RICHARDS BAY COMBINED CYCLE POWER PLANT (CCPP) AND ASSOCIATED INFRASTRUCTURE NEAR RICHARDS BAY, KWAZULU-NATAL PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

August 2019

Prepared for
Eskom Holdings SoC Ltd
1 Maxwell Drive,
Sunninghill,
Johannesburg

Prepared by:
Savannah Environmental (Pty) Ltd
First Floor, Block 2, 5 Woodlands Drive Office Park
Woodmead
Johannesburg, 2191
Tel: +27 (0)11 656 3237
Fax: +27 (0)86 684 0547
E-mail: info@savannahsa.com
www.savannahsa.com

PROJECT DETAILS

DEA Reference	:	14/12/16/3/3/2/1123
Title	:	Environmental Impact Assessment Process Environmental Management Programme: Richards Bay Combined Cycle Power Plant (CCPP) project, KwaZulu-Natal Province
Authors	:	Savannah Environmental Lisa Opperman Jo-Anne Thomas
Applicant	:	Eskom Holdings SoC Ltd
Report Status	:	Environmental Management Programme submitted as part of the final EIA Report
Date	:	August 2019

When used as a reference this report should be cited as: Savannah Environmental (2019). Environmental Management Programme: Richards Bay Combined Cycle Power Plant (CCPP) project, KwaZulu-Natal Province

DEFINITIONS AND TERMINOLOGY

The following definitions and terminology may be applicable to this project and may occur in the report below:

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

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

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

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per the EIA Regulations. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: 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.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

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

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

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

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

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

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

Environmental Authorisation (EA): means the authorisation issued by a competent authority (Department of Environmental Affairs) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) and the EIA Regulations promulgated under the Act.

Environmental Assessment Practitioner (EAP): An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Environmental Control Officer (ECO): An individual appointed by the Owner prior to the commencement of any authorised activities, responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation

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

Environmental impact assessment (EIA): Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

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

Environmental Management Programme (EMPr): A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a project or facility and its ongoing maintenance after implementation.

Environmental Officer (EO): The Environmental Officer (EO), employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. The EO must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Incident: An unplanned occurrence that has caused, or has the potential to cause, environmental damage.

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

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

Method Statement: a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

Photovoltaic effect: Electricity can be generated using photovoltaic panels (semiconductors) which are comprised of individual photovoltaic cells that absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect.

Pre-construction: The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

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

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

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

Vulnerable species: A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the *Gazette*.

ABBREVIATIONS

The following abbreviations may be applicable to this project and may occur in the report below:

CBA	Critical Biodiversity Area
CCPP	Combined Cycle Power Plant
CCGT	Combined Cycle Gas Turbine
CPP	Condenser Polishing Plant
CV	Curriculum Vitae
CDSM	Chief Directorate Surveys and Mapping
CEMP	Construction Environmental Management Plan
DEA	Department of Environmental Affairs
EAP	Environmental Impact Practitioner
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Importance and Sensitivity
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
EN	Endangered
GDP	Gross Domestic Product
GNR	Government Notice Regulation
I&APs	Interested and Affected Parties
IDZ	Industrial Development Zone
kV	Kilo Volt
MW	Mega Watt
NAAQS	National Ambient Air Quality Standards
NEMA	National Environmental Management Act
O&M	Operation and Maintenance
PIA	Paleontological Impact Assessment
QRA	Quantitative Risk Assessment
RB CAA	Richards Bay Clean Air Association
SACAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANS	South Africa National Standards
SHE	Safety, Health and Environment

TABLE OF CONTENTS

APPENDICES

CHAPTER 1: INTRODUCTION

This Environmental Management Programme (EMPr) has been compiled for the Richards Bay Combined Cycle Power Plant (CCPP) and associated infrastructure proposed by Eskom Holdings SOC Ltd (Eskom). The CCPP will have an installed generating capacity of up to 3 000MW and will be fuelled using natural gas as the main fuel resource and diesel as a back-up resource. The project site is located on Portion 2 and Portion 4 of Erf 11376, and is located in the Richards Bay Industrial Development Zone (IDZ) Phase 1D, approximately 6km south west of Richards Bay, and 4km south west of Alton, which falls within the jurisdiction of the City of uMhlathuze Local Municipality and the King Cetshwayo District Municipality, KwaZulu-Natal Province.

This EMPr has been developed on the basis of the findings of the final Environmental Impact Assessment (EIA), and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts.

This EMPr is applicable to Eskom and contractors working on the pre-construction, construction, and operation and maintenance phases of Richards Bay CCPP. In terms of the Duty of Care provision in S28(1) of National Environmental Management Act (NEMA), the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, halted or minimised. The document must therefore be adhered to and updated as relevant throughout the project life cycle. This document fulfils the requirement of the EIA Regulations, 2014 (as amended) and forms part of the final EIA Report for the project.

CHAPTER 2: PROJECT DETAILS

Eskom Holdings SOC Ltd (Eskom) proposes to develop a Combined Cycle Power Plant (CCPP) and associated infrastructure, with an installed generating capacity of up to 3 000MW. The Richards Bay CCPP will be located on Portion 2 and Portion 4 of Erf 11376 situated in the Richards Bay IDZ Phase 1D, KwaZulu-Natal Province. The project site has been zoned for industrial use, which has been reserved specifically for gas to power development. The project aims to provide electricity from an alternative energy source for input into the national grid.

2.1 Project Site

Table 2.1 provides information regarding the proposed project site identified for the Richards Bay CCPP and the associated infrastructure.

Table 2.1: A description of the project site identified for the Richards Bay CCPP and associated infrastructure

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 11376
Portion number(s)	» Portion 2 » Portion 4
SG 21 Digit Code (s)	» N0GV04210001137600002 » N0GV04210001137600004
Current zoning	Industrial Use – The affected properties are located within Phase 1D of the Richards Bay Industrial Development Zone and have been reserved for gas to power development
Current land use	Communal Grazing

2.2 Project Description

The Richards Bay CCPP involves the construction of a gas-fired power station which will provide mid-merit power supply to the electricity grid. The mid-merit power supply will be between a range of 20% to 70% of the total electricity supply produced by the Richards Bay CCPP. The power station will have an installed capacity of up to 3 000MW, to be operated on natural gas, with diesel as a back-up fuel[1]. The natural gas is to be supplied by potential gas suppliers via a gas pipeline to the CCPP.. The LNG terminal infrastructure at the port and the gas supply pipeline to the boundary fence of the Richards Bay CCPP does not form part of the scope of this assessment as this project focuses only on the footprint activities inside Eskom's boundary fence on the site on Phase 1D of the Richards Bay IDZ.

[1] The RB CCPP will not use Diesel as the primary fuel source. Natural gas will be used as the primary fuel source. Diesel is only proposed as a back-up fuel during emergency situations and a maximum operation time of 8 hours is expected for Diesel during the emergency situations.

The main infrastructure associated with the facility includes the following:

- Gas turbines for the generation of electricity through the use of natural gas or diesel (back-up resource).
- HRSG to capture heat from high temperature exhaust gases to produce high temperature and high-pressure dry steam to be utilised in the steam turbines.
- Steam turbines for the generation of additional electricity through the use of dry steam generated by the HRSG.
- Bypass stacks associated with each gas turbine.
- Dirty Water Retention Dams and Clean Water Dams
- Stormwater channels
- Waste storage facilities (general and hazardous).
- Exhaust stacks for the discharge of combustion gases into the atmosphere.
- A water treatment plant for the treatment of potable water and the production of demineralised water (for steam generation).
- Water pipelines and water tanks to transport and store water of both industrial quality and potable quality (to be supplied by the Local Municipality).
- Dry-cooled system consisting of air-cooled condenser fans situated in fan banks.
- Closed Fin-fan coolers to cool lubrication oil for the gas and steam turbines.
- A gas pipeline and a gas pipeline supply conditioning process facility for the conditioning and measuring of the natural gas prior to being supplied to the gas turbines. It must be noted however that the environmental permitting processes for the gas pipeline construction and operation will be undertaken under a separate EIA Process
- Diesel off-loading facility and storage tanks.
- Ancillary infrastructure including access roads, emergency access road warehousing, buildings, access control facilities and workshop area, storage facilities, emergency back-up generators, firefighting systems, laydown areas and 132kV and 400kV switchyards.
- A power line to connect the Richards Bay CCPP to the national grid for the evacuation of the generated electricity. It must be noted however that the due environmental permitting processes for the development of the power line component are being undertaken under a separate EIA Process.

Table 2.2 below provides the details of the Richards Bay CCPP, including the main infrastructure and services required for the development.

Table 2.2: Technical details of the Richards Bay CCPP development proposed in Richards Bay

Component	Description/ Dimensions
Location of the site	Portion 2 and Portion 4 of Erf 11376 located within the Richards Bay IDZ Phase 1D, KwaZulu-Natal.
Landowner	The affected properties are owned by the City of uMhlathuze Local Municipality.
Municipal Jurisdiction	King Cetshwayo District Municipality and the City of uMhlathuze Local Municipality.
Electricity Generating capacity	Up to 3000MW (installed).
Proposed technology	Combined Cycle Gas Turbines (CCGT) Power Plant with an anticipated configuration of 2:2:1 (Gas Turbine: HRSG: Steam Turbine).
Extent of preferred project site	71ha.
Extent of the Richards Bay CCPP development footprint (power plant only)	Up to 60ha.

Component	Description/ Dimensions
Extent of the associated infrastructure development footprint	~11ha.
Gas turbine	The footprint of each gas turbine, including auxiliary equipment, is expected to have an extent of 50m x 100m.
Stack dimensions	Exhaust and Bypass Stack heights will be a minimum of 40m (one exhaust stack per HRSG and one additional bypass stack for each gas turbine) and a diameter of ~7.2m.
Condenser Fans	Air cooled condenser fans will be ~40m in height.
Fuel and dangerous goods storage	» Storage tanks will be required for diesel to be used as a back-up fuel which will have capacity for an 8-hour operation. Two tanks of 5.2 million litre capacity will be required. Diesel will be transported via road. » Natural gas will not be stored on site. » Welded steel tanks will be constructed. The tanks will be bunded. » Four LPG tanks with a storage capacity of up to 6.5m^3 each will be required for the storage of dangerous goods. The total storage capacity required for dangerous goods is 26m^3. » The following dangerous goods will be stored on site: * Cleaning agent for the gas turbine blade washing; * New and used lubricating and hydraulic oils; * Lubrication oils required for turbine rotating equipment and bearings; * Hydraulic oil for the main machine set control valve systems; * Jacking oil for the turbine bearings (this is a high-pressure lubrication oil); * Seal oil for the generator; * Chemicals for the water treatment plant.
Site access	» Direct access to the site is possible via the use of existing dirt roads surrounding the project site. » The new main access to the project site will be via the Western Arterial which leads from the John Ross Highway into the industrial area. » The new access roads to the Richards Bay CCPP will be approximately 3.7m in width per lane and will include two lanes, which will be tarred. » The perimeter security road will be gravel.
Laydown areas	» Approximately 5-10ha will be required for laydown areas. Of this, 8-9ha/80% of the total area allocated for laydown areas will be temporary and progressively used for construction. Of the remaining 1-2 ha/20% of the total area allocated for laydown areas, this will be landscaped following construction.
Grid connection	» The CCPP will be connected to the national grid via an HV yard and a 400kV power line. Transmission EIA process has commenced and is at Scoping phase. » The CCPP will have a maximum of 12 generator transformers.
Pipelines and water storage	» Internal water (potable water and industrial quality), air, diesel, gas and sewerage pipelines. » All pipelines within the site will have a diameter of between 1.27cm to 60.96cm. » The natural gas pipeline throughput capacity is expected to be between 8900 and 9500 tons per day at maximum operation of the CCPP. » The gas pipeline from the station to the boundary will have a maximum diameter up to 60.96cm in diameter. » From the site boundary, natural gas will be transported via the main supply pipeline to the gas processing plant. From the processing plant the gas will be distributed to each individual gas turbine.

Component	Description/ Dimensions
	» Water tanks and pipelines will be installed for water of industrial and potable water quality.
Associated infrastructure	» Internal roads and external road to connect to the local/provincial road. » Control and electrical buildings, including a central control room. » Warehousing and administrative buildings with a height between 5-10m. » Firefighting systems. » Storage facilities for fuel, gas, diesel and chemicals. » Emergency back-up generators.
Building sizes	» Access Building. » Guard hut. » Administration Building. » Rest Room. » Main Workshop. » Main Store. » Chemical and Oil Store. » Fuel Offloading Canopy. » Fuel Treatment and Forwarding Facility. » Fuel Sampling Room. » Fire Pumphouse. » Air Compressor Building. » MCC Room. » Station Control Building. » Turbine Hall. » Water Treatment Plant Lab. » Water Treatment Plant. » Hydrogen Plant Room.
Services required	» Waste disposal - all waste material generated from the development will be collected by a contractor and the waste will be disposed of at a licensed waste disposal facility off site. Eskom has confirmed capacity for the provision of waste disposal services with the Local Municipality. There will be storage for general and hazardous waste. » Sanitation – during construction and operation of the Richards Bay CCPP a connection to the municipal sewer pipeline will be established for sanitation purposes at the plant. It is expected that approximately 20m^3 of sewage will be discharged to this system per day during construction and operation. Eskom has received confirmation of capacity of the sewage system from the Local Municipality. Temporary chemical toilets will however also be used if and where required. » Water – Potable water is to be sourced from the uMhlathuze Municipality Water Works. The construction phase of the Richards Bay CCPP will require 37 290 m^3 of water for a period of 36-48 months. The average consumption will be approximately 800 - 1 000 m^3/month. Water volumes of approximately 1 825 000m^3 per annum are expected to be required for the operation of the plant. This amounts to between 2000 - 5000m^3 provided by the municipality per day. Eskom has received confirmation of capacity from the Local Municipality to provide the required water. » Wastewater from the plant will be discharged to the municipal system. It is estimated that the boiler blowdown system will discharge ~1555m^3 per day, the demineralised treatment plant effluent will discharge ~523.99m^3 per day, condensate polishing plant effluent will discharge ~197m^3 and ~370.6m^3 of oily water prior to treatment will be discharged per day. Eskom has received confirmation of capacity from the municipal system with the Local Municipality.

Component	Description/ Dimensions
	» Electricity: the electricity requirements for this facility are to be obtained from the municipality during the construction phase. Eskom has received confirmation of capacity for the provision of electricity by the Local Municipality. The RB CCPP will generate its own electricity from the facility during operation.
Groundwork Spoil heaps	Temporary groundwork spoil heaps will be required for the duration of the construction phase (~36-48 months). All groundwork temporary spoil heaps will be used for landscaping purposes following construction. Any excess material will be removed from site by a contractor and disposed of.
Water Storage Reservoir	Water storage facilities for both process water and fire-fighting purposes will be located on site. The Local Municipality will supply the potable water.
Water Treatment Plant (Figure 2.3)	» Water of industrial quality will be provided by the local municipality which will be treated for potable water purposes and for demineralised water for the CCPP. As a back-up the Local Municipality will also provide potable water for situations where industrial quality water is not available. » The industrial water supplied by the Municipality to be treated in the water treatment plant will not have heavy metals, dyes and constituents, as per the requirements of Eskom. » Waste water produced from the CCPP will be generated from the demineralised water treatment system, Boiler Blowdown Recovery System and the Condensate Polisher System. The wastewater will be neutralised at the Effluent Neutralisation System (NES) (i.e. water treatment plan) before discharge to the municipality. » Waste water containing oil will include waste water from ground- run-offs, and therefore the effluent is expected to contain grit and silt. An oil-water separator will be installed for the removal of the grit, silt and other foreign particulate matter prior to the water being put through the Primary Oil-Water Separator. The oil removed from this process will be stored in a tank and collected by a licensed sub-contractor to dispose of the oil off-site. A secondary oil-water separator will be required to refine the wastewater prior to discharging it to the local municipality sewage treatment plant. » Potable water from the pre-treatment system will be treated through the demineralised water treatment system. Ion Exchange will be used in the process. The ion exchange treatment system will consist of three trains, each with a hydraulic capacity of 2 403m^3 per day. The system will include the following process units: i) strong acid cation vessel, CO_2 de-gasifier, weak base anion vessel, strong base anion vessel and a mixed bed vessel. The demineralised water produced can be sent to the power station directly or it can be stored in a demineralised water storage tanks. After some time, the vessels will become exhausted and will need to go through a process of regeneration. Regeneration of the resins will take place *in-situ* through the use of specific valves and internal distribution piping and nozzles.
Condensate Polishing Plant	» Condensate Polishing Plant (CPP) will treat the main condensate from the CCPP in order to achieve the feed water quality required for the steam-water cycle and will include pre-polishing filters and an ion exchange system. The CPP serves to prevent contaminants (ionic and corrosion) from entering the boiler and turbine, thereby increasing the unit's availability, reliability and performance. Each turbine unit at the plant will have an independent CPP. The capacity will be 791m^3 per hour per unitised CPP. Regeneration of both the cation and anion resins is required to be undertaken after a period of operation of the power plant due to resin exhaustion. This process is undertaken to minimise the possibility of intrusion of residual chemicals into the steam/water cycle. When resins become exhausted it will be removed from service at the unitised CPP facility and hydraulically transferred to the regeneration facility.

Component	Description/ Dimensions
Water re-use /recycling	» The CCPP will recover boiler blowdown waste water and stormwater for re-use. » The demineralised water inlet at the water treatment plant will reduce the use of raw water from the municipality. However, the quenching water requirements are too high to justify re-use at the water treatment plant, unless quenching is undertaken via an air-cooled heat exchanger. » The recovery of the blowdown vessel flash steam can be cooled and re-used as part of the CCPP. » The use of the steam in the de-aerator for efficiency improvement purposes can also be implemented for water re-use.
Stormwater	» All stormwater will be collected separately from areas designated as clean and dirty areas. » Where stormwater is potentially contaminated, the dirty water will be transported via pipelines to a dirty water retention dam. » The dirty stormwater will be sent to the water treatment plant for processing prior to it being used in the power plant processes. » It is expected that the stormwater from clean areas will contain clean water. » Clean water will therefore be transported via pipelines, natural drainage (where possible) and stormwater channels to a clean water retention dam. » There is a possibility that the clean stormwater will be re-used directly by the plant. Additional details regarding the dirty water retention dams and clean water dams: » Capacity of the dams - Dirty water dams are usually designed as a temporary storage dam. The dam is sized for a 1:50 storm. The dams act as a collection point for all polluted stormwater and washdown water. It is estimated at 130m x 130m x 4m. The clean water dam can receive water from either the municipality or the cleaned dirty water from the dirty water dam. If received from the municipality, it will be stored before being processed for usage in the plant. If received from the dirty water dam, it will be stored before being disposed into the sea via the municipality pipeline. » The composition of the dirty water - The composition of the dirty water will mainly be water with some oils e.g. diesel, lubrication, etc. » Type of liners to be used - Dirty water dam will be HDPE lined. » The location of the storage facility - Storage will be in bunded tanks and sumps. » The duration of storage of the waste - When the tanks or sumps containing hazardous waste are almost full, an authorised waste removal company will be called to remove the waste. » The design of the storage facility - All hazardous waste storage facilities will be properly designed according to a design code. » Types of waste to be stored - Mixture of water and cleaning fluids and oils.
Generation and Storage of waste	» Construction waste (e.g. spoil, packaging materials, rubble, plastics etc.). » General waste will be generated by operation and maintenance staff during the operation of the power station. » General waste and hazardous storage facilities are to be constructed to store wastes as required during both operation and construction. » No solid waste will be generated through the power generation process; only liquid effluent from operations and other liquid wastes (such as oils) arising from maintenance activities will be generated. » An effluent neutralisation sump for the storage and neutralisation of regeneration waste from anion and cation resin regeneration will be required.

Component	Description/ Dimensions
	» The expected volume of waste from the Condensate Polishing Plant (CPP) will be 197m^3 (for cation and anion of a single train). » The expected volume of demineralised waste will be 21.8m^3 per hour. » Temporary storage of the demineralised water treatment plant waste may be required. The temporary storage will be on site within the water treatment plant area. The expected storage volume for the storage is 1 569m^3 (21.8m^3 per hour, assuming a three-day storage capacity). » The expected volume of blowdown recovery waste is 102.8m^3 per hour. » The waste generated from the washing of the gas turbine blades will be stored in a closed sump, collected and disposed of at a licensed disposal facility by an appointed Contractor. » Resin regeneration waste will be sent to the effluent neutralisation sump and thereafter the municipal system.
Handling of waste on site	» Waste water to be discharged will be combined and disposed of via a pipeline into the municipal system.

..

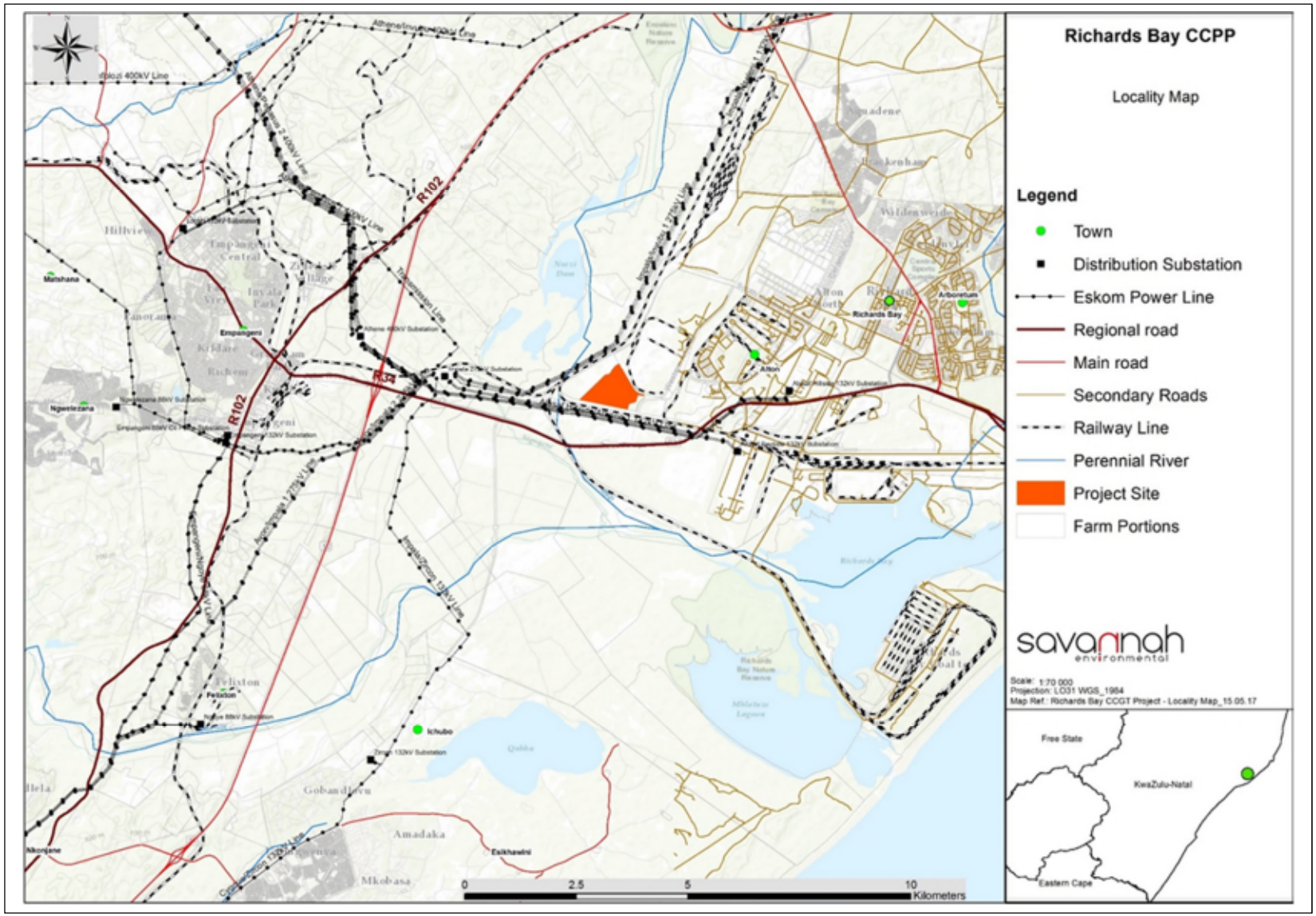

Figure 2.1: Locality map illustrating the location of the project site for the establishment of the Richards Bay CCPP.

2.3. Life-cycle Phases of the Richards Bay CCPP

2.3.1. Construction Phase

Construction of the Richards Bay CCPP is expected to take approximately 36 to 48 months. The construction activities involve the following:

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

Employment opportunities to local community members will be available during the construction phase of the project. Where employees will not reside on the project site and they would need to be accommodated in the Richards Bay area.

Material to be used as part of the construction phase will be sourced from existing borrow pits within the area or from the nearest licensed suppliers to the site. The amount of material required will be between 60 000m^3 and 80 000m^3. All excess solid waste (soil material and rubble) generated from the development and not used for landscaping, will be collected by a contractor, and the waste will be disposed of at a licensed waste disposal facility off-site.

With regards to sanitation, chemical toilet will be utilised and sewage waste will be disposed of at a licensed waste treatment plant.

In terms of water supply, water is to be sourced from the uMhlathuze Municipality Water Works. The construction phase of the Richards Bay CCPP will require 800-1000 m^3/month of water for a period of 36-48 months.

2.3.2 Operation Phase

Prior to the operation of the power station, testing and trials will need to be undertaken before the commercial operation start date.

The proposed facility will create some permanent employment positions that will be retained for more than 25 years. The permanent employment positions will include highly skilled (approximately 38%), skilled (approximately 44%) and semi-skilled (approximately 16%) positions. It is anticipated that there will be full time security, cleaning, maintenance and control room staff required at the site.

The gas turbine is one of the most efficient methods to convert gas fuels to electricity. The use of distillate liquid fuels, usually diesel, is also common as an alternate fuel. A combined cycle power plant or combined cycle gas turbine is a combination of gas fired turbines and steam turbines. The fuel is combusted in the gas turbine to generate electricity. The hot gas leaving the gas turbine passes to a heat recovery boiler, where it heats water to produce steam which passes to a steam turbine to generate additional electricity and then on to a condenser. A combined cycle power plant produces high power outputs at high thermal efficiencies (up to 55%) and with low emissions.

For combustion, fuel (natural gas) and air will be required. Water is required in the power generation process – it is converted to steam for energy conversion (from thermal energy to mechanical energy). For the Operations of the Power plant, the volumes of water required is between 2 000-5 000m³/day to be provided by the municipality. The output of the process is electricity. The power station will provide mid-merit power supply to the electricity grid. The weekly mid-merit power supply will be between a range of 20% to 70% of the total electricity supply produced by the Richards Bay CCPP.

No solid waste will be generated through the power generation process, only liquid effluent will be generated and other liquid wastes (such as oils) arising from maintenance activities will be generated. It is expected that approximately 20m³ of sewage will be discharged to the municipal system per day. Waste water from the plant will be discharged to the municipal system. It is estimated that the boiler blowdown system will discharge ~1 555m³ per day, the de-mineralised treatment plant effluent will discharge ~523.99m³ per day, condensate polishing plant effluent will discharge ~197m³ and ~370.6m³ of oily water prior to treatment will be discharged per day. Any waste oils arising from maintenance activities will be removed from site and disposed of.

2.3.3. Decommissioning of a Gas-to Power Plant

The lifespan of the proposed Richards Bay CCPP will be more than 25 years. Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life or if it is no longer required. The lifespan of the Richards Bay CCPP could be extended depending on the condition of the gas and steam turbines and the HRSG. An assessment will be undertaken prior to the end of the lifecycle of the plant to determine whether the plant should be decommissioned or whether the operation of the plant should continue.

It is most likely that decommissioning activities of the infrastructure of the facility discussed in this EIA process would comprise the disassembly, removal and disposal of the infrastructure. Decommissioning activities will involve disassembly of the production units and ancillary infrastructure, demolishing of buildings, removal of waste from the site and rehabilitation to the desired end-use. Future use of the site after decommissioning of the Richards Bay CCPP could possibly form part of an alternative industry that would be able to utilise some of the existing infrastructure associated with the CCPP. This would however be dependent on the development plans of the area at the time.

It is expected that temporary employment opportunities will be made available during the decommissioning phase.

As part of the decommissioning phase Eskom will undertake the required permitting processes applicable at the time of decommissioning.

2.4 Findings of the Environmental Impact Assessment (EIA)

No environmental fatal flaws were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures and wetland offset plan are implemented, as specified by the specialists.

The potential environmental impacts associated with the RB CCPP identified and assessed through the EIA process include:

- Impacts on ecology, flora, fauna and avifauna.
- Impacts on surface water resources.
- Impacts to soils, land-use and agricultural potential.
- Impacts on geohydrology.
- Impacts on heritage resources, including archaeology and palaeontology.
- Impacts on air quality.
- Impacts on climate change.
- Visual impacts on the area imposed by the components of the facility.
- Positive and negative socio- economic impacts.
- Traffic impacts.

As the project could pose risks to the communities in the area (as a result of fires or possible explosions), a quantitative risk assessment was undertaken.

2.4.1 Impacts on Ecology (fauna, flora and avifauna)

The Ecological Impact Assessment assessed the impact of the RB CCPP on the sensitive ecological features present within the project site for the life-cycle of the project.

From a vegetation perspective, the project site is not regarded as being particularly sensitive. Reasons for this include the following:

- Extensive developments on surrounding areas have effectively isolated this site from similar plant communities. As a result, plant populations were subdivided and reduced, thereby increasing their probability of extinction (Collinge *et al*., 1996).
- Large areas on the project site showed population increases in *Helichrysum kraussii* and *Dichrostachys cinerea* plants, an indication of past disturbance.
- Deforestation of large woodland tree species particularly within the *Helichrysum kraussii – Parinari capensis*, and to a lesser extent in the *Imperata cylindrica – Syzygium cordatum* vegetation communities.
- In terms of land use planning, the project site falls within a zone intended for the development of High Impact Industry and is not recognised as an area earmarked for conservation.
- The project site falls within the Industrial Development Zone (IDZ) of Richards Bay where future developments are planned. Full restoration of the original environment and biota will thus not be feasible in the long term.

» A number of provincially protected and flora endemic species are present on the project site. However, these species are not restricted to the project site. Threatened plant species that could potentially be present include species such as geophytes and herbs that can be easily translocated.

The assessment identified impacts within the construction and operation phases of the project.

During the construction phase, the impacts expected to occur include loss of sensitive terrestrial ecosystems, loss of critical biodiversity areas (CBAs), loss of sensitive aquatic ecosystems, loss of natural vegetation, loss / disturbance of local fauna populations, noise and artificial light disturbances, soil erosion and sedimentation, pollution of soils and habitat. Due to the relatively disturbed nature of the site, the significance of the construction phase impacts ranges from medium to low, following the implementation of the recommended mitigation measures by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

During the operation phase, the anticipated impacts include introduction and spread of alien invasive plant species and weeds, disturbance of local fauna communities, noise and artificial light disturbance, pollution of soils and habitat. The significance of the impacts for the operation phase are low, following the implementation of the recommended mitigation measures by the specialist.

From the findings of the Ecological Impact Assessment (**Appendix D** of the final EIA Report) it can be concluded that ecological impacts of medium to low significance can be expected as a result of the proposed RB CCPP. The proposed development is therefore considered to be appropriate and acceptable from an ecological perspective. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.2 Impacts on Surface Water Resources

The Surface Water Resources Impact Assessment assessed the impact of the RB CCPP on the sensitive water resources present within the project site for the life-cycle of the project. Approximately 91 ha of wetlands have been delineated for the project, with approximately 38ha and 53ha being delineated for the project area and biodiversity offset area to the north of the site, respectively.

The assessment identified impacts within the construction and operation phases of the project.

During the construction phase, the impacts expected to occur include loss / degradation of wetlands, spread of / or establishment of alien and / or invasive plant species, sedimentation and erosion of watercourses, impaired water quality and alteration of the hydrological regime. The significance of the construction phase impacts ranges from high to medium to low, following the implementation of the recommended mitigation measures by the specialist. Importantly, the impact of high significance relates to the loss of wetlands as a result of the proposed development. In this respect, avoidance, mitigation and rehabilitation options are not possible due to the extent of the proposed development, and therefore a wetland offset plan was deemed required (**Appendix E** of the final EIA Report) in line with the mitigation hierarchy to offset the significant residual impacts associated with the proposed loss of the wetlands on the project site.

During the operation phase, the anticipated impacts include impaired water quality and alterations in the hydrological regime. The significance of the impacts for the operation phase are medium, following the

implementation of the recommended mitigation measures by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

From the findings of the Surface Water Resources Impact Assessment (**Appendix E** of the final EIA Report) it can be concluded that ecological impacts of high to medium to low significance are expected as a result of the proposed RB CCPP. As mentioned above, a wetland offset plan was deemed required (**Appendix E** of the final EIA Report) in line with the mitigation hierarchy to offset the significant residual impacts associated with the proposed loss of the wetlands on the project site. This plan has been developed and is under a consultation process with all affected stakeholders.

The proposed development is considered to be acceptable from a surface water resources perspective. The specialist has, therefore, indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures and careful consideration with regards to the requirements of a wetland offset plan.

2.4.3 Impacts on Land Use, Soil and Agricultural Potential

The Soil and Agricultural Potential Impact Assessment assessed the impact of the RB CCPP on the soils present within the project site for the life-cycle of the project.

The soils in the project area are dominated by sandy alluvial soils. the areas with accumulated windblown sands were classified as Namib soils, which accounted for 27.6 ha (38.8 %) of the project area. The areas with moisture at depths greater than 30cm were classified as the Longlands soil form, which accounted for 3.3 ha (4.6 %) of the project area. The soil forms with moisture at or near the surface were classified as Katspruit / Westleigh soil forms, which accounted for 37.5 ha (52.8 %) of the area.

In terms of agricultural potential, the project area is currently being utilised for grazing, no agriculture is possible due to the shallow water table and the sandy nature of the soils present. There are extensive pans across the site and the vegetation is sparse in places. in terms of land potential, the land capability classes were rated to have the following land potentials:

- Class III = L2 (High Potential);
- Class IV = L3 (Good Potential);
- Class V = Vlei (Wetland); and
- Class VIII = L8 (Very Low Potential).

As the development site has been reserved by the City of uMhlathuze Municipality as part of the Industrial Development Zone (IDZ) to house industrialisation and other strategic projects such as gas to power projects, it is not likely that the site would be used for agriculture in the future.

The assessment identified impacts within the construction and operation phases of the project.

During the construction phase, the impacts expected to occur include loss of agricultural potential and loss of soil resources. The significance of the construction phase impacts ranges from high to medium, following the implementation of the mitigation measures recommended by the specialist. These impacts can be reduced by keeping the footprints minimised where possible and strictly following soil management measures

pertaining to erosion control and management and monitoring of any possible soil pollution sources such as vehicles traversing over the sites.

From the findings of the Soil and Agricultural Potential Impact Assessment (**Appendix F** of the final EIA Report) it can be concluded that soil and agricultural potential impacts of high to medium significance are expected as a result of the proposed RB CCPP. The proposed development is considered to be appropriate and acceptable from a soils perspective where mitigation is applied and the soil is handled correctly. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.4 Impacts on Geohydrology

The Geohydrology Impact Assessment assessed the impact of the RB CCPP on the sensitive geohydrological features associated with the project site for the life-cycle of the project. According to the 1:500 000 scale hydrogeological map series (Vryheid, Map sheet 2730) and from available hydrogeological information, Richards Bay groundwater occurs within the inter-granular primary aquifer in the semi consolidated and unconsolidated materials deposited during the Tertiary and Quaternary periods. According to Golder (2014) the depths of boreholes measured within the Richards Bay area varies from 30 to 45 metres below ground level (mbgl) and the aquifer testing conducted indicated the hydraulic conductivity ranging from 0.5 to 5 m/d.

The geohydrological data obtained during the Hydrocensus survey in February 2018 indicated that there are two types of aquifers underlying the site including a shallow primary aquifer and a deep fractured aquifer. The current site groundwater level within the shallow primary aquifer varies from 0.64 to 3.89 mbgl. It is anticipated that a fractured aquifer underlying the site is likely to be located at more than 11 mbgl.

The assessment identified impacts within the construction and operation phases of the project.

During the construction phase, the impacts expected to occur include potential impact on groundwater flow direction and groundwater level due to dewatering to facilitate erection of building foundations, potential impact on surface water bodies and groundwater due to on-site accidental fuel spills and leaks/leachate and infiltration of dirty water. The significance of the construction phase impacts ranges from medium to low, following the implementation of the mitigation measures recommended by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

During the operation phase, the anticipated impacts include potential impact on local groundwater and surface water bodies due to possible leakage of diesel from storage facilities and/or pipelines and Emergency backup generators, potential impact on groundwater and surface water bodies due to waste water and solid waste discharges. The significance of the impacts for the operation phase are low, following the implementation of the mitigation measures recommended by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

From the findings of the Geohydrology Impact Assessment (**Appendix G** of the final EIA Report) it can be concluded that geohydrological impacts of low significance are expected as a result of the proposed RB CCPP. The proposed development is therefore considered to be acceptable from a geohydrological perspective. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.5 Impacts on Heritage (including archaeology and palaeontology)

The Heritage Impact Assessment assessed the impact of the RB CCPP on the sensitive heritage features present within the project site for the life-cycle of the project. No heritage sites of significance (archaeological, palaeontological, cultural or built heritage) were identified within the proposed development site.

The assessment identified impacts within the construction and operation phases of the project.

During the construction phase, the impacts expected to occur include impacts to archaeological, palaeontological or cultural heritage resources which may be unearthed during excavations on the site. The significance of the construction phase impact is low, following the implementation of the recommended mitigation measures by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures. A Chance Find Procedure is to be implemented however for the project should any sites be identified during the construction process.

No potential impacts were identified for the operation phase.

From the findings of the Heritage Impact Assessment (**Appendix H** of the final EIA Report) it can be concluded that heritage impacts of low significance are expected as a result of the proposed RB CCPP. The proposed development is therefore considered to be acceptable from a heritage perspective. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.6 Impacts on Air Quality

The Air Quality Impact Assessment assessed the impact of the RB CCPP on the air quality associated with the project site and surrounding area for the life-cycle of the project.

The RBCAA operates 12 ambient monitoring stations, measuring meteorological parameters and ambient SO_2, total reduced sulphur, and PM_{10} concentrations. Annual average PM_{10} concentrations were compliant with the NAAQS at all stations and similarity between years at each station is noted. Annual average SO_2 at all stations was compliant with the NAAQS with a slight trend towards improvement (lower SO_2 concentrations) at all stations.

The assessment identified impacts within the construction and operation phases of the project.

During the construction phase, the impacts expected to occur include emissions from particulate and gaseous pollutants. The significance of the construction phase impact is low, following the implementation of the mitigation measures recommended by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

During the operation phase, the anticipated impacts include sulphur dioxide emissions and other atmospheric pollutant emissions. The significance of the impacts for the operation phase range from medium to low, following the implementation of the mitigation measures recommended by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

From the findings of the Air Quality Impact Assessment (**Appendix I** of the final EIA Report) it can be concluded that air quality impacts of medium to low significance are expected as a result of the proposed RB CCPP. The proposed development is therefore considered to be appropriate and acceptable from an air quality perspective. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures and on condition that:

- Emissions due to construction activities be mitigated using good practise guidelines.
- Maintain SO_2 and NO_X emissions near the emission factor estimates.
- To limit the possibility of off-site SO_2 exceedances during emergency events, Emergency 2-type events must be avoided as far as practically possible, by using low sulphur (50 ppm) diesel only, when diesel is used as energy source.

2.4.7 Impacts on Climate Change

The Climate Change Impact Assessment assessed the impact of the RB CCPP on the climate change. The assessment only identified that the relevant impacts associated with the project is in the operation phase of the project.

During the operation phase, the impacts expected to occur include climate change impacts of the estimated Greenhouse Gas Emissions from the proposed RB CCPP. The significance of the operation phase impact is high, following the implementation of the recommended mitigation measures by the specialist. The impact of these emissions is considered as high, due to the impact on the national inventory from a single source (i.e. the RB CCPP project site). The proposed project has options to mitigate its carbon emissions. These options include the switching to alternative fuels such as biogas or biodiesel as well as carbon capture and storage where possible. Implementing these technologies will enable the proposed power plant to greatly reduce its greenhouse gas emissions. As such it is advisable that the design of the project takes into account these options to enable the potential retrofit and implementation during the plant's operation phase. Such mitigation actions will help the proposed plant to take on a shared responsibility for climate change mitigation. In addition, it must be noted that, the most important feature of the proposed CCPP power plant is its potential role in enabling a greater uptake of renewable energy onto the South African grid. The load following capacity that it could offer would enable the national grid to accommodate greater proportions of variable renewable energy, such as solar power and wind energy. This would assist in decarbonising the national grid and reduce emissions within South Africa's national greenhouse gas inventory. This will be a positive contribution to the national commitment to mitigate global climate change.

From the findings of the Climate Change Impact Assessment (**Appendix J** of the final EIA Report) it can be concluded that climate change impacts of high significance are expected as a result of the proposed RB CCPP. However, the climate change specialist recommends that the proposed CCPP plant load-following capability be used to maximise the uptake of intermittent renewable energy in the South African grid if possible. In this light, it is the view of specialist that the proposed CCPP power plant is the best technology option, and will not materially result in any direct local climate change impacts, subject to the implementation of appropriate mitigation measures as far as possible.

The proposed development is therefore considered to be acceptable from a climate change perspective.

2.4.8 Visual Impacts

The Visual Impact Assessment assessed the impact of the RB CCPP on the sensitive visual receptors associated with the project site for the life-cycle of the project. The proposed development will occur within an area that has been industrialised and where further heavy industrial development is planned, the power plant will largely be viewed against the background of other heavy industrial development. As a result of this, the development of the RB CCPP is unlikely to significantly increase the extent of industrial development that is obvious from most key viewpoints. It will also not influence views over existing rural areas.

The assessment identified impacts within the construction and operation phases of the project.

During the construction, operation and decommissioning phases, the impacts expected to occur include industrialisation of views from Urban areas, protected areas, roads, homesteads, views as seen from the N2 service station, recreational uses on the northern side of the port could be negatively impacted by further Industrialisation of the landscape. The significance of the identified impacts is low, following the implementation of the mitigation measures recommended by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

From the findings of the Visual Impact Assessment (**Appendix K** of the final EIA Report) it can be concluded that visual impacts of low significance are expected as a result of the proposed RB CCPP.

The proposed development is therefore considered to be appropriate and acceptable from a visual perspective. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.9 Socio-economic Impacts

The Socio-economic Impact Assessment assessed the impact of the RB CCPP on the socio-economic baseline environment associated with the project site for the life-cycle of the project. The assessment identified both positive and negative impacts within the construction and operation phases of the project.

During the construction phase, the positive impacts expected to occur include increase in economic production, impact on Gross Domestic Product (GDP), employment creation, skills development and household income and improved standard of living. The significance of the positive construction phase impacts ranges from high to medium, following the implementation of the recommended mitigation measures by the specialist. The impacts of a high and medium significance identified for the project, after implementation of mitigation measures, are notable from a positive perspective.

During the construction phase, the negative impacts are also however expected to occur, which include demographic shift due to influx of migrant labour, increase in demand for housing and pressure on basic services, social facilities and economic infrastructure. The significance of the negative construction phase impacts is low, following the implementation of the mitigation measures recommended by the specialist. No negative impacts of a high significance were identified for the project, after implementation of mitigation measures.

During the operation phase, only positive impacts are expected and include impact on production, impact on GDP, employment creation, skills development, household income and improved standard of living,

government revenue and improvement in energy generation sector. The significance of the impacts for the operation phase are high, following the implementation of the recommended mitigation measures by the specialist. Again, the impacts of a high significance identified for the project, after implementation of mitigation measures, are notable from a positive perspective.

From the findings of the Socio-economic Impact Assessment (**Appendix L** of the final EIA Report) it can be concluded that the negative socio-economic impacts of low significance are expected as a result of the proposed RB CCPP, whilst mainly positive impacts of high to medium significance were also identified. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation and enhancement measures.

2.4.10 Impacts on Traffic

The Traffic Impact Assessment assessed the impact of the RB CCPP on the traffic volumes and capacity of the road network to accommodate the project site for the life-cycle of the project. The assessment identified impacts within the construction, operation and decommissioning phases of the project. Potential traffic impacts are mainly related to the proposed development access, trip generation and traffic impact on the existing affected road network.

During the construction phase, the impacts expected to occur include traffic impacts during the construction of the RB CCPP. The significance of the construction phase impact is medium following the implementation of the mitigation measures recommended by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

During the operation phase, the anticipated impacts include traffic impacts during the operation of the RB CCPP. The significance of the impacts for the operation phase are medium, following the implementation of the mitigation measures recommended by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

During the decommissioning phase, the impacts expected to occur include traffic impacts during the decommissioning of the RB CCPP. The significance of the construction phase impact is low, following the implementation of the mitigation measures recommended by the specialist. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

From the findings of the Traffic Impact Assessment (**Appendix M** of the final EIA Report) it can be concluded that traffic impacts of medium to low significance are expected as a result of the proposed RB CCPP.

The proposed development is therefore considered to be appropriate and acceptable from a traffic perspective. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the approval of the access and parking layout by the local authority and implementation of the recommended mitigation measures.

2.4.11 Project Risks

The Quantitative Risk Assessment assessed the risk impacts of the RB CCPP associated with the project site for the life-cycle of the project. The following installations were considered for analysis in the Qualitative Risk Assessment (QRA):

- Chlorine;
- Natural gas;
- Diesel;
- Hydrogen;
- LPG; and
- Ammonia.

Consequences for the installations were analysed and assessed, with several worst-case scenarios having the potential to affect individuals located offsite.

During the operation phase, the anticipated impacts include catastrophic rupture of chlorine storage vessel; with subsequent dispersion of toxic vapours over the surrounding area, full bore rupture of incoming natural gas line with flammable vapour dispersion, ignition and flash fire or explosive effects, catastrophic diesel tank rupture with full bund fire and possible bund overtopping, catastrophic rupture of hydrogen storage vessel leading to flammable vapour dispersion and ignition leading to flash fire thermal radiation effects and/or vapour cloud explosion overpressure effects, catastrophic rupture of LPG storage vessel leading to a fireball event, flammable vapour dispersion and ignition leading to flash fire thermal radiation effects and/or vapour cloud explosion overpressure effects, and catastrophic rupture of ammonia storage vessel with subsequent dispersion of toxic vapours over surrounding area. The significance of the impacts for the operation phase are low, following the implementation of the recommended mitigation measures. No impacts of a high significance were identified for the project, after implementation of mitigation measures.

The proposed development is therefore considered to be acceptable from a risk perspective. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures as well as compliance with all statutory requirements and completion of a recognised process hazard analysis (such as a HAZOP study, FMEA, etc.) on the proposed facility prior to construction to ensure design and operational hazards have been identified and adequate mitigation put in place.

2.4.12 Assessment of Cumulative Impacts

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of other known projects within the area. The alignment of energy developments with South Africa's National Energy Response Plan and the global drive to reduce greenhouse gas emissions per unit of power generated is, undoubtedly, positive. The economic benefits of the CCPP at a local, regional and national level has the potential to be significant.

The cumulative impacts associated with the RB CCPP have been assessed to be acceptable, with no unacceptable loss or risk expected (refer to **Table 2.3**).

Table 2.3: Summary of the cumulative impact significance for RB CCPP

Specialist assessment	Overall significance of impact of the proposed project considered in isolation	Cumulative significance of impact of the project and other projects in the area
Ecology (Construction Phase)	Medium	High to Medium (depending on the impact being considered)

Water Resources (Construction Phase)	High	High
Land use, soil and agricultural potential (Construction Phase)	High	High
Geohydrology	None	None
Heritage	None	None
Air Quality	None	None
Visual	Low	Low
Socio-Economic (Construction and Operation Phases)	Medium	Medium
Traffic (Construction and Operation Phases)	Low	Low
Risk (Operation Phase)	Low	Low

Based on the specialist cumulative assessment and findings regarding the development of the RB CCPP and its contribution to the overall impact in the area with consideration to cumulative impacts in isolation of the proposed RB CCPP and other known planned developments in the area, it can be concluded that RB CCPP cumulative impacts will be of medium to high significance in the construction phase and low to medium in the operation phase. On this basis, the following can be concluded considering the RB CCPP:

- The construction of the project will not result in the unacceptable loss of threatened or protected plant species as the site proposed for development has already been largely transformed through past and current land use practices. The proposed development is acceptable from an ecological perspective.
- The construction of the project will not result in the unacceptable loss of water resources provided that the proposed wetland and biodiversity offset plan is adopted and implemented. Opportunities for Eskom to be involved in conservation of other wetland areas in the region which could otherwise be impacted by development must be realised through this offset plan. The proposed development is acceptable from a water resources perspective.
- The construction of the project will not result in the complete or whole-scale change in sense of place and character of the area nor will the project result in unacceptable visual intrusion. This is due to the largely industrial nature of the area surrounding the project site, as well as the zoning of the site for industrial development.
- The project will not significantly increase the negative impact on the socio-economic environment provided that appropriate mitigation measures are implemented. In contrast, there will be numerous positive impacts that can be expected as a result of the proposed RB CCPP in terms of production and employment benefits.
- The project will contribute towards a reduction in greenhouse gas emissions resulting from an alternative energy generation perspective (when compared to coal energy generation), and will aid the country in meeting the commitments made under the COP 21 Agreement, to which the Government has committed to become a signatory.
- The project will not contribute significantly to traffic volumes and can be well accommodated on the existing road network.
- The project will not contribute to the loss of heritage sites as no heritage sites of significance will be affected by the proposed development.
- The project will not contribute significantly to the potential impact on surrounding human populations (including possibility of serious injury or death as a result of major industrial accidents from hazardous materials used on-site) and is considered Low significance.

Based on a detailed evaluation, the cumulative impacts associated with the construction and operation of the proposed RB CCPP and other development within the RBIDZ: Phase 1D are considered to be acceptable. The limited potential for cumulative impacts and risks makes the location of this project within the RBIDZ: Phase 1D a desirable location for further consideration provided that environmental impacts are mitigated to suitable standards as recommended within the final EIA Report.

2.5 Environmental Sensitivity

From the specialist investigations undertaken for the RB CCPP, the following sensitive areas/environmental features have been identified and delineated within the project site (refer to **Figures 2.2** to **Figure 2.4)**:

» **Ecology** – The wetland areas within the site provide habitat to threatened fauna species and should be regarded as of **High Sensitivity**. The biodiversity offset area and conservation area located to the north and south beyond the project site, as well as CBA: irreplaceable areas surrounding the project site should be regarded as no-go areas. From a vegetation perspective, the project site is not regarded as being particularly sensitive due to historical and current disturbance.

» **Surface Water Resources** – From a vegetation perspective the sensitivities relating to the proposed development are the presence of:

i. Provincially protected species, endemic species and species protected under the Natural Forest Act. Removal/destruction of tree species would require permit authorization;
ii. The potential presence of several Threatened flora species;
iii. Wetland vegetation over certain parts of the study area.

* From a fauna perspective, the sensitivities relating to the proposed development are the presence of:

i. *C. mariquensis* (Near Threatened) and *Hemisus guttatus* (Vulnerable) in wetland areas;
ii. The potential presence of *Balearica regulorum* (EN);
iii. The presence of provincially protected bird species.

* The EIS of the wetland systems was determined to be High (Class B) and Moderate (Class C) for the project area and biodiversity offset area respectively.

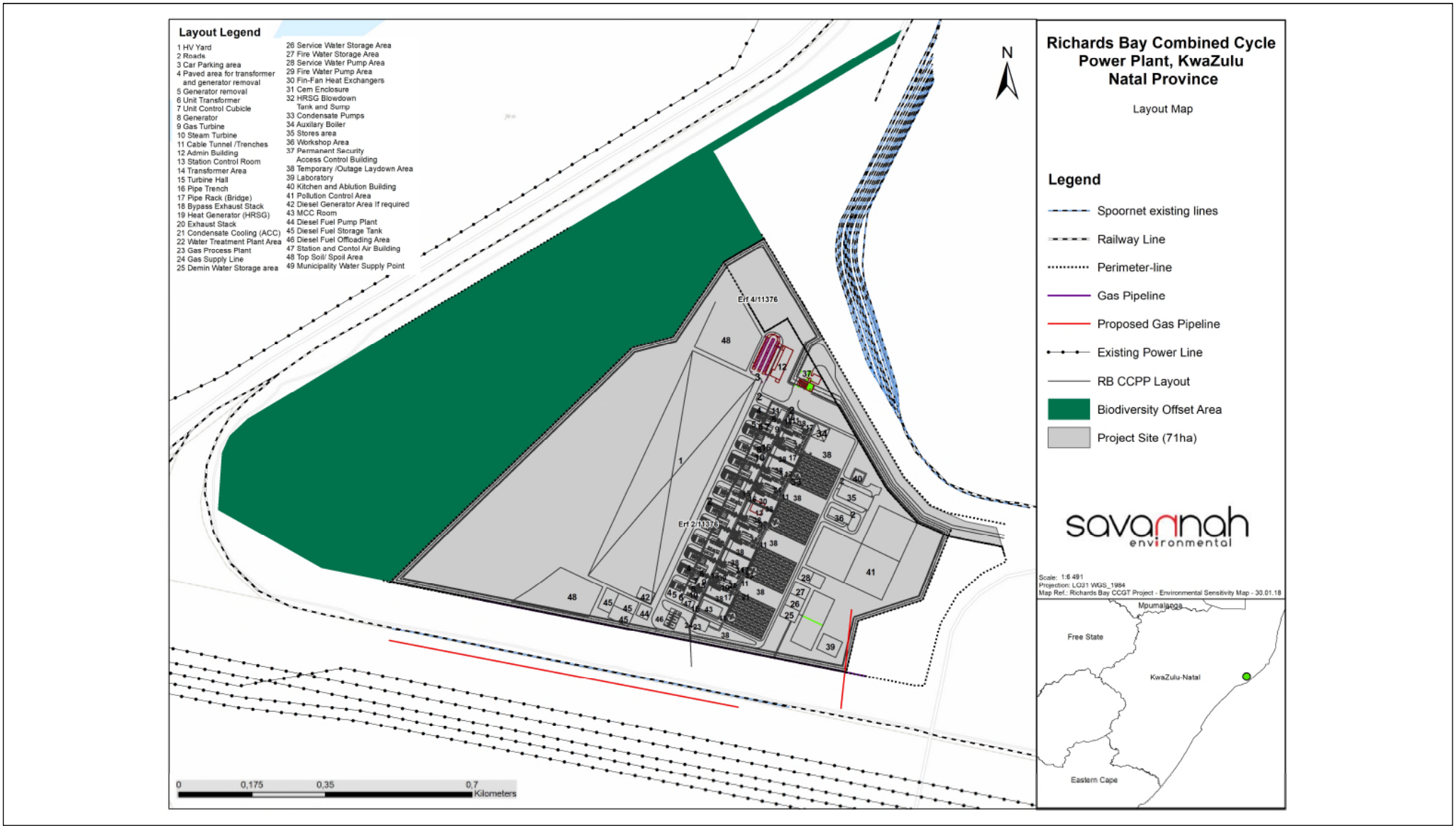

Figure 2.2: Final preferred layout map of the preferred development footprint for Richards Bay CCPP, as was assessed as part of the EIA process.

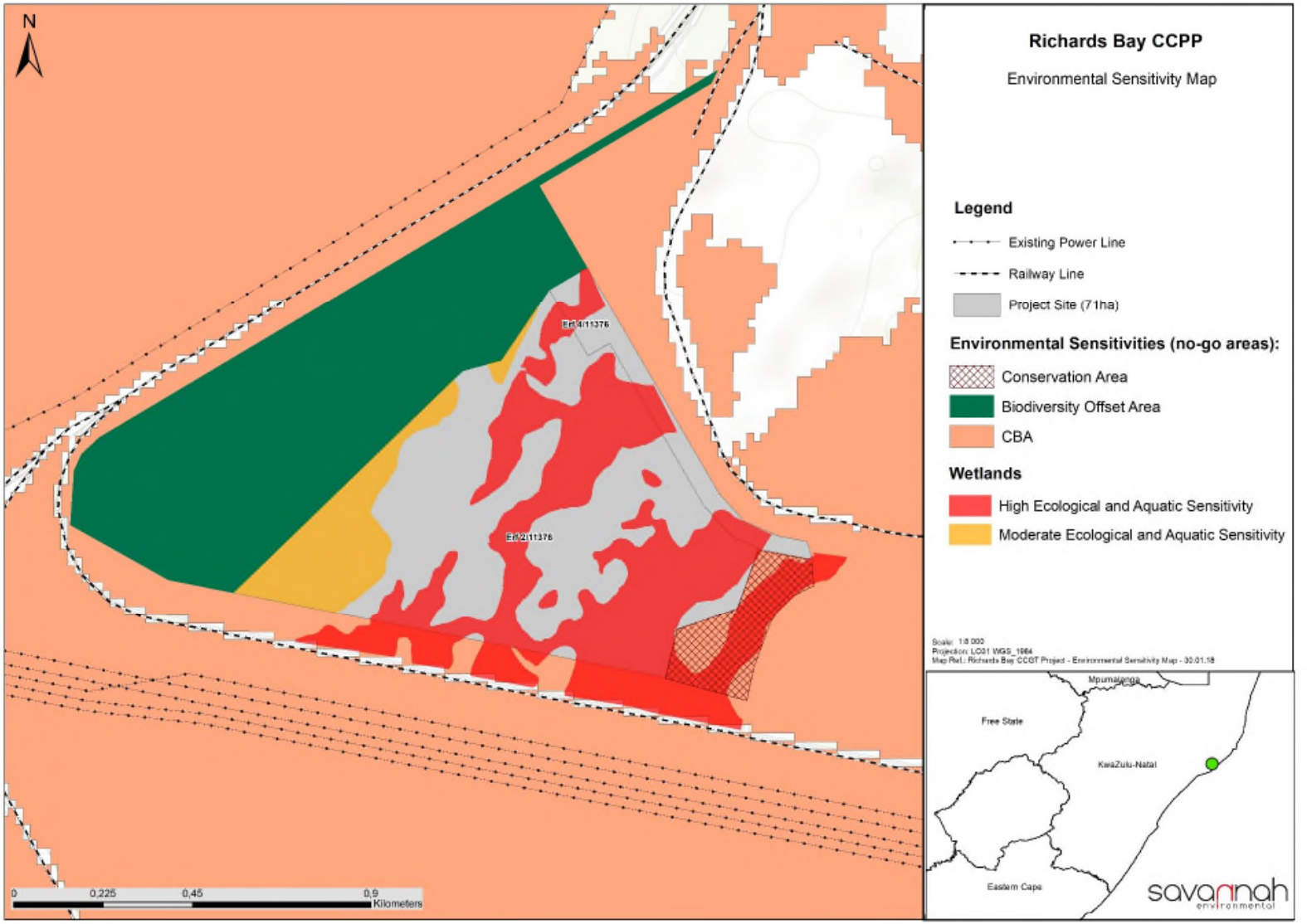

Figure 2.3: Environmental sensitivity map of the project site considered for Richards Bay CCPP.

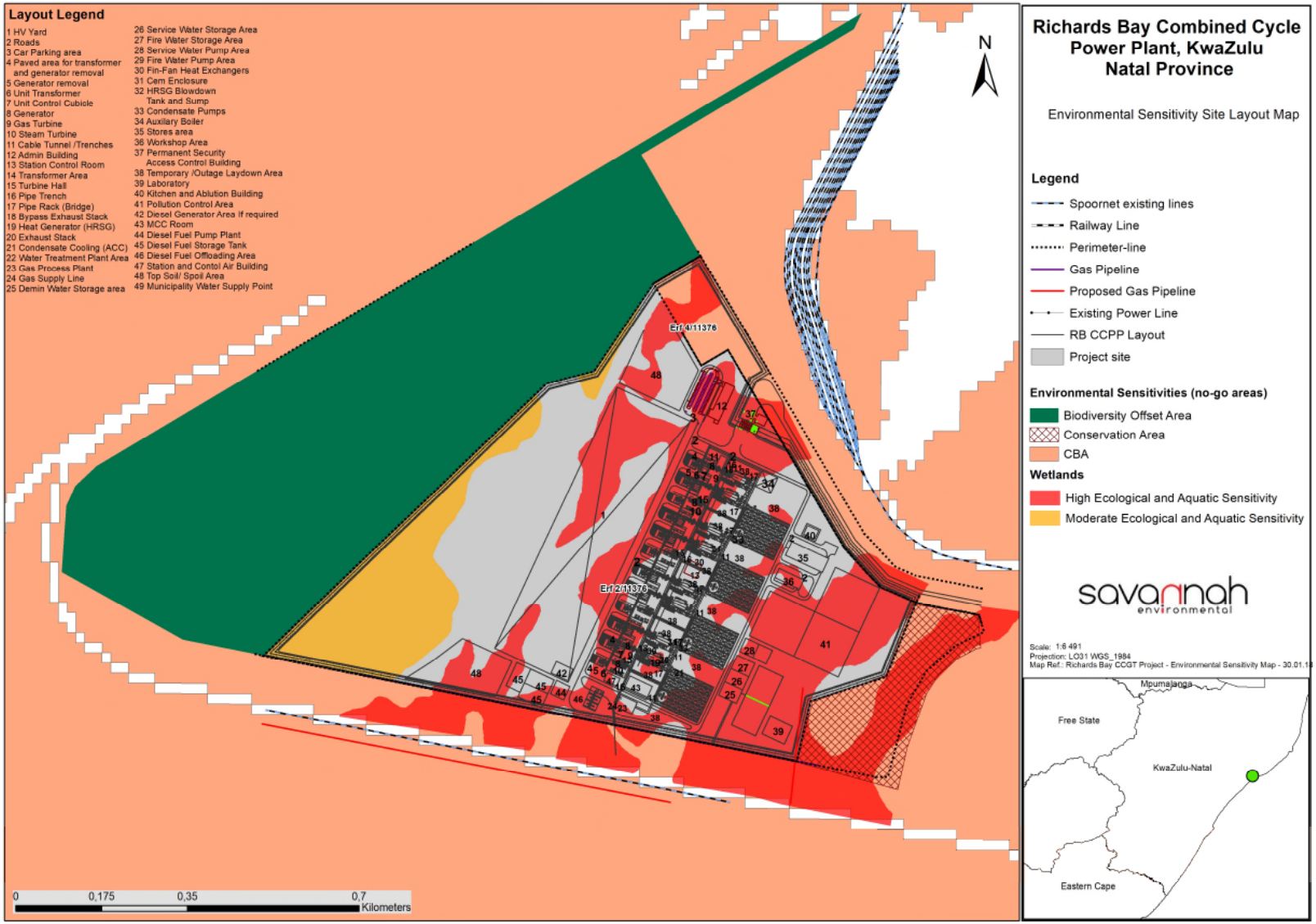

Figure 2.4: Final preferred layout map overlain by the environmental sensitivities for the Project site.

CHAPTER 3 : PURPOSE AND OBJECTIVES OF THE EMPR

An Environmental Management Programme (EMPr) is defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced". The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site clearing and site establishment) through to those incurred during the construction activities themselves (erosion, noise, dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Richards Bay CCPP. The document must be adhered to and updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Appendix 4 of the EIA Regulations, 2014 (as amended) (refer to Table 4.1). This is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for Richards Bay CCPP and/or as the project develops. This will ensure that the construction and operation activities are planned and implemented taking sensitive environmental features into account. The EMPr has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

The EMPr has the following objectives:

- Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Richards Bay CCPP.
- Ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- Propose mechanisms and frequency for monitoring compliance, and prevent long-term or permanent environmental degradation.
- Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the EIA process.

The mitigation measures identified within the EIA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

Eskom must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr, and through its integration into the relevant contract documentation provided to parties responsible for construction and/or operation activities on the site. Since this EMPr is part of the EIA process for the Richards Bay CCPP, it is important that this document be read in conjunction with the final EIA Report compiled for this project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation, the stipulations in the Environmental Authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the planning, construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to and updated as relevant throughout the project life cycle.

CHAPTER 4: STRUCTURE OF THIS EMPR

The preceding chapters provide background to the EMPr and the proposed project, while the chapters which follow consider the following:

- Planning and design activities;
- Construction activities;
- Operation activities; and
- Decommissioning activities.

These chapters set out the procedures necessary for the project owner to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation for the project, an overarching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The management programme has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMPr table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

OBJECTIVE: Description of the objective, which is necessary to meet the overall goals; which take into account the findings of the EIA specialist studies

Project Component/s	List of project components affecting the objective, i.e.: » Gas turbines; » Steam turbines; » Engine halls and stacks; » Internal access roads; » Fuel tanks; » Water storage facilities; » Control centre, guard house, admin building, workshops and a warehouse; and » Associated infrastructure.
Potential Impact	Brief description of potential environmental impact if objective is not met.
Activity/Risk Source	Description of activities which could affect achieving the objective.
Mitigation: Target/Objective	Description of the target and/or desired outcomes of mitigation.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
1. List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Time periods for implementation of measures

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management programme.

Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- Planned activities change (i.e. in terms of the components and/or layout of the facility);
- Modification to or addition to environmental objectives and targets;
- Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMPr to prevent deterioration or further deterioration of the environment.
- Relevant legal or other requirements are changed or introduced; and
- Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

4.1 Contents of this Environmental Management Programme (EMPr)

This Environmental Management Programme (EMPr) has been prepared as part of the EIA process being conducted in support of the application for Environmental Authorisation (EA) for the Richards Bay CCPP. This EMPr has been prepared in accordance with DEA's requirements as contained in Appendix 4 of the 2014 EIA Regulations (GNR 326), and within the Acceptance of Scoping dated 20 November 2017. It provides recommended management and mitigation measures with which to minimise impacts and enhance benefits associated with the project.

An overview of the contents of this EMPr, as prescribed by Appendix 4 of the 2014 EIA Regulations (GNR 326), and where the corresponding information can be found within this EMPr is provided in Table 4.1.

Table 4.1: Summary of where the requirements of Appendix 4 of the 2014 NEMA EIA Regulations (GNR 326) are provided in this EMPr.

Requirement	Location in this EMPr
(1) An EMPr must comply with section 24N of the Act and include – (a) Details of – (i) The EAP who prepared the EMPr. (ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Chapter 4 Appendix J
(b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Chapter 2
(c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Chapter 2 Figure 2.2 to Figure 2.4 Appendix A
(d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –	
(i) Planning and design.	Chapter 5
(ii) Pre-construction activities.	Chapter 5
(iii) Construction activities.	Chapter 6

Requirement	Location in this EMPr
(iv) Rehabilitation of the environment after construction and where applicable post closure.	Chapter 7
(v) Where relevant, operation activities.	Chapter 8
(f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to – (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation. (ii) Comply with any prescribed environmental management standards or practices. (iii) Comply with any applicable provisions of the Act regarding closure, where applicable. (iv) Comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable.	Chapters 5 - 8
(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters 5 - 8
(h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters 5 - 8
(i) An indication of the persons who will be responsible for the implementation of the impact management actions.	Chapters 5 - 8
(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.	Chapters 5 - 8
(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).	Chapters 5 - 8
(l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Chapter 6
(m) An environmental awareness plan describing the manner in which – (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work. (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Chapter 6
(n) Any specific information that may be required by the competent authority.	None have been received to date
(2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

An overview of the contents of this EMPr, as prescribed by DEA's Acceptance of Scoping dated 20 November 2017, and where the corresponding information can be found within this EMPr is provided in Table 4.2.

Table 4.2: Summary of where the requirements prescribed by DEA's Acceptance of Scoping are provided in the EMPr

DEA requirement for EIA	Response / Location in this EMPr
The Environmental Management Programme (EMPr) to be submitted as part of the EIAr must include the following:	
A copy of the final site layout map and alternatives. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible e.g. roads. The layout map must indicate the following:	Refer to Section 2, and Figures 2.2 to Figure 2.4.

DEA requirement for EIA	Response / Location in this EMPr
• Positions of gas turbines, steam turbines, condenser, water treatment plant, diesel offloading storage station, water tank and pipeline, gas pipeline and conditioning facility. • Access roads. • Warehouse and buildings. • Storage facilities. • Generators, 132kV and 440kV switchyards. • Internal roads indicating width (construction period width and operation width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible). • The location of sensitive environmental features on site e.g. CBAs, heritage sites, wetlands, drainage lines etc. that will be affected by the facility and its associated infrastructure. • All existing infrastructure. • Buffer areas. • Buildings. • All "no-go" areas.	
An environmental sensitivity map indicating environmental sensitive areas and its buffer zones.	Refer to Section 2, and Figures 2.2 to Figure 2.4.
The report has provided information that the site is sensitive (figures 3.2, 5.7 and 5.8) i.e. natural wetlands, CBAs and an offset. Therefore, you are required to provide a final layout map overlain by the environmental sensitivity map with a clear legend showing all infrastructures, development footprint and sensitive features.	Refer to Section 2, and Figures 2.2 to Figure 2.4.
An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.	Refer to Appendix C
A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.	Refer to Appendix D
A traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow during construction and operation of the facility. This plan must include measures to minimise impacts on local commuters e.g. limiting construction vehicles travelling on public roadways during morning and late afternoon commute time and avoid using roads through densely populated built-up areas so as not to disturb existing retail and commercial operations.	Refer to Appendix F
Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.	Refer to Objective 7
An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or stormwater systems.	Refer to Objective 12

DEA requirement for EIA	Response / Location in this EMPr
A fire management plan to be implemented during the construction and operation of the facility.	Refer to Appendix F
Emergency preparedness response plan.	Refer to Appendix H

4.2 Project Team

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326) the applicant appointed Savannah Environmental (Pty) Ltd as the independent environmental consultants responsible for managing the application for EA and the supporting EIA process. The application for EA and the EIA process, is being managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), and all other relevant applicable legislation.

4.2.1 Details and Expertise of the Environmental Assessment Practitioner (EAP)

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. Savannah Environmental's team have been actively involved in undertaking environmental studies over the past 13 years, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development.

This EIA process is being managed by Jo-Anne Thomas. She is supported by Shaun Taylor and Nicolene Venter.

» **Jo-Anne Thomas** is a Director at Savannah Environmental (Pty) Ltd and the registered EAP for the EIA for this project. Jo-Anne holds a Master of Science Degree in Botany (M.Sc. Botany) from the University of the Witwatersrand, and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP). 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. Jo-Anne 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.

» **Lisa Opperman** is an Environmental Assessment Practitioner. She holds a Bachelors degree with Honours in Environmental Management and has 4 years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects. She is currently involved in several EIAs for energy and large infrastructure projects across the country.

» **Nicolene Venter** is a Social and Public Participation Consultant at Savannah Environmental. Nicolene has a Higher Secretarial Certificate from Pretoria Technicon, and a Certificate in Public Relations from the Public Relation Institute of South Africa at Damelin Management School. Nicolene has over 21 years of experience as a Public Participation Practitioner and Stakeholder Consultant, and is a Board Member of the International Association for Public Participation Southern Africa (IAP2SA). Nicolene's experience includes managing the stakeholder engagement components of large and complex environmental authorisation processes across many sectors, with particular experience in the power sector. Most notably on large linear power lines and distribution lines, as well as renewable energy projects. Nicolene is well versed with local regulatory requirements as well as international best practice principles for community consultation and stakeholder engagement, as well as international guidelines and performance standards. Nicolene is responsible for managing the Public Participation process required as part of the EIA for this project.

Savannah Environmental's team have been actively involved in undertaking environmental studies over the past 13 years, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development, and therefore have extensive knowledge and experience in EIAs and environmental management, having managed and drafted EMPrs for numerous other power generation projects throughout South Africa. Curricula Vitae (CVs) detailing the Savannah Environmental team's expertise and relevant experience are provided in **Appendix I** to this EMPr.

4.2.2 Details of the Specialist Consultants

A number of independent specialist consultants have been appointed as part of the EIA project team in order to adequately identify and assess potential impacts associated with the project.

Table 4.3: Specialist Consultants which form part of the EIA project team

Specialist Study	Specialist Company	Specialist Name
Ecology	Rautenbach Biodiversity Consulting	Anita Rautenbach
Water Resources (including Wetland Offset Plan)	The Biodiversity Company	Andrew Husted
Geohydrology	Geo Hydraulic and Environmental Technology (Pty) Ltd	John Kalala Ngeleka
Soils & Agricultural Potential	The Biodiversity Company	Andrew Husted
Heritage	Heritage Contracts and Archaeological Consulting	Johan Van Der Walt
Air Quality	Airshed Planning Professionals (Pty) Ltd	Dr. Theresa Bird
Climate Change	Promethium Carbon	Robbie Louw
Visual	Environmental Planning and Design	Jon Marshall
Socio-economic	Urban Econ	Elena Broughton
Traffic	Techso	Stephen Fautley
Risk Assessment	RISCOM (Pty) Ltd	Motlatsi Mabaso

CHAPTER 5: PLANNING AND DESIGN MANAGEMENT PROGRAMME

Overall Goal: undertake the pre-construction activities (planning and design phase) in a way that:

- Ensures that the design of the power plant responds to the identified environmental constraints and opportunities.
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements and avoids sensitive environmental areas as far as practically possible.
- Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
- Ensures that the best environmental options are selected for the power plant.
- Enables the power plant construction activities to be undertaken without significant disruption to other land uses in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

5.1 Objectives

OBJECTIVE 1: Ensure the facility design responds to identified environmental constraints and opportunities

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Impact on identified sensitive areas. » Design fails to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components » Pre-construction activities, e.g. geotechnical investigations, site surveys of substation footprint, power line servitude and internal access roads and environmental walk-through surveys. » Positioning of temporary sites.
Mitigation: Target/Objective	» To ensure that the design of the power plant responds to the identified environmental constraints and opportunities. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner. » To ensure that the design of the power plant responds to the identified constraints identified through pre-construction surveys.

Mitigation: Action/Control	Responsibility	Timeframe
1. Plan and conduct pre-construction activities in an environmentally acceptable manner.	Eskom Contractor	Pre-construction
2. Undertake a detailed geotechnical pre-construction survey.	Eskom Geotechnical specialist	Pre-construction
3. Finalise layout of all components, and submit to DEA for approval prior to commencement of construction.	Eskom	Prior to construction
4. The EMPr should form part of the contract with the Contractors appointed to construct the power plant, and must be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the proposed project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.	Eskom Contractor	Tender Design and Design Review Stage
5. Plan the placement of laydown areas in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible and to avoid habitat loss and disturbance to adjoining areas.	Eskom	Pre-construction
6. Plan the placement of temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible and to avoid habitat loss and disturbance to adjoining areas.	Eskom	Pre-construction
7. Avoid habitat loss and disturbance to adjoining areas of the temporary construction camps and laydown areas.	Eskom	Pre-construction
8. The construction equipment camps must be planned as close to the site as possible to minimise impacts on the environment.	Eskom	Pre-construction
9. Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low sensitivity.	Eskom	Project planning
10. Ensure that laydown areas, construction camps and other temporary use areas are properly fenced or demarcated as appropriate and practically possible.	Eskom	Project planning
11. The construction site must be fenced off.	Eskom	Project planning
12. Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.	Eskom	Planning and design
13. A designated access to the site must be planned to ensure safe entry and exit.	Eskom Contractor	Design
14. The site access road leading into the site should be hard surfaced for 40m or more to reduce material carry into Western Arterial	Eskom Design engineer	Design and planning
15. The access security gate and guardhouse should be set back at least 40 m from Western Arterial to accommodate vehicles stacking outside the gate.	Eskom Design engineer	Design and planning
16. Protocols need to be in place to obviate vehicles stacking into Western Arterial whilst ensuring site safety and security requirements are met.	Eskom Design engineer	Design and planning

Mitigation: Action/Control	Responsibility	Timeframe
17. Clear rules and regulations for access to the proposed site must be developed.	Eskom Contractor	Pre-Construction
18. Access to adjacent conservation areas to be strictly controlled.	Eskom Contractor	Pre-construction
19. On-site parking and safe turn-around facilities should be provided for private vehicles and for buses and mini-buses transporting workers to and from site	Eskom Design engineer	Design and planning
20. Project design must include measures for adequate water collection, spill control and leakage control system.	Eskom Design engineer	Design and planning
21. Project design must include sufficient emergency shut-down valving systems.	Eskom Design engineer	Design and planning
22. Project design must include gas detection.	Eskom Design engineer	Design and planning
23. Project design must include alarm and executive function systems to limit the amount of vapour that's released	Eskom Design engineer	Design and planning
24. Relevant mitigation technologies must be built into the design of the facility to comply with emission and ambient air quality standards.	Eskom Design engineer	Design and planning
25. The design of the project must take the consideration of options to switch to alternative fuels such as biogas or biodiesel as well as carbon capture and storage options to enable the potential retrofit and implementation during the plant's operation phase.	Eskom Design engineer	Design and planning
26. Plan and placement of light fixtures for the plant in such a manner so as to minimise glare and impacts on the surrounding area.	Eskom Contractor	Planning
27. Plan and placement of the ancillary infrastructure in such a manner so as to minimise glare and impacts on the surrounding area.	Eskom Contractor	Planning
28. New elements should be designed to blend as naturally as possible with their backdrop	Eskom Design engineer	Design and planning
29. Plan to maintain the height of structures as low as possible	Eskom Design engineer	Design and planning
30. Minimise disturbance of the surrounding landscape.	Eskom Design engineer	Design and planning
31. Maintain existing vegetation around the development	Eskom Design engineer	Design and planning
32. Plan screen planting to soften views of the development particularly for the R34	Eskom Design engineer	Design and planning
33. Reduce the construction period as far as possible through careful planning and productive implementation of resources.	Eskom Contractor	Pre-construction
34. No temporary site camps must be planned outside the development footprint of the project.	Eskom	Design and planning
35. Consider planning and design level mitigation measures recommended by the specialists as part of the EIA process.	Engineering Design Consultant	Design Phase

Mitigation: Action/Control	Responsibility	Timeframe
36. All stormwater structures should be designed to block amphibian and reptile access to the road surface.	Engineering Design Consultant	Design Phase
37. The biodiversity offset area to the north of the project site must be regarded as a no-go area.	Eskom Design engineer	Design and planning
38. The conservation area to the south of the project site must be regarded as a no-go area.	Eskom Design engineer	Design and planning
39. Develop and implement a Carbon Emissions Management Plan for the RB CCPP project. This management plan must also be submitted to the Richards Bay Clean Air Association (RBCAA) prior to construction.	Eskom Design engineer	Design and planning Construction and Operation
40. Develop and implement an Air Quality Monitoring Plan for the RB CCPP project. This monitoring plan must also be submitted to the Richards Bay Clean Air Association (RBCAA) prior to construction.	Eskom Design engineer	Design and planning Construction and Operation
41. Obtain membership at the RBCAA	Eskom	Pre-construction

Performance Indicator	» The design meets the objectives and does not degrade the environment. » Demarcated sensitive areas are avoided at all times. » Design and layouts respond to the mitigation measures and recommendations in the final EIA Report.
Monitoring	» Review of the design by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction. » Monitor ongoing compliance with the Fire Management Plan (FMP) and method statements.

OBJECTIVE 2: Ensure that relevant permits and plans are in place to manage impacts on the environment

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Impact on identified sensitive areas. » Design fails to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components » Pre-construction activities, e.g. geotechnical investigations, site surveys of substation footprint, power line servitude and internal access roads and environmental walk-through surveys. » Positioning of temporary sites.
Mitigation: Target/Objective	» To ensure that the design of the power plant responds to the identified environmental constraints and opportunities.

	» To ensure that pre-construction activities are undertaken in an environmentally friendly manner. » To ensure that the design of the power plant responds to the identified constraints identified through pre-construction surveys.

Mitigation: Action/Control	Responsibility	Timeframe
1. Obtain any additional environmental permits required prior to the commencement of construction.	Eskom	Pre-construction
2. Obtain abnormal load permits for transportation of project components to site (if required).	Contractor(s)	Prior to construction
3. An ecological pre-construction walkthrough of the final development footprint (including the final power line alignment) must be undertaken prior to the commencement of the construction phase in order to locate species of conservation concern (flora and fauna) that would be affected and that can be translocated. Results of the walk through survey must be used to apply for the relevant permits.	Eskom Specialist	Pre-construction
4. Results of the ecological pre-construction walkthrough must be used to apply for the relevant permits.	Eskom Specialist	Pre-construction
5. No more than two weeks in advance of vegetation clearance that will commence during the breeding season (1 September – 1 March).	Eskom Specialist	Pre-construction
6. A qualified Zoologist must conduct a pre-construction survey of all potential special-status bird nesting habitat in the vicinity of the project site, and on the project site. If pre-construction surveys indicate that no nests of special-status birds are present or that nests are inactive or potential habitat is unoccupied, no further mitigation is required.	Eskom Specialist	Pre-construction
7. If active nests are found, avoidance procedures must be implemented on a case-by-case basis.	Eskom Specialist	Pre-construction
8. Avoidance procedures for nests may include the implementation of buffer zones and relocation of birds or seasonal avoidance. If buffers are created, a no disturbance zone must be created around active nests during the breeding season by a suitably qualified Zoologist.	Eskom Specialist	Pre-construction
9. If nest buffers are created, a no disturbance zone must be created around active nests during the breeding season by a suitably qualified Zoologist.	Eskom Specialist	Pre-construction
10. Immediately prior to felling, trees should be examined for the presence of bats or bat activity. Where bats are still present within an identified roost, it will be necessary to undertake exclusion procedures. The bat specialist/BIG member will advise on the steps necessary for exclusion and the likely time period. If a tree containing a confirmed bat roost must be felled outside the optimum time period, a bat specialist must remove any bats to safety.	Eskom Specialist	Pre-construction
11. Where bats are still present within an identified roost, it will be necessary to undertake exclusion procedures. The bat specialist/BIG member will advise on the steps necessary for exclusion and the likely time period.	Eskom Specialist	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
12. If a tree containing a confirmed bat roost must be felled outside the optimum time period, a bat specialist must remove any bats to safety.	Eskom Specialist	Pre-construction
13. In order to ensure the optimum warning for bats in any unconfirmed bat roosts that may be present, the trees should be pushed lightly two or three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. The tree should then be pushed to the ground slowly and should be left intact on the ground for at least 24 hours to allow any bats within the tree to escape.	Eskom Specialist	Pre-construction
14. A chance find procedure must be developed and implemented in the event that archaeological or palaeontological resources are found.	Eskom Contractor	Pre-construction
15. Search and Rescue (S&R) of species of concern that will be affected by the development must be undertaken prior to the commencement of construction.	Eskom Contractor Specialist	Pre-construction
16. Search and Rescue (S&R) must be undertaken in line with the relevant permits issued.	Eskom Contractor Specialist	Pre-construction
17. The wetland offset strategy must identify and quantify the wetland offset target. The types of offsets available must be described, and options for due consideration in determining the offset provided. A key component of this strategy would be to ensure the securing of the proposed offsite areas by means of proclamation. It is further recommended that no environmental authorisation be issued until such a proclamation is confirmed. The offset area/s could be gazetted as a Section 49 area.	Eskom	Pre-construction
18. The types of offsets available must be described, and options for due consideration in determining the offset provided. A key component of this strategy would be to ensure the securing of the proposed offsite areas by means of proclamation.	Eskom	Pre-construction
19. It is recommended that further consultation with the Local Municiality and KZN Ezemvelo be undertaken for the negotiations of the offset. The offset area/s could be gazetted as a Section 49 area.	Eskom	Pre-construction
20. The wetland offset proposal must drafted in agreement with the Local Municipality, EKZN Wildlife and any other relevant party.	Eskom	Pre-construction
21. Prepare a detailed FMP in collaboration with surrounding landowners.	Eskom	Pre-construction
22. Communicate the FMP to surrounding landowners and maintain records thereof.	Eskom	Pre-construction Construction
23. Develop and implement a stormwater management plan for the site.	Eskom Design engineer	Pre-construction
24. Dirty and clean water runoff from the site must be separated.	Eskom Design engineer	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
25. Compile a soil stripping guideline to preserve high value topsoil for rehabilitation.	Eskom Contractor Specialist	Pre-construction
26. Develop and implement an alien, invasives and weeds eradication/control plan	Eskom Specialist	Pre-construction
27. Develop a groundwater monitoring plan for implementation to prevent the CCPP activities from negatively impacting the groundwater quality and quantity. As part of the monitoring plan the following actions are required: » Site groundwater monitoring network will consist of background monitoring borehole (BH_M2) and two impact monitoring borehole as early warning of groundwater contamination (BH_M1 and BH_M3). » A second groundwater sampling run and groundwater levels measurements during dry season need to be performed by a geohydrologist before construction phase for a baseline quality data characterisation. » During operation phase, groundwater level and quality need to be monitored weekly. This will assist in detecting early contaminated groundwater migration to off-site receptors and in initiating promptly a remediation process. » Due to groundwater and surface interaction within the study area, surface water monitoring of the Nsezi dam, Nseleni River, Voor River and Bhizolo stream in the vicinity of the CCPP must also be included within the monitoring plan to assess any impact during the construction phase and when the CCPP is operational. » The dirty water retention dam must be lined to prevent any seepage of waste water.	Eskom Specialist	Pre-construction

Performance Indicator	» Layout does not destroy/degrade no-go areas. » No disturbance of no-go areas. » Permits are obtained and relevant conditions complied with. » Relevant management plans and Method Statements prepared and implemented.
Monitoring	» Review of the design by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction. » Monitor ongoing compliance with the EMP and method statements.

OBJECTIVE 3: Ensure management of risks associated with the power plant and associated fuel storage

Project Component/s	» Gas turbines; » Steam turbines; » Stacks; » HV-Yards; » Internal access roads; » Diesel off-loading facility and storage tanks;

	» Water infrastructure; » Gas pipeline; » Guard house, admin building, workshops and a warehouse; and » Ancillary infrastructure.
Potential Impact	» Impact on identified sensitive areas. » Inadequate risk mitigation.
Activities/Risk Sources	» Positioning of all project components » Positioning of temporary sites.
Mitigation: Target/Objective	» To ensure that the design of the power plant responds to the identified environmental constraints and opportunities. » To ensure that appropriate risk mitigation is implemented in the design of the facility.

Mitigation: Action/Control	Responsibility	Timeframe
1. Complete a recognised process hazard analysis (such as a HAZOP study, FMEA, etc.) on the proposed facility prior to construction to ensure design and operational hazards have been identified and adequate mitigation put in place.	Eskom	Prior to construction
2. All designs should be in full compliance with (but not limited to) the Occupational Health and Safety Act 85 of 1993 and its regulations.	Eskom Design engineer	Design
3. All designs should be in full compliance with (but not limited to) the National Buildings Regulations.	Eskom Design engineer	Design
4. All designs should be in full compliance with (but not limited to) the Buildings Standards Act 107 of 1977 as well as local by-laws.	Eskom Design engineer	Design
5. Compliance with IEC 61508 standards or equivalent to ensure that adequate protective instrumentation is included in the design and would remain valid for the full life cycle of the tank farm, including demonstration from the designer that sufficient and reliable instrumentation would be specified and installed at the facility.	Eskom Design engineer	Design
6. Compliance with IEC 61511 (Safety Instrument Systems) standards or equivalent to ensure that adequate protective instrumentation is included in the design and would remain valid for the full life cycle of the tank farm, including demonstration from the designer that sufficient and reliable instrumentation would be specified and installed at the facility.	Eskom Design engineer	Design
7. Prepare and issue of a safety document detailing safety and design features reducing the impacts from fires, explosions and flammable atmospheres to the MHI assessment body at the time of the MHI assessment: » Including compliance to statutory laws, applicable codes and standards and world's best practice; » Including the listing of statutory and non-statutory inspections, giving frequency of inspections; » Including provision for the auditing of the built facility against the safety document; » Noting that codes such as IEC 61511 can be used to achieve these requirements;	Eskom	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
8. All terminal designs must be signed off by a professional engineer registered in South Africa in accordance with the Professional Engineers Act, who takes responsibility for suitable designs	Eskom Design engineer	Design
9. Compile an emergency preparedness and response document for on-site and off-site scenarios prior to initiating the MHI risk assessment (with input from local authorities).	Eskom	Design
10. Complete an MHI risk assessment that must be completed in accordance to the MHI regulations, basing such a risk assessment on the final design and including engineering mitigation.	Eskom	Prior to the commencement of construction

Performance Indicator	» The design meets the objectives and does not degrade the environment. » Design and layouts respond to the mitigation measures and recommendations in the final EIA Report. » Design and layouts include appropriate risk mitigation.
Monitoring	» Statutory and non-statutory inspections regarding risk management.

OBJECTIVE 4: Ensure appropriate planning is undertaken by contractors

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Impact on identified sensitive areas. » Design and planning fail to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all project components » Pre-construction activities. » Positioning of temporary sites. » Employment and procurement procedures.
Mitigation: Target/Objective	» To ensure that the design of the power plant responds to the identified environmental constraints and opportunities. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner.

Mitigation: Action/Control	Responsibility	Timeframe
1. The terms of this EMPr must be included in all tender documentation and Contractors contracts.	Eskom Contractor	Pre-construction
2. The terms of the Environmental Authorisation must be included in all tender documentation and Contractors contracts.	Eskom Contractor	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
3. Pre-construction environmental induction for all construction staff on site must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.	EO	Pre-construction
4. A local procurement policy must be adopted to maximise the benefit to the local economy.	Eskom Contractor	Pre-construction
5. Recruitment of temporary workers onsite is not to be permitted.	Eskom Contractor	Pre-Construction
6. A recruitment office with a Community Liaison Officer should be established to deal with jobseekers.	Eskom Contractor	Pre-Construction
7. Set up a labour desk in a secure and suitable area to discourage the gathering of people at the construction site.	Eskom Contractor	Pre-Construction
8. Local community organisations and policing forums must be informed of construction times and the duration of the construction phase.	Eskom Contractor	Pre-Construction
9. Procedures for the control and removal of loiters at the construction site should be established.	Eskom Contractor	Pre-Construction
10. A security company must be appointed and appropriate security procedures implemented.	Eskom Contractor	Pre-Construction
11. A comprehensive employee induction programme must be developed and utilised to cover land access protocols, fire management and road safety.	Contractor	Pre-construction
12. Perform a skills audit to determine the potential skills that could be sourced in the area	Eskom Contractor	Pre-construction

Performance Indicator	» Conditions of the EMPr form part of all contracts. » Local employment and procurement is encouraged.
Monitoring	» Monitor ongoing compliance with the EMP and method statements.

OBJECTIVE 5: Ensure effective communication mechanisms

On-going communication with affected and surrounding landowners is important to maintain during the construction and operation phases of the development. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure.

	» Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Impacts on affected and surrounding landowners and land uses
Activity/risk source	» Activities associated with construction » Activities associated with operation
Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners, and communinties. » Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible.

Mitigation: Action/control	Responsibility	Timeframe
1. Compile and implement a grievance mechanism procedure for the public to be implemented during both the construction and operation phases of the facility. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.	Eskom Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
2. Develop and implement a grievance mechanism for the construction, operation and closure phases of the project for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Eskom Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
3. Liaison with landowners must be undertaken prior to the commencement of construction in order to provide sufficient time for them to plan agricultural activities.	Eskom Contractor	Pre-construction
4. Organise local community meetings to advise the local labour on the project that is planned to be established and the jobs that can potentially be applied for	Contractor	Pre-construction
5. Before construction commences, representatives from the local municipality, community leaders, community-based organisations and the surrounding property owners (of the larger area), must be informed of the details of the contractors, size of the workforce and construction schedules.	Eskom Contractor	Pre-construction and construction
6. Clearly inform the local municipality of the potential impact of the proposed project in order for the necessary preparations to take place	Eskom	Pre-construction

Performance Indicator	» Effective communication procedures in place.
Monitoring	» A Public Complaints register must be maintained, by the Contractor to record all complaints and queries relating to the project and the action taken to resolve the issue. » All correspondence should be in writing. » Eskom and contractor must keep a record of local recruitments and information on local labour; to be shared with the ECO for reporting purposes during construction.

CHAPTER 6: MANAGEMENT PROGRAMME: CONSTRUCTION

Overall Goal: Undertake the construction phase in a way that:

- Ensures that construction activities are appropriately managed in respect of environmental aspects and impacts.
- Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- Minimises the impact on the indigenous natural vegetation, and habitats of ecological value.
- Minimises impacts on fauna (including birds) in the study area.
- Minimises the impact on heritage sites should they be uncovered.
- Establish an environmental baseline during construction activities on the site, where possible.

6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the proponent, Eskom must ensure that the project complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMPr, and the implementation of the EMPr through its integration into the contract documentation. Eskom will retain various key roles and responsibilities during the construction phase.

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to the overall implementation of the EMPr

Several professionals will form part of the construction team. The most important from an environmental perspective are the **Project Manager/Site Manager**, the **Environmental Control Officer** (ECO), the **contractor** and the **Eskom**.

The Project Manager/Site Manager represents and acts on behalf of Eskom regarding the administration of contracts, and is responsible for the implementation of the EMPr on the site during the pre-construction and construction phases of the project. The ECO is responsible for monitoring the implementation of the EMP during the design, pre-construction and construction phases of the project. The contractor is responsible for abiding by the mitigation measures of the EMPr which are implemented by the Project Manager during the construction phase.

Figure 6.1 details the reporting structure for the construction phase of the Richards Bay CCPP.

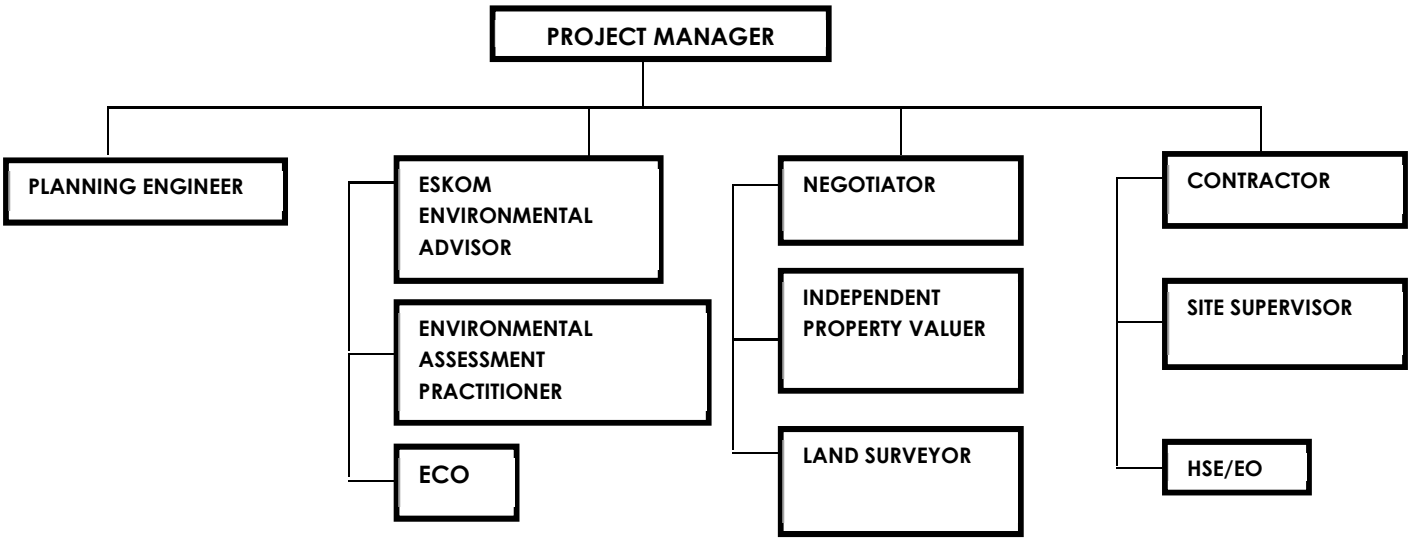

Figure 6.1: Reporting structure for the construction phase of the proposed project

The developer (i.e. Eskom) is responsible for the implementation of the EMPr during all phases of the project. Decommissioning will entail the appointment of a new professional team and responsibilities will be similar to those during the design, pre-construction and construction phases.

Specific responsibilities of each of these parties are detailed in the sections which follow.

6.1.1. Project Manager/Site Manager

The Project Manager/Site Manager is responsible for overall management of project and EMPr implementation. The following tasks will fall within his/her responsibilities:

- Be aware of the findings and conclusions of the Environmental Impact Assessment and the conditions stated within the Environmental Authorisation (once issued).
- Be familiar with the recommendations and mitigation measures of this EMP, and implement these measures.
- Monitor site activities on a daily basis for compliance.
- Conduct internal audits of the construction site against the EMP.
- Confine the construction site to the demarcated area.
- Rectify transgressions through the implementation of corrective action.

6.1.2. Environmental Control Officer

A suitably qualified **Environmental Control Officer (ECO)** must be appointed by the project proponent prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. Accordingly, the ECO will:

- Be fully knowledgeable of the contents of the EIA.
- Be fully knowledgeable of the contents of the conditions of the EA (once issued).
- Be fully knowledgeable of the contents of the EMPr.

- Be fully knowledgeable of the contents of all relevant environmental legislation, and ensure compliance therewith.
- Be fully knowledgeable with the contents of all relevant licences and permits issued for the project.
- Ensure that the contents of the EMPr are communicated to the Contractors site staff and that the Site Manager and Contractors are constantly made aware of the contents through ongoing discussion.
- Ensure that compliance with the EMPr is monitored through regular and comprehensive inspection of the site and surrounding areas.
- Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- Ensure that activities on site comply with all relevant environmental legislation.
- Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMPr.
- Ensure that any non-compliance or remedial measures that need to be applied are reported.
- Keep records of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- Independently report to the Department of Environmental Affairs (DEA) in terms of compliance with the specifications of the EMPr and conditions of the EA (once issued).
- Keep records of all reports submitted to DEA.

6.1.3. Contractor

The contractor is responsible for the implementation and compliance with recommendations and conditions of the EMPr.

- Ensure compliance with the EMPr at all times during construction.
- Provide all necessary supervision during the execution of the project. He/ She should be available on site all the time.
- Comply with special conditions as stipulated by landowners during the negotiation process.
- Inform and educate all employees about the environmental risks associated with the various activities to be undertaken, and highlight those activities which should be avoided during the construction process in order to minimise significant impacts to the environment.
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints
  - Health and safety incidents
  - Hazardous materials stored on site
  - Non-compliance incidents
- Where construction activities are undertaken is close to any inhabited area, the necessary precautions shall be taken by the Contractor to safeguard the lives and property of the inhabitants.
- The Contractor shall under no circumstances interfere with the property of landowners, Grid staff or nearby communities.
- Should the Contractor require clarity on any aspect of the EMPr the Contractor must contact the Environmental Consultant/Officer for advice.

6.1.4. Contractor's Safety, Health and Environment Representative/Environmental Officer

The Contractor's Safety, Health and Environment (SHE) Representative/Environmental Officer (EO), employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE/EO must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.

The Contractor's SHE/EO should:
» Be well versed in environmental matters.
» Understand the relevant environmental legislation and processes.
» Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
» Know the background of the project and understand the implementation programme.
» Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.
» Keep accurate and detailed records of all EMPr-related activities on site.

6.2 Objectives

In order to meet the overall goal for construction, the following objectives, actions, and monitoring requirements have been identified.

OBJECTIVE 2: Minimise impacts related to inappropriate site establishment

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Hazards to landowners and the public. » Damage to indigenous natural vegetation. » Loss of threatened plant species. » Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and resulting erosion.
Activities/Risk Sources	» Any unintended or intended open excavations (foundations and cable trenches). » Movement of construction vehicles in the area and on-site. » Transport to and from the temporary construction area/s.
Mitigation: Target/Objective	» To secure the site against unauthorised entry. » To protect members of the public/landowners/residents. » No loss of or damage to sensitive vegetation in areas outside the immediate development footprint.

	» Minimal visual intrusion by construction activities and intact vegetation cover outside of the immediate construction work areas.

Mitigation: Action/Control	Responsibility	Timeframe
1. Secure site, working areas and excavations in an appropriate manner.	Contractor	Site establishment, and duration of construction
2. Ensure that no activities infringe on identified no-go, very high and high sensitivity areas.	Contractor	Duration of construction
3. The siting of the construction equipment camp/s must take cognisance of any sensitive areas identified in the final EIA Report.	Contractor	Duration of construction
4. Ensure that vegetation is not unnecessarily cleared or removed during the construction phase.	Contractor	Site establishment, and duration of construction
5. Restrict the activities and movement of construction workers to the immediate construction site and existing access roads.	Contractor	Construction
6. Restrict the activities and movement of vehicles to the immediate construction site and existing access roads.	Contractor	Construction
7. Access to adjacent conservation areas must be strictly controlled.	Eskom Contractor	Pre-construction Construction
8. Any individuals of protected species affected by and observed within the development footprint during construction must be translocated under the supervision of the Contractor's Environmental Officer (EO).	EO Specialist	Construction
9. Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily).	Contractor	Construction
10. Ensure that rubble, litter, and disused construction materials are disposed regularly at licensed waste facilities.	Contractor	Construction
11. Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Construction
12. Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	Contractor	Construction
13. The construction site must be fenced and security provided.	Contractor	Construction
14. Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access routes.	Contractor	Construction
15. All unattended open excavations must be adequately demarcated and/or fenced.	Contractor	Construction
16. Establish appropriately bunded areas for storage of hazardous materials (i.e. fuel to be required during construction).	Contractor	Site establishment, and duration of construction
17. Visual impacts must be reduced during construction through minimising areas of surface disturbance.	Contractor	Site establishment, and duration of construction
18. Visual impacts must be reduced during construction through controlling erosion.	Contractor	Site establishment, and duration of construction
19. Visual impacts must be reduced during construction through using dust suppression techniques.	Contractor	Site establishment, and duration of construction

Mitigation: Action/Control	Responsibility	Timeframe
20. Visual impacts must be reduced during construction through restoring exposed soil as closely as possible to their original contour and vegetation.	Contractor	Site establishment, and duration of construction
21. Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing.	Contractor	Site establishment, and duration of construction
22. Cleared alien vegetation must be temporarily stored in a demarcated area.	Contractor	Site establishment, and duration of construction
23. Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers so that the surrounding environment is not polluted (at least one sanitary facility for each sex and for every 30 workers as per the 2014 Construction Regulations; Section 30(1) (b)) at appropriate locations on site).	Contractor	Site establishment, and duration of construction
24. Ablution facilities must be placed within the construction area and along the road.	Contractor	Site establishment, and duration of construction
25. Ablution or sanitation facilities must not be located within 100m from a watercourse or within the 1:100 year flood.	Contractor	Site establishment, and duration of construction
26. Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shade cloth) at the site where construction is being undertaken.	Contractor	Site establishment, and duration of construction
27. Separate bins should be provided for general and hazardous waste.	Contractor	Site establishment, and duration of construction
28. Provision should be made for separation of waste for recycling.	Contractor	Site establishment, and duration of construction
29. Foundations and trenches must be backfilled to originally excavated materials as much as possible.	Contractor	Site establishment, and duration of construction and rehabilitation
30. Excess excavation materials must be disposed of only in approved areas, or, if suitable, stockpiled for use in reclamation activities.	Contractor	Site establishment, and duration of construction and rehabilitation

Performance Indicator	» Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured. » Appropriate and adequate waste management and sanitation facilities provided at construction site. » Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation within the environment) with no evidence of degradation or erosion.
Monitoring	» An incident reporting system is used to record non-conformances to the EMPr. » EO and ECO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances will be immediately reported to the site manager. » Monitoring of vegetation clearing during construction (by contractor as part of construction contract). » Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).

OBJECTIVE 3: Appropriate management of the construction site and construction workers

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Damage to indigenous natural vegetation and sensitive areas. » Damage to and/or loss of topsoil (i.e. pollution, compaction etc.). » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Pollution/contamination of the environment.
Activities/Risk Sources	» Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » Contractors not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.
Mitigation: Target/Objective	» Limit equipment storage within demarcated designated areas. » Ensure adequate sanitation facilities and waste management practices. » Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/Control	Responsibility	Timeframe
1. In order to minimise impacts on the surrounding environment, contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint.	Contractors	Construction
2. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation, the final EIA Report, and this EMPr, as well as the requirements of all relevant environmental legislation.	Contractors	Construction
3. All construction vehicles must adhere to clearly defined and demarcated roads.	Contractor	Construction
4. No driving outside of the development boundary must be permitted.	Contractor	Construction
5. Ensure all construction equipment and vehicles are properly maintained at all times.	Contractor	Construction
6. Ensure that construction workers are clearly identifiable.	Contractor	Construction
7. All workers should carry identification cards and wear identifiable clothing.	Contractor	Construction
8. As far as possible, minimise vegetation clearing and levelling for equipment storage areas.	Contractor	Site establishment, and during construction

Mitigation: Action/Control	Responsibility	Timeframe
9. Ensure that operators and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community. Emphasis should be placed on the vulnerable sector of the population such as children and the elderly.	Contractor	Construction
10. Contact details of emergency services should be prominently displayed on site.	Contractor	Construction
11. Open fires on the site for heating, smoking or cooking are not allowed, except in designated areas.	Contractor	Construction
12. The contractor must provide adequate firefighting equipment on site.	Contractor	Construction
13. The contractor must provide firefighting training to selected construction staff.	Contractor	Construction
14. Personnel trained in first aid should be on site to deal with smaller incidents that require medical attention.	Contractor	Construction
15. Road borders must be regularly maintained to ensure that vegetation remains short to serve as an effective firebreak.	Contractor	Site establishment, and during construction
16. An emergency fire plan must be developed with emergency procedures in the event of a fire.	Contractor	Site establishment, and during construction
17. Rehabilitation of the working areas must be concurrent with the construction of the project.	Contractor	Duration of Contract
18. Ensure waste storage facilities are maintained and emptied on a regular basis.	Contractor	Site establishment, and duration of construction
19. No liquid waste, including grey water, may be discharged into any water body or drainage line.	Contractor	Maintenance: duration of contract within a particular area
20. All sewage disposal to take place at a registered and operational wastewater treatment works. Proof of disposal to be retained as proof of responsible disposal.	Contractor	Maintenance: duration of contract within a particular area
21. Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. This can be achieved through the provision of appropriate environmental awareness training to all personnel.	Contractor	Duration of construction
22. Records of all training undertaken must be kept.	Contractor	Duration of construction
23. Ensure compliance with all national legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials.	Contractor	During construction.
24. Ensure compliance with all regional legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials.	Contractor	During construction.
25. Ensure compliance with all local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials.	Contractor	During construction.

Mitigation: Action/Control	Responsibility	Timeframe
26. Ensure ablution facilities are appropriately maintained. Ablutions must be cleaned regularly and associated waste disposed of at a registered/permitted waste disposal site. Ablutions must be removed from site when construction is completed.	Contractor and sub-contractor/s	Duration of contract
27. Ablutions must be cleaned regularly and associated waste disposed of at a registered/permitted waste disposal site.	Contractor and sub-contractor/s	Duration of contract
28. Ablutions must be removed from site when construction is completed.	Contractor and sub-contractor/s	Duration of contract
29. Cooking and eating of meals must take place in a designated area.	Contractor and sub-contractor/s	Duration of contract
30. No fires are allowed on site.	Contractor and sub-contractor/s	Duration of contract
31. No firewood or kindling may be gathered from the site or surrounds.	Contractor and sub-contractor/s	Duration of contract
32. All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste.	Contractor and sub-contractor/s	Duration of contract
33. Keep a record of all hazardous substances stored on site.	Contractor	Duration of contract
34. Clearly label all the containers storing hazardous waste.	Contractor	Duration of contract
35. A Method Statement should be compiled for the management of pests and vermin within the site, specifically relating to the canteen area if applicable.	Contractor	Construction
36. No disturbance of flora or fauna must be undertaken outside of the demarcated construction area/s.	Contractor and sub-contractor/s	Duration of contract
37. Fire-fighting equipment and training must be provided before the construction phase commences.	Contractor and sub-contractor/s	Duration of contract
38. Workers must be aware of the importance of watercourses and drainage systems (especially those located within and surrounding the project site) and the significance of not undertaking activities that could result in such pollution.	Contractor and EO	Pre-construction Construction
39. Contractors must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct.	Contractor and sub-contractor/s	Pre-construction
40. On completion of the construction phase, all construction workers must leave the site within one week of their contract ending.	Contractor and sub-contractor/s	Construction
41. When possible, no activity should be undertaken at the site between sunset and sunrise, except for security personnel guarding the development.	Contractor and sub-contractor/s	Construction
42. Prepare a Method Statement pertaining to the clearance of vegetation under solar panels in accordance with the Fire Management Plan (FMP).	Contractor	Construction
43. Undertake screen planting	Contractor	Construction

Performance Indicator	» The construction camps and laydown areas have avoided sensitive areas. » Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement. » All areas are rehabilitated promptly after construction in an area is complete. » Excess vegetation clearing and levelling is not undertaken. » No complaints regarding contractor behaviour or habits. » Appropriate training of all staff is undertaken prior to them commencing work on the construction site. » Code of Conduct drafted before commencement of the construction phase.
Monitoring	» Regular audits of the construction camps and areas of construction on site by the EO. » Proof of disposal of sewage at an appropriate licensed wastewater treatment works. » Proof of disposal of waste at an appropriate licensed waste disposal facility. » An incident reporting system should be used to record non-conformances to the EMPr. » Observation and supervision of Contractor practices throughout the construction phase by the EO. » Complaints will be investigated and, if appropriate, acted upon.

OBJECTIVE 4: Maximise local employment, skills development and business opportunities associated with the construction phase

The unemployment rate in the City of uMhlathuze is 27% and the number of employed individuals have been increasing in the past six years (Urban Econ Calculations based on Quantec, 2017). The establishment of the proposed plant is expected to create 50 706 jobs over the construction period with the building and construction sector expected to incur the highest increase in labour in total:

» Jobs will be created at the construction site itself and a portion of these will be made available for the local labour force, which could temporarily reduce the unemployment rate.
» In addition, jobs will be established through indirect impacts during the construction phase, i.e. as a result of procurement of goods and services required for the development of the plant.
» Further jobs will be created through consumption-induced impacts, i.e. as a result of directly and indirectly benefiting households spending income derived from the project on goods and services.

Project Component/s	» Construction activities associated with the establishment of the CCPP. » Availability of required skills in the local communities for the undertaking of the construction activities.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/Risk Sources	» Contractors who make use of their own labour for unskilled tasks, thereby reducing the employment and business opportunities for locals. » Sourcing of individuals with skills similar to the local labour pool outside the municipal area. » Unavailability of locals with the required skills resulting in locals not being employed and labour being sourced from outside the municipal area. » Higher skilled positions might be sourced internationally, where required.
Enhancement: Target/Objective	» The contractor should aim to employ as many low-skilled and semi-skilled workers from the local area as possible. This should also be made a requirement for all contractors. » Employment of a maximum number of the low-skilled and/or semi-skilled workers from the local area where possible.

	» Appropriate skills training and capacity building.

Mitigation: Action/Control	Responsibility	Timeframe
1. Where feasible, effort must be made to employ locally in order to create maximum benefit for the communities.	Contractor	Construction
2. Clearly inform the local municipality of the potential impact of the proposed project in order for the necessary preparations to take place.	Contractor	Construction
3. In order to maximise the positive impact, the contractor must provide training courses for employees where feasible to ensure that employees gain as much as possible from the work experience.	Contractor	Construction
4. Facilitate the transfer of knowledge between experienced employees and the staff.	Contractor	Construction
5. Perform a skills audit to determine the potential skills that could be sourced in the area.	Contractor	Construction
6. Effort should be made to use locally sourced inputs where feasible in order to maximize the benefit to the local economy.	Contractor	Construction
7. Local Small and Medium Enterprises are to be approached to investigate the opportunities for supplying inputs required for the construction of the facility, as far as feasible.	Contractor	Construction

Performance Indicator	» Job opportunities, especially of low to semi-skilled positions, are primarily awarded to members of local communities as appropriate. » Locals and previously disadvantaged individuals (including women) are considered during the hiring process. » Labour, entrepreneurs, businesses, and SMMEs from the local sector are awarded jobs, where possible, based on requirements in the tender documentation. » The involvement of local labour is promoted. » Reports are not made from members of the local communities regarding unrealistic employment opportunities or that only outsiders were employed. » Employment and business policy document that sets out local employment and targets is completed before the construction phase commences. » Skills training and capacity building initiatives are developed and implemented.
Monitoring	» Eskom and contractor must keep a record of local recruitments and information on local labour to be shared with the ECO for reporting purposes.

OBJECTIVE 5: Protection of sensitive areas, flora, fauna and soils

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure.

	» Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Impacts on natural vegetation, habitats and fauna. » Loss of indigenous natural vegetation due to construction activities. » Impacts on soil. » Loss of topsoil. » Erosion.
Activity/Risk Source	» Vegetation clearing. » Site preparation and earthworks. » Excavation of foundations. » Construction of infrastructure. » Site preparation (e.g. compaction). » Excavation of foundations. » Stockpiling of topsoil, subsoil and spoil material.
Mitigation: Target/Objective	» To minimise the development area as far as possible. » To minimise impacts on surrounding sensitive areas. » To minimise impacts on soils. » Minimise spoil material. » Minimise erosion potential.

Mitigation: Action/Control	Responsibility	Timeframe
1. In order to minimise impacts on flora, fauna, and ecological processes, the development footprint should be limited to the minimum necessary to accommodate the required infrastructure.	Contractor	Duration of contract
2. Vegetation clearance to start in the non-breeding dry season (i.e. winter), if possible.	Contractor	Construction
3. Land clearance must only be undertaken immediately prior to construction activities.	Contractor	Construction
4. Unnecessary land clearance must be avoided.	Contractor	Construction
5. Where possible work should be restricted to one area at a time. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories.	Contractor	Construction
6. During vegetation clearance, methods should be employed to minimise potential harm to fauna species.	Contractor	Construction
7. Clearing has to take place in a phased and slow manner, commencing from the interior of the project area progressing outwards towards the boundary to maximise potential for mobile species to move to adjacent areas.	Contractor	Construction
8. Prior and during vegetation clearance any larger fauna species noted should be given the opportunity to move away from the construction machinery.	Contractor	Construction
9. Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing.	Contractor	Duration of Construction
10. No vegetation removal must be allowed outside the designated project development footprint.	Contractor	Duration of Construction
11. Restrict construction activity to demarcated areas.	Contractor	Duration of Construction

Mitigation: Action/Control	Responsibility	Timeframe
12. Practical phased development and vegetation clearing must be practiced so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time.	Contractor	Construction
13. Where possible work should be restricted to one area at a time.	Contractor	Construction
14. Access to adjacent conservation areas to be strictly controlled.	Eskom Contractor	Pre-construction Construction
15. No harvesting of plants for firewood, medicinal or any other purposes are to be permitted	Contractor	Construction
16. Fauna species such as frogs and reptiles that have not moved away should be carefully and safely removed to a suitable location beyond the extent of the development footprint by an Ecologist/Zoologist or a suitably qualified ECO trained in the handling and relocation of animals	Contractor	Construction
17. No killing and poaching of any wild animals to be allowed.	Contractor	Construction
18. It must be clearly communicated to all employees, including subcontractors that no killing and poaching of any wild animals is allowed.	Contractor	Construction
19. Areas beyond the development footprint must be expressly off limits to construction personnel and construction vehicles.	Contractor	Construction
20. Areas beyond the development footprint that is off limits must be communicated to construction personnel.	Contractor	Construction
21. No animals should be intentionally killed or destroyed.	Contractor	Construction
22. Poaching and hunting should not be permitted in the project site or surrounding areas.	Contractor	Construction
23. It is recommended that, while trenches are open during the construction phase, an appropriately sloping section of the side-wall is made available for the escape of any trapped animals	Contractor	Construction
24. Any fauna directly threatened by the construction activities must be removed to a safe location by a suitably qualified person.	Suitably qualified person	Construction
25. A suitable perimeter fence should be constructed around the facility to restrict access of fauna to the site and to restrict/control access of staff to adjacent natural areas.	Contractor	Construction
26. Education of employees on the conservation importance of natural areas and fauna must be provided.	Contractor	Construction
27. Access to no-go areas to be restricted and controlled.	Contractor	Construction
28. Clear communication must be given to all employees regarding the restricted access to no-go areas.		
29. No hunting, snaring, killing or disturbing any fauna species to be allowed on the site or in any of the no-go areas.	Contractor	Construction
30. No collecting of flora species is permitted in the no-go areas.	Contractor	Construction
31. Topsoil must be removed and stored separately from subsoil.	Contractor	Construction
32. Topsoil must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
33. Any fill material must be sourced from a commercial off-site suitable/permitted and authorised source, quarry or borrow pit.	Contractor	Duration of contract
34. Where possible, material from foundation excavations must be used as fill on-site.	Contractor	Duration of contract
35. Topsoil stockpiles must be up to a maximum of 2m in height.	Contractor	Construction
36. Soil stockpiles must be dampened with dust suppressant or equivalent to prevent erosion by wind.	Contractor	Construction
37. Excavated topsoil must be stockpiled in designated areas separate from base material and covered until replaced during rehabilitation.	Contractor	Construction
38. As far as possible, topsoil must not be stored for longer than 3 months.	Contractor	Construction
39. Stockpiles older than 6 months must be enriched before they can be used to ensure the effectiveness of the topsoil.	Contractor	Construction
40. All graded or disturbed areas which will not be covered by permanent infrastructure such as paving, buildings or roads must be stabilised using appropriate erosion control measures.	Contractor	Construction
41. Topsoil must not be stripped or stockpiled when it is raining or when the soil is wet as compaction will occur.	Contractor	Construction
42. A method statement must be developed and submitted to the engineer to deal with erosion issues prior to bulk earthworks operations commencing.	Contractor	Before and during construction
43. Program construction activities so that the area of exposed soil is minimised during times of the year when the potential for erosion is high, for example during summer when intense rainstorms are common.	Contractor	Construction
44. Site drainage such as those generated by the dewatering of excavated trenches must be diverted away from cleared, graded or excavated areas	Contractor	Construction
45. Sediment barriers or sediment traps such as silt fences, sandbags, and hay bales for example must be established to curb erosion and sedimentation where necessary.	Contractor	Construction
46. Sediment barriers should be regularly maintained and cleaned to ensure effective drainage.	Contractor	Construction
47. These temporary barriers may only be removed once construction has been completed and there is no further risk of sedimentation.	Contractor	Construction
48. Topsoil, leaf and plant litter as well as subsoil removed during the construction of roads and building platforms must be stockpiled separately in low heaps, not exceeding 2m in height.	Contractor	Construction
49. Microbial activity, seed viability and soil fertility are adversely affected by long periods of stockpiling when high temperatures can be generated in thick deposits, therefore the topsoil should be restored as soon as possible.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
50. An alternative is to aerate the stockpiled topsoil regularly (as a minimum every six months).	Contractor	Construction
51. Vegetate with a grass mix natural to the area to control erosion if soil stockpiles will be kept for more than three months.	Contractor	Construction
52. Stockpiles are not to be used as stormwater control features.	Contractor	Construction
53. Erosion, sediment control measures such as silt fences, concrete blocks and/or sandbags must be placed around stockpiles (i.e. soil and materials) to limit runoff.	Contractor	Construction
54. Stockpiling of any materials on slopes is to be avoided, unless appropriate erosion control and management measures are implemented.	Contractor	Construction
55. Any erosion problems within the development area as a result of the construction activities observed must be rectified immediately and monitored thereafter to ensure that they do not re-occur.	Contractor	Construction
56. During construction the contractor must protect areas susceptible to erosion by installing appropriate temporary and permanent drainage works as soon as possible.	Contractor	construction
57. Take other measures necessary to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas.	Contractor	construction
58. Create energy dissipation at discharge areas to prevent scouring	Contractor	construction
59. Activity at the site must be reduced after large rainfall events when the soils are wet.	Contractor	Construction
60. No driving off of hardened roads should occur at any time and particularly immediately following large rainfall events.	Contractor	Construction
61. Silt traps or cut-off berms downslope of working areas should be used where there is a danger of topsoil or material stockpiles eroding and entering watercourses and other sensitive areas.	Contractor	Construction
62. Erosion control measures to be regularly maintained.	Contractor	Construction
63. Bush clearing of all bushes and trees taller than one meter..	Contractor	Construction
64. If any erosion occurs, corrective actions (erosion berms) must be taken to minimise any further erosion from taking place.	Contractor	Construction
65. If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion.	Contractor	Construction
66. Only the designated access routes are to be used to reduce any unnecessary compaction.	Contractor	Construction
67. Compacted areas are to be ripped to loosen the soil structure.	Contractor	Construction
68. The topsoil should be stripped by means of an excavator bucket, and loaded onto dump trucks.	Contractor	Construction
69. Topsoil is to be stripped when the soil is dry, as to reduce compaction.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
70. Bush clearing contractors will only clear bushes and trees larger than 1m the remaining vegetation will be stripped with the top 0.3 m of topsoil to conserve as much of the nutrient cycle, organic matter and seed bank as possible	Contractor	Construction
71. The subsoil must be approximately 0.3m to the designated thickness in the stripping guidelines, will then be stripped and stockpiled separately.	Contractor	Construction
72. The handling of the stripped topsoil will be minimised to ensure the soil's structure does not deteriorate significantly.	Contractor	Construction
73. Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles.	Contractor	Construction
74. The stockpiles must be vegetated (details contained in rehabilitation plan) in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.	Contractor	Construction
75. Only the designated access routes are to be used to reduce any unnecessary compaction.	Contractor	Construction
76. Compacted areas are to be ripped to loosen the soil structure.	Contractor	Construction
77. Place the above cleared vegetation were the topsoil stockpiles are to be placed.	Contractor	Construction
78. All construction vehicles must adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises.	Contractor	Construction Operation
79. Outside lighting should be designed to minimise impacts on fauna.	Contractor	Before construction
80. All outside lighting should be directed into the proposed development area as opposed to away from the development.	Contractor	Construction
81. All outside lighting should not be directed in the direction of sensitive areas, including sensitive areas on neighbouring properties.	Contractor	Construction
82. Fluorescent and mercury vapour lighting should be avoided.	Contractor	Construction
83. Sodium vapor (yellow) lights should be used wherever possible.	Contractor	Construction
84. In order to reduce low intensity noise levels, work areas need to be effectively screened to reduce or deflect noise.	Contractor	Construction
85. Engineering controls such as modifications to equipment or work areas to make it quieter, the acquisition of equipment designed to emit low noise and vibration, creation of noise barriers, proper maintenance of tools and equipment must be considered.	Contractor	Construction
86. Noise from vehicles and powered machinery and equipment on-site must not exceed the manufacturer's specifications, based on the installation of a silencer.	Contractor	Construction
87. Equipment should be regularly serviced.	Contractor	Construction
88. Attention should also be given to muffler maintenance and enclosure of noisy equipment.	Contractor	Construction

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing vegetation. » Topsoil appropriately stored, managed and rehabilitated. » Limited soil erosion around site. » No activity in restricted areas. » Minimal level of soil degradation.
Monitoring	» Observation of vegetation clearing activities by EO throughout construction phase. » Supervision of all clearing and earthworks. » Ongoing monitoring of erosion management measures within the site. » Monthly inspections of sediment control devices by the EO. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 6: Minimise the establishment and spread of alien invasive plants

Major factors contributing to invasion by alien invader plants include high disturbance activities and negative grazing practices. Consequences of this may include:

» Loss of indigenous vegetation;
» Change in vegetation structure leading to change in various habitat characteristics;
» Change in plant species composition;
» Change in soil chemical properties;
» Loss of sensitive habitats;
» Loss or disturbance to individuals of rare, endangered, endemic, and/or protected species;
» Fragmentation of sensitive habitats;
» Change in flammability of vegetation, depending on alien species; and
» Hydrological impacts due to increased transpiration and runoff.

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Invasion of natural vegetation surrounding the site by declared weeds or invasive alien species. » Impacts on soil. » Impact on faunal habitats. » Degradation and loss of agricultural potential.
Activities/Risk Sources	» Transport of construction materials to site. » Movement of construction machinery and personnel. » Site preparation and earthworks causing disturbance to indigenous vegetation. » Construction of site access roads. » Stockpiling of topsoil, subsoil and spoil material.

	» Routine maintenance work – especially vehicle movement.
Mitigation: Target/Objective	» To significantly reduce the presence of weeds and eradicate alien invasive species. » To avoid the introduction of additional alien invasive plants to the site. » To avoid distribution and thickening of existing alien plants in the site. » To complement existing alien plant eradication programs in gradually causing a significant reduction of alien plant species throughout the site.

Mitigation: Action/Control	Responsibility	Timeframe
1. Develop and implement an IAP Control and Eradication Programme.	Contractor	Construction
2. Avoid creating conditions in which alien plants may become established.	Contractor	Construction
3. Keep disturbance of indigenous vegetation to a minimum.	Contractor	Construction
4. Rehabilitate disturbed areas as quickly as possible.	Contractor	Construction
5. Do not import soil from areas with alien plants.	Contractor	Construction
6. When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur.	Contractor	Construction
7. Continually monitor the re-emergence of these species and manage according to the invasive species management plan.	Contractor	Construction
8. Continually monitor the re-emergence of these species and manage according to the invasive species management plan.	Contractor	Construction
9. Immediately control any alien plants that become established using registered control methods.	Contractor	Construction
10. The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides.	Contractor	Construction
11. It must be ensured that WHO Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.	Contractor	Construction

Performance Indicator	» For each alien species: number of plants and aerial cover of plants within the site and immediate surroundings.
Monitoring	» On-going monitoring of area by EO during construction. » Annual audit of development footprint and immediate surroundings by qualified botanist. » If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants. » The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the site. » The environmental manager/site agent should be responsible for driving this process. » Reporting frequency depends on legal compliance framework.

OBJECTIVE 7: Minimise impacts on water resources

Project component/s	» Construction activities » Storage of dangerous goods. » Ablution facilities.
Potential Impact	» Pollutants such as lime-containing (high pH) construction materials such as concrete, cement, grouts, etc. could be harmful to aquatic biota, particularly during low flows when dilution is reduced.
Activity/risk source	» Fuelling, usage and maintenance of construction vehicles. » Cement batching and usage. » Labourer using ablution facilities. » Use of any chemicals or hazardous materials/dangerous goods during construction.
Mitigation: Target/Objective	» No incidents related to spills of chemicals and hazardous materials. » No release of contaminated water in watercourses including streams and pans. » No misbehaviour of construction workers (i.e. ablution activities, washing).

Mitigation: Action/control	Responsibility	Timeframe
1. Implement strict management of all hazardous materials/dangerous goods used on site.	Contractor	Construction
2. Spilled fuel, oil or grease must be retrieved where possible, and contaminated soil removed, cleaned and replaced.	Contractor	Construction
3. Contaminated soil must be collected by the Contractor and disposed of at a waste site designated for this purpose.	Contractor	Construction
4. Ensure strict management of potential sources of pollution (hydrocarbons from vehicles and machinery, cement during construction, etc.).	Contractor	Construction
5. Bunded containment must be provided below and around any fuel storage containers.	Contractor	Construction
6. Construction equipment is to be checked daily (by Contractor) to ensure that no fuel spillage takes place from construction vehicles or machinery.	Contractor	Construction
7. Proper use of ablutions should be strictly enforced.	Contractor	Construction
8. No activities shall be allowed to encroach into identified sensitive areas in the adjacent conservation area.	Contractor	Construction
9. If any concrete mixing takes place on site, this is to be done on a board or plastic sheeting, which is to be removed from the site once concreting is completed; or in areas to be covered by further construction.	Contractor	Construction
10. Sand, stone and cement must be stored in demarcated areas, and must be covered or sealed to prevent wind erosion and resultant deposition of dust on the surrounding indigenous vegetation.	Contractor	Construction
11. Any excess sand, stone and cement must be removed from site at the completion of the construction period.	Contractor	Construction
12. Any areas disturbed during the construction phase should be encouraged to rehabilitate as fast and effective as possible.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
13. Compilation of a soil stripping guideline must be undertaken to preserve high value topsoil for rehabilitation an provide input into the location of stockpiles away from preferential flow paths.	Contractor	Construction
14. Where possible, reduce the footprint area of exposed ground during periods of high rainfall.	Contractor	Construction
15. Prioritise vegetation clearing for the winter months as far as possible.	Contractor	Construction
16. Existing headcuts must be rehabilitated during the construction phase.	Contractor	Construction
17. Exposed areas must be ripped and vegetated to increase surface roughness.	Contractor	Construction
18. Only clean vehicles on site and not in the surrounding areas.	Contractor	Construction
19. Implement a groundwater monitoring plan.	Contractor Specialist	Construction
20. If the monitoring data indicates that leakages into the groundwater have occurred, and that the groundwater system is impacted, an environmental site assessment needs to be undertaken by an appropriately qualified and experienced specialist and the necessary remediation measures taken based on the magnitude of the impact.	Contractor Specialist	Construction
21. Supervision of the dewatering process must be undertaken during construction by a qualified geohydrologist to ensure implementation of an appropriate pumping rate and pumping schedule; and to minimise impact extend and magnitude on groundwater condition.	Contractor Specialist	Construction
22. Supervision of excavation and erection of building foundations by a qualified civil engineering team to minimise impact on the groundwater condition.	Contractor	Construction
23. Supervision of the dewatering process must be undertaken during construction by a qualified geohydrologist and excavation and pipeline installation by qualified engineering team are required to minimise impact on groundwater condition	Contractor	Construction
24. Surface and stormwater run-off needs to be diverted through an oil/water separator before leaving the site.	Contractor	Construction

Performance Indicator	» No major preventable spillages are recorded.
Monitoring	» Monitor management measures in place for potentially hazardous materials.

OBJECTIVE 8: Appropriate Stormwater Management

The stormwater management is covered under the Pre-construction and Construction Phase management, but aspects thereof will also continue into the Operation Phase. It is important that the engineers and

contractors responsible for the detailed design of the stormwater systems take into account the requirements of this EMPr, as well as the recommendations by the participating specialists.

Project Component/s	» Alteration of natural areas into hard surfaces impacting on the local hydrological regime of the area.
Potential Impact	» Poor stormwater management and alteration of the hydrological regime.
Activities/Risk Sources	» Placement of hard engineered surfaces.
Mitigation: Target/Objective	» Reduce the potential increase in surface flow velocities and the impact on localised drainage systems.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
1. Any stormwater within the site must be handled in a suitable manner, i.e. construct diversion berms and drains around working areas.	Contractor and Engineers	Construction
2. Contaminated water must not be discharged into the watercourses.	Contractor and Engineers	Construction
3. All roads and other hardened surfaces must have runoff control features which redirects water flow and dissipate any energy in the water which may pose an erosion risk.	Contractor	Construction
4. Stormwater control systems must be implemented to reduce erosion on the project site.	Contractor	Construction
5. New access roads within the site are to be constructed according to design and contract specifications.	Contractor	Construction
6. The access routes must have suitable stormwater management plans and erosion control measures.	Contractor	Construction
7. Drainage measures must promote the dissipation of stormwater run-off.	Contractor	Construction
8. Any loss/alteration of flow dynamics must be quantified, and mitigation options to re-introduce water in a safe and environmentally friendly way must be assessed.	Contractor	Construction

Performance Indicator	» No impacts due to runoff. » Minimise erosion as far as possible. » Appropriate stormwater management system in place.
Monitoring	» Ongoing monitoring of erosion management measures within the site. » Monthly inspections of sediment control devices by the EO. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 9: Protection of heritage resources

The development footprint of approximately 71 hectares was assessed both on desktop level and by a field survey. Large parts of the study area were previously impacted on by illegal sand mining activities and was waterlogged during the survey. As a result of the sand mining and the development of infrastructure like power lines, water pipelines and railway lines within the study area, the property is disturbed or damaged from a

heritage point of view and in terms of the national estate as defined by the NHRA no sites of significance were found during the survey.

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Heritage objects or artefacts found on site are inappropriately managed or destroyed.
Activity/Risk Source	» Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on site.
Mitigation: Target/Objective	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.

Mitigation: Action/control	Responsibility	Timeframe
1. Areas required to be cleared during construction must be clearly marked in the field to avoid unnecessary disturbance of adjacent areas.	Contractor	Construction
2. A chance find procedure must be developed and implemented in the event that archaeological or palaeontological resources are found.	Contractor Heritage specialist	Construction
3. In the case where the proposed development activities bring these materials to the surface, work must cease and SAHRA must be contacted immediately.	Contractor Heritage specialist	Construction
4. Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow if they find sites.	Contractor, ESA and heritage specialist	Duration of contract, particularly during excavations
5. All staff must be familiarised with procedures for dealing with heritage objects/sites.	Contractor, ESA and heritage specialist	Duration of contract, particularly during excavations
6. In the event that fossils resources are discovered during excavations, immediately stop excavation in the vicinity of the potential material. Mark (flag) the position and also spoil material that may contain fossils. Inform the site foreman and the EO. EO to inform Eskom; Eskom contacts the standby archaeologist and/or palaeontologist. EO to describe the occurrence and provide images by email.	Contractor and EO	Construction

Performance Indicator	» No disturbance outside of designated work areas. » All heritage items located are dealt with as per the legislative guidelines.
Monitoring	» Observation of excavation activities by the EO throughout construction phase. » Supervision of all clearing and earthworks. » Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported.

	» Appropriate permits obtained from SAHRA prior to the disturbance or destruction of heritage sites (if required). » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 10: Management of dust and air emissions

During the construction phase, limited gaseous or particulate emissions are anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle entrained dust from the movement of vehicles on the main and internal access roads.

Project component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Dust generation and particulates from vehicle movement to and on-site, foundation excavation, road construction activities, road maintenance activities, temporary stockpiles, and vegetation clearing affecting the surrounding residents and visibility. » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles and construction equipment.
Activity/risk source	» Clearing of vegetation and topsoil. » Excavation, grading, scraping, levelling, digging, drilling and associated construction activities. » Transport of materials, equipment, and components on internal access roads and the associated increased traffic. » Vehicle movement on gravel roads. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning vehicle and construction engines.
Mitigation: Target/Objective	» To ensure emissions from all vehicles and construction engines are minimised, where possible, for the duration of the construction phase. » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase. » Suppression of dust, pollution control and minimise dust generation.

Mitigation: Action/control	Responsibility	Timeframe
1. Implement appropriate dust suppression measures on a regular basis along the gravel access road and on the proposed site.	Contractor	Construction
2. Use of dust suppressants on roads and limit development of new roads.	Contractor	Construction
3. Areas to be cleared in a progressive manner.	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
4. Road surfaces and other infrastructure to be constructed as soon as possible after vegetation clearing in order to minimise exposed ground surfaces, specifically roads which carry traffic.	Contractor	Construction
5. Roads must be maintained in a manner that will ensure that nuisance to the community from dust emissions from road or vehicle sources is not visibly excessive.	Contractor	Construction
6. The site access road leading into the site should be hard surfaced for 40m or more to reduce material carry into Western Arterial	Contractor	Construction
7. Appropriate dust suppressant must be applied on all gravel roads associated, exposed areas and stockpiles associated to the project as required to minimise/control airborne dust.	Contractor	Duration of contract
8. Haul vehicles moving outside the construction site carrying material that can be wind-blown will be covered with suitable material tarpaulins shade cloth.	Contractor	Duration of contract
9. Speed of construction vehicles must be restricted to 30km/hr on all roads within the site.	Contractor	Duration of contract
10. Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if visible dust is blowing toward nearby residences outside the site.	Contractor	Duration of contract
11. Disturbed areas must be re-vegetated as soon as practicable in line with the progression of construction activities.	Contractor	Completion of construction
12. Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Duration of contract
13. All vehicles and containers used for moving waste must encapsulate the waste, which prevents the waste from causing odours and from escaping or blowing around the site. This will also prevent leachate material from spilling out of the containers, which is hazardous.	Contractor	Duration of contract

Performance Indicator	» No complaints from affected residents or community regarding dust or vehicle emissions. » Visual presence of dust and air quality. » Dust does not cause health (inhaling, eye irritation) and safety risks (low visibility). » Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed. » All heavy vehicles equipped with speed monitors before they are used in the construction phase in accordance with South African vehicle legislation. » Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis. » A complaints register must be maintained, in which any complaints from neighbouring farmers will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon.

Monitoring	Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels via the following methods: » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » A complaints register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon. » An incident register and non-conformance must be used to record incidents and non-conformances to the EMPr. » A complaints register must be used to record grievances by the public.

OBJECTIVE 11: Minimise impacts related to traffic management and transportation of equipment and materials to site

During the construction phase the road network surrounding the CCPP Plant will be affected. There will be an increase in traffic impacting on traffic volumes, congestion and road safety (light vehicles, buses, mini-vans (taxis) and as well as heavy construction vehicles), however the extent of the impact will be small and of a local nature. The traffic expected during the construction phase will temporarily add a relatively insignificant traffic volume to the intersection of John Ross Highway / Western Arterial.

Project Component/s	» Delivery of any component required for the construction phase of the facility.
Potential Impact	» Impact of heavy construction vehicles on road surfaces, and possible increased risk in accidents involving people and animals. » Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted. » Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads.
Activities/Risk Sources	» Construction vehicle movement. » Speeding on local roads. » Degradation of local road conditions. » Site preparation and earthworks. » Foundations or plant equipment installation. » Transportation of ready-mix concrete to the site. » Mobile construction equipment movement on-site.
Mitigation: Target/Objective	» Minimise impact of traffic associated with the construction of the facility on local traffic volumes, existing infrastructure, property owners, animals, and road users. » To minimise potential for negative interaction between pedestrians or sensitive users and traffic associated with the facility construction. » To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions.

Mitigation: Action/Control	Responsibility	Timeframe
1. Compile and implement a construction period traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted.	Contractor	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
2. Should abnormal loads have to be transported by road to the site, a permit must be obtained from the relevant Provincial Government.	Contractor (or appointed transportation contractor)	Pre-construction
3. Ensure that, at all times, landowners, tenants and the public have access to their properties as well as to social facilities.	Eskom Contractor	Construction
4. Heavy vehicles used for construction purposes should be inspected regularly to ensure their road-worthiness.	Contractor	Construction
5. Strict vehicle safety standards should be implemented and monitored.	Contractor	Construction
6. No deviation from approved transportation routes must be allowed, unless roads are closed for whatever reason outside the control of the contractor.	Contractor	Duration of contract
7. Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor (or appointed transportation contractor)	Pre-construction
8. Heavy construction vehicles should be restricted to off-peak periods	Contractor	Construction phase
9. Any traffic delays expected because of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Duration of contract
10. Visible signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards).	Contractor	Duration of contract
11. Signage must be appropriately maintained throughout the construction period.	Contractor	Duration of contract
12. Erect temporary road signage on Western Arterial either side of the site access warning motorists of construction traffic activity in order to enhance road safety during construction.	Contractor	Duration of contract
13. All vehicles of the contractor travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor	Duration of contract
14. All construction vehicles must remain on properly demarcated roads.	Contractor	Duration of contract
15. No off-road driving to be allowed.	Contractor	Duration of contract
16. Implement penalties for reckless driving for the drivers of heavy vehicles as a way to enforce compliance to traffic rules.	Contractor	Duration of contract
17. Staff and general trips must occur outside of peak traffic periods.	Contractor	Duration of contract
18. The contractors must ensure that there is a dedicated access and an access control point to the site.	Contractor	Construction phase
19. Provide clearly defined roadway, parking and pedestrian walkway areas within the site with adequate lighting.	Contractor	Construction phase
20. Partner with local municipalities and other prominent users of the local roads to upgrade them to meet the required capacity and intensity of the vehicles related to the planned construction activities.	Contractor	Construction phase

Mitigation: Action/Control	Responsibility	Timeframe
21. Provide public transportation service for workers in order to reduce congestion on roads.	Contractor	Construction phase
22. All construction vehicles must be road worthy.	Contractor	Construction phase
23. All construction vehicle drivers must have the relevant licenses of the use of the vehicles and need to strictly adhere to the rules of the road.	Contractor	Construction phase
24. Heavy construction vehicles should be restricted to off-peak periods.	Contractor	Construction phase
25. Abnormal load vehicles require specific permit for transporting loads, and require liaison with relevant road authorities to ensure route suitability.	Contractor	Construction phase
26. Provide flagmen at the access when accommodating abnormal load vehicles.	Contractor	Construction phase
27. The site access road leading into the site should be hard surfaced for 40m or more to reduce material carry into Western Arterial.	Contractor	Construction phase
28. Road signage and road markings in the vicinity of the site should be well maintained to enhance road safety.	Contractor	Construction phase
29. On-site parking and safe turn-around facilities should be provided for private vehicles and for buses and mini-buses transporting workers to and from site.	Contractor	Construction phase
30. The access security gate and guardhouse should be set back at least 40 m from Western Arterial to accommodate vehicles stacking outside the gate, and protocols need to be in place to obviate vehicles stacking into Western Arterial whilst ensuring site safety and security requirements are met.	Contractor	Construction phase

Performance Indicator	» Vehicles keeping to the speed limits. » Vehicles are in good working order and safety standards are implemented. » Local residents and road users are aware of vehicle movements and schedules. » No construction traffic related accidents are experienced. » Local road conditions and road surfaces are up to standard. » Complaints of residents are not received (e.g. concerning the speeding of heavy vehicles).
Monitoring	» Eskom and or appointed EO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 12: Appropriate handling and management of waste

The construction of the Richards Bay CCPP will involve the generation of various wastes. In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented. The main wastes expected to be generated by the construction activities include:

» general solid waste

» hazardous waste
» inert waste (rock and soil)
» liquid waste (including grey water and sewage)

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activity/Risk Source	» Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks and site preparation.
Mitigation: Target/Objective	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste storage and disposal. » To avoid environmental harm from waste disposal. » A waste manifests should be developed for the ablutions showing proof of disposal of sewage at appropriate water treatment works.

Mitigation: Action/Control	Responsibility	Timeframe
1. Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Duration of contract
2. Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Duration of contract
3. Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties, and that the waste is disposed of at dumping site as approved by the Council.	Contractor	Duration of contract
4. Waste disposal at the construction site must be avoided by separating and trucking out of waste.	Contractor	Construction
5. Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap), and contaminated waste as required.	Contractor	Duration of contract
6. The location of areas for the temporary management of waste streams must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.	Contractor	Duration of contract
7. Where practically possible, construction and general wastes on-site must be reused or recycled.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
8. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Duration of contract
9. Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
10. Uncontaminated waste must be removed at least weekly for disposal, if feasible; other wastes must be removed for recycling/ disposal at an appropriate frequency.	Contractor	Duration of contract
11. Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area and clearly labelled.	Contractor	Duration of contract
12. Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor	Duration of contract
13. No liquid waste, including grey water, may be discharged into any water body or drainage line.	Contractor	Maintenance: duration of contract within a particular area
14. All sewage disposal must take place at a registered and operational wastewater treatment works. Slips of disposal must be retained as proof of responsible disposal.	Contractor	Maintenance: duration of contract within a particular area
15. All liquid wastes should be contained in appropriately sealed vessels/ponds within the footprint of the development, and be disposed of at a designated waste management facility after use.	Contractor	Duration of contract
16. Ensure compliance with all national legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials. The onus is on the Contractor to identify and interpret the applicable legislation. Hazardous waste to be disposed of at a registered landfill site.	Contractor	During and post construction.
17. Ensure compliance with all regional legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials. The onus is on the Contractor to identify and interpret the applicable legislation. Hazardous waste to be disposed of at a registered landfill site.	Contractor	During and post construction.
18. Ensure compliance with all local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials. The onus is on the Contractor to identify and interpret the applicable legislation. Hazardous waste to be disposed of at a registered landfill site.	Contractor	During and post construction.
19. Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste.	Contractor	Duration of contract
20. Waste disposal records must be available for review at any time.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
21. SABS approved spill kits to be available and easily accessible.	Contractor	Duration of contract
22. Regularly serviced chemical toilet facilities and/or septic tank must be used to ensure appropriate control of sewage.	Contractor	Duration of contract
23. Daily inspection of all chemical toilets and septic tanks must be performed by environmental representatives on site.	Contractor	Duration of contract
24. In the event where sewage is discharged into the environment, all contaminated vegetation/ rock and soil must be removed immediately and treated as hazardous waste.	Contractor	Duration of construction
25. Ensure that the below ground storage of the septic tank can withstand the external forces of the surrounding pressure.	Contractor	Duration of construction
26. The area above the septic tank must be demarcated to prevent any vehicles or heavy machinery from driving around the tank.	Contractor	Duration of construction
27. Under no circumstances may waste be burnt on site.	Contractor	Duration of construction
28. Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Contractor	Duration of construction
29. Waste manifests must be provided for all waste streams generated on site, and must be kept on site.	Contractor	Duration of construction
30. Implement an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling, re-use and disposal where appropriate.	Contractor	Duration of construction
31. Where solid waste is disposed of, such disposal shall only occur at a landfill licensed in terms of section 20(b) of the National Environmental Management Waste Act, 2008 (Act 59 of 2008).	Contractor	Duration of construction
32. Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction
33. Spoil stockpiles must also be removed and appropriately disposed of or the materials re-used for an appropriate purpose.	Contractor	Completion of construction
34. Upon the completion of construction, all sanitation facilities (including chemical toilets) must be removed, as well as the associated waste to be disposed of at a registered waste disposal site.	Contractor	Completion of construction
35. Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly, or at an appropriate frequency, at registered waste disposal sites.	Contractor	Duration of construction
36. All building rubble, solid and liquid waste etc. generated during the construction activities must be disposed of as necessary at an appropriately licensed refuse facility.	Contractor	Duration of construction
37. Ensure that no refuse wastes are burnt on the premises or on surrounding premises.	Contractor	Duration of construction
38. Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period of the project and that the waste is disposed of at dumping site as approved by the Council.	Contractor	Duration of construction

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests for all waste streams.
Monitoring	» Observation and supervision of waste management practices throughout construction phase. » Waste collection will be monitored on a regular basis. » Waste documentation completed. » Proof of disposal of sewage at an appropriate wastewater treatment works. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 13: Appropriate handling and storage of chemicals, hazardous substances

The construction phase may involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

Project Component/s	» Laydown areas. » Subcontractors' camps. » Temporary hydrocarbon and chemical storage areas.
Potential Impact	» Release of contaminated water from contact with spilled chemicals. » Generation of contaminated wastes from used chemical containers. » Soil pollution.
Activity/Risk Source	» Vehicles associated with site preparation and earthworks. » Construction activities of area and linear infrastructure. » Hydrocarbon spills by vehicles and machinery during levelling, vegetation clearance and transport of workers, materials and equipment and fuel storage tanks. » Accidental spills of hazardous chemicals. » Polluted water from wash bays and workshops. » Pollution from concrete mixing.
Mitigation: Target/Objective	» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons. » To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons. » Prevent and contain hydrocarbon leaks. » Undertake proper waste management. » Store hazardous chemicals safely in a bunded area.

Mitigation: Action/Control	Responsibility	Timeframe
1. Implement an emergency preparedness plan during the construction phase.	EPC Contractor	Duration of Contract
2. Any liquids stored on site, including fuels and lubricants, should be stored in accordance with applicable legislation.	Contractor	Duration of Contract
3. Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
4. Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment must be contained using a drip tray with plastic sheeting filled with absorbent material when not parked on hard standing.	Contractor	Construction
5. Establish an appropriate Hazardous Stores which is in accordance with the Hazardous Substance Amendment Act, No. 53 of 1992. This should include but not be limited to: » Designated area; » All applicable safety signage; » Firefighting equipment; » Enclosed by an impermeable bund; » Protected from the elements, » Lockable; » Ventilated; and » Has adequate capacity to contain 110% of the largest container contents.	Contractor	Duration of Contract
6. Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures. Where required, a NEMA Section 30 report must be submitted to DEA within 14 days of the incident.	Contractor	Duration of contract
7. In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Duration of contract
8. Spilled concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
9. Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately in line with procedures by trained staff with the appropriate equipment.	Contractor	Duration of contract
10. Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
11. Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies).	Contractor	Duration of contract
12. If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils.	Contractor	Duration of contract
13. All stored fuels to be maintained within an appropriate bund and on a sealed surface as per the requirements of SABS 089:1999 Part 1 and any relevant by-laws.	Contractor	Duration of contract
14. Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	Contractor	Duration of contract
15. Construction machinery must be stored in an appropriately sealed area.	Contractor	Duration of contract
16. Oily water from bunds at the substation must be removed from site by licensed contractors.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
17. The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Duration of contract
18. Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.	Contractor	Duration of contract
19. Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor	Duration of contract
20. The sediment control and water quality structures used on-site must be monitored and maintained in an operational state at all times.	Contractor	Duration of contract
21. An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.	Contractor	Construction
22. Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.	Contractor	Construction
23. As much material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site.	Contractor	Construction
24. All chemicals and toxicants used during construction must be stored in bunded areas.	Contractor	Construction
25. All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site (pre-use inspection).	Contractor	Construction
26. All servicing and re-fuelling of machines and equipment must either take place off-site, or in controlled and bunded working areas.	Contractor	Construction
27. Appropriate action plans must be available on site, and training for contactors and employees in the event of spills, leaks and other potential impacts to the aquatic systems.	Contractor	Construction
28. All waste generated on-site during construction must be adequately managed.	Contractor	Construction
29. Should a chemical spill take place, an aquatic ecologist must be contracted to identify the extent of the impact and assist with additional mitigation measures.	Contractor	Construction
30. Minimise fuels and chemicals stored on site.	Contractor	Construction
31. Install bunds on storage areas and take other precautions to reduce the risk of spills.	Contractor	Construction
32. Implement a contingency plan to handle spills, so that environmental damage is avoided.	Contractor	Construction
33. No refueling, servicing of plant/equipment or chemical substance storage allowed outside of designated areas.	Contractor	Construction
34. Drip trays should be used during al fuel/chemical dispensing.	Contractor	Construction
35. Drip trays to be placed beneath standing machinery/plant.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
36. In the case of petrochemical spillages, the spill should be collected immediately and stored in a designated area until it can be disposed of in accordance with the Hazardous Chemical Substances Regulations, 1995 (Regulation 15).	Contractor	Construction
37. Mitigation includes a regional (industrial area-wide) emergency response plan with involvement by the local authorities as well as alarms and communication systems which allow for fast and effective communication to neighbouring facilities such as the Mondi facility to the north.	Contractor	Construction

Performance Indicator	» No chemical spills outside of designated storage areas. » No water or soil contamination by spills. » No complaints received regarding waste on site or indiscriminate dumping. » Safe storage of hazardous chemicals. » Proper waste management.
Monitoring	» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » A complaints register must be maintained, in which any complaints from the community will be logged. » An incident reporting system will be used to record non-conformances to the EMPr. » On-going visual assessment to detect polluted areas and the application of clean-up and preventative procedures. » Monitor hydrocarbon spills from vehicles and machinery during construction continuously and record volume and nature of spill, location and clean-up actions. » Monitor maintenance of drains and intercept drains weekly. » Analyse soil samples for pollution in areas of known spills or where a breach of containment is evident when it occurs. » Records of accidental spills and clean-up procedures and the results thereof must be audited on an annual basis by the ECO. » Records of all incidents that caused chemical pollution must be kept and a summary of the results must be reported to management annually.

OBJECTIVE 14: Effective management of concrete batching plants

A considerable amount of concrete is required during the construction of the CCPP. In this regard there could be a need to establish a batching plant within the site. Turbid and highly alkaline wastewater, dust emissions and noise are the key potential impacts associated with concrete batching plants. Concrete batching plants, cement, sand and aggregates can produce dust. Potential pollutants in batching plant wastewater and stormwater include cement, sand, aggregates, chemical additive mixtures, fuels and lubricants.

Project component/s	» Batching plant. » Stormwater system.
Potential Impact	» Dust emissions. » Release of contaminated water. » Generation of contaminated wastes from used chemical containers. » Inefficient use of resources resulting in excessive waste generation.

Activity/risk source	» Operation of the batching plant. » Packaging and other construction wastes. » Hydrocarbon use and storage.
Mitigation: Target/Objective	» To ensure that the operation of the batching plant does not cause pollution to the environment or harm to persons.

Mitigation: Action/control	**Responsibility**	**Timeframe**
1. Concrete batching plants should be sited such that impacts on the environment or the amenity of the local community from noise, odour or polluting emissions are minimised.	Contractor	Construction phase
2. Concrete batching plants should be sited away from identified sensitive areas.	Contractor	Construction phase
3. Where there is a regular movement of vehicles, access and exit routes for heavy transport vehicles should be planned to minimise noise and dust impacts on the environment.	Contractor	Construction phase
4. Good maintenance practices must be implemented, including regular sweeping to prevent dust build-up.	Contractor	Construction phase
5. The prevailing wind direction should be considered to ensure that bunkers and conveyors are sited in a sheltered position to minimise the effects of the wind.	Contractor	Construction phase
6. Aggregate material should be delivered in a damp condition, and water sprays or a dust suppression agent should be correctly applied to reduce dust emissions and reduce water usage.	Contractor	Construction phase
7. Process wastewater collected from the entire batching plant area should be diverted to an impervious settling tank or pond. Water should be reused in the concrete batching process, where possible.	Contractor	Construction phase
8. A contaminated stormwater system must be specifically designed for the batching plant to ensure effective control of contaminated stormwater originating from the batching plant and prevent contamination to the surrounding environment.	Contractor	Construction phase
9. Where possible, waste concrete should be used for construction purposes at the batching plant or project site.	Contractor	Construction phase
10. Artificial wind barriers must be installed around the batching plant to minimise air, land and water pollution. Wind barriers must enclose the entire batching plant and not allow fly ash and other dusts from moving through the barrier. The artificial barrier must be maintained daily for any defects and corrected when necessary.	Contractor	Pre-construction/ construction
11. The concrete wash bay structure must be constructed in a double brick arrangement or be reinforced to maintain its integrity throughout operation.	Contractor	Construction phase

Performance Indicator	» No complaints regarding dust » No water or soil contamination by chemical spills » No complaints received regarding waste on site or indiscriminate dumping

Monitoring	» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident and non-conformance register will be used to record incidents and non-conformances to the EMPr. » The appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

6.3 Detailing Method Statements

OBJECTIVE 15: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMPr will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

» Responsible person/s;
» Construction procedures;
» Materials and equipment to be used;
» Getting the equipment to and from site;
» How the equipment/material will be moved while on-site;
» How and where material will be stored;
» The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
» Timing and location of activities;
» Compliance/non-compliance with the Specifications; and
» Any other information deemed necessary by the Site Manager.

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction include:

» Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc. Including a site camp plan indicating all of these).

- Preparation of the site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).
- Soil management/stockpiling and erosion control.
- Excavations and backfilling procedure.
- Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions).
- Stormwater method statement.
- Ablution facilities (placement, maintenance, management and servicing).
- Solid Waste Management:
  - Description of the waste storage facilities (on site and accumulative).
  - Placement of waste stored (on site and accumulative).
  - Management and collection of waste process.
  - Recycle, re-use and removal process and procedure.
- Liquid waste management.
- Design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into the surrounding environment. Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facility where possible. Where no facilities are available, grey water runoff must be controlled to ensure no seepage into the surrounding environment occurs.
- Dust and noise pollution:
  - Describe the necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
  - Procedure to control dust at all times on the site, access roads and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.
- Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply).
  - Lists of all potentially hazardous substances to be used.
  - Appropriate handling, storage and disposal procedures.
  - Prevention protocol of accidental contamination of soil at storage and handling areas.
  - All storage areas, (i.e. for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- Fire prevention and management measures on site.
- Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary).
  - Rehabilitation, re-vegetation process and bush clearing.
- Incident and accident reporting protocol.
- General administration.
- Designate access road and the protocols while roads are in use.
- Requirements on gate control protocols.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager (with input from the ECO), except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the

Contractor from their obligations or responsibilities in terms of their contract. Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

6.4 Awareness and Competence: Construction Phase

OBJECTIVE 16: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm

To achieve effective environmental management, it is important that all personnel involved in the project are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The ECO is responsible for monitoring compliance pre, during and post construction. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Contractors obligations in this regard include the following:

- All Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.
- The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity are to have copies of the relevant Method Statements and be aware of the contents thereof.
- Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff are aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the facility.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
  - Records must be kept of those that have completed the relevant training.
  - Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
  - Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
- All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.
- Contractors and main sub-contractors should have a basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.
- Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
- Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

6.4.1 Environmental Awareness and Induction Training

The EO, in consultation with the contractor, shall ensure that all construction workers receive an induction presentation, as well as on-going environmental education and awareness, on the importance and implications of the EMPr and the environmental requirements it prescribes. The presentation shall be conducted, as far as is possible, in the employees' language of choice. The contractor should provide a translator from their staff for the purpose of translating should this be necessary.

As a minimum, induction training should include:

- Explanation of the importance of complying with the EMPr;
- Explanation of the importance of complying with the Environmental Authorisation;
- Discussion of the potential environmental impacts of construction activities;
- Awareness regarding sensitivities on the site, including sensitive plant species (including the use of visual aids and on-site identification);
- The benefits of improved personal performance;
- Employees' roles and responsibilities, including emergency preparedness (this should be combined with this induction, but presented by the contractor's Health and Safety Representative);
- Explanation of the mitigation measures that must be implemented when carrying out their activities; and
- Explanation of the specifics of this EMPr and its specification (no-go areas, etc.).

Environmental Awareness Training must take the form of an on-site talk and demonstration by the EO/ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the EO/ECO on site. Proof of awareness training should be kept on record. Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should be undertaken by the Contractor's Environmental Officer and should include discussing Eskom's environmental policy and values, the function of the EMPr and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the EO/ECO on site.

6.4.2 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and ones recommended by the on site EO and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

6.5 Monitoring Programme: Construction Phase

OBJECTIVE 17: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). Where this is not clearly dictated, Eskom will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Technical Director/ Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to monitor the implementation of the specified environmental specifications, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications
- Ensure adequate and appropriate interventions to address non-compliance
- Ensure adequate and appropriate interventions to address environmental degradation
- Provide a mechanism for the lodging and resolution of public complaints
- Ensure appropriate and adequate record keeping related to environmental compliance
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site
- Aid in communication and feedback to authorities and stakeholders

All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the DEA in terms of the Environmental Authorisation, must be submitted to the Director: Compliance Monitoring of the Department.

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

6.5.1. Non-Conformance Reports

All supervisory staff including Foremen, Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

6.5.2. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to the Director: Compliance Monitoring at DEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out. The contractor must ensure that all waste manifests are provided to the ECO on a monthly basis in order to inform and update the DEA regarding waste related activities.

6.5.3. Audit Reports

The holder of the Environmental Authorisation must, for the period during which the Environmental Authorisation and EMPr remain valid, ensure that project compliance with the conditions of the Environmental Authorisation and the EMPr are audited, and that the audit reports are submitted to the Director: Compliance Monitoring of the DEA.

An environmental internal audit must be conducted and submitted biannually and an external audit must be conducted on construction completion and the report is to be submitted to DEA. This report must be compiled in accordance with Appendix 7 of the EIA Regulations, 2014, as amended, and indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

6.5.4. Final Audit Report

A final environmental audit report must be compiled by an independent auditor and be submitted to DEA upon completion of the construction and rehabilitation activities. The report must be submitted within 30 days of completion of rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

CHAPTER 7: MANAGEMENT PROGRAMME: REHABILITATION

Overall Goal: Undertake the rehabilitation measures in a way that:

» Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

7.1. Objectives

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

OBJECTIVE 1: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

Project Component/s	» Construction camps. » Laydown areas. » Access roads. » Ancillary buildings.
Potential Impact	» Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for on-going management intervention.
Activity/Risk Source	» Temporary construction areas. » Temporary access roads/tracks. » Other disturbed areas/footprints.
Mitigation: Target/Objective	» Ensure and encourage site rehabilitation of disturbed areas. » Ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.

Mitigation: Action/Control	Responsibility	Timeframe
1. Implement an appropriate Revegetation and Rehabilitation Plan.	Contractor	Following execution of the works
2. All temporary facilities, equipment, and waste materials must be removed from site as soon as construction is completed.	Contractor	Following execution of the works
3. All temporary fencing and danger tape must be removed once the construction phase has been completed.	Contractor	Following completion of construction activities in an area
4. Laydown areas and construction camps are to be checked for spills of substances such as oil, paint, etc.	Contractor	Following completion of construction activities in an area

Mitigation: Action/Control	Responsibility	Timeframe
5. LAny spills recorded must be cleaned up and the contaminated soil appropriately disposed of.	Contractor	Following completion of construction activities in an area
6. All voids, gullies or dongas must be backfilled.	Contractor	Following completion of construction activities in an area
7. Where disturbed areas are not to be used during the operation of the CCPP, these areas must be rehabilitated/re-vegetated with appropriate natural indigenous vegetation and/or local seed mix. .	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
8. A seed mix must be applied to rehabilitated and bare areas.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
9. No exotic plants must be used for rehabilitation purposes.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
10. No grazing must be permitted to allow for the recovery of the area.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
11. The area must be shaped to a natural topography.	Contractor	Following completion of construction activities in an area
12. Trees (or vegetation stands) removed must be replaced.	Contractor	Following completion of construction activities in an area
13. Attenuation ponds mimicking flats should be created in in the area to retain water in the catchment.	Contractor	Following completion of construction activities in an area
14. No planting or importing any listed invasive alien plant species (all Category 1a, 1b, 2 and 3 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.	Contractor	Following completion of construction activities in an area
15. Compacted areas must be ripped (perpendicularly) to a depth of 300mm, and the area shall be top soiled and re-vegetated.	Contractor	Following completion of construction activities in an area
16. Temporary roads must be closed and access across these blocked.	Contractor	Following completion of construction activities in an area
17. The temporary access roads must be rehabilitated.	Contractor	Following completion of construction activities in an area
18. Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
19. Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.	Contractor	Following completion of construction activities in an area

Mitigation: Action/Control	Responsibility	Timeframe
20. Soils must be replaced in the correct sequence / profile.	Contractor	Following completion of construction activities in an area
21. Re-vegetated areas may need to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Proponent in consultation with rehabilitation specialist	Post-rehabilitation
22. Erosion control measures should be used in sensitive areas such as steep slopes, hills, and drainage systems if necessary.	Proponent in consultation with EO and rehabilitation specialist (if required)	Post-rehabilitation
23. On-going alien plant monitoring and removal must be undertaken on all areas of natural vegetation on an annual basis.	Proponent	Post-rehabilitation

Performance Indicator	» All portions of the site, including construction equipment camp and working areas, cleared of equipment and temporary facilities. » Topsoil replaced on all areas and stabilised where practicable or required after construction and temporally utilised areas. » Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites. » Completed site free of erosion and alien invasive plants.
Monitoring	» Rehabilitated areas should be monitored (responsibility of EO) on a weekly basis throughout the construction phase and on a monthly basis thereafter and to the point where the area has rehabilitated to a satisfactory level. » On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented during the operational lifespan of the facility. » On-going alien plant monitoring and removal should be undertaken on an annual basis.

CHAPTER 8: OPERATION MANAGEMENT PROGRAMME

Overall Goal: To ensure that the operation of the Richards Bay CCPP does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the facility in a way that:

» Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
» Enables the operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.

8.1. Objectives

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMPr during operation

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Operations Manager, and Environmental Manager for the operation phase of this project are detailed below.

The **Power Station Manager** will:
» Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
» Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
» Take appropriate action as a result of findings and recommendations in management reviews and audits.
» Provide forums to communicate matters regarding environmental management.

The **Technical/SHEQ Manager** will:

» Develop and Implement an Environmental Management System (EMS) for the CCPP and associated infrastructure.
» Manage and report on the facility's environmental performance.
» Maintain a register of all known environmental impacts and manage the monitoring thereof.
» Conduct internal environmental audits and co-ordinate external environmental audits.
» Liaise with statutory bodies such as the National and Provincial Department of Environmental Affairs (DEA) on environmental performance and other issues.
» Conduct environmental training and awareness for the employees who operate and maintain the facility.
» Compile environmental policies and procedures.
» Liaise with interested and affected parties on environmental issues of common concern.
» Track and control the lodging of any complaints regarding environmental matters.

OBJECTIVE 2: Protection of sensitive area, flora, fauna and soils

Indirect impacts on vegetation and terrestrial fauna during operation could result from maintenance activities and the movement of people and vehicles on site. In order to ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

Project Component/s	» Rehabilitated areas.
Potential Impact	» Disturbance to or loss of vegetation and/or habitat in surrounding areas. » Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.
Activities/Risk Sources	» Movement of employee vehicles within and around the site.
Mitigation: Target/Objective	» Maintain minimised footprints of disturbance of vegetation/habitats on-site. » Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.

Mitigation: Action/Control	Responsibility	Timeframe
1. Rehabilitate disturbed areas should the previous attempt be unsuccessful.	Eskom	Operation
2. Access to adjacent conservation areas to be strictly controlled.	Eskom	Operation
3. All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises.	Eskom	Operation
4. The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides.	Eskom	Operation
5. It must be ensured that WHO Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.	Eskom	Operation
6. Soil surfaces where no revegetation seems possible will have to be covered with gravel or small rock fragments to increase porosity of the soil surface, slow down runoff and prevent wind and water erosion.	Eskom	Operation
7. Any vegetation clearing that needs to take place as part of the maintenance activities must be done in an environmentally friendly manner, including avoiding the use of herbicides and using manual clearing methods wherever possible.	Eskom	Operation
8. If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects.	Eskom	Operation

Mitigation: Action/Control	Responsibility	Timeframe
9. Vehicle movements must be restricted to designated access roads.	O&M Contractor	Operation
10. Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	Eskom	Operation
11. Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (bags, logs), silt fences, stormwater catch-pits, and shade nets).	Eskom	Operation
12. Develop and implement an appropriate stormwater management plan for the operation phase of the CCPP.	Eskom	Operation
13. Site access should be controlled and only authorised staff and contractors should be allowed on-site.	Eskom	Operation
14. No harvesting of plants for firewood, medicinal or any other purposes are to be permitted	Eskom	Operation
15. No killing and poaching of any wild animal to be allowed.	Eskom	Operation
16. It must be clearly communicated to all emplyees, including subcontractors that the killing an poaching of wild animals is not allowed.	Eskom	Operation
17. Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities must be removed to a safe location.	Eskom	Operation
18. An on-going alien plant monitoring and eradication programme must be implemented, where necessary.	Eskom	Operation
19. Regular monitoring for erosion post-construction to ensure that no erosion problems have developed as a result of the past disturbance.	Eskom	Operation

Performance Indicator	» Limited soil erosion around site. » No further disturbance to vegetation or terrestrial faunal habitats. » Continued improvement of rehabilitation efforts.
Monitoring	» Observation of vegetation on-site by environmental manager. » Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas.

OBJECTIVE 3: Minimise dust and air emissions

During the operation phase, limited gaseous or particulate emissions are anticipated from exhaust emissions (i.e. from operational vehicles). Windy conditions and the movement of vehicles on site may lead to dust creation. Emissions from the power generation process could include SO_2 and NO_2.

Project Component/s	» Gravel surfaces. » On-site vehicle movement. » Stacks
Potential Impact	» Dust and particulates from vehicle movement to and on-site. » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles. » Emissions from stacks.

Activities/Risk Sources	» Re-entrainment of deposited dust by vehicle movements. » Wind erosion from unsealed roads and surfaces. » Fuel burning vehicle and construction engines. » Power generation process
Mitigation: Target/Objective	» To ensure emissions from all vehicles are minimised, where possible. » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements. » To ensure emissions from the power generation process are minimised.

Mitigation: Action/Control	Responsibility	Timeframe
1. Implement appropriate dust suppression measures on a regular basis in any exposed surfaces.	Eskom	Operation
2. Wet suppression at key handling points or cleared areas, and on unpaved roads.	Eskom	Operation
3. Haul trucks to be restricted to specified haul roads and using the most direct route.	Eskom	Operation
4. Reduction of extent of open areas to minimise the time between clearing and infrastructure construction, and/or use of wind breaks and water suppression to reduce emissions from open areas.	Eskom	Operation
5. Restriction of disturbance to periods of low wind speeds (less than 5 m/s).	Eskom	Operation
6. Stabilisation of disturbed soil (for example, chemical, rock cladding, or vegetation).	Eskom	Operation
7. Re-vegetation of cleared areas as soon as practically feasible.	Eskom	Operation
8. Speed of vehicles must be restricted on site to 30km/hr.	Eskom	Operation
9. Access roads are paved, and particulate content minimised through sweeping or watering.	Eskom	Operation
10. Control of odorous emissions from the dirty water dam through pH management must be undertake, especially when sulphate loads are high.	Eskom	Operation
11. Vehicles and equipment must be maintained in a road-worthy condition at all times.	Eskom	Operation
12. To limit the possibility of off-site SO2 exceedances during emergency events, Emergency 2-type events must be avoided as far as practically possible, by using low sulphur (50 ppm) diesel only, when diesel is used as energy source	Eskom	Operation
13. 99% of operational time combusting natural gas must be undertaken.	Eskom	Operation
14. A revised (lower) maximum emission limit is implemented at the facility. This could be based on the estimated limit based on simulated ambient concentrations or based on mass balance calculations using S content of natural gas (after the gas supply agreements have been reached).	Eskom	Operation

Performance Indicator	» No complaints from affected residents or community regarding dust or vehicle emissions. » Dust suppression measures implemented where required.

	» Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed. » Emissions from power generation process within regulated limits.
Monitoring	» Immediate reporting by personnel of any potential or actual issues with nuisance, dust or emissions to the Power Station Manager. » A complaints register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMPr.

OBJECTIVE 4: Ensure the implementation of appropriate emergency response plans

Project Component/s	» Operation and maintenance of the CCPP and associated infrastructure. » Storage of dangerous substances (such as Chlorine, Natural gas, Diesel, Hydrogen, LPG; and Ammonia)
Potential Impact	» Veld fires can pose a personal safety risk to landowners and communities, and their homes, crops, livestock and infrastructure. In addition, fire can pose a risk to the facility infrastructure. » Hazards associated with toxic vapours, asphyxiant vapours, thermal radiation from fires, and overpressure from explosions.
Activities/Risk Sources	» The presence of operation and maintenance personnel and their activities on the site can increase the risk of veld fires. » Hazards can increase the risk of impact on employees and surrounding communities.
Mitigation: Target/Objective	» To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods. » To avoid or minimise the risk of impacts to surrounding landowners and communities.

Mitigation: Action/Control	Responsibility	Timeframe
1. Provide adequate firefighting equipment on site and establish a fire-fighting management plan during operation.	Eskom	Operation
2. Provide fire-fighting training to selected operation and maintenance staff.	Eskom	Operation
3. Implement a regional (industrial area-wide) emergency response plan with involvement by the local authorities as well as alarms and communication systems which allow for fast and effective communication to neighbouring facilities such as the Mondi facility to the north.	Eskom	Operation
4. Ensure that appropriate communication channels are established to be implemented in the event of an emergency.	Eskom	Operation
5. Fire breaks should be established where and when required.	Eskom	Operation
6. The relevant legislation when planning and burning firebreaks (in terms of timing, etc.) must be considered and complied with..	Eskom	Operation
7. Contact details of emergency services should be prominently displayed on site.	Eskom	Operation

Mitigation: Action/Control	Responsibility	Timeframe
8. Ensure appropriate procedures are in place for the sufficient emergency shut-down using valving systems, gas detection, alarm and executive function systems to limit the amount of natural gas vapour released in the event of leakages.	Eskom	Operation
9. Implement emergency response arrangements at and systems such as foam pourers, fire-fighting systems and cooperation with emergency responders for diesel storage areas. Preventive measures could include maintenance procedures to prevent the occurrence of a catastrophic loss of containment, as well as strict control of ignition sources and other measures which may be required according to standards such as those prescribed by the South African National Standards system	Eskom	Operation
10. Implement emergency response arrangements and systems for Hydrogen and LPG installations such as alarms to allow for personnel to muster in case of emergency, as well as fire-fighting systems and cooperation with emergency responders. Preventive measures could include maintenance procedures to prevent the occurrence of a catastrophic loss of containment, as well as strict control of ignition sources and other measures which may be required according to standards such as those prescribed by the South African National Standards system.	Eskom	Operation

Performance Indicator	» Firefighting equipment and training provided before the operation phase commences. » Appropriate fire breaks in place.
Monitoring	» The O&M operator must monitor indicators listed above to ensure that they have been met.

OBJECTIVE 5: Maximise local employment, skills development and business opportunities associated with the construction phase

The proposed power plant will create around 90 employment opportunities. A portion of this labour will be sourced from the City of uMhlathuze Municipality while the rest can be expected to be sourced from KwaZulu-Natal and the rest of South Africa. The current labour participation rate is 58% in the City of uMhlathuze Municipality. The operations of the CCPP will therefore increase the number of employed working age individuals, thus slightly combating local unemployment. The electricity sector currently absorbs 0.3% (392 people) of the total employed in the area; therefore, the created employment opportunities at the CCPP will assist in increasing the electricity sector's labour absorption in the municipality.

In addition to the direct jobs created on site, the power plant will also stimulate the creation of 2 523 sustainable employment opportunities through production and consumption induced impacts. Overall, a total contribution of the project towards sustainable employment creation in South Africa will be 2 613 jobs that will be supported. Jobs created during operations through multiplier effects will be distributed among all economic sectors. The largest number of jobs will be created in the transport and storage, and trade and accommodation sectors. The employment created will be for a sustainable period of 25 years.

Project Component/s	» Operation and maintenance activities associated with the CCPP. » Availability of required skills in the local communities for the undertaking of the construction activities.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/Risk Sources	» Limited use of local labour, thereby reducing the employment and business opportunities for locals. » Sourcing of individuals with skills similar to the local labour pool outside the municipal area. » Unavailability of locals with the required skills resulting in locals not being employed and labour being sourced from outside the municipal area. » Higher skilled positions might be sourced internationally, where required.
Enhancement: Target/Objective	» Eskom should aim to employ as many low-skilled and semi-skilled workers from the local area as possible. This should also be made a requirement for all contractors. » Employment of a maximum number of the low-skilled and/or semi-skilled workers from the local area where possible. » Appropriate skills training and capacity building.

Mitigation: Action/Control	**Responsibility**	**Timeframe**
1. Where feasible, effort must be made to employ locally in order to create maximum benefit for the communities.	Eskom	Operation
2. In order to maximise the positive impact, Eskom must provide training courses for employees where feasible to ensure that employees gain as much as possible from the work experience.	Eskom	Operation
3. Facilitate the transfer of knowledge between experienced employees and the staff.	Eskom	Operation
4. Perform a skills audit to determine the potential skills that could be sourced in the area.	Eskom	Operation
5. Effort should be made to use locally sourced inputs where feasible in order to maximize the benefit to the local economy.	Eskom	Operation
6. Local Small and Medium Enterprises must to be approached to investigate the opportunities for supplying inputs required for the construction of the facility, as far as feasible.	Eskom	Operation

Performance Indicator	» Job opportunities, especially of low to semi-skilled positions, are primarily awarded to members of local communities as appropriate. » Locals and previously disadvantaged individuals (including women) are considered during the hiring process. » Labour, entrepreneurs, businesses, and SMMEs from the local sector are awarded jobs, where possible, based on requirements in the tender documentation. » The involvement of local labour is promoted. » Reports are not made from members of the local communities regarding unrealistic employment opportunities or that only outsiders were employed. » Employment and business policy document that sets out local employment and targets is completed before the construction phase commences. » Skills training and capacity building initiatives are developed and implemented.

Monitoring	» Eskom must keep a record of local recruitments and information on local labour to be shared with the ECO for reporting purposes.

OBJECTIVE 6: Minimise impacts related to traffic management

There will be an insignificant increase in traffic impacting on traffic capacity and road safety at the site access intersection with Western Arterial and at the intersection of John Ross Highway / Western Arterial. The operation phase traffic will add a relatively insignificant traffic volume to the road network without any major traffic impact

Project Component/s	» Operation and maintenance vehicles.
Potential Impact	» Impact of vehicles on road surfaces, and possible increased risk in accidents involving people and animals. » Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads.
Activities/Risk Sources	» Operation and maintenance vehicle movement. » Speeding on local roads. » Degradation of local road conditions.
Mitigation: Target/Objective	» Minimise impact of traffic associated with the operation and maintenance of the facility on local traffic volumes, existing infrastructure, property owners, animals, and road users. » To minimise potential for negative interaction between pedestrians or sensitive users and traffic associated with the facility construction. » To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions.

Mitigation: Action/Control	Responsibility	Timeframe
1. Ensure that, at all times, landowners, tenants and the public have access to their properties as well as to social facilities.	Eskom	Operation
2. Vehicles used for operation and maintenance purposes should be inspected regularly to ensure their road-worthiness.	Eskom	Operation
3. Strict vehicle safety standards should be implemented and monitored.	Eskom	Operation
4. Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Eskom	Operation
5. Road signage and road markings in the vicinity of the site should be well maintained to enhance road safety.	Eskom	Operation
6. Provide clearly defined roadway, parking and pedestrian walkway areas within the site with adequate lighting	Eskom	Operation
7. Road signage and road markings in the vicinity of the site should be well maintained to enhance road safety.	Eskom	Operation
8. On-site parking and safe turn-around facilities must be provided for private vehicles and for buses and mini-buses transporting workers to and from site.	Eskom	Operation

Mitigation: Action/Control	Responsibility	Timeframe
9. The access security gate and guardhouse should be set back at least 40 m from Western Arterial to accommodate vehicles stacking outside the gate.	Eskom	Operation
10. Protocols need to be in place to obviate vehicles stacking into Western Arterial whilst ensuring site safety and security requirements are met.	Eskom	Operation

Performance Indicator	» Vehicles keeping to the speed limits. » Vehicles are in good working order and safety standards are implemented. » Local residents and road users are aware of vehicle movements and schedules. » Local road conditions and road surfaces are up to standard. » Complaints of residents are not received (e.g. concerning the speeding of heavy vehicles).
Monitoring	» Environmental manager must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 7: Appropriate handling and management of hazardous substances, waste and dangerous goods

The operation of the CCPP will involve the storage of chemicals and hazardous substances, as well as the generation of limited waste products. The main wastes expected to be generated by the operation activities includes general solid waste, hazardous waste and sewage waste.

Project Component/s	» Gas turbines. » Steam turbines. » Stacks. » HV-Yards. » Internal access roads. » Diesel off-loading facility and storage tanks. » Water infrastructure. » Gas pipeline. » Ancillary infrastructure.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices. » Contamination of water or soil because of poor materials management.
Activity/Risk Source	» Substation, transformers, switchgear and supporting equipment. » Workshop / control room.
Mitigation: Target/Objective	» Comply with waste management legislation. » Minimise production of waste. » Ensure appropriate waste disposal. » Avoid environmental harm from waste disposal. » Ensure appropriate storage of chemicals and hazardous substances.

Mitigation: Action/Control	Responsibility	Timeframe
1. Hazardous substances (such as used/new transformer oils, etc.) must be stored in sealed containers within a clearly demarcated designated area.	Eskom	Operation
2. Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Eskom	Operation and maintenance
3. Storage areas for hazardous substances must be appropriately sealed and bunded.	Eskom	Operation
4. All hazardous materials should be stored in the appropriate manner to prevent contamination of the site.	Eskom	Operation
5. Any accidental chemical, fuel and oil spills that occur at the site must be cleaned up in the appropriate manner as related to the nature of the spill.	Eskom	Operation
6. All structures and/or components replaced during maintenance activities must be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.	Eskom	Operation
7. Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and bunded area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.	Eskom	Operation and maintenance
8. Handling of oils and other hazardous substances should take place within an appropriately sealed and bunded area.	Eskom	Operation and maintenance
9. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.	Eskom	Operation and maintenance
10. Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Eskom	Operation
11. All food waste and litter at the site should be placed in bins with lids and removed from the site on a regular basis.	Eskom	Operation
12. Waste handling, collection, and disposal operations must be managed and controlled by a waste management contractor.	Eskom	Operation
13. All sewage disposal must take place at a registered and operational wastewater treatment works. Proof of disposal to be retained as proof of responsible disposal.	Eskom	Operation
14. Appropriate disposal of used oils and chemicals must be arranged with a licensed facility in consultation with the administering authority.	Eskom	Operation
15. Appropriate disposal of used oils and chemicals must be arranged with a licensed facility in consultation with the administering authority.	Eskom	Operation
16. General waste must be recycled where possible or disposed of at an appropriately licensed landfill.	Eskom	Operation
17. Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	Eskom	Operation

Mitigation: Action/Control	Responsibility	Timeframe
18. All servicing and re-fuelling of machines and equipment must either take place off-site, or in controlled and bunded working areas.	Eskom	Operation
19. Separation and recycling of different waste materials should be supported.	Eskom	Operation
20. Should a chemical spill take place, an aquatic ecologist must be contracted to identify the extent of the impact and assist with additional mitigation measures.	Eskom	Operation
21. Immediately report significant spillages and initiate an environmental site assessment for risk assessment and remediation if necessary.	Eskom	Operation
22. Regular quality monitoring of waste before discharge.	Eskom	Operation
23. The dirty water dam will need to be lined to prevent any seepage of waste water.	Eskom	Operation
24. Emergency response arrangements and systems such as foam pourers, fire-fighting systems and cooperation with emergency responders. Preventive measures could include maintenance procedures to prevent the occurrence of a catastrophic loss of containment, as well as strict control of ignition sources and other measures which may be required according to standards such as those prescribed by the South African National Standards system.	Eskom	Operation

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits identifying that waste segregation recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests. » No contamination of soil or water.
Monitoring	» Waste collection must be monitored on a regular basis. » Waste documentation must be completed and available for inspection. » An incidents/complaints register must be maintained, in which any complaints from the community must be logged. » Complaints must be investigated and, if appropriate, acted upon. » Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the O&M operator. » All appropriate waste disposal certificates accompany the monthly reports.

CHAPTER 9: MANAGEMENT PROGRAMME: DECOMMISSIONING

The lifespan of the proposed Richards Bay CCPP will be more than 25 years. Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life or if it is no longer required. The lifespan of the Richards Bay CCPP could be extended depending on the condition of the gas and steam turbines and the HRSG. An assessment will be undertaken prior to the end of the lifecycle of the plant to determine whether the plant should be decommissioned or whether the operation of the plant should continue.

It is most likely that decommissioning activities of the infrastructure of the facility discussed in this EIA process would comprise the disassembly, removal and disposal of the infrastructure. Decommissioning activities will involve disassembly of the production units and ancillary infrastructure, demolishing of buildings, removal of waste from the site and rehabilitation to the desired end-use. Future use of the site after decommissioning of the Richards Bay CCPP could possibly form part of an alternative industry that would be able to utilise some of the existing infrastructure associated with the CCPP. This would however be dependent on the development plans of the area at the time.

It is expected that temporary employment opportunities will be made available during the decommissioning phase.

As part of the decommissioning phase Eskom will undertake the required permitting processes applicable at the time of decommissioning.

The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore are not repeated in this section.

9.1. Objectives

Within a period of at least 12 months prior to the decommissioning of the site, a Decommissioning Method Statement must be prepared and submitted to the Local Planning Authority, as well as the Provincial and National Environmental Authority. This method statement must cover site restoration, soil replacement, landscaping, conservation, and a timeframe for implementation. Furthermore, this decommissioning must comply with all relevant legal requirements administered by any relevant and competent authority at that time.

The objectives of the decommissioning phase of the proposed project are to:

- Follow a process of decommissioning that is progressive and integrated into the short- and long-term project plans that will assess the closure impacts proactively at regular intervals throughout project life.
- Implement progressive rehabilitation measures, beginning during the construction phase.
- Leave a safe and stable environment for both humans and animals and make their condition sustainable.
- Return rehabilitated land-use to a standard that can be useful to the post-project land user.
- Where applicable, prevent any further soil and surface water contamination by maintaining suitable stormwater management systems.
- Maintain and monitor all rehabilitated areas following re-vegetation, and if monitoring shows that the objectives have been met, apply for closure.