo), and only 3,2% (equivalent to 7 584GWh) was generated by natural gas (refer to **Figure 5.2**).

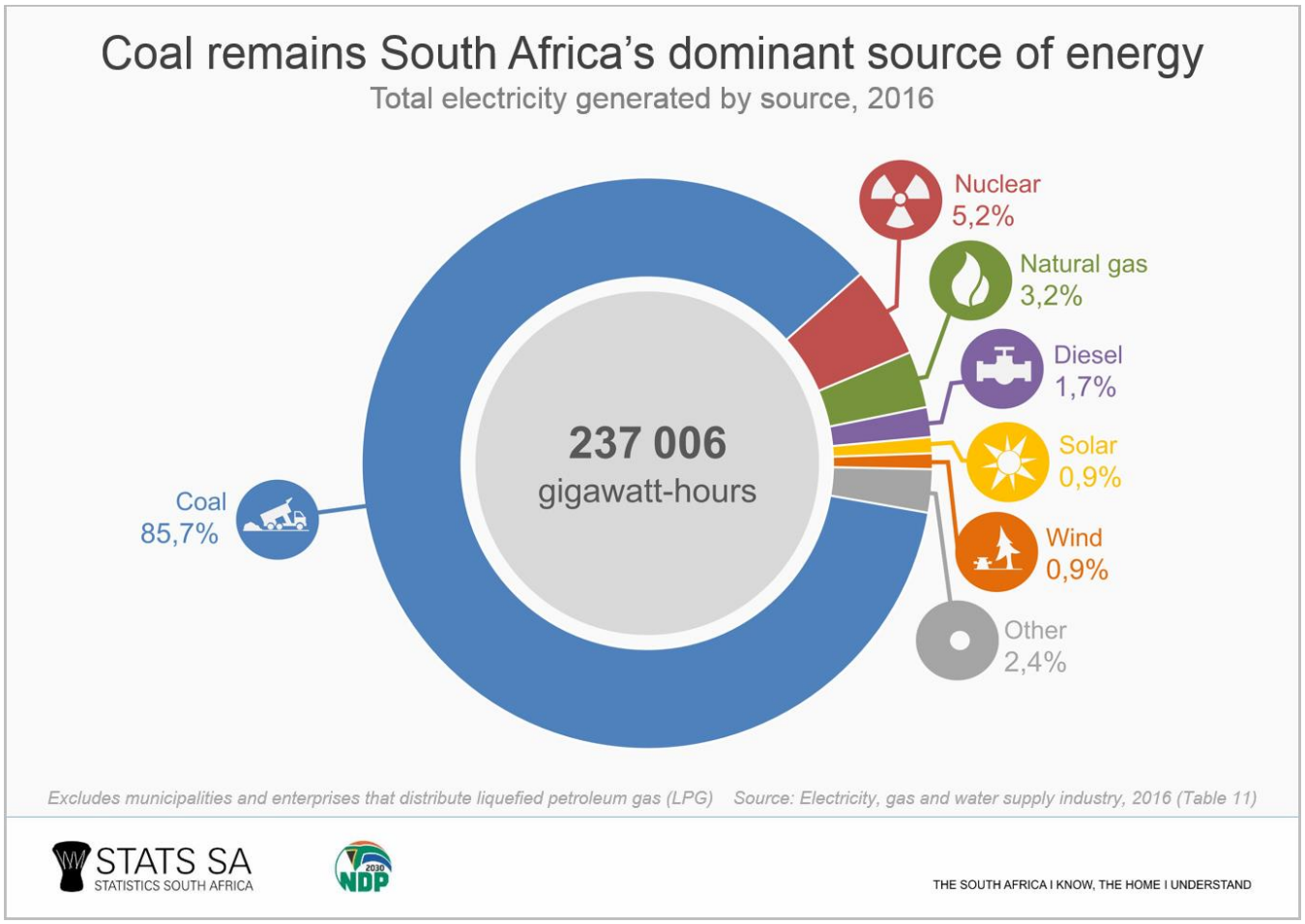

Figure 5.2: Overview of South Africa's electricity generation by source (Source: StatsSA 2016 Electricity, gas and water supply industry).

Whereas the majority of South Africa's electricity generation infrastructure is currently located within Mpumalanga Province due to the location of coal resources within this province, the KwaZulu-Natal Province has been identified as an area where the development of gas to power facilities is a feasible and suitable option for electricity generation.

The Richards Bay area has been ear-marked as a hub for the development of gas to power projects as it is one of the preferred locations for the for the import of Natural Gas in liquid form. Richards Bay is considered to be 'energy-hungry' due to the nature of the heavy industries in the vicinity. Richards Bay is the only port with the ability to connect imported natural gas into existing gas pipeline transmission networks to enable the supply of regasified LNG to gas users. There is also the ability to supply LNG to non-pipeline connected users utilising the operation of LNG transhipment vessels and land-based LNG distribution solutions.

The Phakwe Richards Bay Gas Power 3 CCPP will make use of either natural gas of a mixture of natural gas and green hydrogen. The overarching objective for the gas to power facility is to be capable of operating across a wide variety of dispatch profiles, from base load to mid-merit and providing ancillary services to aid grid stability.

The Phakwe Richards Bay Gas Power 3 CCPP is aligned with the KwaZulu-Natal's Provincial Growth and Development Strategy (PGDS) to address the triple challenge of poverty, inequality and unemployment by creation of 600 job opportunities during the construction phase and 60 job opportunities during its operational lifespan. The project will contribute to human resource development, and strategic infrastructure for social and economic growth which will contribute towards reducing poverty and inequality in KZN. The development of the Phakwe Richards Bay Gas Power 3 CCPP will also drive economic growth, infrastructural transformation and development and is seen as a favourable area for investment and development in terms of the KwaZulu-Natal Provincial Spatial Economic Development Strategy. The project will also contribute towards economic value, economic support and economic growth in Richards Bay in support of the KwaZulu-Natal Provincial Spatial Development Framework. The project will also support the attraction of industries to the Richards Bay Industrial Development Zone, the development of which has been hampered by the lack of electricity supply to support the establishment of new industrial activities. The use of natural gas or a mixture of natural gas and hydrogen, in the development of the Phakwe Richards Bay Gas Power 3 CCPP will offer reduced emissions when compared to the use of coal or diesel for electricity generation in line with the KwaZulu-Natal Climate Change Response and Sustainable Development Plan.

5.2.3. Receptiveness of the proposed project site to development of the Phakwe Richards Bay Gas Power 3 CCPP

Richards Bay has been identified by Phakwe Richards Bay Gas Power 3 (Pty) Ltd as the preferred area for the development of the Phakwe Richards Bay Gas Power 3 CCPP due to:

- it being located within an Industrial Development Zone (RBIDZ Phase 1F) on land designated for noxious industry development, and specifically for the development of gas to power (refer to **Figure 5.3**);
- it being appropriately sized (11.8ha) to accommodate a 2000MW CCPP and associated infrastructure (11ha);
- it being a location with existing large heavy industries and is specifically targeting the attracting of additional heavy industries through the Richards Bay Industrial Development Zone (RBIDZ), which attraction of new industries has been hampered by the unavailability of power to support these planned developments;
- the location of the Port of Richards Bay in close proximity to the industrial areas for the importation of fuel to supply the project, including the future planned LNG import facilities;
- its location in relation to Mozambique, the current exclusive natural gas supplied to South Africa, and the potential to connect Richards Bay to the gas reserves in the north of Mozambique via a new natural gas pipeline which is in accordance with Governments long term energy planning;
- the existence of a large-scale electricity distribution and transmission network connecting to Richards Bay with a capacity of ~3,500MW to facilitate the evacuation of electricity production with the least investment in additional infrastructure.

Phakwe Richards Bay Gas Power 3 (Pty) Ltd identified the properties located in the Richards Bay IDZ for the development of the proposed Phakwe Richards Bay Gas Power 3 CCPP, as these properties being are industrial zoned undeveloped large land parcels suitable for the development of a power plant. Following consideration of various technical aspects, the sites for the Phakwe Richards Bay Gas Power 3 CCPP and related infrastructure was deemed suitable for the project. The following was considered:

These criteria are further explored in the sections below.

Extent of the site: The Phakwe Richards Bay Gas Power 3 CCPP and its associated infrastructure requires an area of land approximately up to 11ha in extent. The project site is approximately 11.8ha, which is sufficient to accommodate the proposed project.

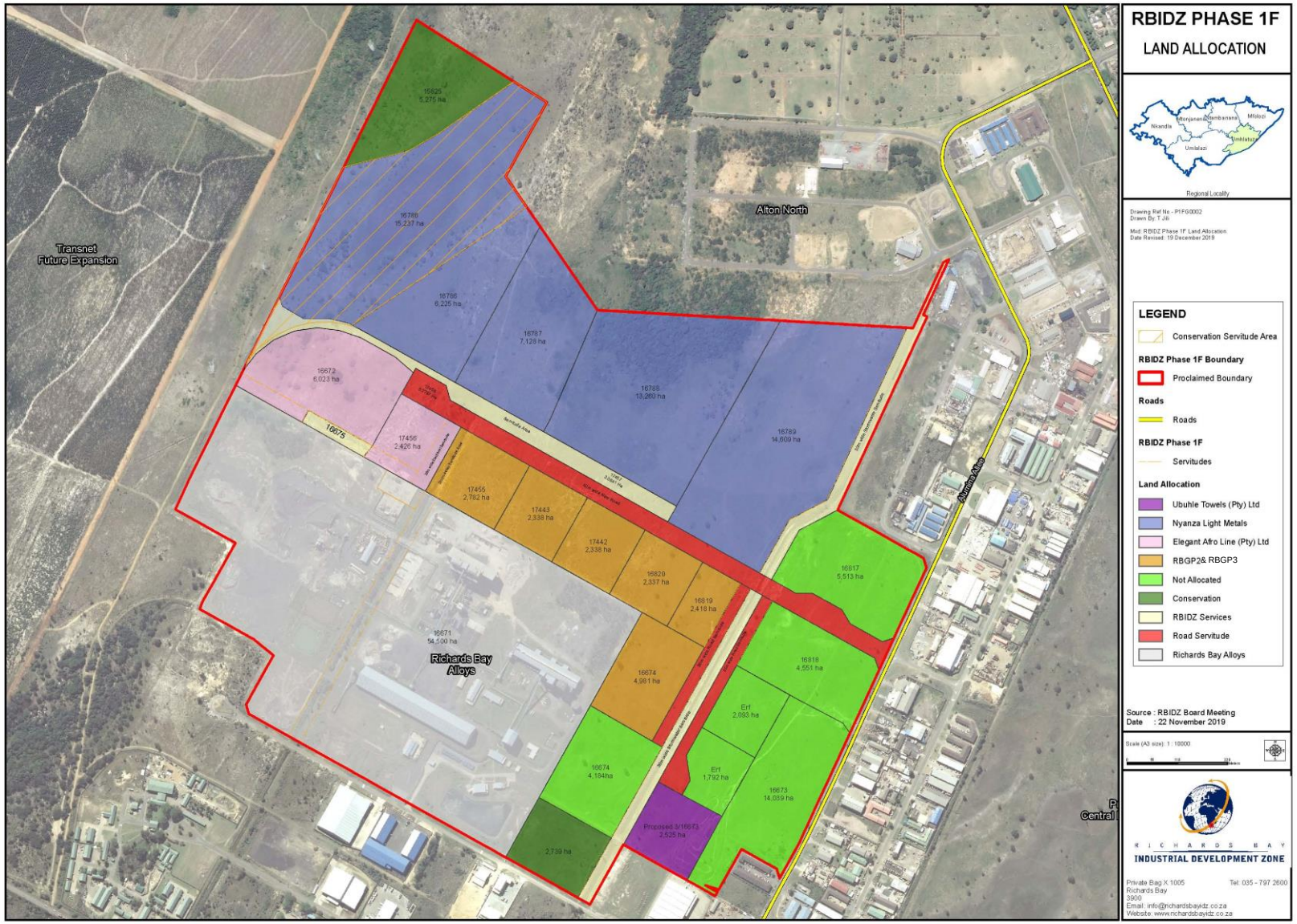

Figure 5.3: Land allocation within the Richards Bay IDZ Phase 1F

Site access: The site will be accessed via existing roads within the IDZ Phase 1F (already approved through an EIA undertaken for the Phase 1F infrastructure).

Current land use considerations: The properties are within the Richards Bay Industrial Development Zone (IDZ) and are zoned for industrial use. The proposed development is therefore considered to be compatible with the surrounding land use.

Fuel resources:

» **Natural gas:** The location of the site within Richards Bay was selected due to its location in relation to the port of Richards Bay where plans for the importation and regassification of LNG are well advanced, and Mozambique which is home to some of the world's largest undeveloped gas reserves creating the potential for pipeline supplied natural gas.

Environmental sensitivity of the site: The Scoping process conducted for the project to date has identified no fatal flaws which could restrict the development of the proposed project at the preferred site, rendering the site a desirable site. Sensitive areas which have been identified onsite will be excluded from the development footprint (refer to **Chapter 9**).

Integrated Environmental management: It complies with the objective of integrated environmental management and the principles of sustainable development taking into account economic, social and environmental factors.

CHAPTER 6: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This section of the Scoping Report provides a description of the environment that may be affected by the Phakwe Richards Bay Gas Power 3 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 11 for list of references), and aims to provide the context within which this EIA process is being conducted.

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)(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 Phakwe Richards Bay Gas Power 3 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 6.2.
	» The climatic conditions of the Richards Bay area is described in Section 6.3.
	» Biophysical characteristics of the project site and the surrounding areas are described in Section 6.4. This includes the topography, hydrology, geology, soils, agricultural potential, and ecology of the project site.
	» Visual considerations are described in Section 6.5
	» The air quality of the area is considered in Section 6.6
	» Ambient noise levels of the area are described in Section 6.7.
	» Heritage resources, including the palaeontology and archaeology of the project site are described in Section 6.8.
	» Social and economic characteristics of the Richards Bay area are described in Section 6.9

6.2. Regional Setting: Location of the Project Site

The KwaZulu-Natal Province is situated in the north-eastern portion of South Africa. The province shares 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 the Richards Bay IDZ Phase 1F Estate. The Phakwe Richards Bay Gas Power 3 CCPP site is currently vacant. The proposed project is located directly adjacent to the existing Tata Steel facility, with several other existing heavy industrial developments in the surrounding area including, the Hillside and Bayside aluminium smelters, the Mondi paper plant, the Foskor plant and a large number of industrial structures related to coal storage and transportation at the Port of Richards Bay.

There are only two proclaimed terrestrial protected areas within the region, namely the Enseleni Nature Reserve to the north-west and the Richards Bay Game Reserve south of the study area. Other than these protected areas, and potentially along the Indian Ocean seaboard, there are no identified tourist attractions or destinations in closer proximity to the development site. Agricultural activities, mainly relating to plantations are located ~860m west of the project site.

There is a well-established railway network and a large number of electricity distribution and transmission power lines traversing the study area. The site for the proposed Phakwe Richards Bay Gas Power 3 CCPP area is situated south west of the regional road (R619). Access to the Phakwe Richards Bay Gas Power 3 CCPP site is available via an existing 8m wide road constructed by the RBIDZ, for use by tenants within Phase 1F.

6.3. 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 6.1** below.

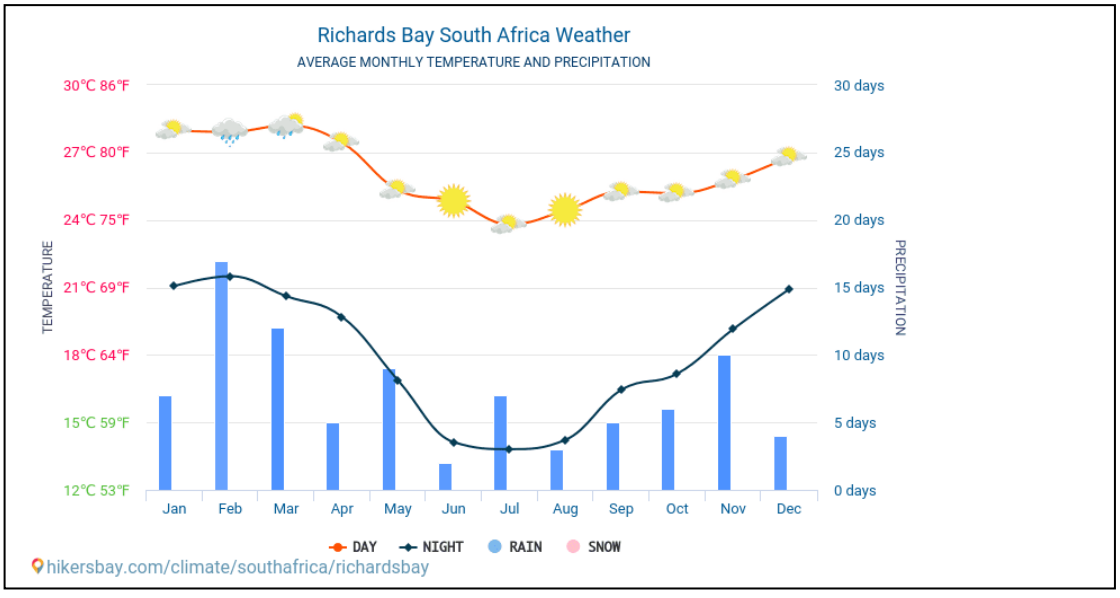

Figure 6.1: Average minimum and maximum temperatures and monthly rainfall for Richards Bay (https://cdn.hikb.at/charts/meteo-average-weather/richardsbay-meteo-average-weather.png).

6.4. Biophysical Characteristics of the Study Area

6.4.1 Topography

The topography of the study area is described as plains of the eastern coastal foreland. The region has an even slope with elevation ranging from sea level at the Indian Ocean to approximately 130m above sea level to the north-west. The flat topography is dominated by wetlands and water bodies (e.g. the Nsezi and Mzingazi lakes, the harbour bay and its numerous channels) while the Mhlatuze River meanders to the south of the study area. The project site is considered to be relatively flat with maximum and minimum elevations of between 32 and 46m above sea level across the north-western portions of the site.

6.4.2 Geology, Soils and Agricultural Potential

The larger study area is underlain by unconsolidated, Quaternary-age sediments. These redistributed cover sands are underlain by recent clays and sands of the upper Port Durnford Formation of the Maputaland Group. The Port Durnford Formation rests unconformably on either Cretaceous sediments or partially calcified / lithified sediments of the Uloa or Umkwelane Formations. It comprises a succession of carbonaceous muds and sands, with basal sandstones, black muds and lignite in evidence. Nearer the surface however, white and orange mottled clayey sands are overlain by younger dune sands, which cover much of the coastal plain.

According to the land type database (Land Type Survey Staff, 1972-2006) the project area is located within the Hb69 land type. The land type is described in the table below (**Table 6.1**).

Table 6.1 The expected soil features for the land type present

Land Type	Expected Soil Features
Hb69	Grey Regic Sands; Regic sands and other soils

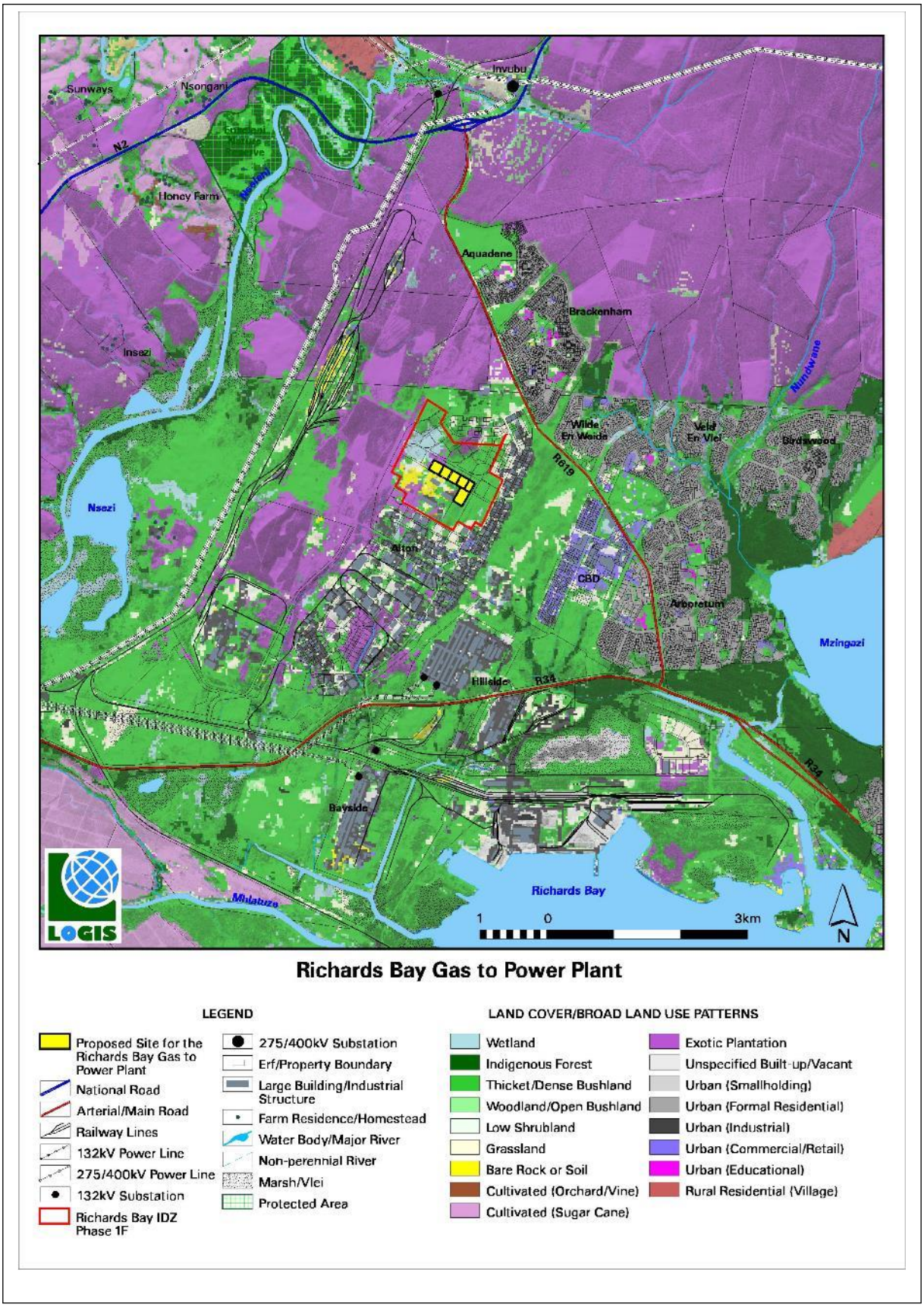

Figure 6.2: Context of the Phakwe Richards Bay Gas Power 3 CCPP project site in the Richards Bay IDZ zones and surrounding areas

6.4.3 Freshwater Features

The project site is located within the Pongola - Mtamvuna Water Management Area (WMA 4) and predominantly falls within the W12F quaternary catchment (**Figure 6.3**). Two Sub Quaternary Reaches (SQRs) are associated with the Phase 1F boundary, namely the classified Nseleni River SQR W12H-3459 SQR and an unnamed SQR which serves as the Mhlatuze estuarine catchment which includes the Richards Bay Harbour. Several wetland areas are located within and around the development footprint area. The Nseleni River is a major tributary of the Mhlatuze River and contributes to the ecological functioning of the Mhlatuze lagoon and Richards Bay Harbour. The desktop ecological status and composition of the classified SQRs is shown in **Table** (DWS, 2021).

Table 6.2 Desktop data pertaining to the ecological condition of the associated SQRs (DWS, 2021)

SQR	Nseleni W12H-3459	Nundwane W12J-3450
Present Ecological Status	Largely Modified (class D)	Moderately Modified (class C)
Ecological Importance	High	High
Ecological Sensitivity	Very High	Very High
Contributing Factors	Enseleni Nature Reserve, extensive cultivation (dryland sugarcane), Lake Nsezi - artificially raised, water supply to Richards Bay, back flooding entire reach, estuary in lower reach	Extensive forestry, swamp forest in Riparian Zone, Alien Invasive Plants, roads, urban in lower reach (Richard Bay), lower reach in Lake Mzingazi
Default Ecological Category	Natural (class A)	Natural (class A)

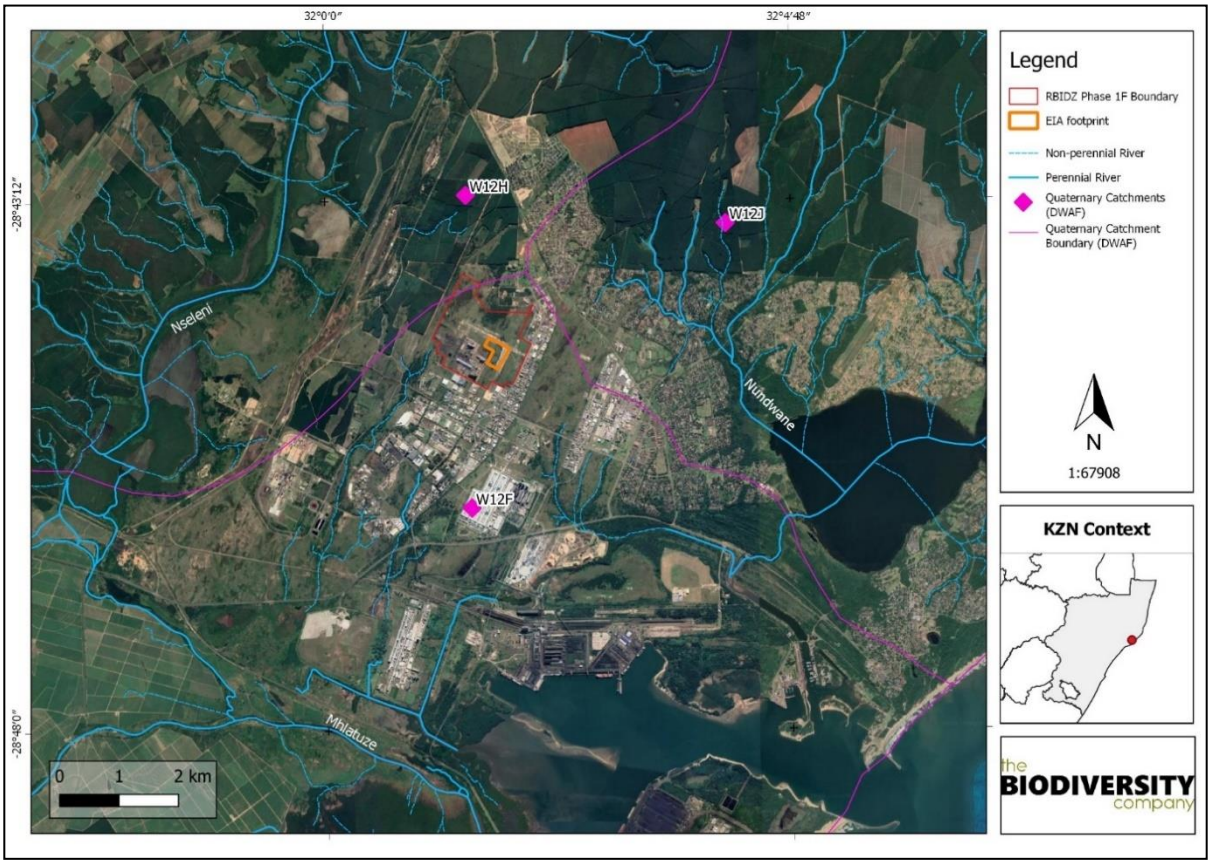

Figure 6.3 The project site in relation to the sub quaternary reach catchments

The National Wetland Map 5 (NWM 5) spatial data was published in October 2019 (Deventer *et al*. 2019) in collaboration with SANBI with the specific aim of spatially representing the location, type and extent of wetlands in South Africa. The data represents a synthesis of a wide number of official watercourse data including rivers, inland wetlands and estuaries. This database recognises the presence of depression wetlands within the project area belonging to Indian Ocean Coastal Belt Group 1 (**Figure 6.4**). A wetland assessment as part of the RBIDZ feasibility (SIVEST, 2010) noted that the loss of the wetland areas must be looked at holistically in the context of the conservation needs of all the IDZ sites assessed. In response to this, two sites were of distinctly higher quality, namely, IDZ 1C and the western portion of IDZ 1D as they have very high conservation significance and it was felt that these areas should be excluded from any development planning for the area and development should rather be focused on IDZ 1A, 1B, 1F and the eastern portion of 1D. The IDZ 1C and 1D are referred to as potential offset areas.

Richards Bay Industrial Development Zone SoC Ltd received Environmental Authorisation (EA) for the IDZ Phase 1F in September 2016 (DFFE Ref No.: 14/12/16/3/3/3/665). This EA included the infilling of some of the wetlands on site to release the land for development.

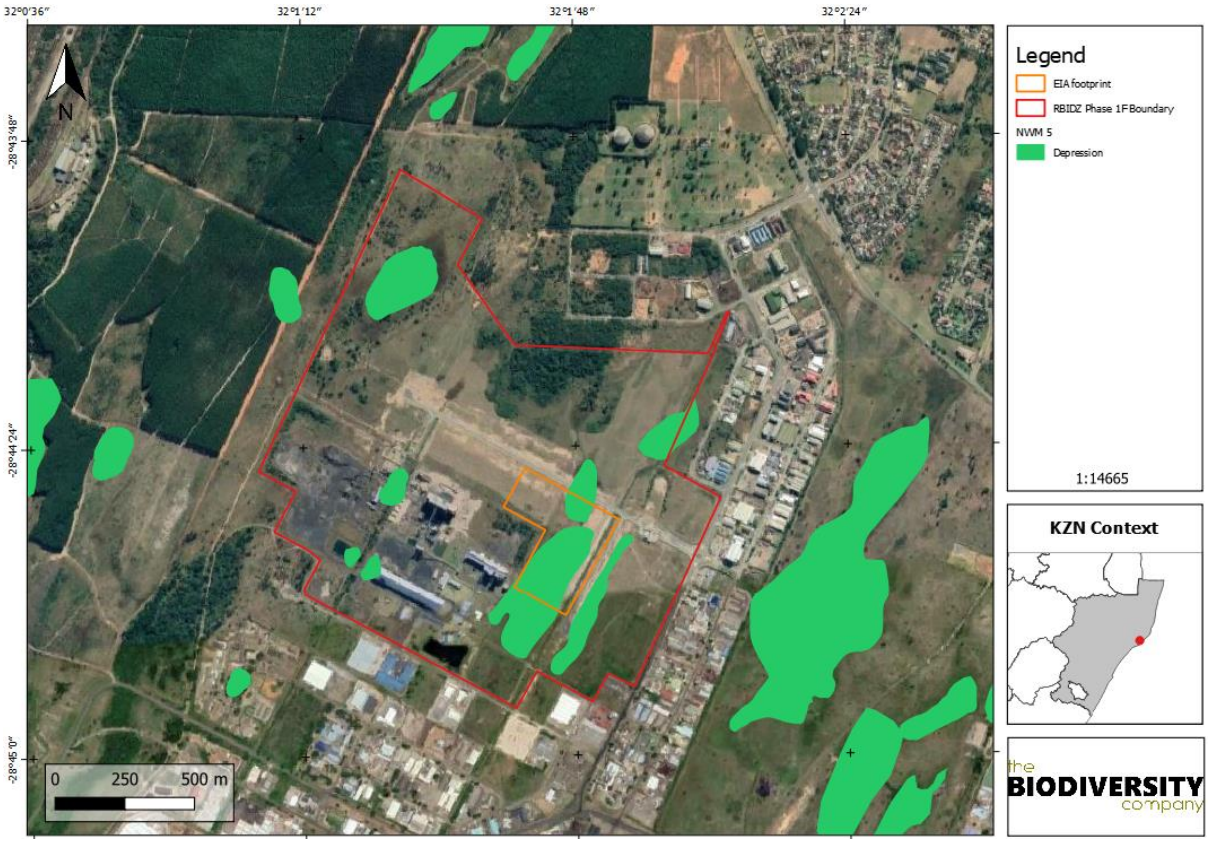

Figure 6.4 National wetland areas located within the development footprint

The following existing impacts were observed in the Phase 1F project area:

» The existing development within the area has altered the surface flow dynamics through construction of the plant and ancillary infrastructure, creating directional surface run-off across the project area and artificial pooling in some localities (**Figure 6.5**). Water typically exits a wetland flat through evapotranspiration and infiltration (Ollis *et al.* 2013), which has been inhibited due to the changes in topography and slope for the catchment area (**Figure 6.6**).

- The removal of vegetation due to historical clearing in sections of the project area, and current development for service infrastructure. Large areas of disturbance and associated erosion scarring is present.
- Historical disturbances and current land uses have likely resulted in the onset and establishment of alien vegetation across the project and offset areas
- Industrial activities in the upper reaches of the Eastern unnamed tributary have resulted in the modification of the aquatic environment (class D). Cumulative impacts in the form of a large impoundment have further altered the natural hydrology of the system.

Figure 6.5: Photograph of the EIA footprint area and associated impacts

Figure 6.6: Satellite imagery of Phase 1F development area and associated impacts A) 7/2016 and B) 7/2020 (Google Earth)

6.4.4 Ecological Profile

The larger study area is situated within the following KZN vegetation biomes and vegetation types, namely Freshwater Wetlands and Maputaland Wooded Grassland. The Subtropical Freshwater Wetlands ordinarily

occur in low lying areas and are expected to be dominated by reeds, sedges, rushes and water-logged meadows dominated by grasses. The dominant vegetation type is the Maputaland Wooded Grassland. This vegetation type is typically supported coastal sandy grasslands rich in geoxylic suffritices, dwarf shrubs, small trees and very rich herbaceous flora.

i) Protected and other conservation areas

Protected areas 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 6.7**):

» Richards Bay Nature Reserve and IBA located 6 km to the south
» Enseleni Nature Reserve located 4 km to the northwest
» NPAES priority focus area located 22.9 km to the west

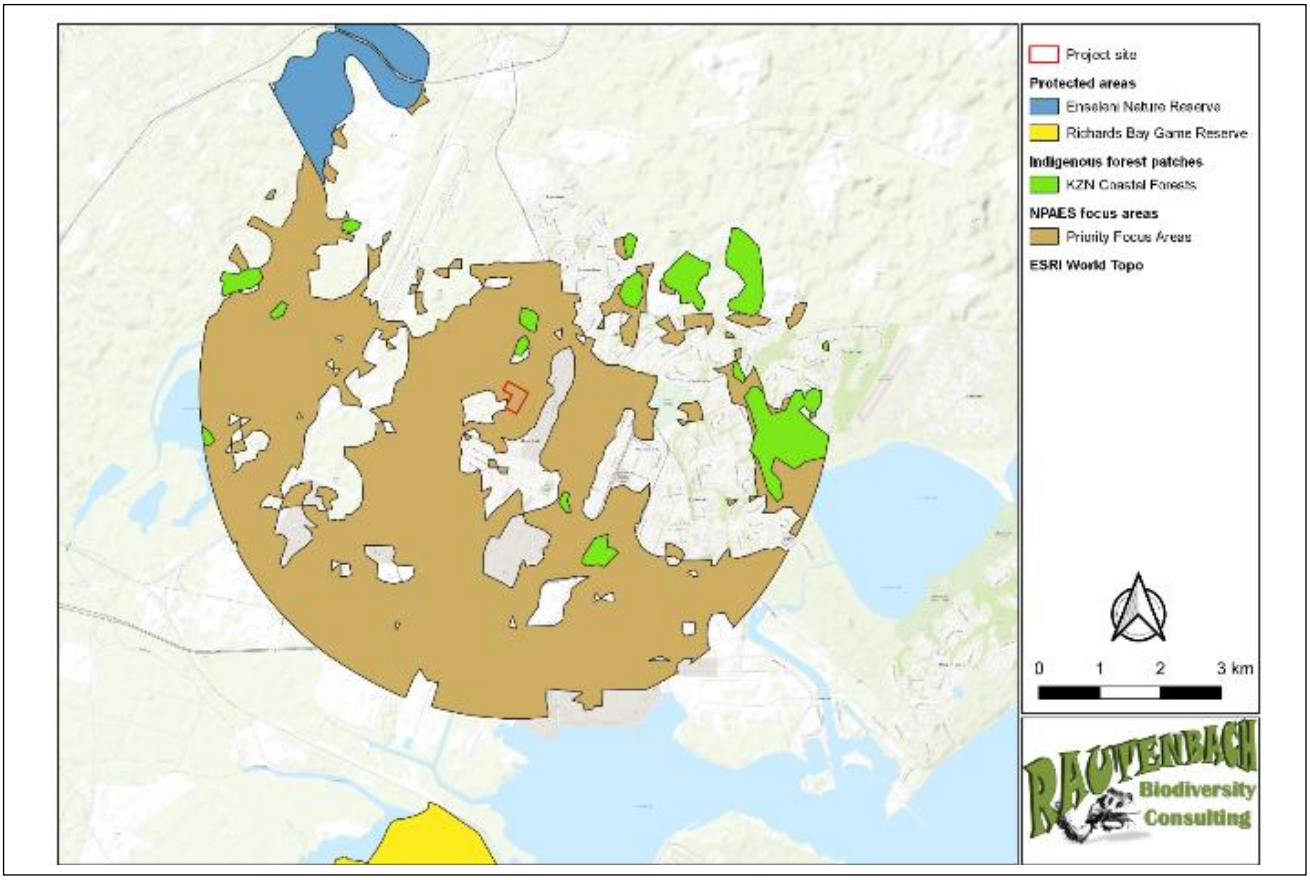

Figure 6.7: Protected and other conservation areas in relation to the project site

ii) Threatened Ecosystems

The project site falls entirely with the 'Critically Endangered' Kwambonambi Hygrophilous Grassland terrestrial ecosystem, identified at national level.

At regional level, according to the Ecosystem Threat Status of the National Biodiversity Assessment (NBA, SANBI 2018) and EKZNW (2011) the Maputaland Wooded Grassland is classified as Endangered. Provincial vegetation delineation demarcated two vegetation types intersecting with the project site, the "Endangered" Maputaland Wooded Grassland, and "Vulnerable" Subtropical freshwater wetlands (**Figure 6.8**).

Figure 6.8: Provincial vegetation classification

iii) Critical Biodiversity Areas

According to EKZNW (2016), the planning units (PU) identified in the CBAs represent the localities for one or more biodiversity features for which conservation targets can be achieved. The distribution of the biodiversity features is not always applicable to the entire extent of the PU but is more often confined to a specific niche habitat, e.g. a forest or wetland reflected as a portion of the PU. Generally CBAs are terrestrial (land) and aquatic (water) features (e.g. vleis, rivers and estuaries) in the landscape and/or indicates the potential for the occurrence of protected species that are critical for conserving biodiversity and maintaining ecosystem functioning in the long-term. The site may have been incorrectly classified as CBA due to an error in the land cover map, or alternatively a disturbance to the site has occurred subsequent to the development of the CBA Map. The site must be assessed for its potential to be rehabilitated and/or its role as part of a landscape corridor and the potential presence of protected species. Further, the proposed activity at the site should be investigated in terms of its potential impact on adjacent correctly classified CBA and ESAs.

Provincial scale data layers (KZN CBA Irreplaceable version 26012016) identified CBA areas intersecting with the project site (**Figure 6.9**). Important biodiversity features contained within the CBA areas include the presence of NPAES focus areas and the Critically Endangered Kwambonambi Hygrophilous Grassland ecosystem. No national or provincial ESA designated areas intersect with the project site.

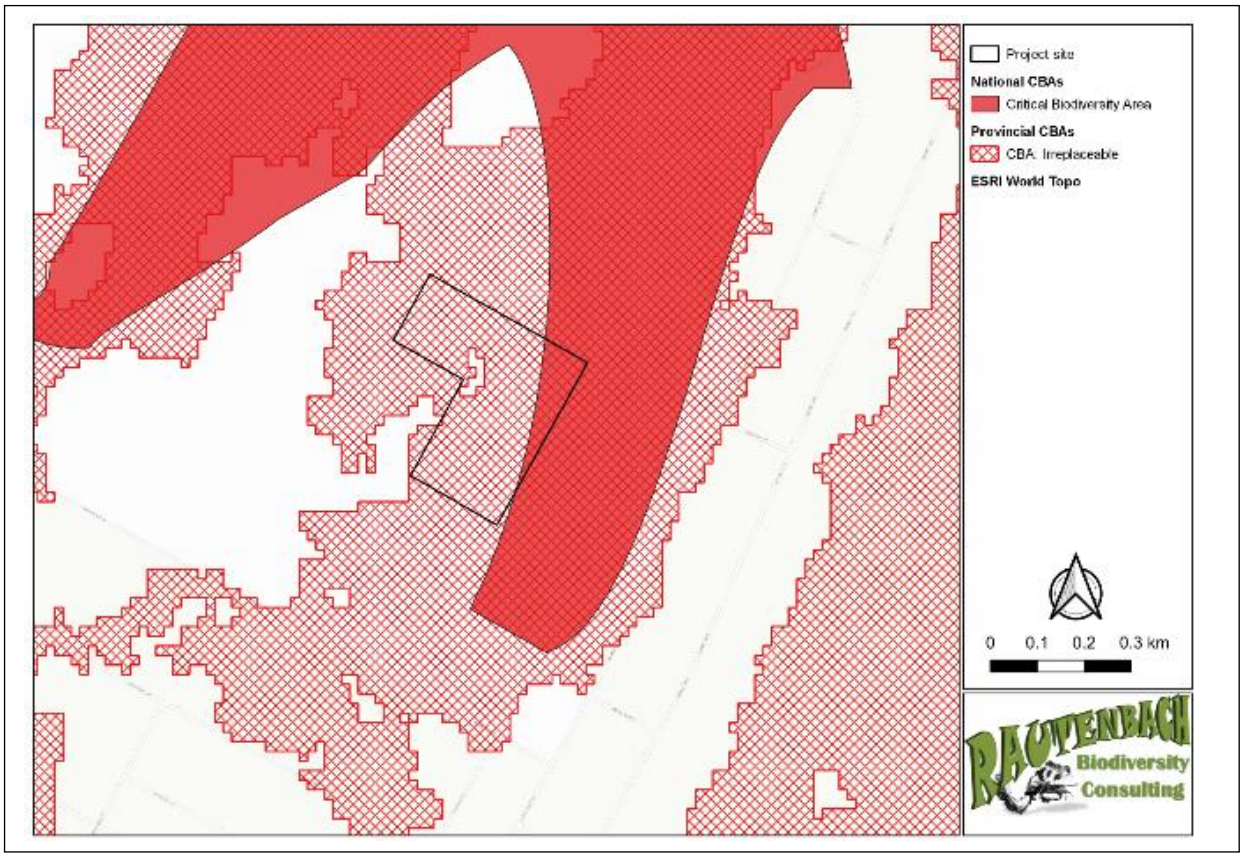

Figure 6.9: Critical Biodiversity Areas present in the study area

The EKZNW also identified a series of altitudinal and biogeographic corridors which created a linked landscape for the conservation of species in a fragmented environment and which facilitate evolutionary, ecological and climate change processes. The project site does not intersect with any landscape or locally recognised important ecological corridors.

The project site is bordered by industrial and residential developments and natural grassland. Areas directly adjacent to the project site categorised as natural grassland are degraded (based on onsite observation). The project site is thus not connected to untransformed habitats, but migrations may still be possible across some of the surrounding transformed/degraded habitats, specifically the more mobile species such as birds.

iv) Vegetation of the Project Site

The project site was found to be located within degraded coastal grasslands and hygrophilous sedge wetlands, with visible surface water present on the southern portion. Most of the site was recently mowed, thus the site had a homogenous appearance (refer to **Figure 6.10**).

Unvegetated areas, particularly along the north-eastern and south-eastern boundaries were noted, and numerous vehicle tracks crossed the entire site. Surprisingly, few invasive plant species were present although species such as *Psidium guajava* and *Cuscuta campestris* were observed, albeit at low densities.

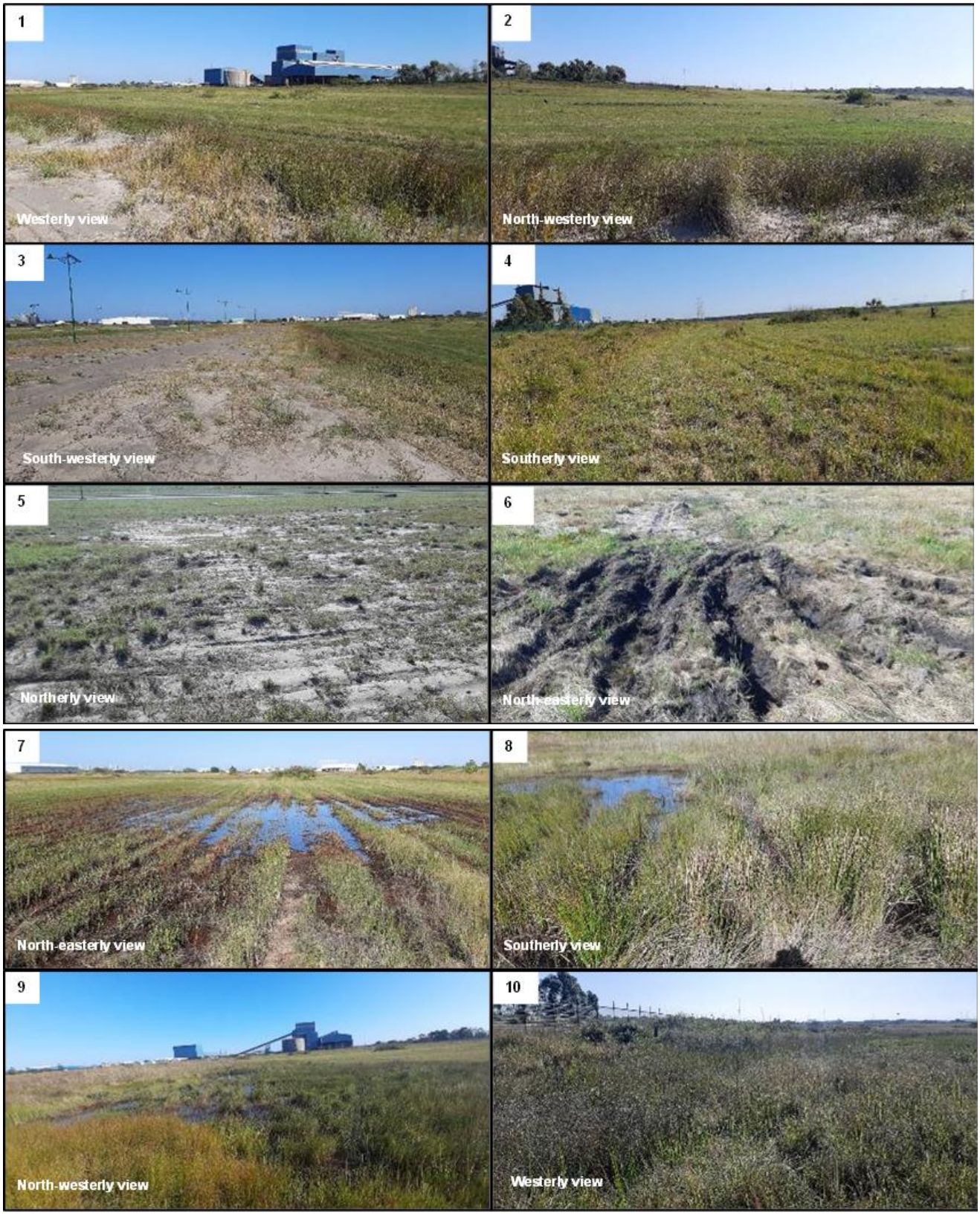

Figure 6.10: Photographs of the vegetation on the project site

Flora & Fauna species of Conservation Concern

Database searches identified 94 Red Listed fauna and flora species known/expected to be present in KwaZulu-Natal. Of these, **25** species may potentially be present on the project site (**Figure 6.11** and **Table 6.2** and **Table 6.3**). Due to the degraded nature of the project site, most of these species have a Low probability of occurrence.

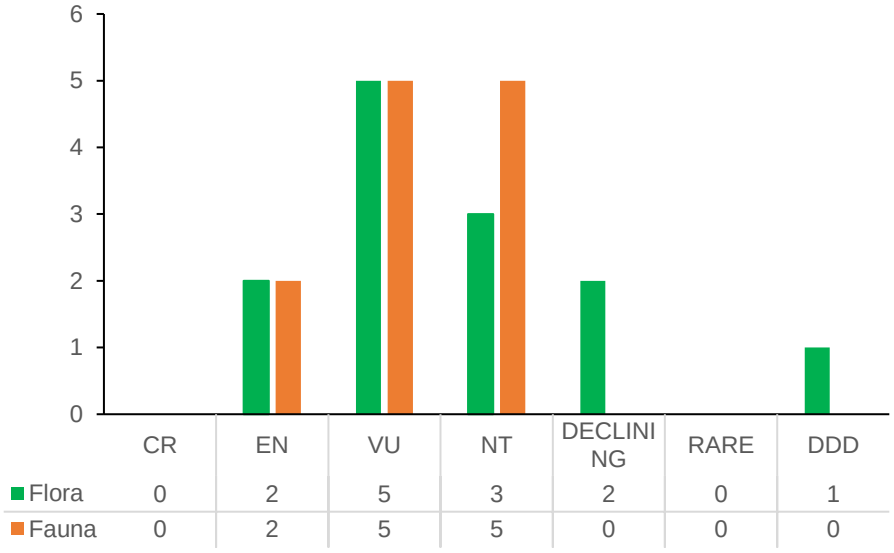

Figure 6.11: Number of Red Listed fauna and flora species potentially present on the project site.

Table 6.2: List of Red Listed flora species potentially present on the project site.

TAXONOMIC INFORMATION		CONSERVATION STATUS			
Family	**Scientific Name**	**SA Red List Status**	**NEMBA (2015)**	**Provincial**	**SA Endemism**
Apocynaceae	*Raphionacme lucens*	NT	-	Sched 8	-
	Sisyranthus franksiae	DDD	-	Sched 8	Endemic
	Pachycarpus concolor subsp. *arenicola*	VU			
Araceae	*Wolffiella denticulata*	VU			SA endemic
Asphodelaceae	** *Aloe cooperi*	DECLINING	-	Sched 8	
	Kniphofia littoralis	NT	-	Sched 8	Endemic
Asteraceae	*Nidorella tongensis*	EN	-	-	Endemic
Cyperaceae	*Cyperus sensilis*	NT	-	Sched 8	SA endemic
Fabaceae	*Aspalathus gerrardii*	VU	-	Sched 7	SA endemic
Hypoxidaceae	*Hypoxis hemerocallidea*	LC (DECREASING)		Sched 8	-
Iridaceae	*Freesia laxa* subsp. *azurea*	VU	-	Sched 12/Sched 7	-
Polygonaceae	*Oxygonum dregeanum* subsp. *streyi*	EN			
Santalaceae	*Thesium polygaloides*	VU	-	Sched 7	Endemic

Table 6.3: List of Red Listed flora species potentially present on the project site

Taxonomic Information			Conservation Status				
Family	**Scientific Name**	**Common Name**	**SA Red Listing**	**NEMBA 2015**	**Provincial**	**Cites**	**SA Endemism**
MAMMALS							
Muridae	*Dasymys incomtus*	African Marsh Rat	NT	-	Sched 3	-	No
Soricidae	*Crocidura maquassiensis*	Maquassie Musk Shrew	VU	-	Sched 3	-	No
	Crocidura mariquensis	Swamp Musk Shrew	NT	-	-	-	No
Vespertilionidae	*Scotoecus albofuscus*	Thomas' House Bat	NT	-	Sched 3	-	End of range
Reptiles							
Pelomedusidae	*Pelusios rhodesianus*	Variable hinged terrapin	VU	-	Sched 3	-	No
Frogs							
Hemisotidae	*Hemisus guttatus*	Spotted Shovel-nosed Frog	VU	-	Sched 3	-	Endemic
Hyperoliidae	*Afrixalus spinifrons*	Natal Leaf-folding Frog	VU	-	Sched 3	-	No
	Hyperolius pickersgilli	Pickersgill's reed frog	EN	-	Sched 3	-	No
Birds							
Accipitridae	*Circus ranivorus*	Marsh-harrier, African	EN	-	Sched 3	II	No
Coraciidae	*Coracias garrulus*	Roller, European	NT	-	-	-	No
Motacillidae	*Anthus brachyurus*	Pipit Short-tailed	VU	-	Sched 3	-	No
Rostratulidae	*Rostratula benghalensis*	Painted-snipe Greater	NT	-	Sched 3		

6.5 Visual Considerations

The industrial activities, the Richards Bay IDZ and the transportation infrastructure related to the port are the primary land use activities within the study area. This and the intensive forestry and sugar cane production to the north (and south) account for the largest economical drivers within the region. There is a well-established railway network and a large number of electricity distribution and transmission power lines traversing the study area.

The N2 national road, the R34 arterial road (John Ross Parkway) and the R619 main road provide motorised access to the region. The John Ross Parkway traverses south of the Alton industrial area and the R619 north-east of the proposed development site.

The majority of residential areas within Richards Bay are located north of the city and east of the R619 main road. Residential neighbourhoods include Aquadene, Brackenham, Arboretum, Birdswood, Veld-en-Vlei and Wilde-en-Weide. The Brackenham and Wilde-en-Weide residential areas are located at distances of respectively 1.2km and 1.4km (at the closest) from the proposed development site.

The power plant may have a fairly large area of potential visual exposure (**Figure 6.12**), not considering the built structures and vegetation. The visual impacts will not be in isolation, but rather determined in the context of the existing structures and buildings present at this location and within the region.

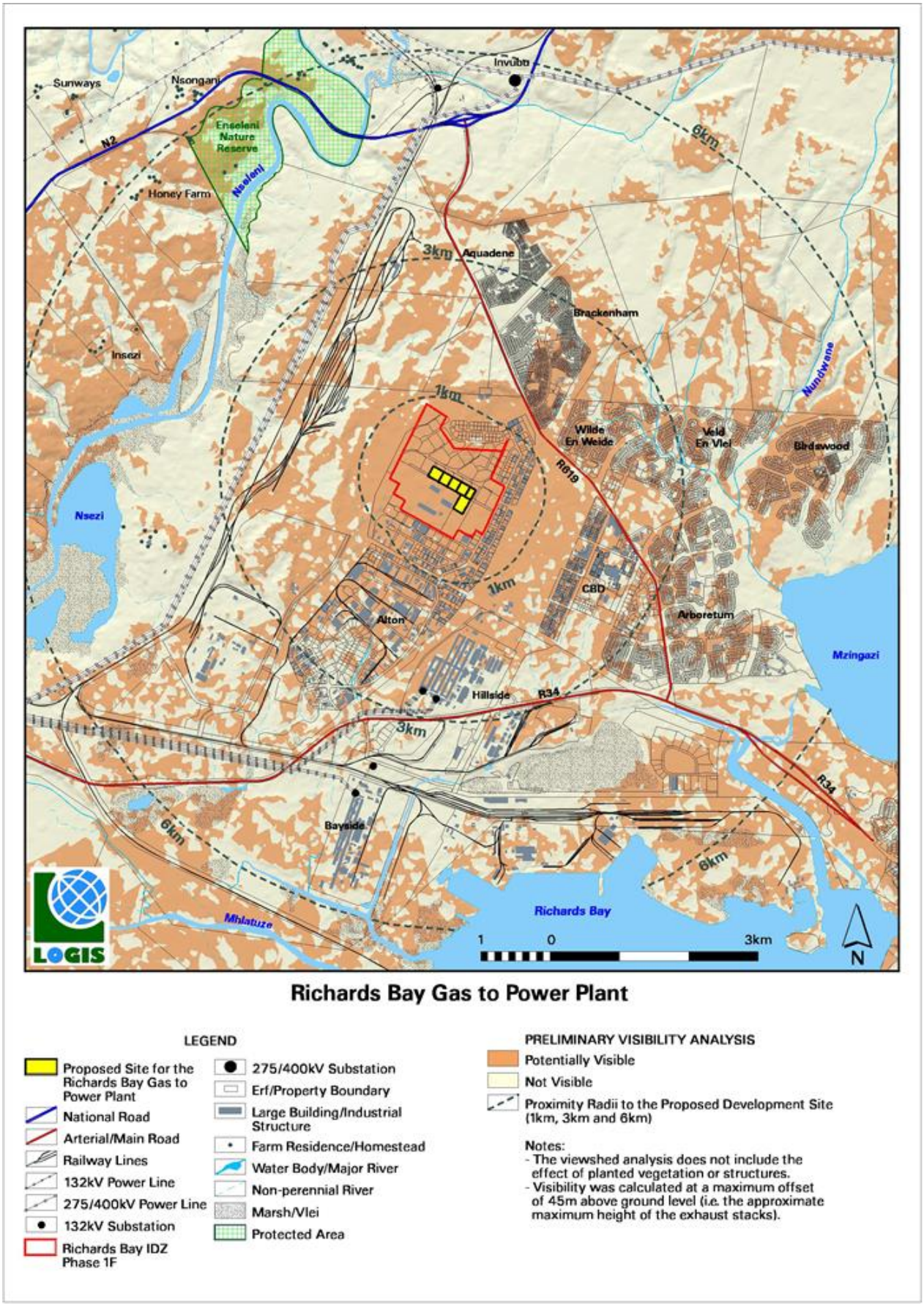

Figure 6.12: Map indicating the potential (preliminary) visual exposure of the proposed power plant.

6.6 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 downward transport and the rate of dilution of pollutants. 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.

i) 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 6.13 provides the location of the main industries and mines within the Local Municipality.

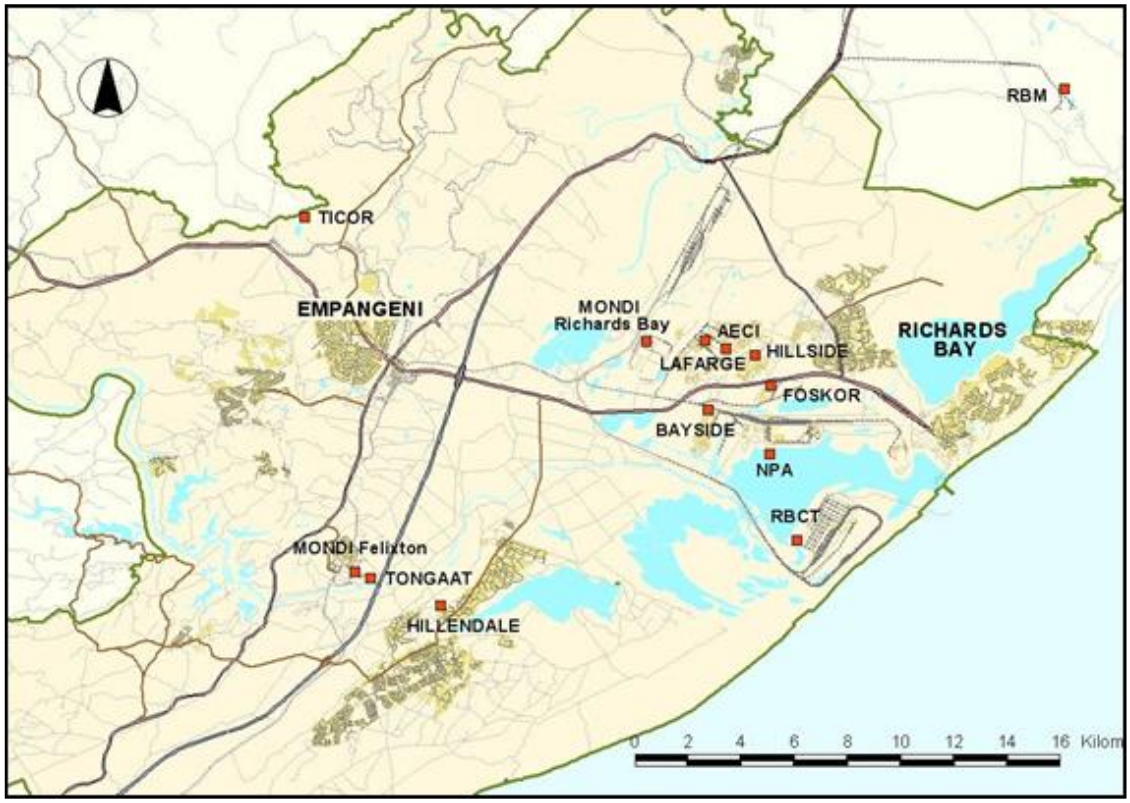

Figure 6.13: Location of all the main industries and mines within the City of uMhlathuze Local Municipality

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 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 wildfires (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.

ii) Air Quality Sensitive Receptors

The nearest large residential areas to the project site are Wild-en-Weide (1.9 km east-north-east); Richards Bay CBD (1.9 km south-east); Brackenham (2.1 km north-east); Aquadene (3.5 km north) and Arboretum (4 km east-south-east). There are several schools, hospitals and clinics located within 5 km of the proposed location (**Figure 6.14**). The location of the various air quality monitoring station (AQMS) is shown in **Figure 6.15**. Industrial areas (Alton and the Richards Bay CBD) are located within 5 km of the proposed project.

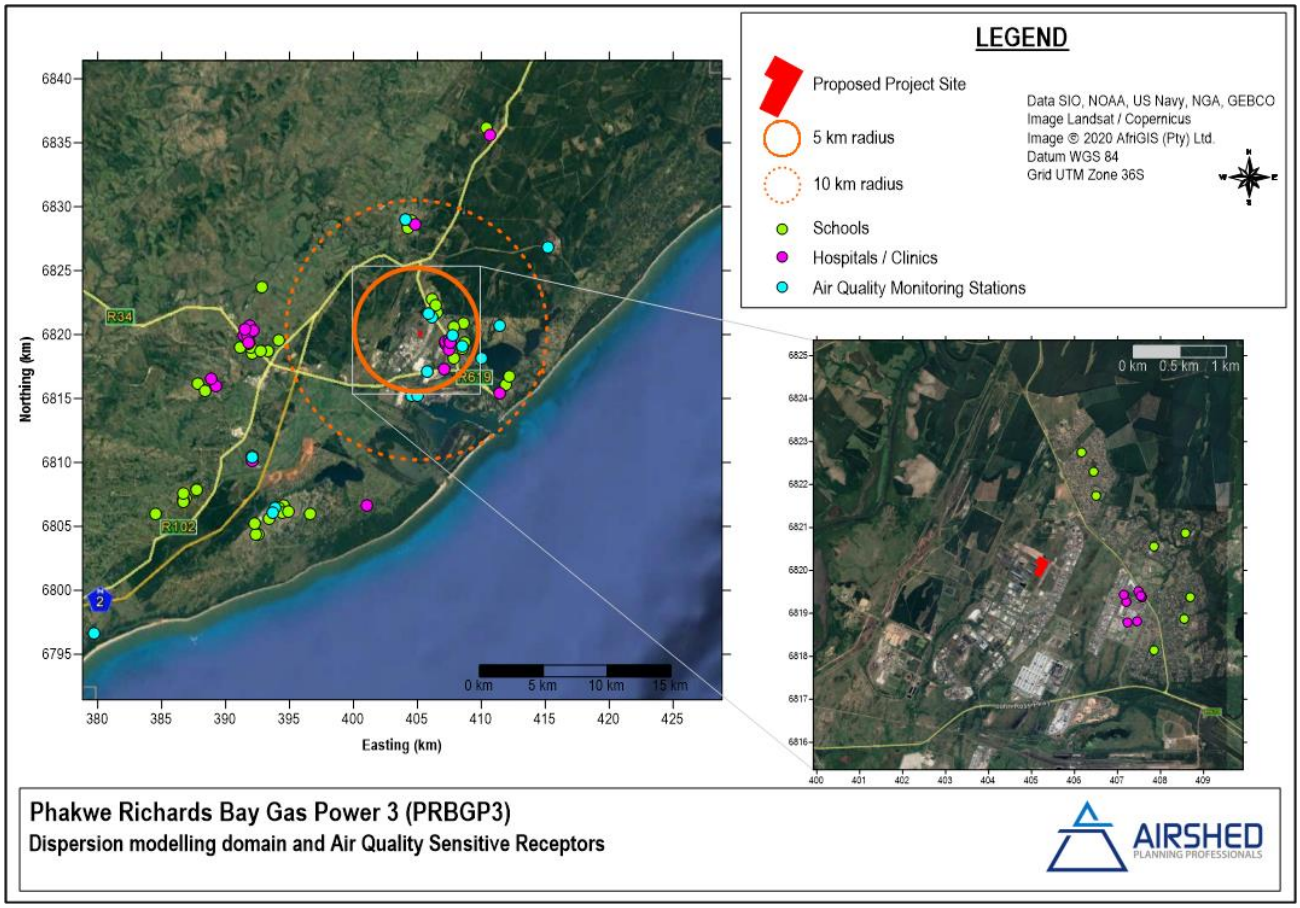

Figure 6.14: Location of the Proposed Project in relation to the AQSRs

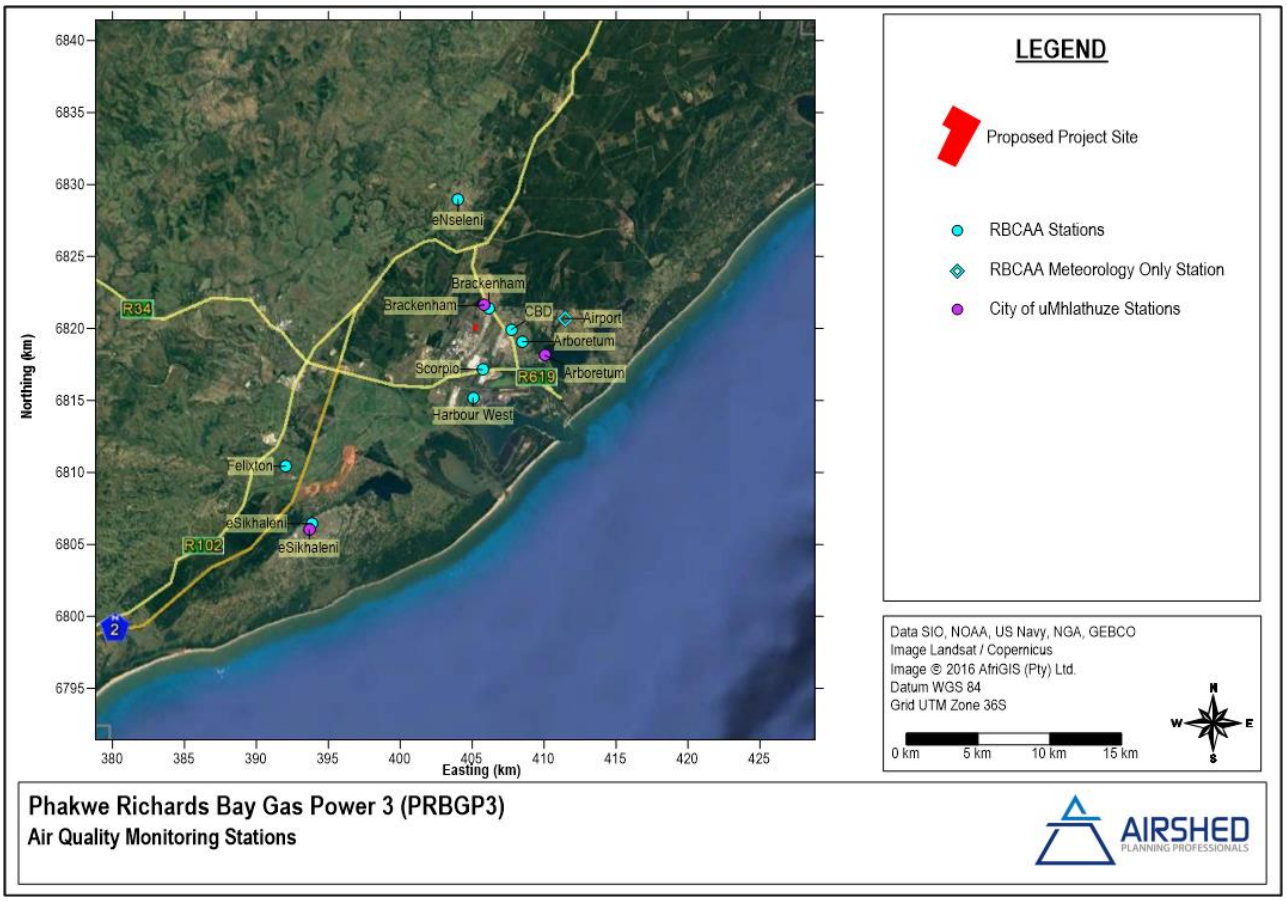

Figure 6.15: Location of the Proposed Project in relation to the AQMSs

ii) Measured Baseline Ambient Air Quality

Air quality monitoring stations operated by the Richards Bay Air Quality Association (7) and the City of uMhlattuze (3), measuring meteorological parameters and ambient SO_2, TRS and PM_{10} concentrations are located within the study area. Hourly data from all stations was provided by the RBCAA for the period 2016 to 2020. In general, the ambient air quality in Richards Bay is in compliance with NAAQS, with the exception of Harbour West for daily SO_2, Brackenham for daily PM10, and eSikhaleni for $PM_{2.5}$ and PM_{10}.

PM_{10} & $PM_{2.5}$ Ambient Concentrations

The daily PM_{10} concentrations – for the data period provided (2016 to 2020) – indicate non-compliance with the daily PM_{10} NAAQS at Brackenham station during 2018, where daily average concentrations measured exceeded 75 µg/m³ on more than four occasions during the year. There were exceedances of the 24-hour NAAQS for both PM2.5 and PM10 in 2019 and 2020 at the uMhlathuze eSikhaleni station. The annual NAAQS was also exceeded for $PM_{2.5}$ in 2019. Annual average PM_{10} concentrations were compliant with the NAAQS at all stations and similarity between years at each station is noted.

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. Harbour West AQMS had the largest number of hourly exceedances, 22 hours in 2018 and 1 hour in 2020. The NAAQS allows for 88 hours exceeding the limit concentration per year (350 µg/m³). The Scorpio AQMS recorded 12 hours in 2018 and 2 hours in 2016. The CBD AQMS recorded 1 hour (in 2016) exceeding the hourly limit concentration. No hourly exceedances were measured at the other stations

during the January 2016 to December 2019 period. The Harbour West AQMS recorded non-compliance with the daily SO2 NAAQS (125 µg/m³) in 2018 due to 5 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 one day during 2018 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.

6.7. Noise

Potential noise sensitive receptors which could be affected by the development of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure have been identified from aerial images. Potential noise-sensitive developments identified are highlighted in **Figure 6.16**. This include the residential suburb of "Wild en Weide" where ambient sound levels is ideal for residential use.

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.

Long-term measurements were collected over a period of two (2) nights at three location in the "Wild en Weide" residential suburb. This data was augmented with 4 short-term (10-minutes) sound level measurements collected within the Alton Industrial area over the same 2-night period. The data collected is summarised in (**Figure 6.11**).

Monitoring location	GPS Co-ordinate	Night-time average sound level ($L_{Aeq,f}$) - dBA	Daytime average sound level ($L_{Aeq,f}$) - dBA	Night-time rating level i.t.o SANS 10103	Daytime rating level i.t.o SANS 10103
RBGPLTSL01	-28.735179°, 32.043652°	42.6	50.4	Sub-urban to urban	Sub-urban
RBGPLTSL02	-28.736250°, 32.045824°	43.4	52.8	Urban	Sub-urban to urban
RBGPLTSL03	-28.736305°, 32.047195°	39.2	57.7	Sub-urban	Busy urban
RBGPSTSL11	-28.764698°, 32.020459°	53.3	Not measured	Busy urban to central business district	-

Figure 6.16: Summary of average sound levels measured

Considering the results of the measurement data:

» Ambient sound levels in the closest residential area are typical of a sub-urban to urban noise district and within the noise limits recommended for residential use by the WHO and IFC;
» Ambient noise levels in the Alton Industrial area are elevated and typical of a busy urban to central business noise district. It should be noted that SANS 10103 highlights that ambient sound levels in an industrial noise district (appropriately zoned) up to 70 dBA is expected and typical.

6.8. Heritage features of the region

6.8.1. Heritage and archaeology

In general, the study area has been subjected to a lot of industrial activity. The surrounding area is under sugarcane agriculture with electrical, rail, gas pipeline, and vehicle servitudes. While the large number of known sites within the vicinity of the proposed development (**Figure 6.17**) is indicative of some archaeological sensitivity, the specific area proposed for development has been extensively previously disturbed and is located within an area that has been extensively previously developed. As such, it is very unlikely that significant archaeological heritage will be impacted by the proposed development.

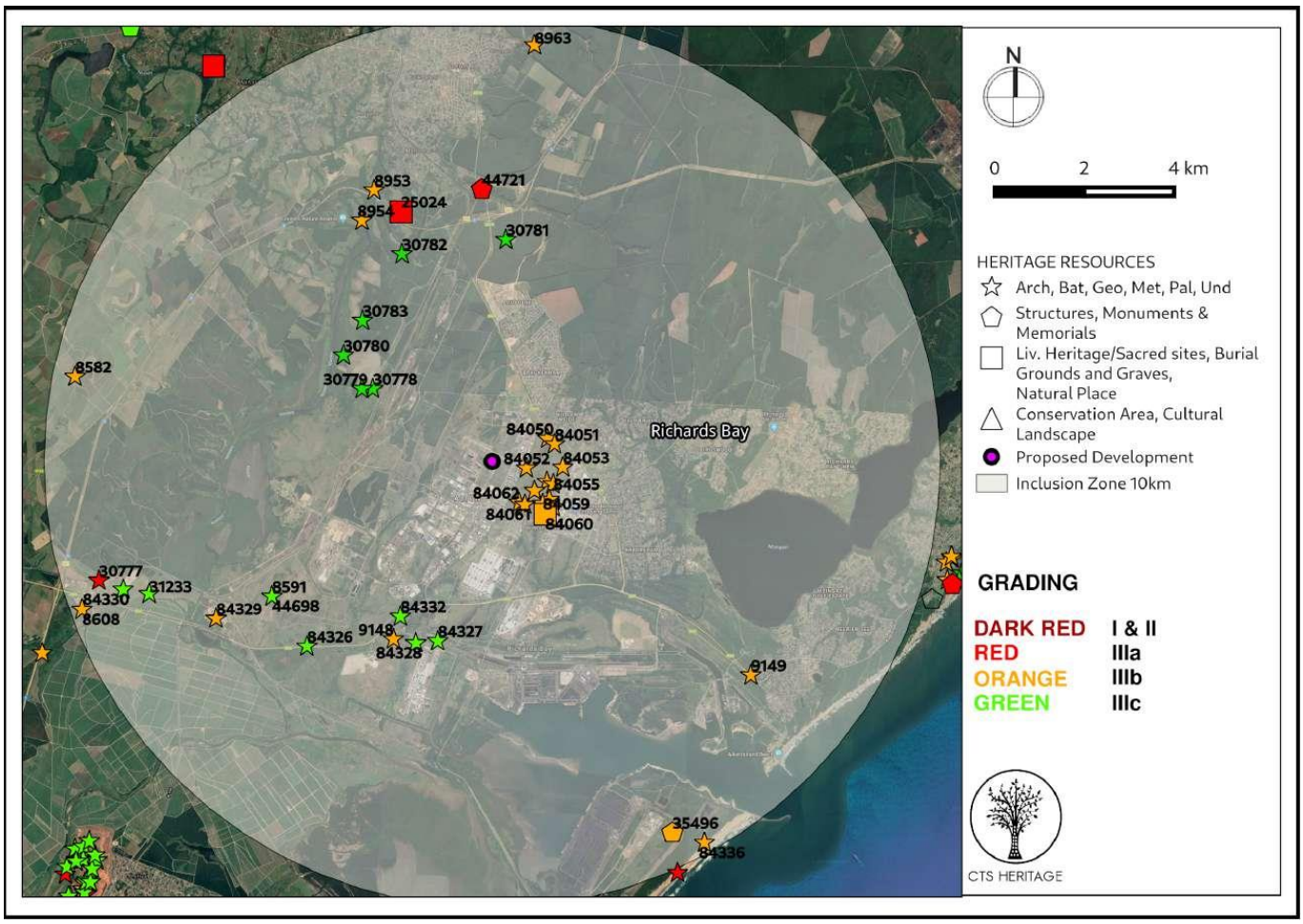

Figure 6.17: Map of heritage resources identified within the area.

6.8.2. Palaeontology (Fossils)

According to the SAHRIS Palaeosensitivity Map (**Figure 6.18**), the area proposed for development is underlain by sediments of low palaeontological sensitivity consisting of redistributed yellow quaternary sands. As such, it is very unlikely that the proposed development will negatively impact on significant palaeontological heritage.

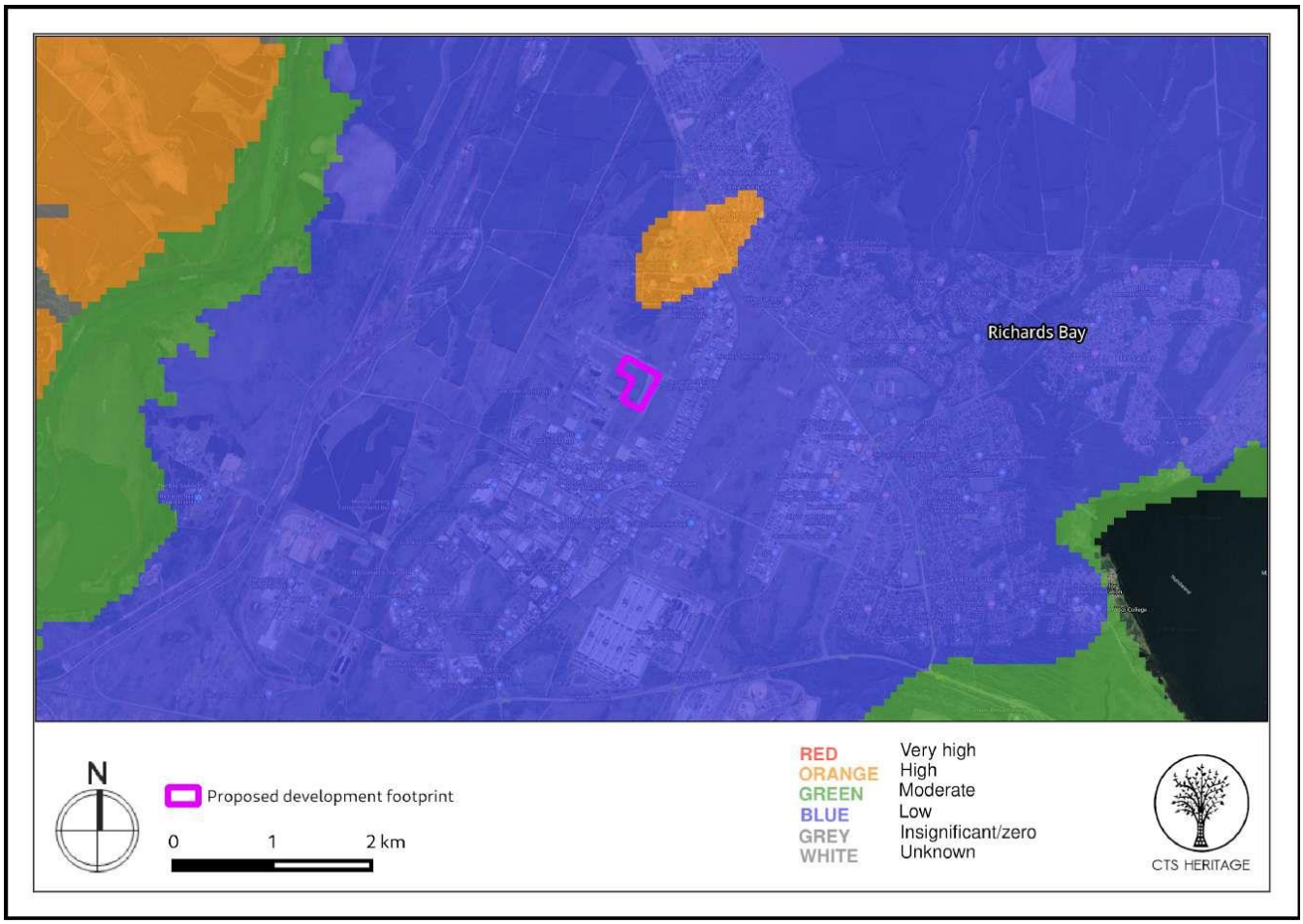

Figure 6.18: Palaeosensitivity Map. Indicating fossil sensitivity underlying the study area

6.9. Current Social and Economic Characteristics of the Project Site and Surrounding Areas

Between 2001 and 2011 the City of uMhlathuze Local Municipality (LM) experienced an annual population increase of 1.5%, with the population in 2011 reported to be 362 778 people. According to the 2016, Community Survey 2016 population within the uMhlathuze LM reported to be 410 465 persons, indicating a growth rate of 2.81% annually between 2011 and 2016, significantly higher than previously experienced.

For the period 1996 to 2016, the percentage of the total population within the City of uMhlathuze Local Municipality classified as 'potentially economically active' (ages of 15 and 64) has been consistently higher than the percentage of the population within this age group in the District Municipality and KZN province. Access to education within uMhlathuze Local Municipality improved between 2001 and 2011, with the percentage of the population over the age of 20 reported to have never received formal education dropping from 18% to 8%. While the same trend was experienced within the DM (a drop of 32% to 16% reporting no access) and province (a drop of 22% to 11% reporting no access), access was better within the LM.

Despite improvements between 2001 and 2016, unemployment within the uMhlathuze Local Municipality remains high at 30% however, this is below the level of unemployment reported for the King Cetshwayo DM 34% and KwaZulu-Natal 33.

The Gross Value Added (GVA) of City of uMhlathuze LM was valued to be R36 122 million in 2019 current prices as shown in the table below. This is equal to a GDP per capita of R102 152 which is significantly higher than the national and provincial economies with a GDP-R per capita of R75 205 and R61 174 respectively.

The figure below illustrates the economic profile of the City of uMhlathuze LM in terms of GVA per sector.

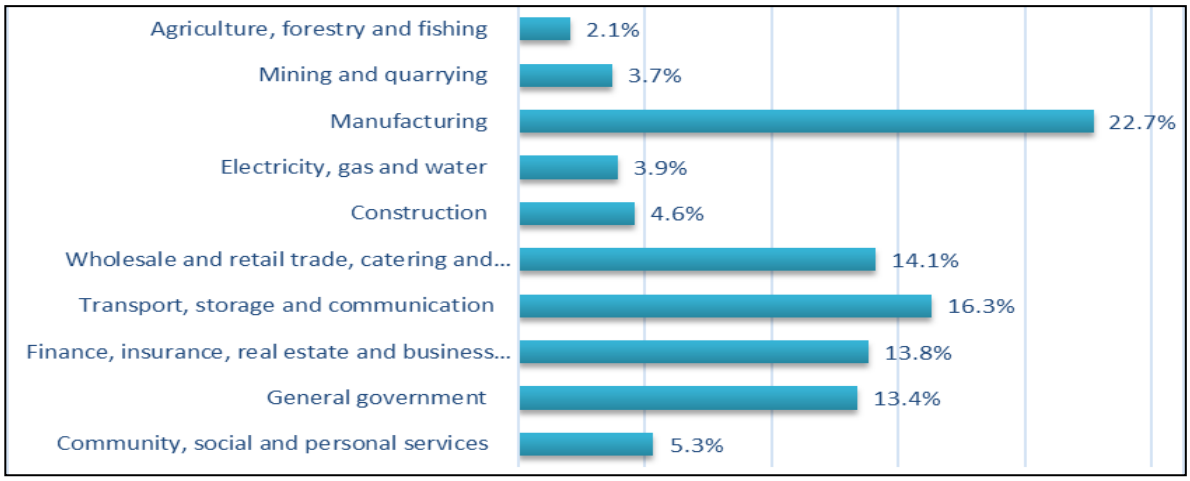

Figure 6.19: City of uMhlathuze Local Municipality GVA Contribution by Sector, 2018 (Source: Quantec Research, Urban-Econ Calculations, 2020)

As illustrated, the economy of the City of uMhlathuze LM is dominated by manufacturing, which accounts for about a fifth of the economy (22%). This is indicative of the high concentration of industrial activity in Richards Bay, with the Port of Richards Bay, the RBIDZ and associated industries playing a significant economic role.

Transport storage and communication is the next highest contributor (16%), followed by wholesale and retail trade sector contributing 14%. Finance, insurance and business services and General government sectors each contribute about 13%. These sectors are typically associated with the provision of services to industry. General government contributes 13%, which is to be expected given that Richards Bay is home to both the DM and LM governments, as well as several satellite provincial departments which service the north of KwaZulu-Natal (KZN). The remaining 20% is made of the agriculture, mining, construction, and social and personal services sectors.

The sectoral employment pattern of City of uMhlathuze LM show that the largest sector is the Wholesale and retail trade sector with about 22% of total employment. This is followed by the Finance insurance real estate and business services and the Community and social services sectors.

Access to electricity for lighting (the most basic level of access) within the uMhlathuze LM is better than access on a district and provincial level. Access to piped water improved significantly within the uMhlathuze LM between 2001 and 2016, with 94% of all households reported to have access to piped water either within their household or within their yard.

CHAPTER 7: APPROACH TO UNDERTAKING THE SCOPING PROCESS

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 Phakwe Richards Bay Gas Power 3 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.

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
(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 Phakwe Richards Bay Gas Power 3 CCPP and a description of the activities which form part of the development of the Phakwe Richards Bay Gas Power 3 CCPP have been included in section 7.1 and Table 7.1.
(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 Phakwe Richards Bay Gas Power 3 CCPP has been described and is included in section 7.3.2.
(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 7.3.2. A Comments and Responses report including all comments and responses has been included in **Appendix C8**.

7.2. 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 7.1: Listed activities triggered by the Phakwe Richards Bay Gas Power 3 CCPP

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended (GNR327)	Describe the portion of the proposed project to which the applicable listed activity relates.
12(ii)(a)(c)	The development of—	Wetlands occur within the project site which will be affected by the development. The

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended (GNR327)	Describe the portion of the proposed project to which the applicable listed activity relates.
	(ii) or infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —	development will be located within watercourses, as well as within 32 meters of a watercourse.
14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	Chemicals of up to 80m^3 will be utilized during construction and operation of the facility, stored in bunded tanks on site. This storage infrastructure will supply the proposed development with the fuel required for black start, heating as well as operation.
16	The development and related operation of facilities for the desalination of water with a design capacity to produce more than 100 cubic metres of treated water per day.	A demineralisation water treatment plant producing more than 100m^3 per day of process water to be used in the energy production system will be developed as part of this project
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	The development 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.
27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation,	The development requires the clearance of up to a maximum of 11.8 ha of indigenous vegetation.
28(ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	The development occurs within an industrial complex (RB IDZ Phase 1F) which is regarded as being outside an urban area, and will have a footprint of up to 11.8ha. This area was most likely utilised for agriculture between the years of 1998 and 2004

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended (GNR324)	Describe the portion of the proposed project to which the applicable listed activity relates.
2(d)(viii)	The development of reservoirs, excluding dams, with a capacity of more than 250 cubic metres. d. KwaZulu-Natal	The development includes storage tanks for process water of capacity greater than 250 cubic metres. The project site is located within a Critical Biodiversity Area (CBA) as per the KwaZulu-Natal Biodiversity Sector Plan, 2016 (updated).

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended (GNR324)	Describe the portion of the proposed project to which the applicable listed activity relates.
	viii. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	
4(d)(viii)	The development of a road wider than 4 metres with a reserve less than 13,5 metres. d. KwaZulu-Natal viii. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The development will require the development of access or internal roads of 6m maximum width. The project site is located within a Critical Biodiversity Area (CBA) as per the KwaZulu-Natal Biodiversity Sector Plan, 2016 (updated)
10(d) (ix)	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 30 but not exceeding 80 cubic metres. d. KwaZulu-Natal ix. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	Chemicals of up to 80m^3 will be utilized during construction and operation of the facility, stored in bunded tanks on site. This storage infrastructure will supply the proposed development with the fuel required for black start, heating as well as operation. The project site is located within a Critical Biodiversity Area (CBA) as per the KwaZulu-Natal Biodiversity Sector Plan, 2016 (updated).
12(d)(v)	The clearance of an area of 300 square metres or more of indigenous vegetation d. KwaZulu-Natal v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The development requires the clearance of up to a maximum of 11.8ha of indigenous vegetation. The project site is located within a Critical Biodiversity Area (CBA) as per the KwaZulu-Natal Biodiversity Sector Plan, 2016 (updated).
14(ii)(a)(c)(d)(vii)	The development of (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; d. KwaZulu-Natal vii. 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. The development will be located within watercourses, as well as within 32 meters of a watercourse. The project site is located within a Critical Biodiversity Area (CBA) as per the KwaZulu-Natal Biodiversity Sector Plan, 2016 (updated).
15	The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, such land was zoned open space, conservation or had an equivalent zoning, on or after 02 August 2010.	The development site is located within the RB IDZ phase 1F, for which rezoning efforts are ongoing. The site may have been zoned open space, conservation or equivalent since 2010 and therefore this activity will

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended (GNR324)	Describe the portion of the proposed project to which the applicable listed activity relates.
		represent commercial and industrial development in such a zone.

Activity No(s):	Provide the relevant Scoping and EIR Activity(ies) as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended (GNR325)	Describe the portion of the proposed project to which the applicable listed activity relates.
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.	Phakwe Richards Bay Gas Power 3 CCPP will have a generating capacity of up to 2000MW and will use natural gas (in various forms) as a fuel resource, which is a non-renewable resource.
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 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 in terms of the NEM: Air Quality Act

On the basis of the above listed activities, a Scoping and an EIA process is required to be undertaken for the development in support of an Application for Authorisation. This process is to be undertaken in two phases 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, as well as project alternatives in order to determine which should be assessed in more detail in the EIA Phase. 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), consideration of feasible alternatives and public consultation. Recommendations of practical and achievable mitigation and management measures are included in an Environmental Management Programme (EMPr) considering all phases of the project. Following the public review of the EIA report and EMPr, this phase culminates in the submission of a Final EIA Report and EMPr to the competent authority for review and decision-making.

7.3. 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 identified 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.

7.4. . 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 DEFF) in terms of Regulations 5 and 16 of the EIA Regulations 2016, as amended (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.

7.4.1. Authority Consultation and Application for Authorisation

In terms of Government Notice 779 of 01 July 2016, the National Department of Forestry, Fisheries, and the Environment 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 this Scoping phase. To date, this consultation has included the following:

» Pre-application consultation meeting;
» Submission and approval of the public participation plan;
» Submission of the application for authorisation to DFFE;
» Submission of this 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**.

7.4.2. 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 Phakwe Richards Bay Gas Power 3 CCPP project.
» Adequate review periods are provided for I&APs to comment on the findings of the Scoping and EIA Reports.

The restrictions enforced in terms of Government Gazette 43096 which placed the country in a national state of disaster limiting the movement of people to curb the spread of the COVID-19 virus has placed some

limitations on the commencement and continuation of the public consultation as part of the EIA process. Considering these limitations, a public participation plan **(Appendix C9**) and consultation process has been designed by Savannah Environmental and approved by DFFE to cater for the undertaking of the public participation process which includes I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, Municipalities, ward councillors and other key stakeholders.

The traditional means and opportunities available for the undertaking of public participation will still be covered and implemented as part of the public participation plan considering the current limitations. Alternative means of undertaking consultation has been designed and will be implemented by Savannah Environmental to ensure that I&APs are afforded sufficient opportunity to raise comments on the project through an interactive web-based platform readily available and accessible to any person illustrating interest in the project and enables the public participation process to be undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014, as amended.

This online stakeholder engagement platform allows the EAP to visually present details regarding the project and our consultation documentation, including project maps and plans, presentations and posters regarding the project, and reports available for review. The use of online tools enables stakeholders and I&APs to explore the project- specific content in their own time, and allow them to participate in a meaningful way in the consultation process. The online stakeholder engagement platform considered the limitations applied by the Disaster Management Act Regulations prohibiting the gathering of people, as well as limitations which certain I&APs may have in terms of access to computers and internet as well as access to public spaces not open for operation or which have restricted access.

The schematic illustration overleaf provides an overview of the tools that are available to I&APs and stakeholders to access project information and interact with the public participation team to obtain project information and resolve any queries that may arise, and to meet the requirements for public participation.

Key tasks undertaken in the Scoping Phase to ensure effective participation 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.
» Radio live reads.
» 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, sms's, whatsapp, 'please call me' and consultation meetings or virtual focus group 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 7.2**.

Table 7.2: List of Stakeholders identified during the Scoping Phase

Organs of State
National Government Departments
Department of Mineral Resources and Energy (DMRE)
Department of Forestry, Fisheries, and the Environment (DFFE)
Department of Agriculture, Rural Development and Land Reform (DARDLR)
Department of Water and Sanitation (DWS)
Government Bodies and State Owned Companies
Eskom Holdings SoC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African National Roads Agency Limited (SANRAL)
South African Heritage Resources Agency (SAHRA)
Telkom SA Ltd
Transnet SA SoC Limited
Provincial Government Departments
KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA)
Amafa / Heritage KwaZulu-Natal
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
GroundWork
Landowners
Affected landowners » Richards Bay IDZ
Neighbouring/Surrounding landowners » City of uMhlathuze Local Municipality » Mondi » Transnet Ltd

ii. Database 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 details of[8]:

» 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 November 2021, 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 on 10 November 2021 at visible points along the boundary of the project site, in accordance with the requirements of the EIA Regulations.
» An advertisement announcing the availability of and inviting comment on the Scoping Report in Zululand Observer newspaper on 12 November 2021.

[8] Note that addresses and contact details are not contained within the register presented to the public in line with the requirements of the Protection of Personal Information (POPI) Act (Act 4 of 2013).

- Radio adverts (live reads) on a local community radio station will be undertaken announcing the project and the availability of the scoping report and where I&APs can register their details should they require any further information.
- Compilation of a background information document (BID) for the project in order to provide information regarding the Phakwe Richards Bay Gas Power 3 CCPP and the EIA process (refer to **Appendix C3**). The BID has been distributed to identified stakeholders and I&APs together with a notification letter. The BID is also available electronically on the Savannah Environmental website.
- I&APs have been encouraged to view the Scoping Report and submit written comment. The Scoping Report has been circulated to Organs of State via CD or electronic transfer (Dropbox, WeTransfer, etc), as per individual request.

The evidence of the above has been included in this Scoping Report in **Appendix C**.

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 will be provided in the scoping phase and will continue to be provided to I&APs to note their issues during the remainder of the EIA process. I&APs are being consulted through the following means:

- **Focus group meetings**: Focus group meetings will be held with key government departments, stakeholders, I&APs and landowners during the scoping phase of the process. 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. As per the approved public participation plan, these meetings will be held via virtual platform. The minutes of these meetings will be included in the final Scoping Report for review and acceptance by the DEFF.
- **One-on-one consultation meetings** for example with directly affected or surrounding landowners As per the approved public participation plan, these meetings will be held via virtual platform.
- **Telephonic** consultation sessions.
- Written, faxed or e-mail correspondence.

Comments received have been included within Appendix C6. All 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** within the Final Scoping report.

Table 7.3: Summary of Public Participation Process

Activity	Date
The EIA process was advertised in: » The Zululand Observer.	12 November 2021
Placement of site notices, on-site and in public places.	10 November 2021
Distribution of process notification letters and background information documents to organs of state departments, ward councillors, landowners within the study area, neighbouring landowners and stakeholder groups.	12 November 2021
The availability of the scoping report was advertised in: » The Zululand Observer	12 November 2021
Review period for the Scoping Report for public comment.	12 November – 13 December 2021

Activity	Date
Preliminary list of Focus Group Meetings to be held: » City of Mhlathuze Local Municipality » KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs » Richards Bay Clean Air Association » Adjacent Landowners & other I&APs	Meeting dates to be confirmed and included within the final scoping report.

v. Identification and Recording of Issues and Concerns

A Comments and Responses Report has been compiled to include all comments received. Additional comments received during the Scoping phase 30-day review period, will be included in the Comments and Responses Report within the Final Scoping Report. The Comments and Responses Report is included as **Appendix C8**.

7.5. Review of the Scoping Report

The Scoping Report has been made available for review from **12 November 2021** to **13 December 2021** and download from the Savannah Environmental website, www.savannahSA.com.

7.6. Identification and Evaluation of Issues

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulation 19 and 21 of the 2014 EIA Regulations.

The requirement for the submission of a Screening Report (**Appendix P** for the proposed development is applicable as it triggers Regulation 19 of the 2014 EIA Regulations (as amended). **Table 7.4** provides a summary of the specialist assessment requirements identified for the project site in terms of the screening tool and responses to each assessment requirement based on the nature and extent of the project.

Table 7.4: Sensitivity ratings from the DEFF's web-based online Screening Tool associated with the development of Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Landscape/Visual Assessment	Not specified within screening tool	A Visual Impact Assessment has been undertaken for the proposed project (refer to Appendix I).
Archaeological and Cultural Heritage Impact Assessment	Low Sensitivity	A Heritage Screening Assessment has been undertaken for the proposed project (refer to Appendix F).
Palaeontology Impact Assessment	Low Sensitivity	A Heritage Screening Assessment encompassing a Palaeontology assessment has been undertaken for the proposed project (refer to Appendix F).
Terrestrial Biodiversity Impact Assessment	Very High Sensitivity	A Terrestrial Biodiversity Impact Assessment has been undertaken for the proposed project (refer to Appendix D).

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Aquatic Biodiversity Impact Assessment	Very High Sensitivity	An Aquatic Biodiversity Impact Assessment has been undertaken for the proposed project (refer to Appendix E).
Socio- Economic Assessment	Not specified within screening tool	A Socio- Economic Impact Assessment has been undertaken for the proposed project (refer to Appendix E) (refer to Appendix J).
Plant Species Assessment	Medium Sensitivity	A plant species assessment has been included within the Terrestrial Biodiversity Assessment (refer to Appendix D).
Animal Species Assessment	High Sensitivity	An animal species assessment has been included within the Terrestrial Biodiversity Assessment (refer to Appendix D).
Soil and Agricultural Assessment	Very High Sensitivity	A Soil and Agricultural Potential Assessment has been undertaken for the proposed project (refer to Appendix E).

Based on the results of the screening, and from experience on similar projects and in the study area, the EIA project team has identified the following issues as requiring investigation.

Table 7.5: Specialist consultants appointed to evaluate the potential impacts associated with the Phakwe Richards Bay Gas Power 3 CCPP

Issue	Specialist	Refer Appendix
Terrestrial Ecology	Anita Rautenbach of Rautenbach Biodiversity Consulting	Appendix D
Soils and Wetlands	Dale Kindler and Andrew Husted of The Biodiversity Company	Appendix E
Heritage (incl. palaeontology)	Jenna Lavin of CTS Heritage	Appendix F
Air Quality	Terri Bird of Airshed	Appendix G
Noise	Morne de Jager of EARES	Appendix H
Visual	Lourens du Plessis of LOGIS	Appendix I
Socio-economic	Eugene de Beer of Urban-Econ Development Economists	Appendix J
Traffic	Iris Wink of JG Afrika	Appendix K

It should be noted that additional assessments to those listed above are proposed as part of the EIA phase. Refer to Chapter 10 for the Plan of Study for the EIA.

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.

7.7. 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.

7.8 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 Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure (i.e. based on the surrounding land use, access to the site, access to infrastructure etc.)
- 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**.

7.9 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);
- Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations;
- Department of Environmental Affairs (2017), Integrated Environmental Management Guideline: Guideline on Need and Desirability;
- Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation; and
- International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS 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 7.1**. A more detailed review of legislative requirements applicable to the Phakwe Richards Bay Gas Power 3 CCPP will be included in the EIA phase.

Table 7.1: Initial review of the relevant environmental policies, legislation, guidelines and standards applicable to the Phakwe Richards Bay Gas Power 3 CCPP, Richards Bay

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.
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) » 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)

Legislation	Applicable Sections
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 37886 of August 2014, as amended in 2020).
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 37054 of 22 November 2013 provides a list of activities which require an Air Emissions License and provides the emission 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. » 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

Legislation	Applicable Sections
	» 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) » GNR 509 of 2016 provides the requirements for General Authorisation relating to 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)) » GNR 267 of 2017 provides Regulations regarding the Procedural Requirements for Water Use Licence Applications and Appeals' including Section 21(b) for the storage of water in dams or reservoirs, section 21(f) for the discharge of water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit, Section 21(g) for the disposal of waste in a manner which may detrimentally impact of a water resource and Section 21 (h) for the disposal in any manner of water which contains waste from or which has been heated in any industrial or power generation process.
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.

Legislation	Applicable Sections
	Provincial Legislation
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.
King Cetshwayo 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 (2019)	» 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 enable the comprehensive management of all erven (both private and public sector) within the Municipality; * To promote and implement the applicable planning and development legislation and principles as adopted by the relevant National, Provincial and Municipal spheres of government from time to time; * To promote and implement the Vision and Strategies of the Integrated Development Plan in the realization of quality environments * To manage land-use rights, to provide facilitation over use rights, to manage urban growth and development and to manage conservation of the natural environment in order to: » Achieve co-ordinated and harmonious development in a way that will efficiently promote public safety, health, order, convenience and to protect the general welfare of the inhabitants of the Municipality; » Promote integrated and sustainable development through-out the area of jurisdiction; » Promote sustainable environmental management, conserve and protect environmentally sensitive areas. » Promote all forms of development and growth through sound planning principles that would support a mix of land-uses managed in an appropriate manner
	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'. * 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

Legislation	Applicable Sections
	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.
IFC EHS Guideline on Thermal Power Plants	» The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. » The guideline includes information relevant to combustion, gasification or pyrolysis processes fuelled by gaseous, liquid and solid fossil fuels and biomass and designed to deliver electrical or mechanical power, steam, heat, or any combination of these, regardless of the fuel type (except for solid waste which is covered under a separate Guideline for Waste Management Facilities), with a total rated heat input capacity equal to or above 50 Megawatt thermal input (MWth). It applies to boilers, reciprocating engines, and combustion turbines in new and existing facilities. » As described in the introduction to the General EHS Guidelines, the general approach to the management of EHS issues in industrial development activities, including power plants, should consider potential impacts as early as possible in the project cycle, including the incorporation of EHS considerations into the site selection and plant design processes in order to maximize the range of options available to prevent and control potential negative impacts.
International Finance Corporation (IFC) Performance Standards and Environmental and Social Sustainability (January 2012)	» The International Finance Corporation's (IFC) Performance Standards (PSs) on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012. » Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an ESMS appropriate to the nature and scale of the project, and commensurate with the level of its environmental and social risks and impacts, be established and maintained. The above-mentioned standard is the overarching standard to which all the

Legislation	Applicable Sections
	other standards relate. Performance Standard 2 through to 8 establish specific requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, the standards 2 and 8 describe potential social and environmental impacts that require particular attention specifically within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1. » Given the nature of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure, it is anticipated (at this stage of the process) that Performance Standards 1, 2, 3, 4, 6, and 8 may be applicable to the project.
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 8: SCOPING OF ISSUES

The potential impacts of the proposed Phakwe Richards Bay Gas Power 3 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 7 of this report), this has been informed by a review of existing baseline information and desktop 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 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, including visual, noise and traffic impacts.

Environmental issues specific to the operation of the Phakwe Richards Bay Gas Power 3 CCPP and its associated infrastructure could include, among others:

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

The sections which follow provide a summary of the findings of the scoping study undertaken for the construction and operation phases of the proposed project. Impacts associated with the decommissioning phase are expected to be similar to those associated with construction and are therefore not repeated. Impacts of the Phakwe Richards Bay Gas Power 3 CCPP are described and evaluated, and recommendations are made regarding further studies required within the EIA phase of the process.

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
(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) can be avoided, managed or mitigated.	The potential impacts associated with the construction and operation of the Phakwe Richards Bay Gas Power 3 CCPP have been identified and assessed within Section 8.3.
(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 8.2.
(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 project have been included in Section 8.3.
(g)(viii) the possible mitigation measures that could be applied and level of residual risk	Recommendations regarding the development of the Phakwe Richards Bay Gas Power 3 CCPP have been included in Section 8.3.

8.2. 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 Phakwe Richards Bay Gas Power 3 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 in relation to the project description and layouts provided at this stage in the process.
- 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.

8.3. Impacts during the Construction and Operational Phases

8.3.1 Potential Impacts on Terrestrial Ecology

Impact

During the preliminary site inspection, the area was found to be degraded, with existing negative environmental impacts present. The terrestrial biodiversity is therefore not representative of the environmental sensitivities identified during the desktop assessment (e.g., CR ecosystems, EN & VU vegetation types, CBA areas, NPAES focus areas, wetlands). Nevertheless, several fauna and flora species of conservation concern may potentially be present, albeit probability of occurrence is regarded as Low for most of the species.

The following impacts on the ecology within the project site and the surrounding area could potentially occur during the construction and operational phase of the Phakwe Richards Bay Gas Power 3 CCPP (refer to Appendix D):

- Loss of sensitive terrestrial biodiversity features (NPAES focus areas, the Critically Endangered Kwambonambi Hygrophilous Grassland ecosystem, the Endangered Maputaland Wooded Grassland vegetation type, the Vulnerable Subtropical Freshwater wetlands, National and provincial CBA areas).
- Potential loss of flora species of converaton concen
- Potential loss of fauna species of converaton concen
- Soil and wetland contamination (loss of wetland, fuana and flora habitat)
- Invasion of Alien invaisive species
- Impacts to fauna due to alternations in nighttime conditions

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of sensitive terrestrial biodiversity features	Direct impacts » Habitat fragmentation » Loss of biodiversity » Environmental degradation » Loss of habitat for SCC fauna & flora. Indirect impacts » Negative changes to the conservation status of identified biodiversity features. » Negative changes to the conservation status of identified biodiversity features.	National	None identified at this stage

	» Alterations to population dynamics and biotic interactions of species present in the area.		
Potential loss of flora species of conservation concern	Direct impacts » The complete destruction of SCC flora species. » Fragmentation of populations on the affected areas. » Loss of genetic variation within a community. » Illegal collection of sensitive flora. Indirect impacts » Negative change of a species' conservation status on national/regional scale.	National	None identified at this stage
Potential loss of fauna species of conservation concern	Direct impacts » Loss/displacement of SCC fauna species. » Inadvertent killing of slow-moving species during earthworks. » Illegal collection/poaching of fauna species. » Loss of genetic variation. » Isolation of local fauna populations. » Loss of fauna diversity. » Habitat fragmentation. Indirect impacts » Alterations to population dynamics and biotic interactions. » Negative change of a species' conservation status on national/regional scale.	National	None identified at this stage
Soil and water contamination of wetlands (fauna, flora, Wetland habitat)	Direct impacts » Loss of fauna & flora habitat. » Habitat degradation. » Loss of biodiversity. Indirect impacts » Changes in trophic interactions of species.	Local	None identified at this stage
Infestation of alien species	Direct impacts » Decrease in species richness and diversity. » Changes to the physical and structural complexity of the environment. Indirect impacts	Local	None identified at this stage

	» Habitat loss/alteration » Change in ecosystem processes (e.g., changes in soil nutrient dynamics.		
Impacts on fauna species caused by permanent alterations in nighttime conditions.	Direct impacts » Loss of fauna and flora diversity. Indirect impacts » Changes in trophic interactions of species.	Local	None identified at this stage
Description of expected significance of impact The proposed development site has a long history of transformation and therefore the impacts on the terrestrial environment are likely to be limited. However, species of conservation concern have potential to occur on the proposed development site. Moderate impacts are expected from an ecological perspective.			
Gaps in knowledge & recommendations for further study » The presence of fauna and flora species of conservation concern should be confirmed with more detailed specialist assessments. » Flora and vegetation studies should be conducted during the summer season (beginning of November – end of April. » The mowing of the vegetation on the site significantly decreases the detection probability of several flora species of conservation concern potentially present. Further environmental disturbance should not be allowed until the relevant authorities have granted environmental authorization for the proposed development. » A detailed wetland assessment will be required by a suitably qualified specialist to assess the condition of the wetland habitats on the project site. » Although the project site falls within several areas considered to be of terrestrial biodiversity importance, due to the degraded nature of the site, the terrestrial biodiversity is not representative of the environmental sensitivities identified during the desktop assessment. However, several fauna and flora species of conservation concern may potentially be present. The identification of no-go areas will therefore be dependent on the results of more detailed fauna, flora and wetland assessments. Consequently, the identification of no-go areas can only be conducted following the completion of the recommended studies.will be required for the protected species and species of concern that have a high probability of occurrence which will be impacted by the proposed facility.			

8.3.2 Potential Impacts on Wetlands and Aquatic Features

Impact

Several wetland systems are expected to be located within the development footprint area. Furthermore, several IDZ wetland offset areas are located within the development footprint (**Figure 8.1**). A wetland assessment as part of the RBIDZ feasibility (SIVEST, 2010) noted that the loss of the wetland areas must be looked at holistically in the context of the conservation needs of all the IDZ sites assessed. It was determined that the wetland sites within IDZ Phase 1F may be developed and are earmarked to be offset within other areas.

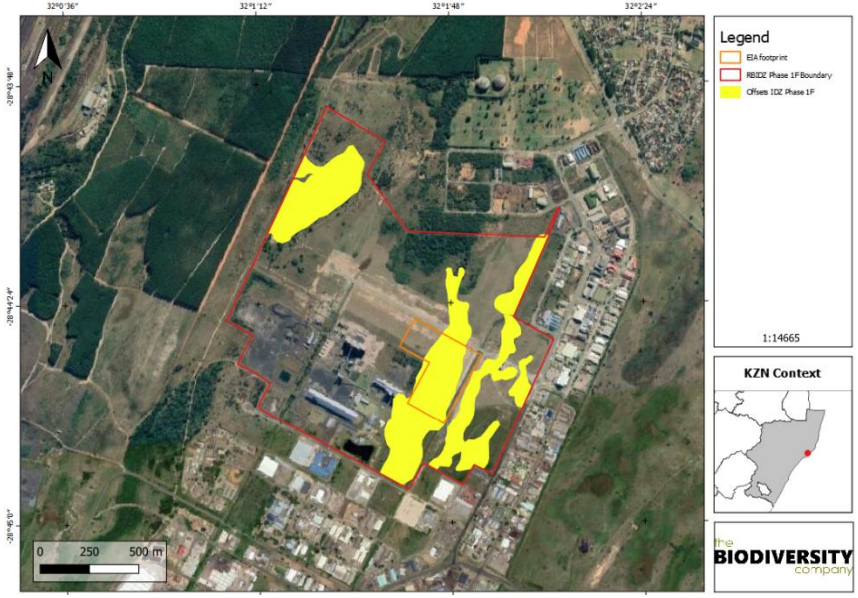

Figure 8.1: Wetland offsets located within the project development footprint.

From a freshwater perspective, industrial activities in the upper reaches of the Eastern unnamed tributary have resulted in the modification of the aquatic environment. Impacts related to upstream impoundment have further altered the natural hydrology of the system.

The following impacts on freshwater within the project site and the surrounding area could potentially occur during the construction and operational phase of the Phakwe Richards Bay Gas Power 3 CCPP (refer to Appendix E):

- » Disturbance / degradation / loss to wetland soils or vegetation
- » Increased erosion and sedimentation
- » Establishment of alien invasive species
- » Impaired water quality

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance / degradation / loss to wetland soils or vegetation due to the construction of the facility and associated infrastructure.	Direct impacts: » Disturbance / degradation / loss to wetland soils or vegetation Indirect impacts: » Loss of ecosystem services	Regional	Water resources and buffer area
Increased erosion and sedimentation & contamination of resources	Direct Impact » Erosion and structural changes to the systems Indirect Impact » Sedimentation & contamination of wetlands	Regional	None identified at this stage
Impaired water quality	Direct Impact » Contamination of water quality Indirect Impact » Contamination of water quality	Regional	Water resources and buffer area
Environmental pollution due to increased sedimentation and erosion of watercourses	Direct Impact » Erosion and structural changes to the systems Indirect Impact »	Regional	None identified at this stage
Spread of alien invasive species	Direct Impact » Removal of vegetation and establishment of alien vegetation Indirect Impact » Infestation and establishment of alien vegetation	Lco » Infestation and establishment of alien vegetation al	None identified at this stage

Description of expected significance of impact The most notable impact is the expectant loss of some water resources, the desktop wetlands in particular. The loss of wetland is unavoidable with the proposed layout, however the EA for the Richards Bay IDZ Phase 1F EA included the infilling of some of the wetlands on site to release the land for development. The proposed layout will also alter the hydrodynamics of the immediate catchment area.
Gaps in knowledge & recommendations for further study » This is completed at a desktop level only. » Identification, delineation and characterisation of water resources. » Undertake a functional assessment of systems where applicable. » Determine a suitable buffer width for the resources. » **Recommendations with regards to general field surveys** » Field surveys to prioritise the development areas, but also consider the 500 m regulation area. » Beneficial to undertake fieldwork during the wet season period.

8.3.5 Impacts on soil and agricultural potential

Impact

The entire operation takes place within the context of presently vacant, unutilized land within an existing industrial. The agricultural sensitivity for the project development area was however determined to be of High sensitivity (DFFE Screening Tool) due to the association with soils of high land capability.

The following impacts on soils and agricultural within the project site and the surrounding area could potentially occur during the construction and operational phase of the Phakwe Richards Bay Gas Power 3 CCPP (refer to Appendix E):

» Loss of land capability

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Compaction/soil stripping/transformation of land use which leads to loss of land capability	Direct impacts: » Loss of soil / land capability Indirect impacts: » Loss of land capability	Regional	None identified at this stage

Description of expected significance of impact

The stripping of topsoil will result in a loss of soil. The extent of the footprint area is to be developed, and the agricultural potential of the area will be permanently altered. The land use will also be permanently altered to represent a transformed or developed land use classification.

The removal of soils and development of the area will result in soils being replaced, with constructed areas concrete (compacted) for the footprint area. This will result in a loss of infiltration, and a n increase on surface stormwater to be managed for the area.

Gaps in knowledge & recommendations for further study

- This is completed at a desktop level only.
- Identification and delineation of soil forms.
- Determine of soil sensitivity.

Recommendations with regards to general field surveys

- Field surveys to prioritise the development areas.

8.3.6 Impacts on heritage (archaeological) and palaeontological resources

Impact

Archaeological, built environment and palaeontological heritage resources may be impacted by the construction phase of the proposed development.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impacts to Archaeology	Direct Impact » None Indirect Impact » None	Local	None identified
Impact to Palaeontology	Direct Impact » None Indirect Impact » None	Local	None identified

Description of expected significance of impact

Significant archaeology is unlikely to be negatively impacted by the proposed development as the area has been extensively previously disturbed.

Significant palaeontological heritage is unlikely to be negatively impacted by the proposed development as the palaeontological sensitivity of the area is Low.

Recommendations

- The heritage resources in the area proposed for development are sufficiently recorded - The surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development.

» Should any heritage resources be impacted during the course of development, work must cease and AMAFA must be contacted in order to determine a way forward. This will likely require input from either an archaeological specialist or palaeontological specialist depending on the nature of the heritage resource impacted

8.3.7 Impacts on ambient air quality

Impact

Based on qir quality dispersion modelling that the been done, emission were quantified from 11 industries within the Richards Bay airshed. The baseline operations were simulated to result in exceedances PM_{10} of the currently enforceable NAAQS (40 µg/m³) across much of the port area and adjacent areas mainly due to coal stockpiling and handling operations. Annual average SO2, due to normal operations of the industrial sources in Richards Bay, were simulated to comply with the NAAQS across the domain, where the highest concentrations are expected close to Richards Bay central, Alton, and Brackenham. Annual average NO2 was simulated to comply with the NAAQS across the domain for normal operation of the industries operating in Richards Bay, with maximum concentrations occurring near Alton and Richards Bay Central.

The following potential construction and operational impacts of the proposed project based on a desktop assessment of existing information have been identified:

» Elevated ambient concentrations of particulate and gaseous atmospheric pollutants as a result of construction activities.
» During the operation phase, the proposed development is likely to contribute NO_X, CO, and VOCs to the existing baseline concentrations.
» The combustion of natural gas will produce greenhouse gas emissions which will contribute to the global phenomenon of anthropogenic climate change
» Health related impacts due to air quality related impacts

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Particulate and Gaseous pollutant emissions	Direct impacts: » Potentially elevated ambient particulate and gaseous concentrations that may have human health impacts. » Potentially elevated nuisance dustfall rates. Indirect impacts: » Low probability of impacts to vegetation as a result of particulate deposition	Local	None identified at this stage
Gaseous pollutant emissions during operation	Direct impacts: » Potentially elevated ambient gaseous pollutant concentrations, that may have human health impacts, as a result of gas combustion in turbines.	Local	None identified at this stage

	» Low probability of elevated ambient particulate concentrations that may have human health impacts, due to gas combustion in turbines. Indirect impacts: » Low probability of impacts to vegetation as a result of pollutant exposure and particulate deposition.		
Contribution to Climate Change	The combustion of natural gas will produce greenhouse gas emissions which will contribute to the global phenomenon of anthropogenic climate change.	Global	None identified at this stage
Health Impacts	The combustion of natural gas may have potentially related health impacts.	Local	None identified at this stage
Description of expected significance of impact During construction, the bulk earthworks and vehicle activity associated with construction of the proposed facility are likely to result in local impacts, with possible non-compliance with the NAAQS near site within the industrial area but not at sensitive receptors. The impact is likely to be short-term in nature and can be minimised through effective mitigation measures and good housekeeping practices. During operation, The combustion of natural gas (with the possible the inclusion of hydrogen) is likely to result in local impacts, with possible non-compliance with the NAAQS near site within the industrial area and possibly within surrounding suburbs and at sensitive receptors. The pollutants of concern include: CO, NO2, and (to a lesser extent) SO2, PM10, PM2.5 and VOCs. The impact is likely to be long-term in nature. Effective mitigation measures are likely to reduce the extent of impact.			
Gaps in knowledge & recommendations for further study » NOX emissions from the gas combustion during the operation phase will likely have the most substantive impact on ambient air quality. Ambient NOX and NO2 are not currently monitored by the RBCAA, however the City of uMhlathuze AQMSs record ambient NOX and NO2 and the most recent data will be used to assess cumulative impact of the proposed facility. 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 NOX. Existing simulated baseline studies (WSP in 2016) will support the measured baseline to assess the cumulative impacts over the Richards Bay domain. Design considerations to minimise air quality impact already under consideration include natural gas and hydrogen mix; closed cycle turbines with heat recovery (increasing the total plant efficiency). These should be expanded (if not already under consideration): turbine combustion optimisation to reduce NOx emissions; and stack height for optimal dispersion to minimise near-site impacts. These design details should be available prior to the dispersion modelling study in the EIA phase. » Climate Change impact assessment will be undertaken during the EIA phase to determine the impact of the Phakwe Richards Bay Gas Power 3 CCPP on the climate. » A Health impact assessment will be undertaken during the EIA phase to determine the impact of the Phakwe Richards Bay Gas Power 3 CCPP on health			

8.3.8 Impacts on ambient noise levels

Impact

The construction and operational activities associated with the development of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure will increase the ambient noise levels in the area.

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 contractor's camps, storage and laydown areas;
- Earthworks, possible blasting (if hard rock is encountered) and piling activities;
- Development of foundations;
- Laying of pipelines and establishment of the switchyard; and
- Construction of infrastructure and facilities.

Operational activities that will have an impact include:

- The air intake fans;
- Fans located on the air and steam condensers;
- Gas Turbine, steam turbine and generator (normally within building);
- Ventilation fans located on the turbine generator building; and
- Exhaust and flue stacks

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increase in noise level at receptors during construction.	Increased noises or disturbing noises may increase annoyance levels with project	Multiple night-time construction activities taking place simultaneously may impact an area within 2 000m from the activities	None identified
Increase in noise level at receptors during operation.	Increased noises or disturbing noises may increase annoyance levels with project	Multiple night-time construction activities taking place simultaneously may impact an area within 2 000m from the activities	None identifies
Description of expected significance of impact			

The significance of noise impacts will be low during the construction phase and medium to low during operation.
Gaps in knowledge & recommendations for further study Noise modelling to be undertaken during the EIA Phase will calculate potential noise levels considering topography, ground surface constants and potential noise-emitting activities.

8.3.9 Visual Impacts

Impact

Visual impact of the construction and operational activities on observers in close proximity to the proposed infrastructure and activities. Anticipated issues related to the potential visual impact of the proposed power plant and an-cillary infrastructure includes the following:

- The visibility of the facility from, and potential visual impact on observers travelling along the R619 main road or residing within a 1 – 3km radius of the plant (e.g. residents of Brachenham and Wilde-en-Weide).
- The visibility of the facility to, and potential visual impact on residents of farm residences located within close proximity of the site (if present).
- Potential cumulative visual impacts (or alternatively, consolidation of visual impacts) with specific reference to the location of the proposed power plant within an existing indus-trial area.
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in close proximity to the facility.
- The visual absorption capacity of existing structures, buildings and natural or planted veg-etation (if applicable) within the study area.
- The potential to mitigate visual impacts.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
The viewing of the power plant and ancillary infrastructure and activities	The potential negative experience of viewing the power plant and ancillary infrastructure and activities	Primarily observers situated within a 1-3km radius of the power plant	None identified at this stage

Description of expected significance of impact

Visual impacts during the construction phase of the Phakwe Richards Bay CCPP are expected to be moderate significance but contained to the local extent of the site due to sensitive visual receptors that were identified within 2000m of the proposed power plant site.

Gaps in knowledge & recommendations for further study

- A finalised layout of the power plant and ancillary infrastructure are required for further analysis. This includes the provision of the dimensions of structures and equipment.
- Additional spatial analyses are required in order to create a visual impact index that will include the following criteria:
  - Visual exposure (including the effect of existing structures and vegetation)
  - Visual distance/observer proximity to the structures/activities

- Viewer incidence/viewer perception (sensitive visual receptors)
- Visual absorption capacity of the environment surrounding the power plant infrastructure and activities

Additional activities:

» Identify potential cumulative visual impacts (or consolidation of visual impacts)
» Undertake a site visit
» Recommend mitigation measures and/or infrastructure placement alternatives

8.3.10 Impacts on the socio-economic environment

Impact:

The following components have been identified within the receiving Socio-Economic Environment:

» Load shedding in terms of electricity supply is a reality within the KZN province and greater Country.
» High levels of unemployment within the Local and District Municipalities at 31% and 34.7%, respectively.
» Richards Bay had an average monthly income of R 23,130 with a significantly smaller portion of households living on less than R 3,200 per month. The relatively high average income is likely attributable to the high level of industrialisation in Richards Bay.

The development of the Phakwe Richards Bay Gas Power 3 CCPP will have both positive and negative impacts on the social environment during the construction and operational phase. The section below provides more details of the associated potential impacts.

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

» Demographic Impacts
» Community Impacts
» Economic and Socio-economic Impacts

Issue	Nature	Extent of Impact	No-Go Areas
Size and composition of the resident population	Direct impacts: » None Indirect impacts: » During construction, the proposed development could result in increased population sizes of communities close to the development.	Municipal	None identified at this stage

Changes in Household numbers	Direct impacts: » None Indirect impacts: » With increased number of people moving close to the development there would also be an increase in the number of residential areas	Regional	None identified at this stage
Standard of living	Direct impacts: » None Indirect impacts: » With increased population and household numbers within the area, the standard of living could be negatively impacted as some people would not have the financial means to maintain a good standard of living.	Municipal	None identified at this stage
Infrastructure development	Direct impacts: » The proposed project will result in infrastructure development in the area since the development will comprise of various infrastructure units. Indirect impacts: » None	Municipal	None identified at this stage
Pressure on basic services during operational stage	Direct impacts: » None Indirect impacts: » The development of the project and increased population and household numbers linked to the project will likely result in added pressure on the supply of basic services.	Regional	None identified at this stage
Ambient particulate concentrations and dustfall rates during operational stage	Direct impacts: » Potentially elevated ambient particulate concentrations that may have human health impacts. » Potentially elevated nuisance dustfall rates. Indirect impacts: » Low probability of impacts to vegetation as a result of particulate deposition	Local	None identified at this stage
Ambient gaseous pollutant concentrations during operational stage	Direct impacts: » Potentially elevated ambient gaseous pollutant concentrations, that may have human health impacts, as a result of vehicle exhaust emissions. Indirect impacts: » Low probability of impacts to vegetation as a result of pollutant exposure	Local	None identified at this stage

Ambient air pollutant concentrations during operational stage	Direct impacts: » Potentially elevated ambient gaseous pollutant concentrations, that may have human health impacts, as a result of gas combustion in turbines. » Low probability of elevated ambient particulate concentrations that may have human health impacts, due to gas combustion in turbines. Indirect impacts: » Low probability of impacts to vegetation as a result of pollutant exposure and particulate deposition.	Local	None identified at this stage
Increased noise levels during construction stage	Direct impact » The construction of the plant can be expected to result in increased noise levels to surrounding communities. Indirect impact » Protest from neighbouring communities due to disturbance.	Local	None identified at this stage
Increased noise levels during operational stage	Direct impact » The construction of the plant can be expected to result in increased noise levels to surrounding communities within 2000m of the site. Indirect impact » Protest from neighbouring communities due to disturbance.	Local	None identified at this stage
Improved energy generation during operational stage	Direct impacts: » The development of the proposed project will result in improved electricity generation » Indirect impacts: » The electricity generated from the plant will improve the national energy supply and release pressure from Eskom.	National	None identified at this stage
Production during construction and operational stage.	Direct impacts: » None » Indirect impacts: » With improved electricity generation and reduced power-cuts, the level of production can be expected to increase.	National	None identified at this stage
Economic Value (GDP)	Direct impacts: » None » Indirect impacts:	National	None identified at this stage

	» Through improved energy supply and production, GDP is expected to be positively impacted by the project.		
Tax Revenue	Direct impacts: » The revenue generated at the operational stage of the plant will incur tax. » Indirect impacts: » This will improve government revenue and hence resources that can be allocated for service delivery.	National	None identified at this stage
Household Income	Direct impacts: » None Indirect impacts: » Through income earned by employee at the plant as well as improved economic activity as a result of the power plant, household incomes of can be expected to increase.	National	None identified at this stage
Skills Development	Direct impacts: » Skills development in the form of training employees on how to operate the gas power plant will be transferred. Indirect impacts: None	Regional	None identified at this stage
Property Prices	Direct impacts: » None » Indirct impacts: » The impact on property prices will be minimal since the site in located in a IDZ location.	Regional	None identified at this stage
Employment Creation during construction and operational stages.	Direct impacts: » The project will result in direct employment creation. Indirect impacts: » Through improved productivity levels in the area, more employment can be created in other sectors.	National	None identified at this stage
Description of expected significance of impact The proposed development site is located in an industrial area which is considered to be a Industrial Development Zone (IDZ). This therefore means that the area has several large scale current and planned projects in the area. The development of the power plant, and given the nature of its clean energy production, is not expected to have significant negative impacts on its surroundings. There are currently many heavy vehicles travelling in the area and the construction and operation of the proposed power plant will not result in significant changes to the current activity in the area. It's also important to note that there would be some minor negative impacts as listed in the table			

above and these impacts can be minimised through the implementation of appropriate mitigation measures. The area of Wild En Weide is the closest residential establishment to the site and some of the above listed impacts will affect these residents.

Gaps in knowledge & recommendations for further study

- The development of the plant could result in an increase in the number of households as well as the population number in the area.
- With increase in population numbers and lack of service delivery to serve the increase in the population and household numbers, the standard of living in the area might be negatively impacted.
- Assessing the current living standards of the communities surrounding the site.
- The increase in population and household sizes could lead to increased levels of crime as some people who fail to find employment in the area could resort to crime as a way of survival.
- For the above listed demographic impacts, the construction and operational phases are expected to result in simi-lar impacts.
- Carefully assess the proximity of the nearest residential establishments to see if these could be impacted by the power plant development.
- Mapping of all affected communities and organisations concern within the development footprint.
- Mapping of known and potential business establishments which might be affected by the development of the pro-ject on the identified site.
- Indication of the potential resistance from neighbouring organisations about the proposed development site.
- Assessment of the extent to which the air and noise pollution will impact/affect the surrounding communities of Wild En Weide.
- Mapping of known and potential business establishments which might be affected by the development of the pro-ject on the identified site.

8.3.11 Impacts on traffic

Impact:

Potential transport related impacts during construction and operation are as follows:

Construction Phase

- Construction related traffic
- The construction traffic would also lead to noise and dust pollution.
- This phase also includes the construction of roads, excavations, trenching and ancillary construction works that will temporarily generate the most traffic.

Operational Phase

During operation, it is expected that staff and security will visit the facility. Approximately 60 full-time employees will be stationed on site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.

Issue	Nature	Extent of Impact	No-Go Areas

Traffic Congestion	Direct: Potential traffic congestion and delays on the surrounding road network. Indirect: The associated noise, dust and exhaust pollution due to the increase in traffic	Local	N/A
Description of expected significance of impact The significance of the transport impact during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level. Traffic will return to normal levels after construction is completed. Noise and dust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. These potential impacts will be limited to the construction period.			
Gaps in knowledge & recommendations for further study » Existing traffic volumes along the R34 and R619 » Local or imported components » Number of components » Number of abnormal loads » Dimensions and weight of components » Construction period » Number of site staff » Fleet size **Recommendations** » To clarify the items above, an additional site visit during the EIA phase is recommended. » Transport Specialist requires the above information when it becomes available			

8.4 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. Boundaries must be set so analysts are not attempting to measure effects on everything. Therefore, the cumulative impacts associated with the Phakwe Richards Bay Gas Power 3 CCPP have been viewed from two perspectives within this report:

- Cumulative impacts associated with the location and nature of the project,
- Cumulative impacts associated with other relevant approved or existing and proposed similar developments within the surrounding area of the proposed Phakwe Richards Bay Gas Power 3 CCPP.

Refer to **Figure 8.1** for an illustration of other existing industrial developments located within the surrounding areas of the project site.

Cumulative impacts, in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (NEMA, 2017). 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 Phakwe Richards Bay Gas Power 3 CCPP is proposed to be located in the Richards Bay Industrial Development Zone Phase 1F which falls within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province.

The Richards Bay IDZ has been identified by City of uMhlathuze Local Municipality as an area of focus for the development of industrial development. As such, 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 Tata Steel, which is located directly adjacent to the south of the site.

Cumulative impacts associated with the proposed project could relate to:

- Ecological Impacts;
- Aquatic and Surface Water Impacts;
- Visual and social impacts due to a more industrialised area;
- Air quality impacts (including climate change and health related impacts);
- Noise impacts;
- Traffic impacts; and
- Socio-economic impacts.

From a cumulative perspective it is anticipated at this stage that the development of the Phakwe Richards Bay Gas Power 3 CCPP will not result in unacceptable risk or loss to the environment. This is supported by the following:

- The transformed nature of the vegetation within a large portion of the site.
- The fact that the site is located within the Richards Bay Industrial Development Zone, and can therefore be considered as a site which would have been developed for some type of industry or entity at some stage in the future.
- The limited potential of the site for agricultural purposes due to its location within the Richards Bay IDZ, the current land zoning of the site and low agricultural potential of the soils on the site.
- The location of the site in relation to residential areas and sensitive social receptors.

The cumulative impacts associated with the development of the Phakwe Richards Bay Gas Power 3 CCPP will be assessed in detail 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.

» Critical and much needed energy enhancement of South Africa's energy security, through the establishment of additional electricity generation capacity to alleviate load shedding and provide much need efficient and flexible generation capacity necessary to support the variability and expansion of South Africa's renewable generation capacity
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.

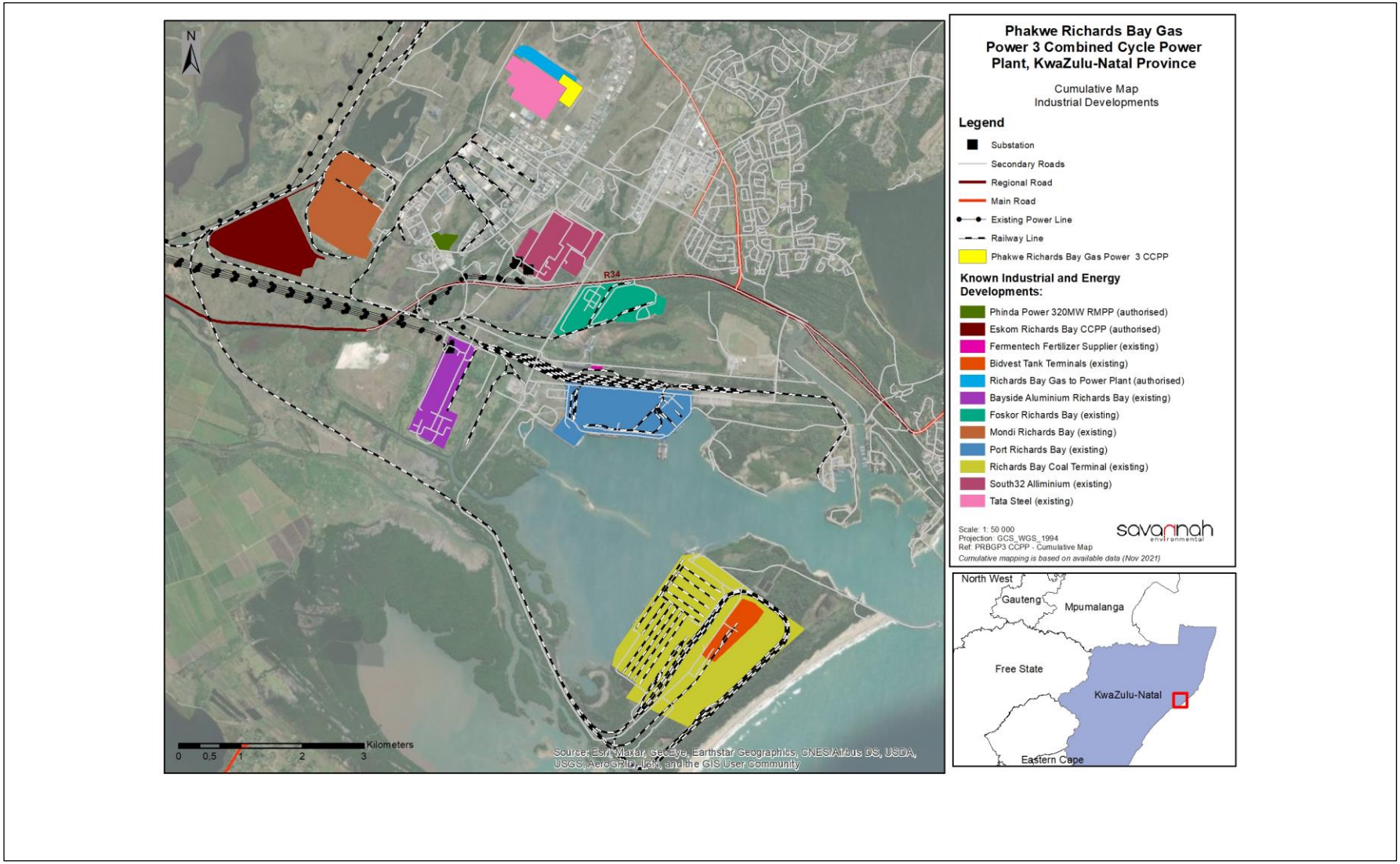

Figure 8.1: Cumulative map illustrating other industrial developments located within the vicinity of the Phakwe Richards Bay Gas Power 3 CCPP project sites (**Appendix L**)

CHAPTER 9: CONCLUSION

Phakwe Richards Bay Gas Power 3 (Pty) Ltd (PRBGP3) proposes the development of a combined cycle (CC) gas to power plant, with a capacity of up to 2 000MW, on various erven within the Richards Bay IDZ Phase 1F, Richards Bay. The project site is located approximately 5km north-east of Richards Bay and 1km north of the suburb of Alton, within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province. The facility will be operated with natural gas or a mixture of natural gas and hydrogen.

The development of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure provides an opportunity to contribute to "just transition" of the energy mix through the development of a power station which will enable the generation of electricity through the use of a cleaner fuel resource, with less emissions (which will be reduced over time with the planned inclusion of green hydrogen in the fuel mix with natural gas and may eventually reach zero emissions when the percentage of green hydrogen reaches 100%, replacing completely the natural gas) than coal fired power stations, which can also support the uptake of renewable energy as part of the energy mix, while the process of decommissioning of coal based technology facilities are undertaken.

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 is aimed at detailing the nature and extent of the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure, 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 Phakwe Richards Bay Gas Power 3 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 being undertaken in accordance with the approved public participation plan, and every effort is being made to include representatives of all stakeholder groupings in the communities surrounding the project site and the province.

During this Scoping phase issues associated with the proposed project were identified and 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 Phakwe Richards Bay Gas Power 3 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 10 of this Scoping Report.

9.1. 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 Phakwe Richards Bay Gas Power 3 CCPP is included within this chapter.

9.2 Conclusion drawn from the Evaluation of the Proposed Project

Potential impacts associated with the development of the Phakwe Richards Bay Gas Power 3 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 Phakwe Richards Bay Gas Power 3 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 primary impact arising at a national level will be the positive impact of critical additional energy generation. The issue of Climate change arises from an international perspective.

The following provides a summary of the findings of the specialist studies undertaken:

» ***Terrestrial Ecology:*** The project site for the Phakwe Richards Bay Gas Power 3 CCPP falls entirely within a NPAES focus area, the 'Critically Endangered' Kwambonambi Hygrophilous Grassland ecosystem, the 'Endangered' Maputaland Wooded Grassland vegetation type, and intersects with 'Vulnerable' Subtropical Freshwater wetlands and National and Provincial CBA areas. These findings are therefore in contradiction with local (uMhlathuze municipality) conservation planning objectives which zoned the project site for the development of noxious industries. During the preliminary site inspection undertaken during July 2020, it was determined that the site is already degraded and therefore not representative of the environmental sensitivities identified during the desktop assessment, and unlikely to support high levels of biodiversity. Nevertheless, several fauna and flora species of conservation concern may potentially be present, albeit probability of occurrence is regarded as Low for most of the species. The presence or absence of these species, and a better understanding of the environmental impacts the proposed development may have on fauna and flora species of conservation concern will investigated further during the EIA phase and mitigation measures recommended to minimise impacts.

» ***Wetland and Aquatic Features:*** A wetland assessment as part of the RBIDZ feasibility (SIVEST, 2010) noted that the loss of the wetland areas must be looked at holistically in the context of the conservation needs of all the IDZ sites assessed. In response to this, two sites were of distinctly higher quality, namely, IDZ 1C and the western portion of IDZ 1D as they have very high conservation significance and it was felt that these areas should be excluded from any development planning for the area and development should rather be focused on IDZ 1A, 1B, 1F and the eastern portion of 1D. The IDZ 1C and 1D are referred to as potential offset areas. A conceptual wetland offset plan was compiled in support of the EA. Richards Bay Industrial Development Zone SoC Ltd received Environmental Authorisation (EA) for the IDZ Phase 1F in September 2016 (DFFE Ref No.: 14/12/16/3/3/3/665). This EA included the infilling of some of the wetlands on site to release the land for development. The existing development within the area has altered the surface flow dynamics creating directional surface run-off across the project area and artificial pooling in some localities which has altered the hydrology of the area. A detailed assessment on the functioning of the wetlands systems and any other freshwater features within the project site and within the 500m regulated area of the site will be undertaken during the EIA phase and mitigation measures recommended to minimise impacts.

» ***Soils and Agricultural Potential:*** Although the project site is located within a naturally degraded industrial area, the land capability of the soils have been regarded as high sensitivity based on a desktop evaluation using the DFFE screening Tool. The delineation of soil forms and determination of soil sensitivity will be undertaken during the EIA phase and mitigation measures recommended to minimise impacts and mitigation measures recommended to minimise impacts.

» ***Heritage Resources (incl. Palaeontological and Archaeological):*** The heritage resources in the area proposed for development are sufficiently recorded, as the surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development. Regarding palaeontological resources, it is very unlikely that the proposed development will negatively impact on significant palaeontological heritage and as such, it is recommended that no further palaeontological studies are required. A Chance Finds Procedure must however be included within the EMPr for the project.

»

» ***Air Quality, Climate Change, and Health:*** The proposed Phakwe Richards Bay Gas Power 3 CCPP, with a generating capacity up to 2 000 MW, may result in 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. The impacts are likely to be local. During the operation phase, the proposed Phakwe Richards Bay Gas Power 3 CCPP, with a generating capacity up to 2 000MW, is likely to contribute NO_X, CO, and VOCs to the existing baseline concentrations. Cumulative impacts of SO_2 and PM emissions, although small, may result in cumulative impacts with possible non-compliance to already elevated baseline concentrations. The impacts are likely to be regional. Atmospheric dispersion modelling will be used to assess incremental and cumulative impacts on ambient pollutant concentrations during the EIA phase of assessment. Although the Phakwe Richards Bay Gas Power 3 CCPP proposes to progressively reduce carbon emission over time with the increased presence of green hydrogen as part of the fuel mix, climate change impacts associated with the development of the Phakwe Richards Bay Gas Power 3 CCPP relate to the combustion of fuel (natural gas) at the CCPP 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. It is expected that the Phakwe Richards Bay Gas Power 3 CCPP will contribute to South Africa's national emissions inventory. The significance of this impact must be quantified in the impact assessment phase of the project. The significance of health-related impacts as a result of air quality impacts must also be evaluated in the EIA phase.

» ***Noise:*** The construction and operation of the Phakwe Richards Bay Gas Power 3 CCPP will increase the noise levels in the vicinity of the plant. The site visit identified potential noise-sensitive receptors within 2000m to the project site. It is expected that the significant impacts on noise sensitive receptors could be of medium-low significance. No no-go areas for development were identified. It is recommended that the noise impact be investigated in more detail during the EIA phase, including further ambient sound measurements and recommendations for mitigation measures, where required.

» ***Visual:*** Impacts from a visual perspective are expected to occur during the construction and operation phases of the Phakwe Richards Bay Gas Power 3 CCPP on observers in close proximity to the proposed infrastructure and activities. The project site is located within the Richards Bay IDZ and adjacent to existing heavy industrial development. 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. The significance of the development of the Phakwe Richards Bay Gas Power 3 CCPP on the visual aspects is expected to be moderate. No no-go areas for development were identified. Potential visual impacts must be assessed in detail within the EIA Phase of the process and mitigation measures recommended where required.

» ***Socio-economic aspects:*** The construction of the Phakwe Richards Bay Gas Power 3 CCPP will result in both positive and negative impacts on the social environment. During the construction phase the positive impacts will include an increase in the production and GDP of the national and local economies, temporary employment opportunities, skills development and household income leading to improved standard of living. 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, an increased demand in housing within the broader area, and impacts on daily living and movement patterns as a result of increases in traffic. Positive and negative impacts are expected to occur with the operation of the Phakwe Richards Bay Gas Power 3 CCPP. Positive impacts include a sustainable increase in the production and GDP 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 potential impacts on air quality from the operating Phakwe Richards Bay Gas Power 3 CCPP, traffic and visual impacts. The significance of socio-economic impacts must be quantified through a detailed assessment in the EIA Phase of the process and mitigation and enhancement measures recommended where required.

» ***Traffic impacts:*** Impacts on traffic are expected during the construction phase of the facility. No impacts on traffic are expected during operation. The proposed site is deemed well located and connected for its purpose. The proposed access point, located on the access road located off Alumina Alley, will need to be upgraded to cater for the construction vehicles and abnormal load vehicles. The significance of the transport impact during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level. Traffic will return to normal levels after construction is completed. Impacts associated with traffic during the construction phase must be further assessed during the EIA phase and appropriate mitigation recommended where required.

» ***Cumulative Impacts:*** The project site is located within an existing industrial area of the Richards Bay IDZ, an area where further heavy industry is planned. Industrial developments directly adjacent to the project site include the Tata Steel facility. Other authorised gas to power projects have been permitted within the Richards Bay area, although none have yet commenced construction. As a result, there is the potential for cumulative impacts to occur. The significance of these impacts must be assessed within the impact assessment phase of the EIA process.

No environmental fatal flaws or impacts of very high significance were identified to be associated with the development of the Phakwe Richards Bay Gas Power 3 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.

9.3 Scoping Phase Sensitivity Analysis

Through the Scoping Phase sensitive features within the project site and surroundings have been identified which could be affected by the development of the Phakwe Richards Bay Gas Power 3 CCPP (refer to **Figure 9.1**). These include wetland features and medium sensitivity vegetation (Maputaland Wooded Grassland) within the project site, as well as potentially sensitive noise and air quality receptors further afield (>2km). Regarding the wetland features, Richards Bay Industrial Development Zone SoC Ltd received Environmental Authorisation (EA) for the IDZ Phase 1F in September 2016 (DFFE Ref No.: 14/12/16/3/3/3/665). This EA included the infilling of some of the wetlands on site to release the land for development. However, it has been recommended that the loss of the wetland areas must be considered holistically in the context of the conservation needs of all the IDZ sites assessed. The direct and indirect impacts on the site and surrounding sensitivities will be assessed in detail during the EIA phase.

9.5 Recommendations

The findings of this Scoping Report were based primarily on desktop assessments and site visits. Based on this assessment, no environmental fatal flaws have been identified to be associated with the project at this stage in the process. 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 10 of this report. These studies will consider the detailed layouts produced by Phakwe Richards Bay Gas Power 3 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.

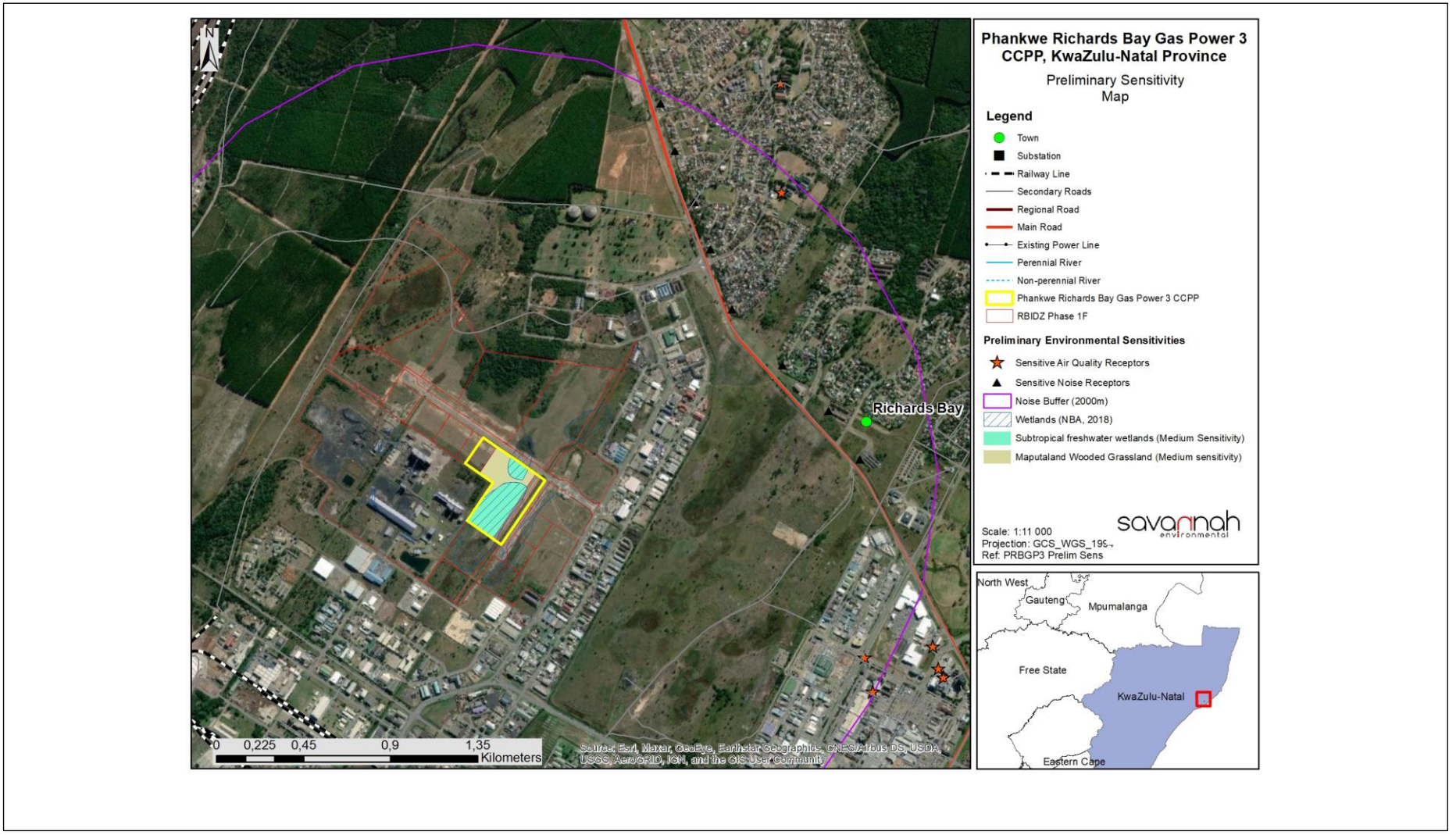

Figure 9.1: Sensitivity map illustrating the sensitive environmental features located within and around the Phakwe Richards Bay Gas Power 3 CCPP project sites (**Appendix L**)

CHAPTER 10: PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

This Scoping Report includes a description of the nature and extent of the Phakwe Richards Bay Gas Power 3 CCPP located on sites within Richards Bay Industrial Development Zone (IDZ), 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 the EIA.

10.1. 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 Phakwe Richards Bay Gas Power 3 CCPP is included within Sections 10.2 to 10.8 of this chapter.

10.2 Aims of the EIA Phase

The EIA Study to be undertaken for the Phakwe Richards Bay Gas Power 3 CCPP will aim to achieve the following:

- Provide a description of all components of the project, including identified feasible alternative.
- Provide an overall description of the economic, social and biophysical environment affected by the development of the proposed project.
- Provide a description of the positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focussing on the geographical, physical, biological, social, economic, heritage and cultural aspects;
- Assess potentially significant impacts (direct, indirect and cumulative, where required) Identify and recommend appropriate measures to avoid, manage and mitigate 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 Phakwe Richards Bay Gas Power 3 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.

10.3 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 Final 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 and EMPr for review and comment. The report will be made available for a 30-day review period.
- Submission of a Final EIA Report and EMPr 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.

10.4 Consideration of Alternatives

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

- **The 'do nothing' alternative:** not constructing the proposed Phakwe Richards Bay Gas Power 3 CCPP on the project site within the RBIDZ Phase 1F.
- **Site-specific layout/design alternatives:** In terms of the position of the Phakwe Richards Bay Gas Power 3 CCPP within the project site, and layout and/or design of the facility development footprint.
- **Technology alternatives:** No power generation technology alternatives are being considered for this development within the Richards Bay area. As detailed within this Scoping Report, the Phakwe Richards Bay Gas Power 3 CCPP and associated infrastructure provides an opportunity to contribute to "just transition" of the energy mix through the development of a power station which will enable the generation of electricity through the use of a cleaner fuel resource, with less emissions (however not zero emissions) than coal fired power stations, and can also support the uptake of renewable energy as part of the energy mix, while the process of decommissioning of coal based technology facilities is undertaken. In addition, by utilising fuel sources such hydrogen (whether 100% hydrogen or a as blend) for the operation of gas power facility, there may be a further reduction in carbon emissions related to power generation if green or similarly sourced hydrogen is used.
- **Fuel alternatives:** The Phakwe Richards Bay Gas Power 3 CCPP will be operated using natural gas, or a mixture of natural gas and hydrogen. The inclusion of H2 in the mixture of the fuel source lowers carbon emissions of the power plant during combustion, with the potential to reach zero emission when the fuel consists completely of H2, as is envisaged in the future for this facility.
-

10.5 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 10.1**. The specialists responsible for these studies are also reflected within this table. These specialist studies will consider the development footprint proposed for the Phakwe Richards Bay Gas Power 3 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 therefore proposed:

» ***Impacts on archaeological and palaeontological resources***: The desktop study indicated the heritage resources in the area proposed for development are sufficiently recorded, as the surveys undertaken in the area adequately captured the heritage resources. There are no known sites which require mitigation or management plans. No further heritage work is recommended for the proposed development. Regarding palaeontological resources, it is very unlikely that the proposed development will negatively impact on significant palaeontological heritage and as such, it is recommended that no further palaeontological studies are required.

Table 10.1: 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 Phakwe Richards Bay Gas Power 3 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** During the preliminary site inspection, it was determined that the site is already degraded and therefore not representative of the environmental sensitivities identified during the desktop assessment, and unlikely to support high levels of biodiversity. Nevertheless, several fauna and flora species of conservation concern may potentially be present, albeit probability of occurrence is regarded as Low for most of the species. The precautionary approach is to assume that the species listed are present and more detailed studies will be required to confirm the presence or absence of these species, and to gain a better understanding of the environmental impacts the proposed development may have on fauna and flora species of conservation concern. It is therefore recommended that the presence of fauna and flora species of conservation concern should be confirmed with more detailed assessments during the EIA phase. Flora and vegetation studies should be conducted during the summer season (beginning of November to end of April for KwaZulu-Natal) and should include the following: » The location and extent of all plant communities on the project site should be documented and mapped according to the guidelines and requirements provided in the Sensitivity Mapping Rules for Biodiversity Assessments (EKZNW Guidelines for Biodiversity Impact Assessments, 2013); the Protocols for the Specialist assessment and minimum report content requirements for environmental impacts on biodiversity [G 43310 – GB320], and the Species Environmental Assessment Guidelines (Version 1.0) (SANBI 2020). » A list of plant species should be provided, indicating the number of forbs/herbs, grasses, shrubs, tree species and a description of the vegetation structure for each plant community identified. Medicinal and exotic/invasive species should be indicated. » All Red and Orange listed plant species, as well as plant populations should be mapped out with a GPS (WGS84 datum; geographic coordinate system). » Protective buffer zone widths, consistent with the Red List Plant Species Guidelines should be designated as sensitive on a sensitivity map. Fauna studies should include the following:	Anita Rautenbach of Rautenbach Biodiversity Consulting

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Assess the significance of the fauna habitat components of the site qualitatively and quantitatively. » Provide a detailed list of all fauna species confirmed to be present on site and all adjacent properties within a 500 m radius. » Provide GPS locations (WGS 84 datum; geographic coordinate system) of all Red listed, provincially protected and endemic fauna species confirmed to be present on site, as well as the location and extent of all habitats for Red Listed species on site and on adjacent properties within a 500 m radius a sensitivity map (Guidelines for Biodiversity Impact Assessments in KZN, 2013; Protocols for the Specialist assessment and minimum report content requirements for environmental impacts on biodiversity [G 43310 – GB320], and the Species Environmental Assessment Guidelines (Version 1.0) (SANBI 2020). » Determine the size and location of buffer zones for all Red Data fauna species. Buffer zone sizes should be motivated in terms of the latest research. » Provide detailed site-specific mitigation measures where appropriate. For the avifauna field survey, an ecosystem/regional approach should be adopted and should include the following: » Determine whether the proposed development site falls within the known or expected distributional range of any of the Red List Bird Species. » Determine if suitable habitat occurs on the proposed development site or neighbouring properties for Red Listed Bird Species whose distributional ranges overlap with the proposed development site. » All flight paths, breeding sites and related buffer and specific threat areas (e.g., collisions, electrocutions etc.) should be indicated on sensitivity map according to the Sensitivity Mapping Rules for Biodiversity Assessments (Guidelines for Biodiversity Impact Assessments in KZN, 2013; Protocols for the Specialist assessment and minimum report content requirements for environmental impacts on biodiversity [G 43310 – GB320], and the Species Environmental Assessment Guidelines (Version 1.0) (SANBI 2020). From the above, an assessment of impacts will be undertaken and recommendations regarding mitigation measures will be made for inclusion in the EMPr. A reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised, will be provided. **Assessment of Impacts for the EIA** The methodology described above will assist in the assessment of the overall effect of the proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	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 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: » The description of the current state of identified wetland on the boundary of the project site, specifically focusing on Present Ecological State (PES), Ecological Importance and Sensitivity (EIS) as well as the Ecosystem Regulating and Supporting Services that this wetland system provides will be presented in the Aquatic Biodiversity Impact Assessment Report during the EIA phase of the project. » In-situ water quality testing is planned during the follow-up site visit and the results will be presented and interpretation thereof presented in the Aquatic Biodiversity Impact Assessment Report which will be submitted during the EIA phase of the project. » The results obtained will form the baseline survey from which changes to both upstream and downstream water quality as a result of the project can be measured during the construction and operation phases of the proposed development and will inform monitoring requirements for the project Environmental Management Programme (EMPr). » The recorded values will be compared to the acceptable ranges as indicated in the South African Water Quality Guidelines compiled by the Department of Water Affairs and Forestry (DWAF, 1998) for Aquatic Ecosystems and presented and discussed in the Aquatic Biodiversity Impact Assessment Report during the EIA phase of the project. » Recommendations for rehabilitation of any disturbed wetland areas identified will be provided. » Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised. **Assessment of Impacts for the EIA**	Dale Kindler and Andrew Husted of the Biodiversity Company

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	The methodology described above will assist in the assessment of the overall effect of the 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 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 & Agricultural Impact Assessment	**Sensitivity Analysis and EIA assessment** The following activities are proposed during the EIA Phase: » Soil and agricultural survey for all proposed infrastructure. The survey will include soil classification and land capability and agricultural potential is to be determined by a combination of soil, terrain and climate features identified on site. » Recommendations for mitigation of any signficant impacts identified will be provided. » Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised. » **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. It will refer 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**	Dale Kindler and Andrew Husted of the Biodiversity Company

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	For each overarching anticipated impact, management recommendations for the design, construction, and operational phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Air Quality Impact Assessment	**Sensitivity Analysis and EIA assessment** The impact assessment for air quality will include the following: » 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 for the baseline, incremental, and cumulative scenarios using the CALPUFF atmospheric dispersion model. » 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 Environment, Forestry and Fisheries (DEFF) in support of the Atmospheric Emission License (AEL) application. » Impact Significance rating according to the method provided by Savannah Environmental (Pty) Ltd. » Recommendations regarding mitigation and monitoring for inclusion in the project EMPr. » Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised. **Assessment of Impacts for the EIA** The methodology described above assist in the assessment of the overall effect of the 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 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.	Terri Bird of AirShed Planning Professionals
Health Risk Assessment	**EIA assessment** The elements of the Human Health Risk approach are described below:	WCA van Niekerk and MH Fourie of Infotox

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Hazard assessment » Exposure-response assessment » Risk characterisation » Uncertainty review Furthermore, the results of air dispersion modelling from the air quality impact assessment are estimates of the resultant air concentrations of dispersed contaminants in the vicinity of impacted communities. These estimates will be incremental; that is, it will reflect the contribution of power generating activities and fugitive gas emissions to air concentrations of contaminants, over and above the background concentrations already present in the environment. Estimates of incremental air concentrations are the input needed to estimate potential human health risks in terms of selected health effects of interest according to the airborne contaminants of interest. The results of the HHRA, together with the baseline health status of the impacted communities, will be used to conduct a Health Impact Assessment.	
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. ∗ Setting the performance benchmark using the national GHG Emissions trajectory. » Analysis of alternatives: ∗ Review of alternatives for technology (gas engine, gas turbine, etc); ∗ Review of alternative cooling technologies; ∗ 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 assessment, including energy demand, against the identified alternatives. » Emission management during operations: ∗ Emission management plan for the operations phase.	Robbie Louw of Promethium Carbon

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised. **Assessment of Impacts for the EIA** The methodology described above assists in the assessment of the overall effect of the 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 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 Phakwe Richards Bay Gas Power 3 CCPP will have on surrounding areas. The visual impact assessment will include the following: » Undertake site visit » Determination of potential visual exposure » Determination of visual distance/observer proximity to the facility » Determination of viewer incidence/viewer perception (sensitive visual receptors) » Determination of the visual absorption capacity of the landscape » Calculate the visual impact index » Determine impact significance » Propose mitigation measures » Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised. **Assessment of Impacts for the EIA**	Lourens du Plessis of LOGIS

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	The methodology described above assists in the assessment of the overall effect of the 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 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** It is recommended that a full EIA level Socio-Economic Impact Assessment be conducted as part of the EIA phase. The following activities should be undertaken as part of this process: » Review comments pertaining to social impacts received from members of the key stakeholders, and any organ of state during the public review of the Scoping Report. Where applicable, comments received from DFFE on the Final Scoping Report, which may pertain to socio-economic impact assessment, will also be reviewed. » Update the baseline information with information received during the data collection, as well as any additional information received from the client, or updates to the project description. » Assess impacts identified for the project in terms of their nature, extent, duration, magnitude, probability, status, and significance; including energy demand, as well as the degree to which the impact can be reversed, may cause irreplaceable loss of resources, and can be mitigated. » Identify mitigation measures with which to reduce negative impacts and enhance positive impacts for inclusion in the Environmental Management Programme (EMPr). » Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised. **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	Eugene de Beer of Urban Econ Development Economists

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	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 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: » Confirmation of trip generation based on the activities related to traffic movement for the construction » and operation (maintenance) phases of the facility. » Access assessment based on the preferred access point. » Impact assessment and mitigation measure » Cumulative impact assessment » From the above, an assessment of impacts will be undertaken and recommendations regarding mitigation measures will be made for inclusion in the EMPr. A reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised will be provided. **Assessment of Impacts for the EIA** The methodology described above assists in the assessment of the overall effect of the 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 be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. **Environmental Management Programme**	Iris Wink of JG Afrika

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	For each overarching anticipated impact, management recommendations for the design, construction, and operational phase will be drafted for inclusion in the project EMPr.	
Noise Impact Assessment	**Sensitivity Analysis and EIA assessment** The undertaking of the Noise impact assessment will include the following: » Ambient sound level measurements as collected onsite will be evaluated and processed to classify the area in terms of typical noise districts and to motivate appropriate noise limits; » Data as received from the developer will be used to model the potential noise impact. » The following information will be considered: o The Sound Power Emission details of a selected generator that may be considered at this facility; o The surface contours (topography) of the project focus area; o Surface and meteorological constants; » The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact; » The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts; » The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required); and Recommendations	Morne de Jager of EARES
Cumulative Assessment	Assess the cumulative impacts associated with the construction and operation of more than one development (i.e., industrial developments) within the immediate surrounding areas of the project site and within a 30km radius of the site. The objective is to identify and focus on potentially significant cumulative impacts so these may be taken into consideration in the decision-making process.	Savannah Environmental

10.6 Methodology for the Assessment of Potential Impacts

Direct, indirect and cumulative impacts of the above issues identified through this Scoping Study 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).

Specialist studies will also consider cumulative impacts associated with similar developments within a 30km radius of the proposed project. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact). In this regard, specialist studies considered whether the construction of the proposed development will result in:

- Unacceptable risk
- Unacceptable loss
- Complete or whole-scale changes to the environment or sense of place
- Unacceptable increase in impact

A conclusion regarding whether the proposed development will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

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 into the EIA Report for the project. 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.

10.7 Public Participation Process

A public participation process will be undertaken by Savannah Environmental during the EIA phase in accordance with the approved Public Participation Plan. 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 Phakwe Richards Bay Gas Power 3 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) using the most suitable virtual platform.
- One-on-one consultation meetings will be held using the most suitable virtual platform via an appropriate forum (for example with directly affected and surrounding landowners, meetings with the relevant ward councillor/s and or community representatives, etc.).
- 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 received via the Savannah Environmental online stakeholder engagement platform or in writing.

The EIA Report will be made available for a 30-day review period prior to finalisation and submission to the DFFE for decision-making.

10.8 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	12 November 2021
Finalisation of Scoping Report, and submission of the Final Scoping Report to DFFE	January 2022
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	February 2022
Undertake specialist studies	January/February 2022
Make EIA Report and EMPr available to the public, stakeholders and authorities for review and comment	March 2022
Finalisation of EIA Report, and submission of the Final EIA Report to DFFE	April 2022
Authority review period and decision-making (107 calendar days)	August 2022

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Heritage

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
138084	Archaeological Specialist Reports	Gavin Anderson	03/07/2012	Heritage Survey of the Proposed Aquadene Housing Project, Kwa-Zulu Natal
6998	AIA Phase 1	Gavin Anderson, L Anderson	14/04/2008	ARCHAEOLOGICAL SURVEY OF THE PROPOSED JOHN ROSS INTERCHANGE DEVELOPMENT
124672	HIA Phase 1		01/03/2013	HIA Mandlazini Agric-Village Sewer Network Installation
305321	HIA Phase 1	Gavin Anderson	16/05/2010	HERITAGE SURVEY OF THE PROPOSED RICHARDS BAY CENTRAL INDUSTRIAL AREA
303819	AIA Phase 1	Gavin Anderson	09/10/2008	ARCHAEOLOGICAL SURVEY OF THE PROPOSED ALTON SEWER PIPE UPGRADE
305311	AIA Phase 1	Gavin Anderson	06/11/2008	ARCHAEOLOGICAL SURVEY OF THE PROPOSED BOUBLING OF THE NORTH CENTRAL ARTERIAL, RICHARDS BAY
305351	AIA Phase 1	Gavin Anderson	16/11/2008	ARCHAEOLOGICAL SURVEY OF THE PROPOSED NEW INFRASTRUCTURE AT THE ARRIVAL YARD AT THE RICHARDS BAY COAL TERMINAL
309928	HIA Phase 1	Gavin Anderson, Louise Anderson	01/06/2009	HERITAGE SURVEY OF THE PROPOSED EXPANSION TO THE TRANSNET NATIONAL PORTS AUTHORITY, RICHARDS BAY.
363688	HIA Letter of Exemption	Jaco van der Walt	20/05/2016	Proposed Hillside Desalination Plant to be established at the Hillside Aluminium smelter site, Richards Bay, KwaZulu-Natal.
270553	Heritage Impact Assessment Specialist Reports		24/04/2015	Heritage Screener for the Proposed 60MW Biomass Plant within the Ricahrds Bay IDZ, Umhlautze Local Munucipality, KwaZulu-Natal
303819	AIA Phase 1	Gavin Anderson	09/10/2008	ARCHAEOLOGICAL SURVEY OF THE PROPOSED ALTON SEWER PIPE UPGRADE
151204	HIA Letter of Exemption	Gavin Anderson		
181499	HIA Letter of Exemption	Len van Schalkwyk	12/11/2014	Application for Exemption from a Phase 1 Heritage Impact Assessment Proposed Richards Bay Industrial Development Zone (RBIDZ),

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