EIA REPORT:

PROPOSED PHAKWE RICHARDS BAY GAS POWER 3 2 000 MW COMBINED CYCLE GAS TO POWER PLANT, KWAZULU-NATAL PROVINCE

TRANSPORT IMPACT ASSESSMENT

APRIL 2022
First Issue

Prepared by:

JG AFRIKA (PTY) LTD

Branch: Cape Town
PO Box 38561
Postal code: 7430
Telephone: 021 530 1800
Email: wink@jgafrika.com

VERIFICATION PAGE	Qual-frm-026
	Rev 14

TITLE:

EIA REPORT: PROPOSED PHAKWE RICHARDS BAY GAS POWER 3
2 000 MW COMBINED CYCLE GAS TO POWER PLANT, KWAZULU-NATAL PROVINCE:
TRANSPORT IMPACT ASSESSMENT

JGA REF. NO.	DATE:	REPORT STATUS
5398	14/04/2022	First Issue

CARRIED OUT BY:

JG AFRIKA (PTY) LTD
CAPE TOWN

PO Box 38651
Pinelands 7430

Tel.: 021 530 1800
Email: wink@jgafrika.com

COMMISSIONED BY:

Savannah Environmental (Pty) Ltd
WOODMEAD

First Floor, Block 2
5 Woodlands Drive Office Park
Woodmead, 2191

Tel: +27 011 656 3237
Email: joanne@savannahsa.com

AUTHOR

Adrian Johnson *PrTechEng*

CLIENT CONTACT PERSON

Jo-Anne Thomas

SYNOPSIS

Preparation of a Transport Impact Assessment for the proposed the Phakwe Richards Bay Gas Power 3 (PRBGP3) 2 000 MW Combined Cycle Gas to be located within the Richards Bay Industrial Development Zone in the Kwazulu-Natal Province, pertaining to all relevant traffic and transportation engineering aspects.

KEY WORDS:

EIA Report, Gas to Power Facility, Transport Impact Assessment

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO 9001: 2015 which has been independently certified by DEKRA Certification.

Verification	Capacity	Name	Signature	Date
By Author	Senior Technologist	Adrian Johnson		14/04/2022
Checked by:	Associate	Iris Wink		14/04/2022
Authorised by:	Director	Duane Petersen		14/04/2022

Filename:	X:\Projects - (In-progress)\5398 Richards Bay Gas to Power (IW)\Report\TIA\2000MW PP\5398_2000MW PP_EIA_JG AFRIKA_20220414.docx

Report template version: 2017-10-30

SPECIALIST EXPERTISE

IRIS SIGRID WINK

Profession	Civil Engineer (Traffic & Transportation)
Position in Firm	Associate
Area of Specialisation	Manager: Traffic & Transportation Engineering
Qualifications	PrEng, MSc Eng (Civil & Transportation)
Years of Experience	19 Years
Years with Firm	9 Years

SUMMARY OF EXPERIENCE

Iris is a Professional Engineer registered with ECSA (20110156). She joined JG Afrika (Pty) Ltd. in 2012. Iris obtained a Master of Science degree in Civil Engineering in Germany and has more than 15 years of experience in a wide field of traffic and transport engineering projects. Iris left Germany in 2003 and has worked as a traffic and transport engineer in South Africa and Germany. She has technical and professional skills in traffic impact studies, public transport planning, non-motorised transport planning and design, design and development of transport systems, project planning and implementation for residential, commercial and industrial projects and providing conceptual designs for the abovementioned. She has also been involved with transport assessments for renewable energy projects and traffic safety audits.

PROFESSIONAL REGISTRATIONS & INSTITUTE MEMBERSHIPS

PrEng -Registered with the Engineering Council of South Africa No. 20110156
-Registered Mentor with ECSA for the Cape Town Office of JG Afrika
MSAICE -Member of the South African Institution of Civil Engineers
ITSSA -Member of ITS SA (Intelligent Transport Systems South Africa)
SAWEA -Member of the South African Wind Energy Association
SARF -South African Road Federation: Committee Member of Council
SARF WR - SARF Western Region Committee Member
SARF RSC - Road Safety Committee Member
IRF - Global Road Safety Audit Team Leader with the International Road Federation (IRF)

EDUCATION

1996 - Matric – Matric (Abitur) – Carl Friedrich Gauss Schule, Hemmingen, Germany
1998 - Diploma as Draughtsperson – Lower Saxonian State Office for Road and Bridge Engineering
2003 - MSc Eng (Civil and Transportation) – Leibniz Technical University of Hanover, Germany

SPECIFIC EXPERIENCE

JG Afrika (Pty) Ltd (Previously Jeffares & Green (Pty) Ltd)
2016 – Date
Position – Associate

- **Rondekop Windfarm** – Transport study for the proposed Kudusberg Windfarm near Sutherland, Northern Cape – Client: G7 Renewable Energies

- **Kudusberg Windfarm** – Transport study for the proposed Kudusberg Windfarm near Sutherland, Northern Cape – Client: G7 Renewable Energies
- **Multiple Traffic Impact and Route Assessment** for the proposed Solar PV Facilities in the Northern Cape – Client: Private Developer
- **Kuruman Windfarm –** Transport study for the proposed Kuruman Windfarm in Kuruman, Northern Cape – Client: Mulilo Renewable Project Developments
- **Coega West Windfarm** – Transportation and Traffic Management Plan for the proposed Coega Windfarm in Coega, Port Elizabeth – Client: Electrawinds Coega
- **Traffic and Parking Audits** for the Suburb of Groenvallei in Cape Town – Client: City of Cape Town Department of Property Management.
- **Road Safety Audit** for the Upgrade of N1 Section 4 Monument River – Client: Aurecon on behalf of SANRAL
- **Sonop Windfarm** – Traffic Impact Assessment for the proposed Sonop Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Universal Windfarm** - Traffic Impact Assessment for the proposed Universal Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Road Safety Audit** for the Upgrade of N2 Section 8 Knysna to Wittedrift – Client: SMEC on behalf of SANRAL
- **Road Safety Audit** for the Upgrade of N1 Section 16 Zandkraal to Winburg South – Client: SMEC on behalf of SANRAL
- **Traffic and Road Safety Studies** for the Improvement of N7 Section 2 and Section 3 (Rooidraai and Piekenierskloof Pass) – Client: SANRAL
- **Road Safety Appraisal**s for Northern Region of Cape Town – Client: Aurecon on behalf of City of Cape Town (TCT)
- **Traffic Engineering Services** for the Enkanini Informal Settlement, Kayamandi - Client: Stellenbosch Municipality
- **Lead Traffic Engineer** for the Upgrade of a 150km Section of the National Route N2 from Kangela to Pongola in KwaZulu-Natal, Client: SANRAL
- **Traffic Engineering Services** for the Kosovo Informal Settlement (which is part of the Southern Corridor Upgrade Programme), Client: Western Cape Government
- **Traffic and Road Safety Studies** for the proposed Kosovo Informal Housing Development (part of the Southern Corridor Upgrade Program), Client: Western Cape Government.
- **Road Safety Audit Stage 3** – Upgrade of the R573 Section 2 between Mpumalanga/Gauteng and Mpumalanga/Limpopo, Client: AECOM on behalf of SANRAL
- **Road Safety Audit Stage 1 and 3** – Upgrade of the N2 Section 5 between Lizmore and Heidelberg, Client: Aurecon on behalf of SANRAL
- **Traffic Safety Studies** for Roads Upgrades in Cofimvaba, Eastern Cape – Client: Cofimvaba Municipality
- **Road Safety Audit Stage 1 and 3** – Improvement of Intersections between Olifantshoek and Kathu, Northern Cape, Client: Nadeson/Gibb on behalf of SANRAL
- **Road Safety Audit Stage 3** – Upgrade of the Beacon Way Intersection on the N2 at Plettenberg Bay, Client: AECOM on behalf of SANRAL

- **Traffic Impact Assessment** for a proposed Primary School at Die Bos in Strand, Somerset West, Client: Edifice Consulting Engineers
- **Road Safety Audit** Stage 1 and 3 – Improvement of R75 between Port Elizabeth and Uitenhage, Eastern Cape, Client: SMEC on behalf of SANRAL

TRANSPORT IMPACT ASSESSMENT

TABLE OF CONTENTS

TABLES

FIGURES

ANNEXURES

PROPOSED 2 000 MW COMBINED CYCLE GAS TO POWER PLANT, KWAZULU-NATAL PROVINCE

1 INTRODUCTION AND METHODOLOGY

1.1 Scope and Objectives

Phakwe Richards Bay Gas Power 3 (Pty) Ltd. proposes to develop the Phakwe Richards Bay Gas Power 3 (PRBGP3) 2000 MW Combined Cycle Gas to Power Plant on various erven within the Richards Bay IDZ phase 1F, Richards Bay, KwaZulu Natal, as shown in **Figure 1-1** below.

The project site is situated in the City of uMhlathuze Local Municipality which falls within jurisdiction of the King Cetshwayo District Municipality, KwaZulu-Natal Province.

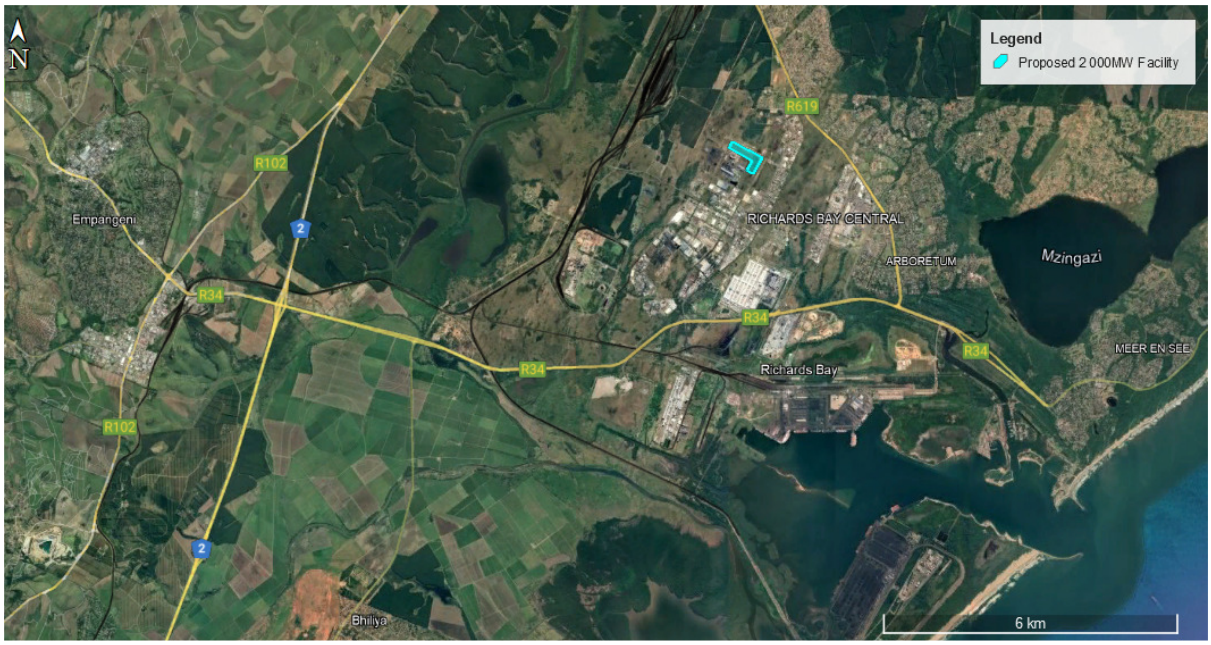


Figure 1-1: Location of the Proposed 2 000MW Facility

As part of the environmental impact processes, the services of a Transportation Specialist are required to conduct a Transport Impact Assessment for the proposed facility.

The following two main transportation activities will be investigated:

- Abnormal load vehicles transporting components to the site; and
- The transportation of construction materials, equipment and people to and from the site/facility.

The transport study will aim to provide the following objectives:

- Assess activities related to traffic movement for the construction and operation (maintenance) phases of the facility;
- Recommend a preliminary route for the transportation of the components to the proposed site;
- Recommend a preliminary transportation route for the transportation of materials, equipment and people to site; and
- Recommend alternative or secondary routes where possible.

1.2 Terms of Reference

The Terms of Reference for this Transport Impact Assessment include the following:

General:

- A description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed project;
- A description and evaluation of environmental issues and potential impacts (including direct, indirect, cumulative impacts and residual risks) that have been identified;
- Direct, indirect, cumulative impacts and residual risks of the identified issues must be evaluated within the EIA Report in terms of the following criteria:
  - the nature, which shall include a description of what causes the effect, what will be affected and how it will be affected;
- A statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts;
- A comparative evaluation of the identified feasible alternatives and nomination of a preferred alternative;
- Any aspects conditional to the findings of the assessment which are to be included as conditions of the Environmental Authorisation;
- This must also include any gaps in knowledge at this point of the study. Consideration of areas that would constitute “acceptable and defendable loss” should be included in this discussion.
- A reasoned opinion as to whether the proposed project should be authorized;
- Summary of the positive and negative impacts and risks of the proposed project and identified alternatives; and
- Mitigation measures and management recommendations to be included in the Environmental Management Programme to be submitted with the FEIR.

Specific:

- Extent of the transport study and study area;
- The proposed development;
- Trip generation for the facility during construction and operation;
- Traffic impact on external road network;
- Accessibility and turning requirements;
- National and local haulage routes;
- Assessment of internal roads and site access;
- Assessment of freight requirements and permitting needed for abnormal loads; and
- Traffic accommodation during construction.

1.3 Approach and Methodology

The report deals with the traffic impact on the surrounding road network in the vicinity of the site during:

- The construction of the access roads;
- The construction of the facility;
- The operation and maintenance during the operational phase; and
- The decommissioning phase.

This study was informed by the following:

Project Assessment

- Overview of project background information including location maps, component specifications and any possible resulting abnormal loads to be transported; and
- Research of all available documentation and information relevant to the proposed facility.

The study considered and assessed the following:

Traffic and Haulage Route Assessment

- Estimation of trip generation;
- Discussion on potential traffic impacts;
- Assessment of possible haul routes; and
- Vehicle trips related to the construction, operational (maintenance) and decommissioning phases of the project.

Site layout, Access Points and Internal Roads Assessment per Site

- Description of the surrounding road network;
- Description of site layout;
- Assessment of the proposed access points; and
- Assessment of the proposed internal roads on site.

The findings of the transport assessment are detailed in this report, prepared as part of the environmental impact assessment process for the proposed facility.

1.4 Assumptions and Limitations

The following assumptions and limitations apply:

- This study is based on the project information provided by the Client;
- According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000mm, total maximum width 4 300 mm and total maximum length 10 500 mm;
- Maximum vertical height clearances along the haulage route is 5.2 m for abnormal loads;
- Imported elements will be transported from the most feasible port of entry, which is deemed to be Richards Bay;
- If any elements are manufactured within South Africa, these will be transported from their respective manufacturing centers, which would be either in the greater Johannesburg or Pinetown/Durban;
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads; and
- Material for the construction of internal access roads will be sourced locally as far as possible.

1.5 Source of Information

Information used in a transport study includes:

- Project Information provided by the Client;

- Google Earth.kmz provided by the Client;
- Google Earth Satellite Imagery;
- Information gathered during the site visit; and
- Project research of all available information.

2 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE STUDY

2.1 Port of Entry

Components imported to South Africa will be via the Richards Bay Port, as the proposed site is located within a 5km radius of this Port. A deep-sea water port and boasting 13 berths, the Richards Bay terminal handles dry bulk ores, minerals and break-bulk consignments with a draft that easily accommodates Cape size and Panamax vessels.

The terminal exports over 30 varied commodities from magnetite to ferrochrome, woodchips to aluminium and steel. A large percentage of dry bulk commodities are handled via a computer-controlled network of conveyor belts extending 40 km to seven harbour bound industries. These belts transport cargo between the quayside and the respective manufacturers. Break bulk cargo, on the other hand, is a skip-loading operation that due to the density of the commodities primarily relies on road motor transport (RMT) to and from the point of trade. The Richards Bay Port is operated by Transnet Port Terminals.

2.2 Abnormal Load Considerations

It is expected that the transformers will be transported with an abnormal load vehicle. Abnormal permits are required for vehicles exceeding the following permissible maximum dimensions on road freight transport in terms of the Road Traffic Act (Act No. 93 of 1996) and the National Road Traffic Regulations, 2000:

- Length of 22 m for an interlink, 18.5 m for truck and trailer and 13.5 m for a single unit truck;
- Width of 2.6 m;
- Height of 4.3 m measured from the ground;
- Possible height of load being 2.7 m;
- Weight of gross vehicle mass of 56 t resulting in a payload of approximately 30t;
- Axle unit limitations are 18 t for dual and 24 t for triple-axle units; and
- Axle load limitations are 7.7 t on the front axle and 9 t on the single or rear axles.

Any dimension / mass outside the above will be classified as an Abnormal Load and will necessitate an application to the Department of Transport and Public Works for a permit that will give authorisation for the conveyance of said load. A permit is required for each Province that the haulage route traverses.

2.3 Further Guideline Documentation

The Technical Recommendations for Highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outlines the rules and conditions that apply to the transport of abnormal loads and vehicles on public roads. Within the guidelines, the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts.

The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power / mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the Road Traffic Act and the relevant regulations.

2.4 Permitting – General Rules

The limits recommended in TRH 11 are intended to serve as a guide to the Permit Issuing Authorities. It must be noted that each Administration has the right to refuse a permit application or to modify the conditions under which a permit is granted. It is understood that:

a) A permit is issued at the sole discretion of the Issuing Authority. The permit may be refused because of the condition of the road, the culverts and bridges, the nature of other traffic on the road, abnormally heavy traffic during certain periods or for any other reason.
b) A permit can be withdrawn if the vehicle upon inspection is found in any way not fit to be operated.
c) During certain periods, such as school holidays or long weekends an embargo may be placed on the issuing or permits. Embargo lists are compiled annually and are obtainable from the Issuing Authorities.

2.5 Load Limitations

The maximum load that a road vehicle or combination of vehicles will be allowed to carry legally under permit on a public road is limited by:

- the capacity of the vehicles as rated by the manufacturer;
- the load which may be carried by the tyres;
- the damaging effect on pavements;
- the structural capacity on bridges and culverts;
- the power of the prime mover(s);
- the load imposed by the driving axles; and
- the load imposed by the steering axles.

2.6 Dimensional Limitations

A load of abnormal dimensions may cause an obstruction and danger to other traffic. For this reason, all loads must, as far as possible, conform to the legal dimensions. Permits will only be considered for indivisible loads, i.e. loads that cannot, without disproportionate effort, expense or risk of damage, be divided into two or more loads for the purpose of transport on public roads. For each of the characteristics below there is a legally permissible limit and what is allowed under permit:

- Width;
- Height;
- Length;
- Front Overhang;
- Rear Overhang;
- Front Load Projection;
- Rear Load Projection;
- Wheelbase;
- Turning Radius; and
- Stability of Loaded Vehicles.

2.7 Transporting Other Plant, Material and Equipment

In addition to transporting the specialised equipment, the normal Civil Engineering construction materials, plant and equipment will need to be transported to the site (e.g. sand, stone, cement, gravel, water,

compaction equipment, concrete mixers, etc.). Other components, such as electrical cables and substation transformers, will also be transported to site during construction. The transport of these items will generally be conducted with normal heavy loads vehicles, however, certain items might require an abnormal load vehicle due to the load or size limitations.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Description of the site

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

The proposed site is located within the Richards Bay Industrial Development Zone, a fully serviced industrial estate with prime rail, road and port access. The proposed facility will be located on an access road off Alumina Alley. The site is bounded by the R619 to the east and the R34 to the west, as shown in **Figure 3-1**.

The R34 is a 4-lane dual carriageway carrying high volumes of heavy vehicles travelling to and from the Richards Bay Port, which accommodates one of the largest liquefied petroleum gas (LPG) import terminals in South Africa. The site is deemed well located and connected for its purpose.

Figure 3-1: Aerial View of Proposed Site

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

- Up to 4 gas turbines for the generation of electricity through the use of natural gas (liquid or gas forms), or a mixture of Natural gas and Hydrogen (in a proportion scaling up from 20% H2) as fuel source, operating all turbines at mid-merit or baseload (estimated 16 to 24 hours daily operation).
- Exhaust stacks associated with each gas turbine.
- Up to 4 Recovery Steam Generator (HRSG to generate steam by capturing the heat from the turbine exhaust.

- Up to 4 steam turbines to generate additional electricity by means of the steam generated by the HRSG.
- The water treatment plant will demineralise incoming water from municipal or similar supply to the gas turbine and steam cycle requirements. The water treatment plant will produce two parts demineralised water and reject one-part brine, which will be discharged to the RB IDZ stormwater system.
- Steam turbine water system will be a closed cycle with air cooled condensers. Make-up water will be required to replace blow down.
- Air cooled condensers to condensate used steam from the steam turbine.
- Compressed air station to supply service and process air.
- Water pipelines and water tanks for storage and distributing of process water. (Potential sourcing of alternative water outside RB IDZ supply (Municipality))
- Water retention pond
- Closed Fin-fan coolers to cool lubrication oil for the gas turbines
- Gas generator Lubrication Oil System.
- Gas pipeline supply conditioning process facility. Please note, gas supply will be via dedicated pipeline from the proposed Transnet supply pipeline network of Richards Bay (the location of this network has not yet been confirmed) or, alternatively directly from the Regasification facilities at RB Harbour. The gas pipeline will be separately authorized.
- Site water facilities including potable water, storm water, waste water
- Fire water (FW) storage and FW system
- Diesel emergency generator for start-up operation.
- Onsite fuel conditioning including heating system.
- All underground services: This includes stormwater and wastewater.
- Ancillary infrastructure including:
  - Roads (access and internal);
  - Warehousing and buildings;
  - Workshop building;
  - Fire water pump building;
  - Administration and Control Building;
  - Ablution facilities;
  - Storage facilities;
  - Guard House;
  - Fencing;
  - Maintenance and cleaning area;
  - Operational and maintenance control centre;
- Electrical facilities including:
  - Power evacuation including GCBs, GSU transformers, MV busbar, HV cabling and 1x275kV or 400kV GIS Power Plant substation.
  - Generators and auxiliaries;
- Service infrastructure including:
  - Stormwater channels;
  - Water pipelines
  - Temporary work areas during the construction phase (laydown areas)

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

3.2 National Route to Site for Imported Components

Components imported to South Africa will be shipped to the Richards Bay Port. The site can be accessed using two routes (shown in **Figure 3-2**) that connect the Port to the R34 (from the east access of the Port) and Ferro Close (from the west access of the Port). From the R34, multiple route options to the site are available. These route options are discussed in section 3.4.

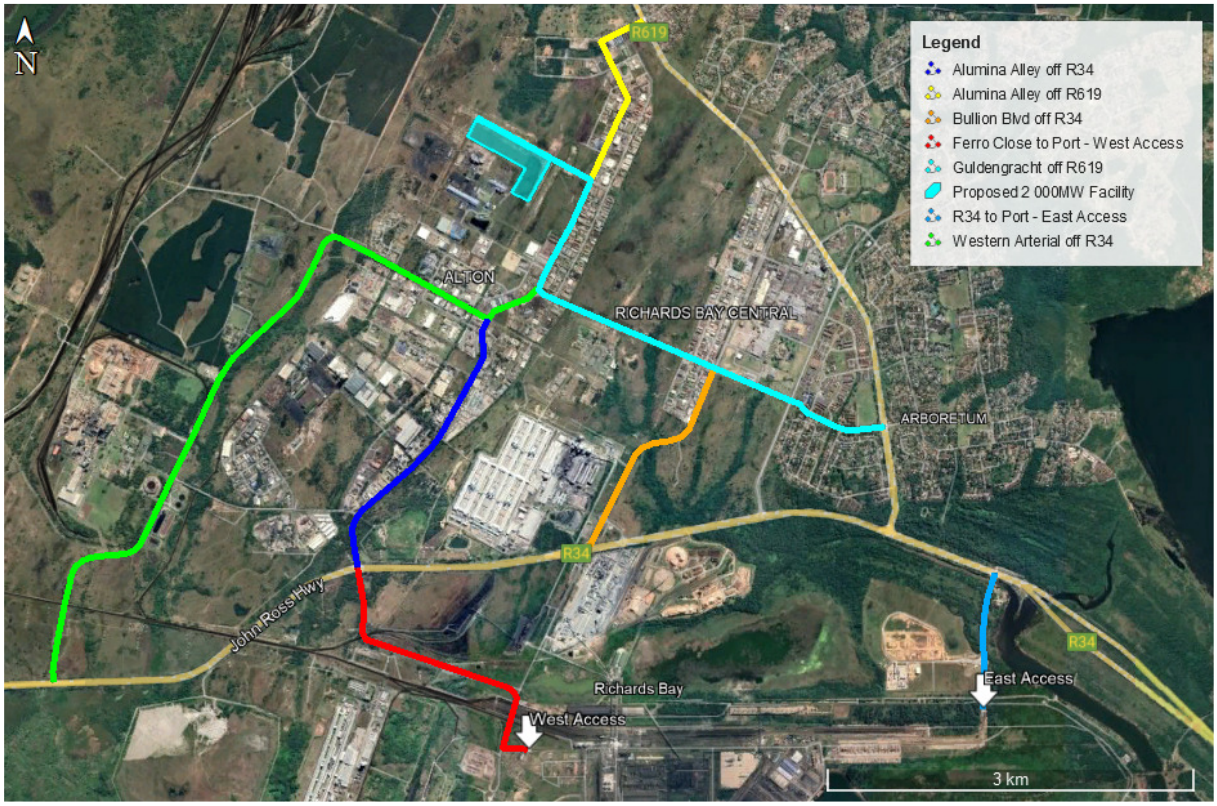


Figure 3-2: Haulage Routes from Port to the Proposed Site

3.3 Route for Components manufactured within South Africa

It is anticipated that elements manufactured within South Africa will be transported to the site from the Johannesburg and/or Pinetown/Durban areas. Components will be transported to site using appropriate National and Provincial routes. It is expected that the components will generally be transported to site with normal heavy load vehicles, with the exception of the storage tanks, transformers and gas engines/gas turbines, which require an abnormal load vehicle.

For any abnormal loads, it is critical to ensure that the vehicle will be able to move safely and without obstruction along the preferred route. The preferred route should be surveyed prior to construction to identify any problem areas, e.g. intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification. After the road modifications

have been implemented, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that the delivery will occur without disruptions. This process is to be undertaken by the haulage company transporting the components and the Contractor, who will modify the road and intersections to accommodate abnormal vehicles. It needs to be ensured that gravel sections (if any) of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.

There are several bridges and culverts along the National and Provincial routes, which need to be confirmed for load bearing capacity and height clearances. However, there are alternative routes which can be investigated if the selected route or sections of the route should not be feasible.

Any low hanging overhead lines (lower than 5.1m), e.g., Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.

3.3.1 Route from Johannesburg Area to Site – Normal Loads

Normal loads will transport elements via three potential routes from Johannesburg to the site, as shown in **Figure 3-3** below. No road limitations are envisaged along the route for normal load freight. The distance from Johannesburg to the site is 609km via R34, 605km via N17, N11 and R34 and 621km via N17 and N2.

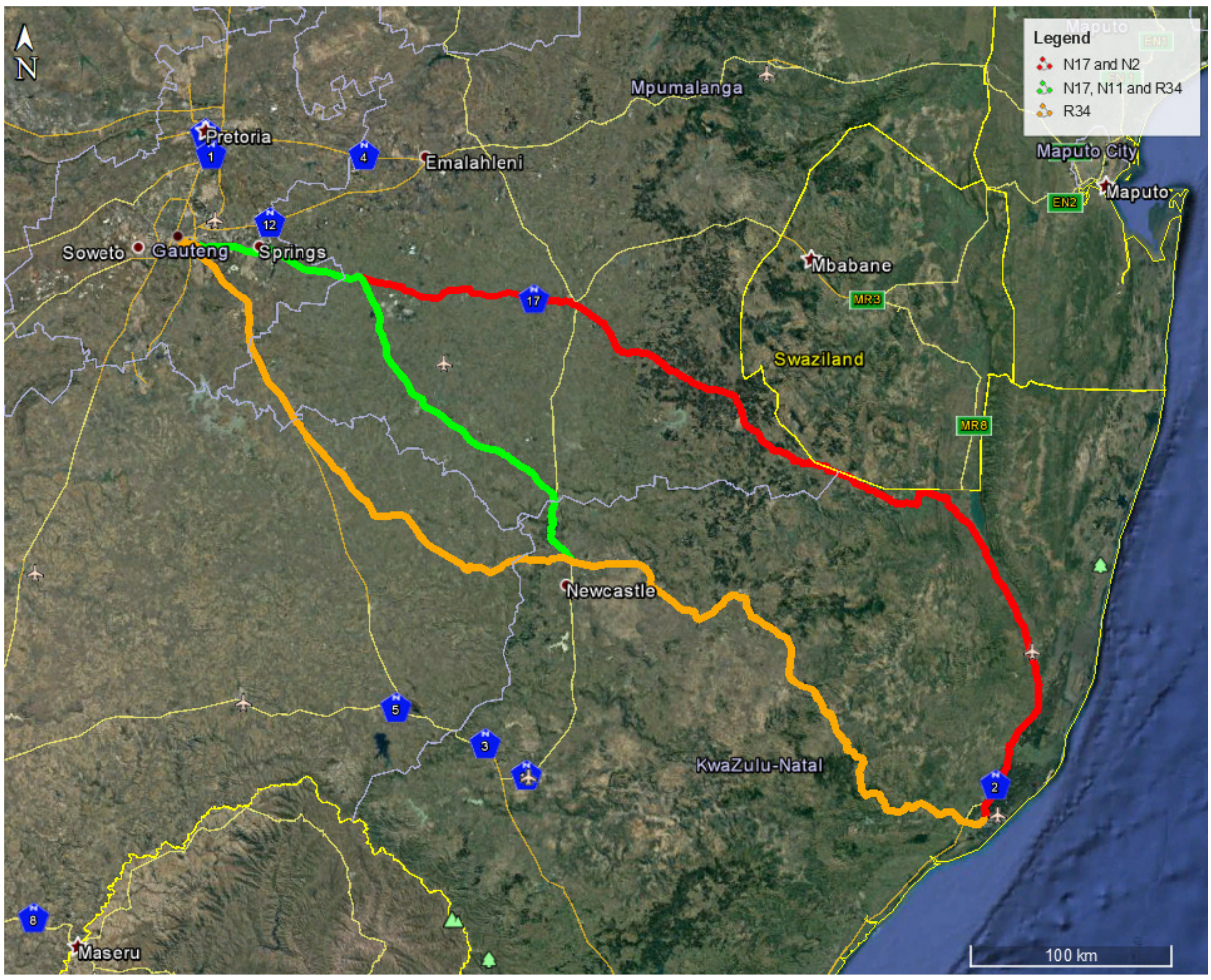


Figure 3-3: Route from Johannesburg to the Proposed Site

3.3.2 Route from Pinetown / Durban to Site - Normal load

Normal loads will transport elements via the N2 from Durban and Pinetown to the site. No road limitations are envisaged along the route for normal load freight. The distance from Durban to the site is approximately 180km.

Figure 3-4: Route from Durban to the Proposed Site

3.4 Proposed main access road to the Proposed Development

The main access road to the proposed development will be the R34, shown in **Figure 3-5** and **Figure 3-6**, a 4-lane dual carriageway road accommodating heavy vehicles traveling to and from the Port.

A desktop study was undertaken using the typical traffic data available on Google Maps**. Traffic delays are experienced along the R619, most likely resulting from traffic to and from the Boardwalk Mall and the surrounding residential areas. Traffic delays are also experienced on the R34 between Empangeni and the R619. These route sections should be avoided during peak periods (as far as possible) to minimise the impact on the surrounding road network.**

Figure 3-5: R34

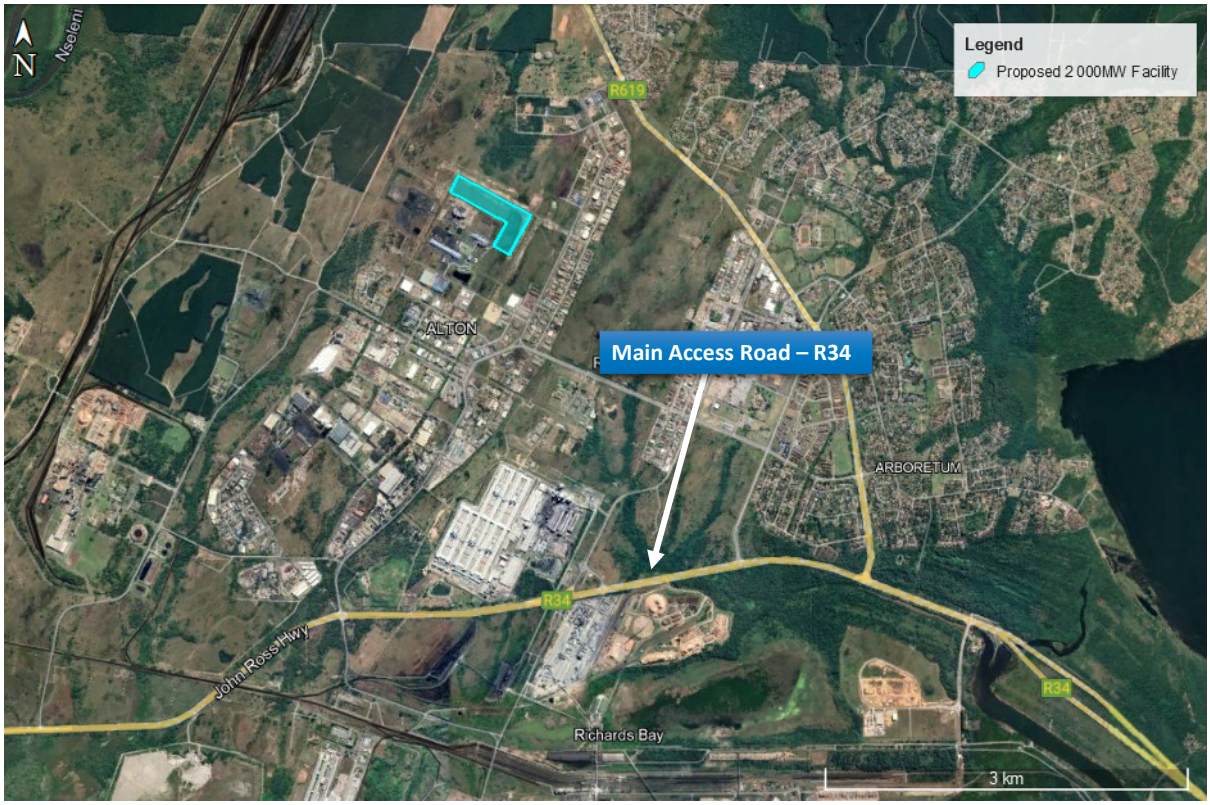


Figure 3-6: Main Access Road to the Proposed Development

3.4.1 Proposed Access Route

The potential main access roads to the site are located off the R34 and R619 (shown in **Figure 3-7**). As traffic delays are experienced on the R619 during peak periods, the proposed access roads located off the R619 are to be avoided during peak periods. Since residential areas are located along the R619, the two proposed access roads located along the R619 viz. Alumina Alley and Gulden Gracht (shown

in yellow and cyan in **Figure 3-7**) should only be used when the other potential access roads are not accessible.

The potential access roads located off the R34 viz. Western Arterial, Alumina Alley and Bullion Road are deemed the preferred access roads to the site.

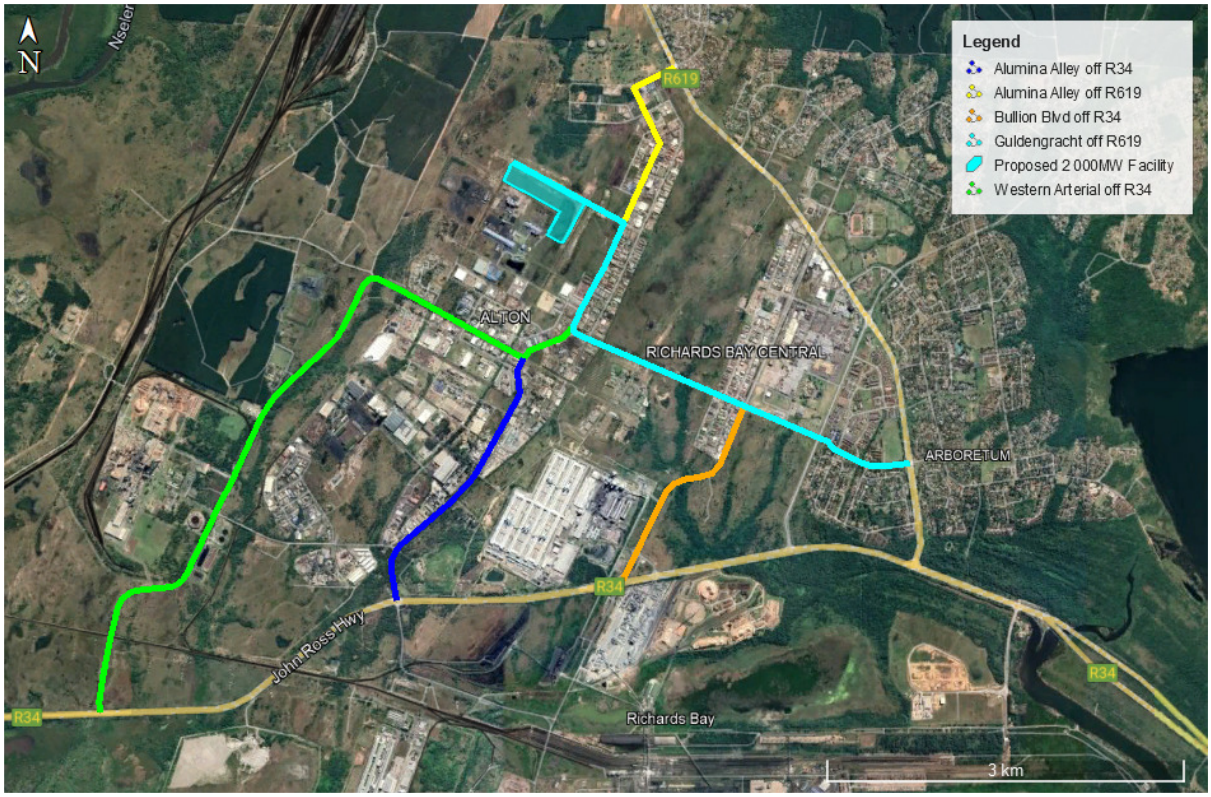


Figure 3-7: Potential Main Access Roads

The proposed access point, located on the access road located off Alumina Alley, will need to be upgraded to cater for the construction vehicles and abnormal load vehicles. Generally, the road width at the access point needs to be a minimum of 8m and the access roads on site a minimum of 5m. The radius at the access points needs to be large enough to allow for all construction vehicles to turn safely. It is recommended that the access point be surfaced and the internal access roads on site remain gravel.

It is recommended that the site access be controlled via a boom and gatehouse. It is also recommended that security staff be stationed on site at the access booms during construction. A minimum stacking distance of 25m should be provided between the road edge of the external road and the boom.

3.5 Main Route for the Transportation of Materials, Plant and People to the proposed site

It is envisaged that the majority of materials, plant and labour will be sourced from towns within a 50km radius of the proposed site and transported to the site via the N2, R34 and R619.

Should concrete batch plants (if required) or quarries not be available in the surrounding areas, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

4 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

Key legal requirements pertaining to the transport requirements for the proposed development are:

- Abnormal load permits, (Section 81 of the National Road Traffic Act (Act 93 of 1996) and the National Road Traffic Regulations, 2000)
- Port permit (Guidelines for Agreements, Licenses and Permits in terms of the National Ports Act No. 12 of 2005), and
- Authorisation from Road Authorities to modify the road reserve to accommodate turning movements of abnormal loads at intersections.

5 IDENTIFICATION OF KEY ISSUES

5.1 Identification of Potential Impacts

The potential transport related impacts are described below.

5.1.1 Construction Phase

Potential impact

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

5.1.2 Operational Phase

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

5.1.3 Decommissioning Phase

This phase will result in the same impact as the Construction Phase as similar trips are expected.

5.1.4 Cumulative Impacts

- Traffic congestion/delays on the surrounding road network.
- Noise and dust pollution

6.1.1 Potential Impact (Construction Phase)

Nature of the impact

- Potential traffic congestion and delays on the surrounding road network and associated noise and dust pollution.

Significance of impact without mitigation measures

- Traffic generated by the construction of the facility will have a significant impact on the surrounding road network. The exact number of trips generated during construction will be determined by the contractor and the haulage company transporting the components to site, the staff requirements and where equipment is sourced from.

Estimate trips generated during the Construction Phase

It is expected that the delivery of the components to the site during the construction phase will not result in a significant increase in traffic. It is expected that less than 15 abnormal load trips will be required to transport certain components to the proposed site. Assuming a construction period of 24 months, 1 (one) abnormal load trip will be required per month to complete the component delivery to the site. The abnormal load trip can be scheduled to occur outside of peak periods, and it is not expected that the abnormal load trip will have any impact on the surrounding road network.

It is assumed that during the peak of the construction period, 850 employees will be active on site. Staff trips are assumed to be:

Table 6-1: Estimation of daily staff trips

Vehicle Type	Number of vehicles	Number of Employees
Car	20	30 (assuming 1.5 occupants)
Bakkie	40	60(assuming 1.5 occupants)
Taxi – 15 seats	35	540
Bus – 80 seats	3	240
Total	**98**	**870**

It is difficult to accurately estimate the construction traffic for the transportation of materials as it depends on the type of vehicles, tempo of the construction, source/location of construction material etc. However, it is assumed that at the peak of construction, approximately 250 construction vehicle trips will access the site per day. This includes the remaining component deliveries that can be made with normal heavy load vehicles.

The total estimated daily site trips at the peak of construction are shown in the table below.

Table 6-2: Estimation of daily site trips

Activity	Number of trips
Staff trips	98
Construction trips	250
Total	**348**

The impact on general traffic on the surrounding road network is therefore deemed nominal as the 348 trips will be distributed across a 9 hr working day. The majority of the trips will occur outside the peak hours.

As components and other elements will be stored on site, many internal trips will occur on site during construction, i.e., dumpers will bring small equipment from laydown / storage area to site, cranes will lift structures / equipment to final locations, flat-bed trucks will be used to transfer equipment telehandlers and cherry pickers will be used to support the work at heights. These trips are internal to the construction site and will not have an impact on the traffic on the surrounding road network.

The significance of the transport impact without mitigation measures during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level.

Proposed mitigation measures

- The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- Dust suppression of any gravel roads during the construction phase, as required.
- Regular maintenance of gravel roads by the Contractor during the construction phase and by the Owner/Facility Manager during the operation phase, if required.
- The use of mobile batch plants and quarries near the site would decrease the traffic impact on the surrounding road network.
- Staff and general trips should occur outside of peak traffic periods as far as possible.
- Consider scheduling shift changes to occur outside peak hours to concentrate staff trips in off peak periods.
- If required, low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.
- The preferred routes should be surveyed to identify problem areas (e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification). After the road modifications have been implemented, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that delivery will occur without disruptions. This process is to be undertaken by the haulage company transporting the components and the contractor, who will modify the road and intersections to accommodate abnormal vehicles. It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.
- Design and maintenance of internal roads. Any internal gravel roads (if applicable) will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage. This process is to be undertaken by a civil engineering consultant or a geometric design professional.

Significance of impact with mitigation measures

The proposed mitigation measures for the construction traffic will result in a reduction of the impact on the surrounding road network, but the impact on the local traffic will remain moderate as long as daily trips do not exceed the assumptions made above. The dust suppression, however, will result in significantly reducing the impact.

6.1.2 Potential Impact (Operation Phase)

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

6.1.3 Potential Impact (Decommissioning Phase)

The decommissioning phase will result in the same impact as the construction phase as similar trips are expected. The potential traffic impact will be of medium significance before mitigation measures during the construction and decommissioning phases. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level of low significance.

7 NO-GO ALTERNATIVE

The no-go alternative implies that the proposed development does not proceed. This would mean that there will be no negative environmental impacts and no traffic impact on the surrounding network. However, this would also mean that there would be no socio-economic benefits to the surrounding communities, and it will not assist the government in meeting energy demands. **Hence, the no-go alternative is not a preferred alternative.**

8 IMPACT ASSESSMENT SUMMARY

The assessment of impacts and recommendation of mitigation measures as discussed above are collated in the tables below. The assessment methodology is attached as **Annexure A.**

8.1 Construction Phase

Table 8-1: Impact Rating - Construction Phase – Traffic Congestion

Nature: **Traffic congestion during the construction phase and the associated noise and dust pollution.**			
Impact description: The impact will occur due to added pressure on the road network due to the increase in traffic associated with the transport of equipment, material and staff to site during the construction phase.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Short-term (2)	The construction period will last between 1 – 2 years.	**Medium Negative (40)**
Extent	Local (2)	Pressure will only be added on the local road network.	
Magnitude	Moderate (6)	The increase in traffic will have a moderate impact on traffic operations.	
Probability	Highly Probable (4)	The possibility of the impact on the traffic operations is highly probable.	
Mitigation/Enhancement Measures			
Mitigation: • Stagger component delivery to site. • Reduce the construction period, if feasible. • The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network by reducing the construction trips and the distance travelled to transport the materials to the site. • Staff and general trips should occur outside of peak traffic periods. • Regular maintenance of gravel roads (if applicable) by the Contractor during the construction phase and by Client/Facility Manager during operation phase. • Dust suppression of gravel roads during the construction phase, as required.			
Post Mitigation/Enhancement Measures			
Duration	Short-term (1)	The construction period will last between 1 – 2 years.	**Low Negative (15)**
Extent	Local (2)	Pressure will only be added on the local road network.	
Magnitude	Low (2)	The increase in traffic will have a low impact on traffic operations.	
Probability	Probable (3)	The possibility of the impact on the traffic operations is probable.	
Cumulative impacts: The duration of the construction phase is short term (i.e., the impact of the generated traffic on the surrounding road network is temporary and renewable energy facilities, when operational, do not add any significant traffic to the road network). Even if all renewable energy projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.			
Residual Risks:			

Traffic will return to normal levels after construction is completed. Dust and noise pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Dust and noise pollution are limited to the construction period.

8.2 Operational Phase

Table 8-2: Impact Rating – Operational Phase

IMPACT TABLE – OPERATIONAL PHASE
The traffic generated during this phase will be minimal and will have not have any impact on the surrounding road network.

8.3 Decommissioning Phase

Table 8-3: Impact Rating- Decommissioning Phase

IMPACT TABLE – DECOMMISSIONING PHASE
This phase will have a similar impact as the Construction Phase i.e., traffic congestion, air pollution and noise pollution, as similar trips/movements are expected.

9 CUMULATIVE IMPACTS

To assess the cumulative impact, it was assumed that all projects within 50km currently proposed and authorized, would be constructed at the same time. A map indicating the known industrial and energy developments is attached as **Annexure B**. This is the precautionary approach as in reality; authorities will consider all application and construction is likely to be staggered depending on project-specific issues.

The construction and decommissioning phases are the only significant traffic generators. The duration of these phases is short term (i.e., the impact of the generated traffic on the surrounding road network is temporary and the facility, when operational, is not expected to add any significant traffic to the road network). Even if all projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.

The assessments of cumulative impacts are collated in the table below.

Table 9-1: Cumulative Impact Rating

Nature: *Traffic congestion caused by the traffic generated by the proposed development and the associated noise and dust pollution.*		
	Overall impact of the proposed project considered in isolation (post mitigation)	**Cumulative impact of the project and other projects in the area**
Extent	Local (2)	High (5)
Duration	Short (1)	Medium-term (3)
Magnitude	Low (2)	High (8)
Probability	Probable (3)	Improbable (2)
Significance	**Low (15)**	**Medium (32)**
Status (positive/negative)	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Confidence in findings: High.		
Mitigation: • *Stagger component delivery to site.* • *Dust suppression.* • *Reduce the construction period, is feasible.* • *The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network by reducing the construction trips and the distance travelled to transport the materials to the site.* • *Staff and general trips should occur outside of peak traffic periods.*		

10 ENVIRONMENTAL MANAGEMENT PROGRAM INPUTS

OBJECTIVE: It is recommended that dust suppression and maintenance of gravel roads form part of the EMPr. This would be required during the Construction phase where an increase in vehicle trips can be expected. No traffic related mitigation measures are envisaged during the operational phase due to the negligible traffic volume generated during this phase.

Project component/s	Construction Phase traffic
Potential Impact	Dust and noise pollution due to increase in traffic volume
Activity/risk source	Transportation of material, components, equipment and staff to site
Mitigation: Target/Objective	Minimize impacts on road network and surrounding communities

Mitigation: Action/control	Responsibility	Timeframe
• Stagger component delivery to site. • The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network. • Dust suppression, if required. • Reduce the construction period as far as possible, if feasible. • Maintenance of gravel roads. • Apply for abnormal load permits prior to commencement of delivery via abnormal loads. • Assess the preferred route and undertake a 'dry run' to ensure that the delivery of the components will occur without disruptions. • Staff and general trips should occur outside of peak traffic periods as far as possible. • Any low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles, if required.	• Holder of the EA	• Before construction commences and regularly during construction phase

Performance Indicator	Staggering or reducing the construction trips will reduce the impact of dust and noise pollution.
Monitoring	• Regular monitoring of road surface quality. • Monitoring congestion levels (increase in vehicle trips) • Apply for required permits prior to commencement of construction

11 CONCLUSION AND RECOMMENDATIONS

The potential traffic and transport related impacts for the construction, operation and decommissioning phases of the proposed Phakwe Richards Bay Gas Power 3 (PRBGP3) 2000 MW Combined Cycle Gas to Power Plant were identified and assessed.

- The main impact on the external road network will be during the construction phase. This phase is temporary in comparison to the operational period. The number of abnormal load vehicles was estimated and found to be able to be accommodated by the road network.
- During operation, it is expected that maintenance and security staff will periodically visit the facility. It is assumed that approximately 60 full-time employees will be stationed on site (subject to change). Based on experience with similar projects, the number of full-time employees is generally low and consequently, the associated trips are negligible. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- The traffic generated during the construction phase, although significant, will be temporary and impacts are considered to be negative and of medium significance before and of **low significance** after mitigation.
- The traffic generated during the decommissioning phase will be less than the construction phase traffic and the impact on the surrounding road network will also be considered negative and of medium significance before and of **low significance** after mitigation.
- The proposed access point, located on the access road located off Alumina Alley, will need to be upgraded to cater for the construction vehicles and abnormal load vehicles.
- As traffic delays are experienced along the R619, the access roads located off the R619 should be avoided or if necessary, used during off peak hours.
- The preferred access roads to the site are the roads located off the R34 viz. Western Arterial, Alumina Alley and Bullion Road.

The potential mitigation measures mentioned in the construction and decommissioning phases are:

- Dust suppression, as required
- Component delivery to/ removal from the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network by reducing the construction trips and the distance travelled to transport the materials to the site.
- Staff and general trips should occur outside of peak traffic periods.
- A “dry run” of the preferred route.
- Design and maintenance of internal roads.

- Any low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved or raised to accommodate the abnormal load vehicles.

The construction and decommissioning phases are the only significant traffic generators and therefore noise and dust pollution will be higher during these phases. The duration of these phases is short term i.e., the impact on the surrounding road network is temporary and the facility, when operational, will not add any significant traffic to the road network.

The development is supported from a traffic and transport engineering perspective provided that the recommendations and mitigations contained in this report are adhered to.

The potential impacts associated with the facility and associated infrastructure are acceptable from a traffic and transport engineering perspective and it is therefore recommended that the proposed facility be authorised

12 REFERENCES

- Google Earth Pro
- SANS 10280/NRS 041-1:2008 - Overhead Power Lines for Conditions Prevailing in South Africa
- Road Traffic Act (Act No. 93 of 1996)
- National Road Traffic Regulations, 2000
- The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads

Annexure A – Assessment Methodology

Assessment of Impacts

Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase must be assessed in terms of the following criteria:

» The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
» The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
» The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5;
» The **magnitude**, quantified on a scale from0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment
  - 2 is minor and will not result in an impact on processes
  - 4 is low and will cause a slight impact on processes
  - 6 is moderate and will result in processes continuing but in a modified way
  - 8 is high (processes are altered to the extent that they temporarily cease)
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes
» The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring.
  Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
» The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
» The **status**, which will be described as either positive, negative or neutral.
» The degree to which the impact can be reversed.
» The degree to which the impact may cause irreplaceable loss of resources.
» The *degree* to which the impact can be *mitigated.*

The **significance** is calculated by combining the criteria in the following formula:
S=(E+D+M)P
S = Significance weighting
E = Extent
D = Duration
M =Magnitude
P = Probability

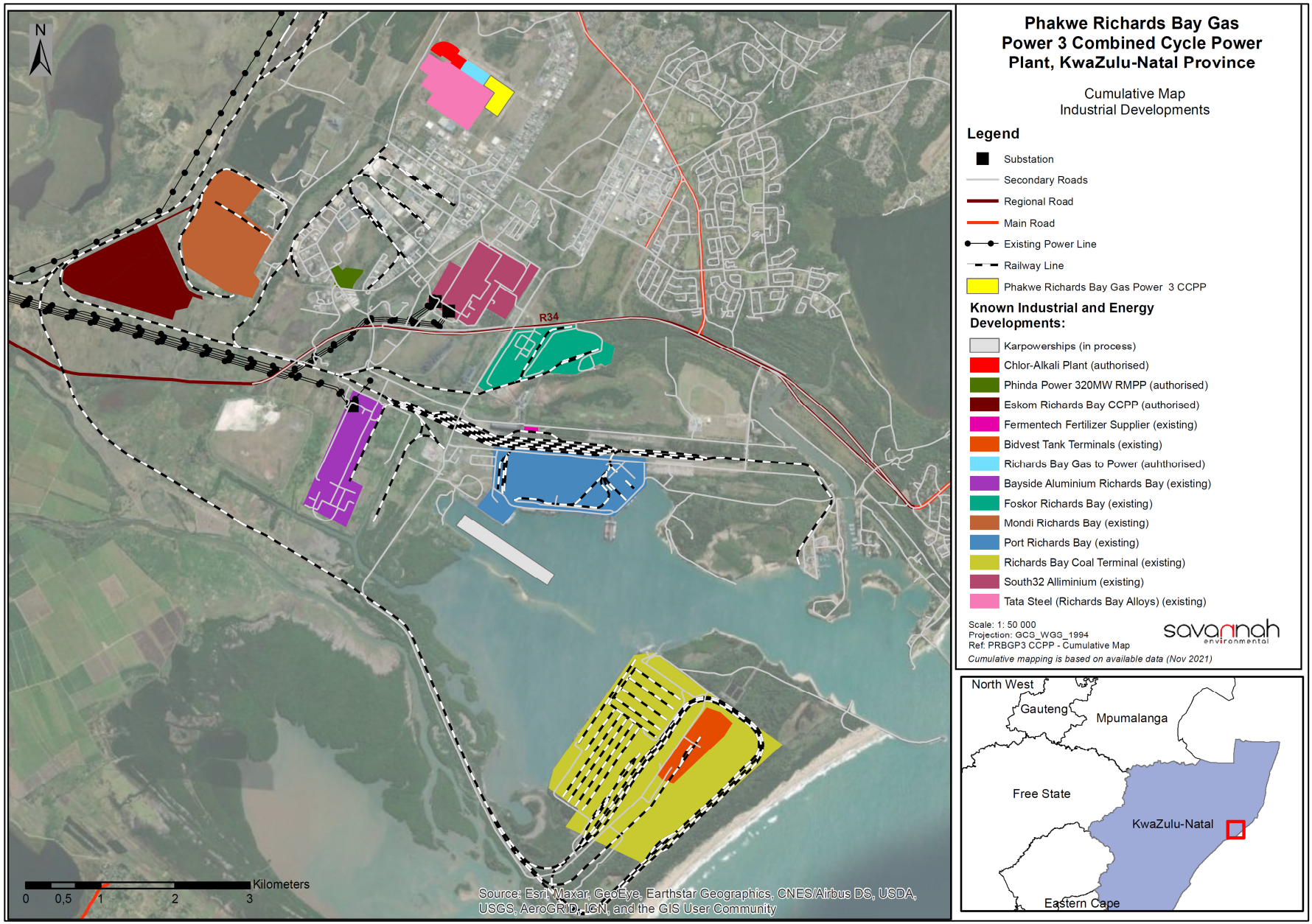
The **significance weightings** for each potential impact are as follows:

» < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),

» 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),

» > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

Annexure B – Cumulative Map


N
R34
Kilometers
0 0,5 1 2 3
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Phakwe Richards Bay Gas Power 3 Combined Cycle Power Plant, KwaZulu-Natal Province
Cumulative Map
Industrial Developments
Legend
Substation
Secondary Roads
Regional Road
Main Road
Existing Power Line
Railway Line
Phakwe Richards Bay Gas Power 3 CCPP
Known Industrial and Energy Developments:
Karpowerships (in process)
Chlor-Alkali Plant (authorised)
Phinda Power 320MW RMPP (authorised)
Eskom Richards Bay CCPP (authorised)
Fermentech Fertilizer Supplier (existing)
Bidvest Tank Terminals (existing)
Richards Bay Gas to Power (authorised)
Bayside Aluminium Richards Bay (existing)
Foskor Richards Bay (existing)
Mondi Richards Bay (existing)
Port Richards Bay (existing)
Richards Bay Coal Terminal (existing)
South32 Alliminium (existing)
Tata Steel (Richards Bay Alloys) (existing)
Scale: 1: 50 000
Projection: GCS_WGS_1994
Ref: PRBGP3 CCPP - Cumulative Map
savannah environmental
Cumulative mapping is based on available data (Nov 2021)
North West
Gauteng
Mpumalanga
Free State
KwaZulu-Natal
Eastern Cape