

Traffic Impact Assessment

RED CAP ENERGY GAMMA GRID CONNECTION TRAFFIC IMPACT ASSESSMENT



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1 EXECUTIVE SUMMARY

Red Cap Energy (Pty) Ltd, hereafter known as Red Cap, propose developing several Wind Farms to the north of Beaufort West, within the Central Karoo District Municipality of the Western Cape. These include the Nuweveld Wind Farms, Hoogland North Wind Farms and the Hoogland South Wind Farms.

A Grid Corridor between the Nuweveld Collector Substation and Droërivier Substation has been authorised. In order to improve the reliability, efficiency and capacity of the grid in the region, Eskom has advised that an additional 400 kV transmission line is required to evacuate power from the Nuweveld Collector Substation to the Gamma Substation in the east. This will allow additional/new renewable energy generation facilities to feed electricity to the national grid, such as the proposed Hoogland projects. Thus, a Grid Corridor between the Nuweveld Collector Substation and Gamma Substation was identified.

This Traffic Impact Assessment has been prepared for the Grid Connection between the Nuweveld Collector Substation and Gamma Substation. The Grid Corridor has been identified through an iterative process of desktop specialist assessment and landowner engagements. The alignment and extent of the Corridor have been finalised for assessment purposes. The assessment applies to the full extent of the Corridor, and the recommendations apply to any route therein.

Traffic Impact Assessments for each of the Wind Farms and Grid connections (Nuweveld Collector Substation and Droërivier Substation) have been addressed under separate reports. This Traffic Impact Assessment is for the Grid Connection between the Nuweveld Collector Substation and Gamma Substation. Based on the latest available information, the Grid Connection will consist of:

- Connection to the existing Nuweveld Collector Substation, provision has been made in the design for additional “outgoing” bays;*
- The construction of approximately 110 km of 400 kV overhead transmission line between the proposed Nuweveld Collector Substation to the existing Gamma substation; and*
- Expansion to the Eskom Gamma substation.*

This Traffic Impact Assessment was undertaken by Mr A. Schwarz, in accordance with the relevant guidelines, to provide a technical appraisal of the traffic impact of the Grid Connection on the existing road network, during the construction, operation, and decommissioning phases. A site visit was conducted in September 2019 and together with traffic count data obtained from the provincial authorities, forms the basis of this assessment.

The proposed transportation access routes to be used for the transportation of equipment and material, including abnormal loads (ie transformers, if required), for the Grid Connection, are on national roads and have been previously used for the transportation of similar equipment.

Traffic generation estimates used in this assessment are based on the experience of similar projects. The worst-case scenario for the cumulative impact has been adopted, which assumes the operational phase of the three Nuweveld Wind Farms and the construction phase of the Hoogland Wind Farms. The most significant increase in traffic volumes results from the daily transportation of personnel, to and from the site. The projected increase in traffic on the TR05801 (R381) is less than fifty vehicles per hour, the threshold as stipulated in the South African Traffic Impact

and Site Traffic Assessment Manual (2012). The TR05801 is the western extremity of the Gamma Gridline project.

There will be an increase in traffic volumes on the road network during the construction phase of this development, and less conspicuous during the operational phase. Due to the low usage of these roads, any additional traffic on the roads will be noticeable to the local community. This report has assessed the impact of the additional traffic on the surrounding road network and found that the existing road network is currently operating well below its capacity and provides an adequate level of service. The increase in traffic volumes will lead to greater wear and tear especially during the construction phase of the development but will not have an undue detrimental impact on the structural integrity of the roads within the study area, provided routine maintenance of the roads is undertaken. Due to budgetary constraints within various spheres of government, nominal maintenance is undertaken on the road network. To this end, it is strongly suggested that the developer contributes toward the ongoing maintenance of the road network associated with the development, during all phases of the development.

In addition, there are several gravel sections on TR05801 and DR02311, through mountain passes of Molteno Pass and De Jagers Pass, which are extremely treacherous and pose a potential risk to road users transporting staff to and from the site. These areas, with the approval of the local road authorities, will have to be addressed by the developer.

It should be noted that it is not possible to determine the expected traffic volumes that will be generated during the decommissioning phase. It can, however, be expected that these volumes will be lower than during the construction phase. As part of the decommissioning process, a separate traffic impact assessment should be undertaken since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes, etc. would have changed over the operational life of the development.

A range of management and mitigation strategies are identified for implementation during the construction and operation phases of the development to minimise traffic impacts and reduce community disruption and the risk of traffic incidents.

Thus, from a traffic and transportation perspective, there are no constraints or notable impacts that would jeopardise the implementation of this development.

2 PROJECT SPECIFICATIONS

A synopsis of the components and specifications for the new Grid Connection is provided in Table 1

Table 1 - Synopsis of Project Specifications

Project Components Description	Specifications & Footprint areas	Approximate Disturbance Area (WCS)
Nuweveld Collector Substation	No expansion is required at the Nuweveld Collector Substation	
Overhead transmission line and pylons	There will be a 400 kV overhead line supported by mostly lattice structure pylons. The spans (distance between pylons) on the pylons are on average 400 m. Each pylon is conservatively assumed to have a footprint of 100 m ² .	2.75 ha
Access roads and tracks	Existing access roads and tracks (upgraded to ± 2-4 m wide where needed) will be used as far as possible and new access tracks would be created where needed (±2-4 m wide).	46.0 ha

Project Components Description	Specifications & Footprint areas	Approximate Disturbance Area (WCS)
Temporary areas	Temporary laydown areas will be identified along the alignment, with the main equipment and construction yards being located along the alignment or based in one of the surrounding towns. It is anticipated that the total area required for the temporary laydown areas is up to 5 ha.	5.0 ha
Substation infrastructure	300 m x 300 m expansion to the Gamma Substation (including transformers and other standard substation infrastructure)	9.0 ha
Total disturbance footprint		62.75 ha

3 ABBREVIATIONS

The following abbreviations have been used in this document.

Table 2 - List of Abbreviations

Abbreviation	Meaning
AADT	Average Annual Daily Traffic
ADT	Average Daily Traffic
BW	Beaufort West
COTO	South African Committee of Transportation Officials
DFFE	Department of Fisheries, Forestry and Environment
EIA	Environmental Impact Assessment
EPCM	Engineering, Procurement, Construction and Management
km/h	Kilometre per hour
MW	Megawatt
NEMA	National Environmental Management Act 107 of 1998
RCAM	Road Classification and Access Management
RNIS	Road Network Information System
SANRAL	South African National Roads Agency SOC Ltd
TIA	Traffic Impact Assessment
TMP	Traffic Management Plan
vph	Vehicle per hour
VW	Victoria West
WCS	Worst Case Scenario
WTG	Wind Turbine Generator

4 GLOSSARY

The following definitions apply to these words which have been used in this document.

Table 3 - Definitions

Definitions	
Average Annual Daily Traffic	is the total traffic volume (in both directions) generated in a year, including school and public holidays and weekends, divided by the number of days in the year.
Average Daily Traffic	is the total traffic (in both directions) generated in a twenty-four-hour period, on a typical working weekday.
Diurnal	means happening or active during the daytime.
Peak Traffic	traffic at the time it is most busy.
Traffic Volume	is the number of vehicles passing a specific point in a given time, expressed in vehicles per hour.
Trip	is defined as a single (one-directional) movement, with either the destination or the origin of the trip being site.

5 INTRODUCTION

5.1 PROJECT DESCRIPTION

Red Cap has received Environmental Authorisation for three wind farms and a 400 kV Grid Corridor collectively known as Nuweveld Wind Farm Development, located close to Beaufort West in the Western Cape Province. The approved Grid Corridor links the Nuweveld projects to the Droërivier Substation, approximately 65 km to the south of the wind farms, as shown in Figure 1.

Red Cap is also proposing to develop four additional wind farms and associated Grid Connections, known as the Hoogland Projects. The Hoogland Wind Farms are located northwest and southwest of the Nuweveld Wind farms, and the Hoogland Grid Connections will terminate at the Nuweveld Collector Substation, as shown in Figure 1.



Figure 1 - Gamma Grid Corridors

To expand the capacity of the Eskom grid and improve the functionality of the grid in the area, an additional 400 kV Grid Connection is required from the Nuweveld Collector Substation to the Gamma Substation, approximately 90 km to the east of the Nuweveld Collector Substation. This additional line will improve functionality by creating a 400 kV ring-line between the Droërivier Substation, Gamma Substation and Nuweveld Collector Substation, and create opportunities for other wind farm developments (such as the proposed Hoogland projects) to tie into the grid either at the Nuweveld Collector Substation or along the new 400 kV transmission line. As such, the proposed new line will allow Eskom to release further renewable energy potential in an area that is becoming a renewable energy development node in South Africa, thereby helping to alleviate South Africa's power crisis.

A 300 m x 300 m expansion to the Gamma Substation (including transformers and other standard substation infrastructure) and access tracks for construction and maintenance of the line will also be required and form components of the project.

Although the gridline starts in the Western Cape (Central Karoo District Municipality and Beaufort West Local Municipality), portions of the line will traverse portions of the Northern Cape (Pixley ka Seme District Municipality and Ubuntu Local Municipality).

The project triggers activities listed in terms of the Environmental Impact Assessment Regulations, 2014, as amended. These activities require authorisation from the Department of Forestry, Fisheries and the Environment (DFFE), prior to commencement. An application for Environmental Authorisation (EA) will be submitted and informed by a Basic Assessment (BA) process as the project will lie wholly within a strategic transmission corridor specifically identified for the placement of this infrastructure.

The BA process will be informed by a suite of specialist studies, including this Traffic Impact Assessment (TIA).

5.2 TERMS OF REFERENCE

Red Cap appointed Mr A. Schwarz, to prepare a TIA, with emphasis on access from the public roads to the sites on which the proposed transmission line between the approved Nuweveld Collector Substation and the existing Eskom Gamma Substation, hereafter referred to as the 'Grid Corridor'. The extent of the Grid Corridor is shown in Figure 2.

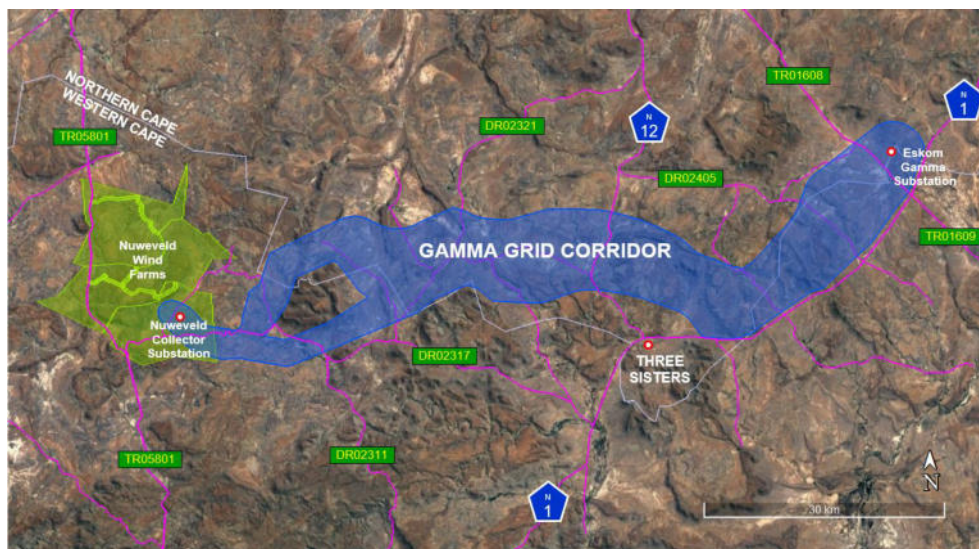


Figure 2 - Grid Corridor

This TIA forms an integral part of the supporting documentation required for the Environmental Authorisation application to the Department of Fisheries, Forestry and Environment (DFFE).

5.3 SCOPE AND OBJECTIVES

5.3.1 Scope

The scope of the study is to evaluate the impact the development of the 400 kV Grid Connection and expansion to the Gamma Substation, will have on the adjacent road network.

The scope of this report includes, inter alia:

- Identify possible transportation routes of construction equipment and material from the major commercial centres within South Africa, to various sites along the Grid Corridor;
- Identify the potential road network that could be affected by the erection of the Grid Connection within the Grid Corridor;

- Determine a traffic baseline against which the potential traffic impacts are to be measured;
- Identify potential impacts and cumulative impacts that may occur during the construction, operational and decommissioning phases of the development;
- Determine mitigation and/or management measures which could be implemented, to, as far as possible, reduce the effect of negative impacts; and
- Incorporate and address all issues and concerns raised by Interested and Affected Parties, (if and when applicable).

5.3.2 Objectives

The objective of this report is to determine the potential traffic impact, that the project will have on the existing public road network.

5.4 LEGISLATION AND PERMIT REQUIREMENTS

The overarching environmental legislation for the management of the environment in South Africa, is the National Environmental Management Act, 1998 (Act 107 of 1998 “NEMA”). Its preamble states that sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of environmental decisions to ensure that the development serves present and future generations.

Traffic impacts are therefore an important aspect to be considered in the decision-making of developments.

5.4.1 Roads

The relevant legislation associated with the road (infrastructure), transportation and traffic include, inter alia:

- National Water Act (Act 36 of 1998), with regards to all crossings of watercourses;
- National Road Traffic Act (Act 93 of 1996);
- Advertising on Road and Ribbon Development Act (Act 21 of 1940):
 - Regulates the display of advertisements outside certain urban areas at places visible from public roads, the depositing or leaving of disused machinery or refuse and the erection, construction or laying of structures and other things near certain public roads, and the access to certain land from such roads;
 - Section 9: Prohibition of the erection of structures near-certain roads;
 - Section 9A: Prohibition of the erection of structures or construction of other things near intersections of certain roads;
 - Section 10: Restriction of access to land through a fence, etc., along certain roads.
- Roads Ordinance Number 19 of 1976:
 - Consolidate and amend the law relating to public roads and public paths and provide for matters incidental thereto;
 - Section 13: Erection of gates across public roads and public paths;
 - Section 17: Erection of structures on or near public roads;
 - Section 18: Access to and exit from certain public roads and public paths.

5.4.2 Vehicle Dimensions

Regulations 221 to 230 of the National Road Traffic Act relate to vehicle dimensions, the most salient points are summarised below.

Regulation 221: Defines the legislation requirements regarding the overall length of vehicles, and is summarised as follows:

- a rigid vehicle shall not exceed 12.5 m;
- articulated motor vehicles and semi-trailers shall not exceed 18.5 m;
- other combinations of motor vehicles (including interlinks, multiple trailers, etc.) shall not exceed 22.0 m.

Regulation 223: Defines the legislation requirements regarding the overall width of vehicles with a gross mass of 12 000 kilograms or more, which shall not exceed 2.6 m.

Regulation 224: Define the legislative requirements regarding the overall height of a vehicle and transported load, which shall not exceed 4.3 m.

Regulation 225: Defines the legislation requirements regarding the maximum turning radius and wheelbase, which shall not exceed 13.1 m or 10.0 m (for a semi-trailer) respectively.

5.4.3 Vehicle Loads

Regulations 231 to 249 of the National Road Traffic Act relate to vehicle loads, the most salient points are summarised below.

Regulation 240: Defines the legislation requirements regarding the mass load carrying capacity on roads, the most relevant points are summarised below:

- The mass load of a wheel fitted to a steering axle shall not exceed 3 850 kg, others shall not exceed 4 000 kg;
- The mass load of an axle fitted with two wheels, which is the steering axle shall not exceed 7 700 kg, others shall not exceed 8 000 kg;
- The mass load of an axle fitted with four wheels shall not exceed 9 000 kg;
- The mass load of an axle unit, which consists of two axles, each of which is fitted with two wheels, acting as a steering axle unit shall not exceed 15 400 kg, other axle units shall not exceed 16 000 kg;
- The mass load of an axle unit, which consists of two axles, each of which is fitted with four wheels, shall not exceed 18 000 kg;
- The mass load of an axle unit, which consists of three or more axles, each of which are fitted with two wheels, acting as a steering axle unit shall not exceed 23 100 kg, other axle units shall not exceed 24 000 kg;
- The mass load of an axle unit, which consists of three or more axles, each of which is fitted with four wheels shall not exceed 24 000 kg;
- The axle mass load of an axle unit consists of two axles, one of which is a drive axle with four wheels and the other is an axle with two wheels, the sum of the two axles shall not exceed 18 200 kg.

Regulation 241: Defines the legislation requirements regarding the mass load-carrying capacity of bridges.

5.4.4 Abnormal Loads

The National Road Traffic Act (Act 93 of 1996) and the National Road Traffic Regulations (2000) prescribe certain limitations on vehicle dimensions and axle and vehicle masses that a vehicle using a public road must comply with. Where the prescribed limitations are exceeded, these loads are classified as abnormal loads. Provisions for such abnormal vehicles and loads are made in Section 81 of the National Road Traffic, as substituted by Section 23 of the National Road Traffic Amendment Act (Act 64 of 2008).

The requirements and procedures for transporting abnormal loads are contained in the following two documents:

- “TRH 11 - Dimensional and Mass Limitations and Other Requirements for Abnormal Load Vehicles”; and
- “Administrative Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads”.

5.5 METHODOLOGY

The South African Traffic Impact and Site Traffic Assessment Standards (2014), and the Manual for Traffic Impact Studies (1995), form the basis for this traffic impact assessment.

The methodology adopted in the compilation of this report includes, inter alia:

- *Road network:* Identify the road network which will be used by vehicles associated with this development, and other developments in the area;
- *Traffic volume:* Establish the existing traffic volumes (baseline) and the number of future vehicle trips generated during the construction, operation and decommissioning of this development;
- *Modal split:* Determine the mode of transport, vehicle type and size for each trip or category of trip generated during the construction, operational and decommissioning of this development;
- *Peak Hour Rate:* Establish the peak-hour vehicle trip rate generated during the construction, operation and decommissioning of this development;
- *Impact assessment:* Identify and assess the significance and severity of development-related traffic on the existing road network. Where possible compare the existing traffic volumes on the roads with the traffic generated by this development; and
- *Impact mitigation:* Propose practical measures to mitigate the impacts of development-related traffic on the existing road network.

5.6 ASSUMPTIONS

The compiling of this report is based on the following assumptions:

GENERAL

- All three Nuweveld Wind Farms are constructed and are operational;
- The Nuweveld Collector Substation is constructed and is operational;
- The Grid Connection between the Nuweveld Collector Substation and Eskom Droërivier Substation is constructed and is operational; and

- The construction of the Hoogland Wind Farms (both the northern and southern clusters) will take place simultaneously with the construction of the Gamma Gridline Project.

NUWEVELD COLLECTOR SUBSTATION

- No modifications to the substation are required, only electrical connection. The expected duration of this work is assumed to be limited to two weeks, during this period access will be via the TR05801.

ESKOM GAMMA SUBSTATION

- Expansion to the existing substation will be required. The envisaged work includes the construction of receiving bays and integration into the substation. The expected duration of this work is assumed to be in the order of six months.

TRANSMISSION LINE

- Besides the Grid Connections between Nuweveld Collector Substation, approved Nuweveld Wind Farm and Droërivier Substation, there are no other approved 132 kV or 400 kV transmission lines earmarked for construction within thirty kilometres of the proposed Grid Corridor. Thus, there will be no cumulative impact from other transmission line development that will occur simultaneously with the Gamma Gridline Project that needs to be taken into consideration;
- The servitude for the transmission line is still to be finalised and registered, it is assumed that it will fall within the defined Grid Corridor;
- The Grid Corridor is sub-divided into smaller zones, each accessed from the existing public road network;
- Since the transmission line has not been designed or detailed, the trip loads calculated in this TIA are based on the pylon details provided in Table 4, which might differ from the final design. However, it is unlikely that the final design will adversely affect the volumes calculated in this document.

Table 4 - Pylon Details

Description	Pylon 1	Pylon 2
Type	518H	529A
Split (in %)	20%	80%
Span between structures	500 m	500 m
Weight per pylon (in kg)	10 500 kg	4 000 kg

MANPOWER

- The manpower complement for the Grid Connection during the peak construction phase is assumed not to exceed 110 individuals. This is based on 50 individuals working on the Gamma Substations expansion and 60 individuals working on the transmission line.
- No accommodation is provided on-site.

WORKFORCE DISTRIBUTION

- There are several towns in the area from which the workforce could be drawn. However, the percentage of casual labour on this project would be limited, as the majority of this work is more specialised. Thus, the workforce distribution is based on the availability of accommodation in the surrounding towns. It is for this reason that the workforce is assumed to commute from both Beaufort West and Victoria West. The percentage will be dictated by the distance that has to be travelled to the proposed area.

TRAFFIC

- *Delivery routes of equipment and materials to the various sites along the grid corridor, from various commercial centres within South Africa, will vary. As the shortest route to the proposed working area will be adopted;*
- *Only vehicles with a gross vehicle mass of less than ten tonnes shall use the Molteno Pass and De Jager's Pass for the commuting of personnel and the transportation of construction equipment and materials;*
- *The supply of raw material for the manufacture of the foundations, as a worst-case scenario, will be sourced from commercial sources outside the development area;*
- *Concrete for the foundations of the transmission line is envisaged to be mixed as close to the foundations as possible;*
- *The maximum payload of vehicles used to transport equipment and material to the site is assumed to be in the order of 26 000 kg; and*
- *The transportation of personnel shall be provided by either bakkies (2 Pax), minibuses (12 Pax) or Buses (35 Pax), all vehicles shall be retained on-site during the day.*

5.7 LIMITATIONS

This report excludes the following:

- *Transport Management Plan for the development, as this will depend on the construction process adopted by the contractor that is still to be appointed;*
- *The design and interfacing of the proposed transmission lines with the existing Eskom infrastructure;*
- *The geometric details of intersections and entrances onto the site from the public road network, as this will be finalised during the detailed design phase, which will require approval from the relevant roads authorities;*
- *Assessment of risks and impacts associated with loading or off-loading of the vehicles at the site or associated facilities are not addressed since these will be addressed in the Standard Operating Procedures developed by the Engineering, Procurement, Construction and Management (EPCM) contractor for the construction and decommissioning of the development;*
- *The suitability of the minor roads for the delivery and transportation and commuting of personnel will need to be assessed at the time of implementation, as the road conditions could have changed. It must be noted that not all the roads included in this report were evaluated during the site visit.*

These limitations/exclusions are not expected to materially affect the findings of this assessment.

5.8 SOURCE OF INFORMATION

Information used in compiling this report was drawn from the following sources:

- *Manual for Traffic Impact Studies, Department of Transport, RR 93/635, 1995;*
- *TMH 16, Volume 1 - South African Traffic Impact and Site Traffic Assessment Manual, COTO 2012;*
- *TMH 16, Volume 2 - South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual, COTO 2014;*
- *TMH 17 - The South African Trip Data Manual, COTO 2012;*

- *TRH 4 - Structural Design of Flexible Pavement for Interurban and Rural Roads, 1996;*
- *TRH 26 - South African Road Classification and Access Management Manual, 2012;*
- *All information relating to the roads within the Western Cape was obtained from the Western Cape Government Road Network Information System (https://rnis.westerncape.gov.za/rnis/rnis_web_reports.main.null);*
- *All information relating to traffic volumes on the roads within the Western Cape was obtained from the Western Cape Government Road Network Information System (https://rnis.westerncape.gov.za/rnis/rnis_web_reports.main.null);*
- *Traffic volumes on the roads within the Northern Cape and the national roads were obtained from Mikros Traffic Monitoring (Pty) Ltd, with approval from the required authorities;*
- *The number of households was obtained from the Department of Statistics South Africa (http://www.statssa.gov.za/?page_id=964);*
- *Information regarding mountain passes was obtained from Mountain Passes of South Africa (<https://mountainpassessouthafrica.co.za/>);*
- *Distance and estimated travelling times were obtained using Google Maps;*
- *Satellite imagery of the site available on Google Earth was also used for evaluation;*
- *Most of the photographs used in this report were taken by the author, during the site visit.*

6 DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1 ROAD NETWORK

The existing road network, within the study area, is well developed. A combination of national roads and first, second and third-order roads, provides access to the Grid Corridor from the local towns and the major commercial centres within South Africa.

In general, besides the Molteno Pass and the De Jager's Pass, no obvious problems were identified or associated with the transport of personnel or freight to the various zones of the Grid Corridor. It will, however, be necessary to confirm certain aspects such as clearances, bridge capacities, etc., by the logistics contractor as part of their preparation, as this will depend on the actual vehicle configuration to be used.

The more prevalent public road network, which provides access to the Grid Corridor, is shown in Figure 3.

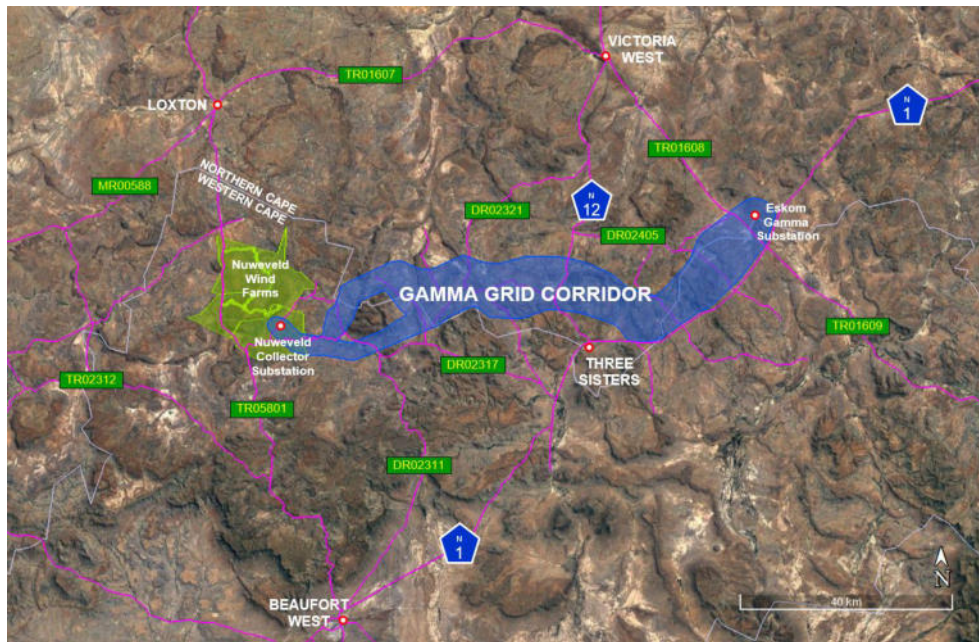


Figure 3 - Existing Road Network

Details of the more relevant roads, within the study area, are delineated in the sections below.

6.1.1 National Roads

N1 (NR001)

The N1 is a Principal Arterial providing high mobility between provinces, regions and towns, and falls under the jurisdiction of the South African National Road Agency. The N1 starts at the M6 (western Boulevard) in Cape Town and ends at Beit Bridge Border Post at the Zimbabwe border, passing through or bypassing many towns on the route. The N1 and N12 merge approximately seven kilometres west of Beaufort West, before splitting again at Three Sisters.

This is a Class 1 road, generally consisting of a single paved carriageway, with one lane in each direction and paved shoulders, as shown in Figure 4. Climbing lanes are provided along various sections of the road and there are turning lanes at major intersections. In many cases, the shoulder is wide enough to allow yellow-line driving. The road is in good condition with a speed limit of 120 km/h.



Figure 4 - N1 (East of Beaufort West)

N12 (NR012)

The N12 is a Principal Arterial providing high mobility between provinces, regions and towns, and falls under the jurisdiction of the South African National Road Agency. The N12 starts at the N2/N9 (Kraaibosch Interchange) approximately 5 km south of George and ends at eMalahleni, passing through or bypassing many towns on the route. The N1 and N12 merge approximately seven kilometres west of Beaufort West, before splitting again at Three Sisters.

This is a Class 1 road, generally consisting of a single paved carriageway, with one lane in each direction and a combination of paved and gravel shoulders, an example of paved shoulders is shown in Figure 5. The road north of the Three Sisters is in good condition with a speed limit of 120 km/h.



Figure 5 - N12 (North of Three Sisters)

6.1.2 Trunk Roads

The Trunk Roads in the area are very diverse, from first-world paved roads to third-world gravel roads. There is a noticeable difference in the condition of the roads in the Northern Cape and Western Cape, the roads in the Western Cape are generally of a better condition as they are better maintained.

TR016 (R63)

The TR016 is a Major Arterial providing mobility between provinces, regions and towns, the management and maintenance of this road fall under the jurisdiction of the Provincial Roads Department in which the roads are located. The TR016 (R63) starts at the R27 approximately 23 km east of Calvinia and ends at N2 north of East London. The road is split into several sections, TR01606 is section 6 (Carnarvon to Loxton), TR01607 is section 7 (Loxton to Victoria West), TR01608 is section 8 (Victoria West to Provincial Bounder), and TR01609 is section 9 (Provincial Bounder to Murraysburg).

According to the Western Cape Road Information System the Functional Class of section 9 of the R63, the road is a Class 2, with an RCAM classification of R2c. The road is situated in a 30 m wide servitude and consists of a single paved carriageway, 6.8 m wide, with one lane in each direction and gravel shoulders, as shown in Figure 6. The road is in fair condition with a speed limit of 120 km/h.



Figure 6 - TR01608 (East of Victoria West)

TR05801 (R381)

The R381 is a Minor Arterial providing mobility between provinces, regions and towns, the management and maintenance of this road fall under the jurisdiction of the Provincial Roads Department in which the roads are located. The R381 starts at the N1, north of Beaufort West and ends at R63 in Loxton.

According to the Western Cape Road Information System, the Functional Class of this road is Level 2, with an RCAM classification of R2b. The road is situated in a 20 m wide servitude, sections of the road are paved, and the surfacing and width details of this road are provided in Table 5.

Table 5 - R381 Road Details

Start km	End km	Surface Type	Width	Shoulder Width	Shoulder Type
0	10.07	Surfaced	7.20	2.00	Unsurfaced
10.07	13.28	Surfaced	8.60	2.00	Unsurfaced
13.28	23.80	Gravel	7.00		
23.80	32.96	Surfaced	7.20	0.9	Unsurfaced
32.96	38.20	Surfaced	6.80	0.9	Unsurfaced
38.20	95.75	Gravel	8.50		
95.75	111.00	Gravel			

The paved sections of the R381, consist of a single paved carriageway, with one lane in each direction and unpaved shoulders, as shown in Figure 7.



Figure 7 - Paved Section of R381

Several sections of the road are extremely treacherous, with no barriers and steep drop-offs, very tight corners, negative banking and loose gravel. A section of the road is shown in Figure 8.



Figure 8 - Unpaved Section of R381

6.1.3 District Roads

The district roads in the area are level 4 roads and are classified as Resident Access Collector roads, providing accessibility to nearby towns and main roads. Maintenance and management of these roads fall under the jurisdiction of the Provincial Roads Department, in which the roads are located. The minimum required level of service on these roads is a LOS C.

Most of these roads consist of a gravel carriageway, approximately 7 m wide, within a 20 m wide servitude. As a result of the width, road users have to reduce speed when passing oncoming vehicles. Although most of these roads are suitable for offroad vehicles, the use of these roads by heavy vehicles is will have to be accessed on a case-by-case base, as the conditions change seasonally.

The condition of these roads is not consistent and varies from very poor to satisfactory. However, several sections of these roads are very stony, which could result in mechanical damage to vehicles.

DR02311

The DR02311 starts at N1 (east of Beaufort West) and ends at the intersection with the DR02317.

According to the Western Cape Road Information System, the Functional Class of this road is Level 4, with an RCAM classification of R4a. The road is situated in a 20 m wide servitude, consisting of an 8.5 m wide gravel road, and is approximately 58.5 km long. Sections of the road, through the De Jager's Pass, are extremely treacherous, with no barriers and steep drop-offs, as shown in Figure 9.



Figure 9 - De Jager's Pass on DR02311

DR02317

The DR02317 starts at TR05801 and ends at the intersection with the N1.

According to the Western Cape Road Information System, the Functional Class of this road is Level 4, with an RCAM classification of R4c. The road is situated in a 20 m wide servitude, the road is approximately 68.3 km long and consists of a 7.0 m wide gravel road, as shown in Figure 10.



Figure 10 - DR02317

At approximately eight kilometres from the TR05801, the DR02317 passes through existing homestead as shown in Figure 11.



Figure 11 - DR02317 8 km from R381

There are several other farming communities which straddle the DR02317, like the one at approximately 22 kilometres from the TR05801, as shown in Figure 12.



Figure 12 - DR02317 22 km from R381

DR02318

The DR02318 starts at DR02317 and ends at the intersection with the N12.

According to the Western Cape Road Information System, the Functional Class of this road is Level 4, with the RCAM classification of R4c. The road is situated in a

20 m wide servitude, the road is approximately 32.35 km long and consists of a 7.0 m wide gravel road, as shown in Figure 13.



Figure 13 - DR02318 at the intersection with DR02317

DR02405

The DR02405 starts at N12 and ends at the intersection with the MR00587.

According to the Western Cape Road Information System, the Functional Class of this road is Level 4, with an RCAM classification of R4c. The road is situated in a 20 m wide servitude, the road is approximately 65.3 km long and consists of a 7.0 m wide gravel road, as shown in Figure 14.



Figure 14 - DR02405 at the intersection with the N1

6.1.4 Minor Roads

Minor roads in the area, have a functional classification of level 5 and are categorised as Local Access roads, providing direct access to properties. The management and maintenance of this road fall under the jurisdiction of the Provincial Roads

Department, in which the roads are located. The minimum required level of service on these roads is a LOS C.

Most of these roads consist of a gravel carriageway, within a 20 m wide servitude.

OP08881

The OP08881 starts at DR02317 and ends at the intersection with the OP08880.

According to the Western Cape Road Information System, the Functional Class of this road is Level 5, there is no RCAM classification for this road. The road is situated in a 20 m wide servitude, there are no other details provided for this road.

OP08895

The OP08895 starts at DR02317 and ends at the intersection with the DR02318, in the Northern Cape.

According to the Western Cape Road Information System, the Functional Class of this road is Level 5, there is no RCAM classification for this road. The road is situated in a 20 m wide servitude, there are no other details provided for this road.

OP09225

The OP09225 starts at NR00109, as shown in Figure 15, and ends at the intersection with the DR02405, in the Northern Cape.

According to the Western Cape Road Information System, the Functional Class of this road is Level 5, there is no RCAM classification for this road. The road is situated in a 20 m wide servitude, there are no other details provided for this road.



Figure 15 - OP09225 at the intersection with the N1

6.2 SITE ACCESS

Access to the Nuweveld Wind Farms shall be used for the portion of the Grid Connection that falls within the wind farms' boundaries. Access to the Nuweveld Collector Substation shall be via the access routes provided for Nuweveld East Wind Farm from the DR02317. Access to the servitude for the transmission line that falls outside the wind farms' boundaries shall be provided from the public road network.

Since the servitude for the transmission lines has not been confirmed, the detailed design of the transmission line has not been finalised. Therefore the exact position

of the foundations of the pylons is still unknown. Thus, it is difficult to identify the most likely positions for the contractor to access the servitude. Where feasible, existing private roads/tracks should be used, and where existing private roads/tracks do not exist or are not suitable, new tracks will have to be created.

Thus, for this report, access to the Grid Corridor from the public roads will be assumed to be provided by existing and/or new private roads/tracks, in agreement with the relevant landowners. The proposed Grid Corridor extends over a large area, for assessment purposes the proposed Grid Corridor has been divided into several zones, each zone is accessed from the existing road network, and the zones are shown in Figure 16.

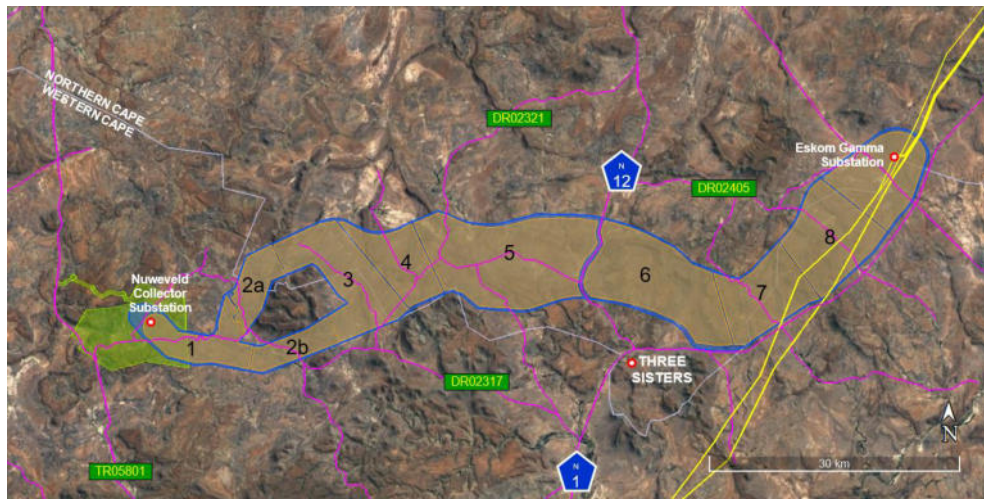


Figure 16 - Zones of the Grid Corridor

It should be noted that the proposed routes identified in this document are based on distance and accessibility, and could vary from the routes used by the personnel travelling to and from the various zones identified.

ZONE 1

The first portion of the Grid Corridor falls within the Nuweveld / Droërvier Grid Connection, it is envisaged that access for personnel and the delivery of equipment and material will be via the DR02317, as shown in Figure 17.



Figure 17 - Zone 1

The most likely route for delivering equipment and material to this zone of the project will be via Loxton on the TR05801.

The commuting of personnel from Beaufort West is envisaged to be via the TR05801 and DR02317, and commuting of personnel from Victoria West is envisaged to be either via the TR05801 or N12 and DR02317.

ZONE 2

This zone consists of two portions, a northern portion which is accessed from the OP08881 and a southern portion which is accessed from the DR02317, as shown in Figure 18.

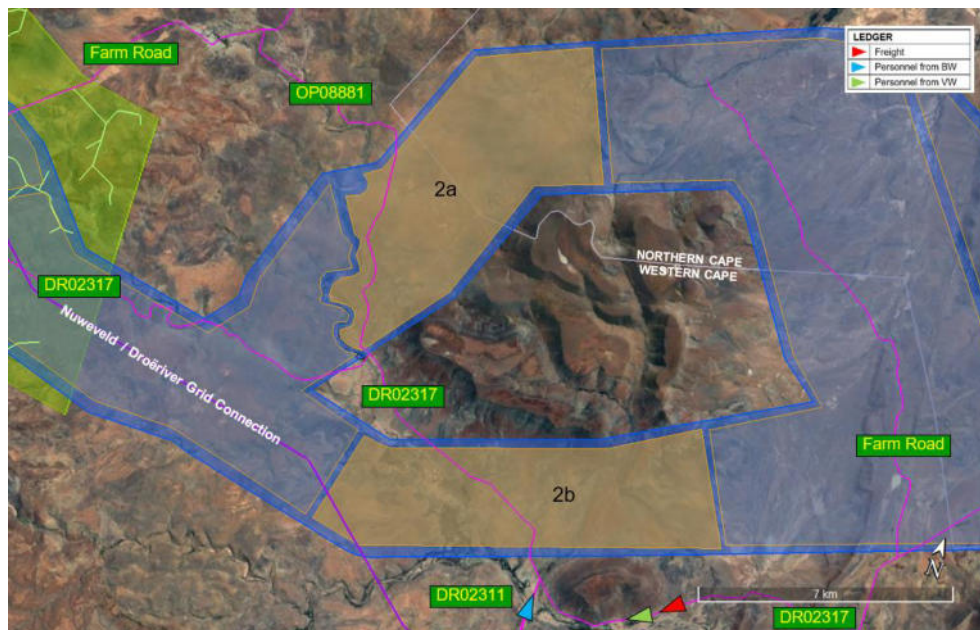


Figure 18 - Zone 2

Delivery of equipment and material to these zones are assumed to be from the DR02317, via the N1 (from the east).

The commuting of personnel from Beaufort West is envisaged to be via the DR02311 and DR02317. While personnel commuting from Victoria West will be via the DR02317.

ZONE 3

This zone of the Grid Corridor straddles an unidentified farm road, as shown in Figure 19. This road does not appear to fall under the jurisdiction of the Western Cape Roads authorities, however, the roads are shown on the Surveyor Generals diagram for the property.



Figure 19 - Zone 3

Delivery of equipment and material to this zone can be either via the DR02317 or the DR 02318. The preferred route will be selected by the transport company appointed.

The commuting of personnel from Beaufort West is envisaged to be via the DR02311 and the DR02317. While personnel commuting from Victoria West is envisaged to be the DR02318. There are several routes to access this road, the author has selected the N12 as the preferred feeder route.

ZONE 4

This Zone of the Grid Corridor straddles the DR02318 (east-west direction) and the DR 02320 (north-south direction), as shown in Figure 20.

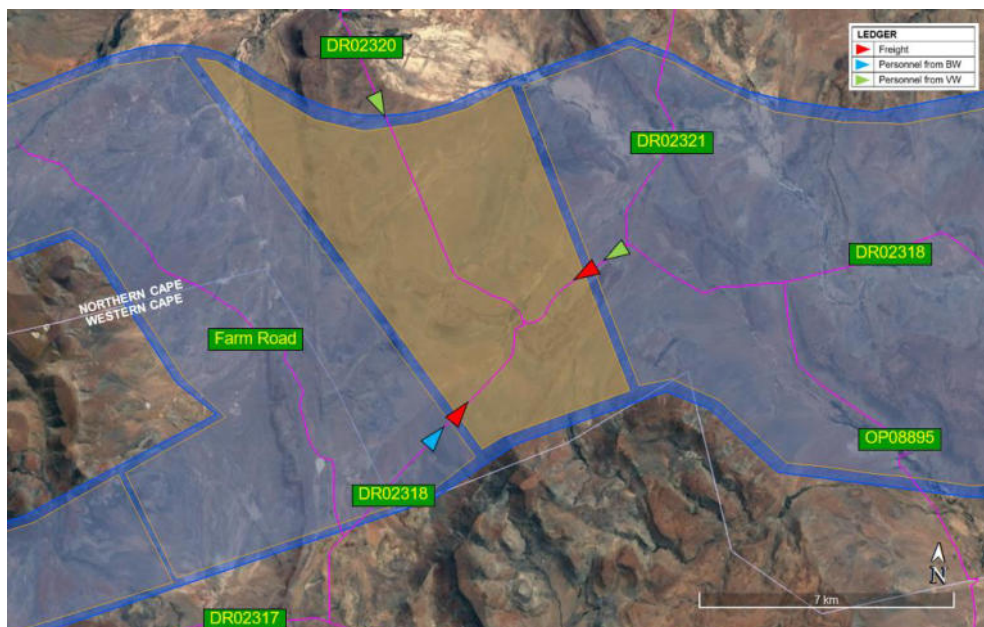


Figure 20 - Zone 4

Delivery of equipment and material to this zone can be either via the DR02317 or the DR 02318. The preferred route will be selected by the transport company appointed.

The commuting of personnel from Beaufort West is envisaged to be via the DR02317, which is fed from the DR02311. While personnel commuting from Victoria West is

envisaged to be the DR02318. There are several routes to access this road, the author has selected the N12 as the preferred feeder route.

ZONE 5

This Zone of the Grid Corridor straddles the DR02318 (east-west direction), with its eastern boundary being the N12, as shown in Figure 21.



Figure 21 - Zone 5

Delivery of equipment and material to this zone is envisaged to be via the DR02318, from the N12.

The commuting of personnel from Beaufort West is envisaged to be via the DR02318, from the N12, alternatively, personnel can access the area via the OP08895, from the DR02317, which is fed from either the N1 or the DR02311. While, personnel commuting from Victoria West is envisaged to be via the DR02318, from the N12, alternatively personnel can access the area via the DR 02321.

ZONE 6

This Zone of the Grid Corridor, with its western boundary being the N12, the Grid Corridor straddles the railway line servitude, as shown in Figure 22. A portion of the Noblesfontein Wind Farm extends into the proposed Grid Corridor. According to the Survey Generals diagram for farm 238, there is a 40 m wide electrical power line servitude indicated, not shown in Figure 21. There is no evidence that the road adjacent to the railway line, through this portion of the Grid Corridor falls under the jurisdiction of the Northern Cape Roads authority. Thus it is strongly suggested that Red Cap needs to approach Transnet to obtain the necessary permission to use this road.

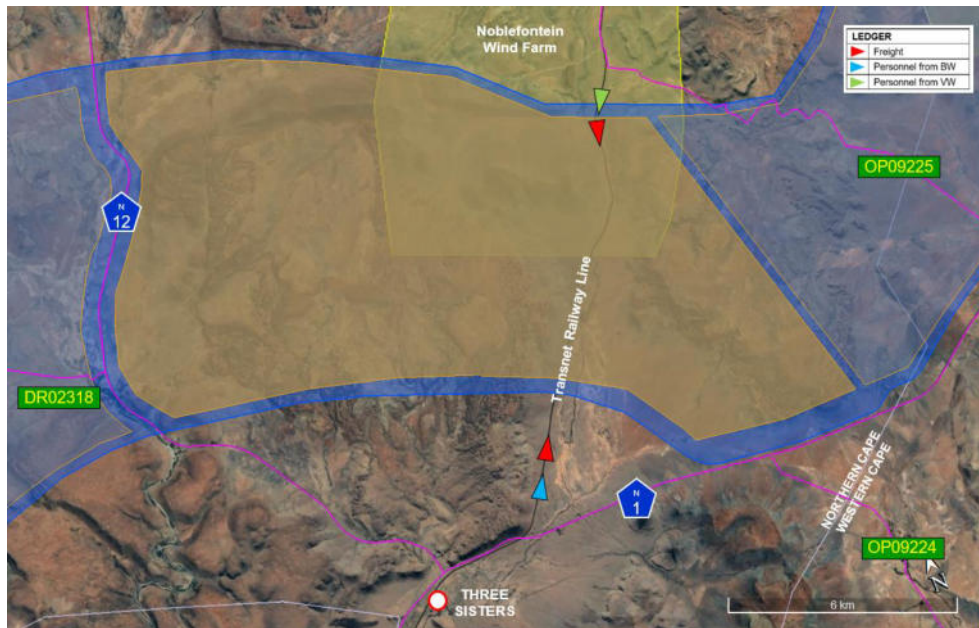


Figure 22 - Zone 6

Delivery of equipment and material to this zone is envisaged to be along the road adjacent to the railway line from either the north from the N12 or the south from the N1. However, approval to use this road will be required.

Please note, that there are other roads in the area, which are private roads belonging to the Noblesfontein Wind Farm.

The commuting of personnel from Beaufort West is envisaged to be via the N1. While personnel commuting from Victoria West is envisaged to be from the N12.

Zone 7

This Zone of the Grid Corridor straddles OP09225 (northwest-southeast direction), there are two existing Eskom Transmission Lines in this zone, as shown in Figure 23.

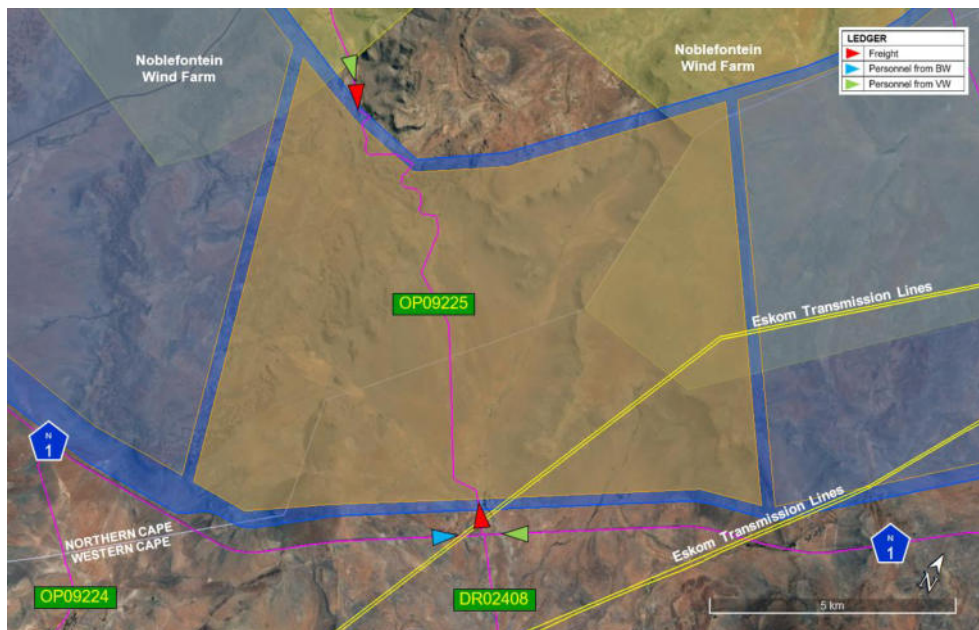


Figure 23 - Zone 7

Delivery of equipment and material to this zone is envisaged to be via the OP09225, from the N1, an alternative route could be via the OP09225 from the N12, which is a gravel road.

The commuting of personnel from Beaufort West is envisaged to be via the OP09225, from the N1. While, personnel commuting from Victoria West is envisaged to be via the OP09225, from the N1, either via the N12 or TR01608, alternatively personnel can access the area via the OP09225, from the N12.

Zone 8

This Zone of the Grid Corridor is intersected by the DR02405 (northwest-southeast direction), 3 x 400 kV Droërivier / Hydra 1, 2 and 3 Transmission Lines, and a 765 kV Gamma / Kappa 1 Transmission Line. The property on which the Noblesfontein Wind Farm was constructed extends into the proposed Grid Corridor, as shown in Figure 24.

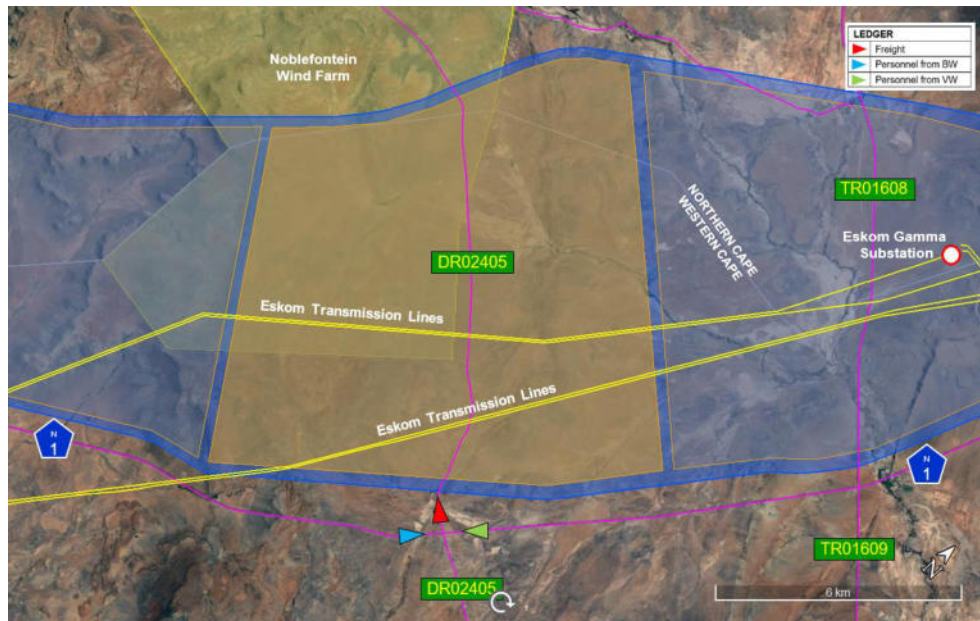


Figure 24 - Zone 8

Delivery of equipment and material to this zone is envisaged to be via the DR02405, from the N1. Given the distance to the N12, on gravel roads, no alternative routes are envisaged.

The commuting of personnel from Beaufort West is envisaged to be via the DR02405, from the N1 (south). While, personnel commuting from Victoria West is envisaged to be via the DR02405, from the N1 (north), and via the TR01608.

ZONE 9

This Zone of the Grid Corridor is intersected by the TR01608 (northwest-southeast direction), 3 x 400 kV Droërivier / Hydra 1, 2 and 3 Transmission Lines, and a 765 kV Gamma / Kappa 1 Transmission Line, as shown in Figure 25.

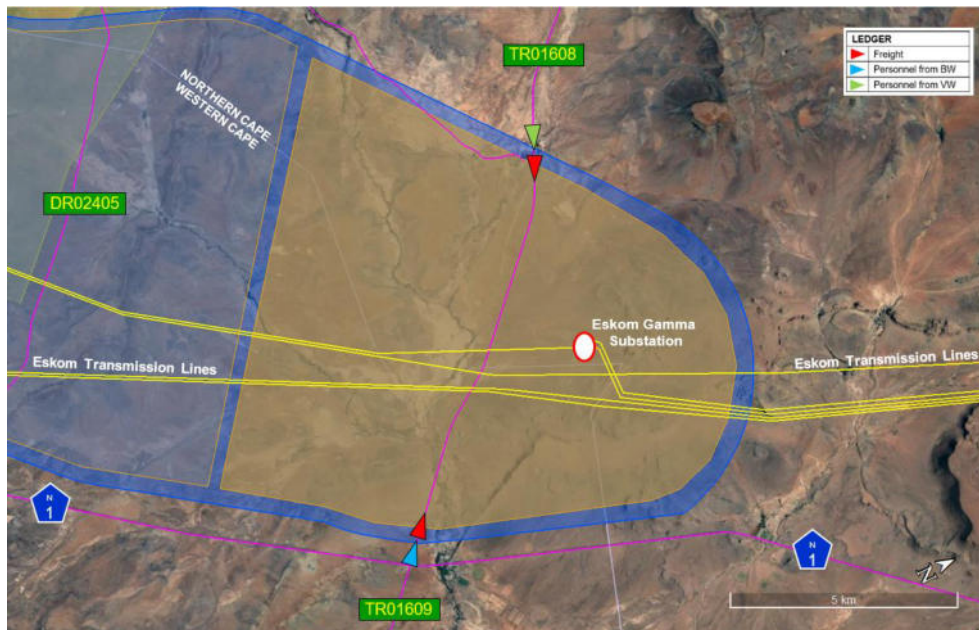


Figure 25 - Zone 9

Delivery of equipment and material to this zone is either via the TR01608 (north), from the N12, or via the TR01608 (south), from the N1.

The commuting of personnel from Beaufort West is envisaged to be via the TR01608 (south), from the N1. While, personnel commuting from Victoria West is envisaged to be via the TR01608 (north), from the N12.

6.3 SERVITUDE TRACKS

Once the transmission line route has been established, a servitude track shall be designed, approved and constructed, this track shall be used during the construction and operational phases. Due to the natural constraints, i.e. rivers, mountains, railway lines, etc, and environmental sensitivities areas, it should not be assumed that the service track will be continuous along the proposed transmission line.

Access to the servitude from the public road will most likely be via existing private roads/tracks, where available, which are provided by the landowner. However, special arrangements will have to be negotiated with the landowner to use these tracks. If there is no suitable existing access from the public road network, then a new access road will need to be constructed, and all new access roads would need to be agreed to by the relevant landowner and approved by the local roads authority.

When existing private roads/tracks are to be used, it is strongly recommended that the condition of these roads be recorded (preferably photographic) and agreed upon by the landowner, prior to any work commencing on the property.

The contractor shall maintain all private roads/tracks used to access the servitude. Upon completion of the works, these roads shall be left in a condition similar to or better than they were before work on the proposed transmission line commences.

6.4 TRANSPORTATION ROUTES

6.4.1 Commuter Routes

The towns in this part of the country are few and far apart. There are several towns within a 150 km radius of the proposed development. However, as stated in section 5.6 above the main commuter routes will be from either Beaufort West or Victoria West, depending on which zone construction work is being executed.

The various commuter routes, for each zone of the project, have been addressed in section 6.2 above.

6.4.2 Freight Routes

Since the majority of equipment and material used on this project will be fabricated in one of the commercial centres in South Africa the various routes from the Container Terminals will not be discussed.

Commercial Centres

The most likely transportation routes for domestically supplied and manufactured components from the major commercial centres to the proposed developments are either Cape Town or Johannesburg (or any supplier along these routes), as shown in Figure 26.

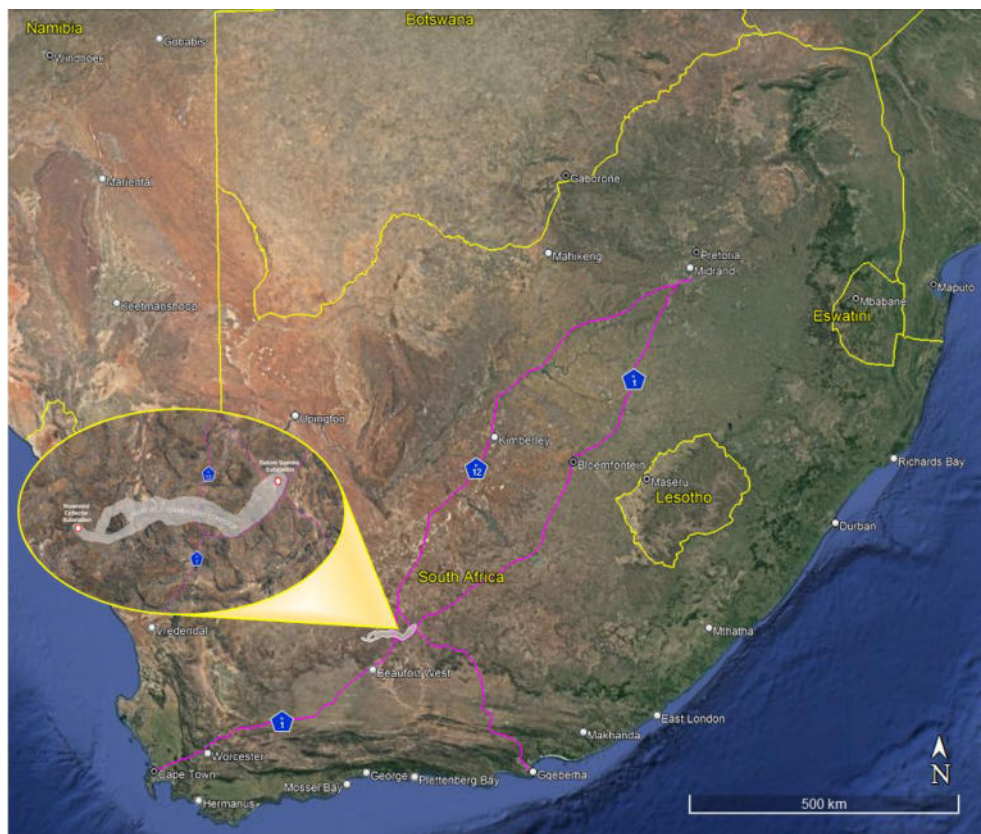


Figure 26 - Freight Routes - Commercial Centres

The distances from the proposed developments to the major commercial centres in South Africa are shown in Table 6.

Table 6 - Distance - Major Commercial Centres

Commercial Centres	Distance
Cape Town	799 km
Johannesburg (via N1)	1054 km
Johannesburg (via N12)	1041 km

Although the closest major commercial centre to the proposed developments is located in the greater Cape Town area, many components will be fabricated in Johannesburg and transported to the proposed development.

6.5 RENEWABLE DEVELOPMENTS

According to the South African Renewable Energy EIA Application Database for the 4 Quarter of 2021 and the authors' knowledge, there are several developments in that fall within the 30 km radius of the proposed Grid Corridor, as shown in Figure 27.

Only Noblesfontein Wind Farm (indicated in yellow), is in the operational phase. Red Cap proposes developing Nuweveld Wind Farms (indicated in green), Hoogland North Wind Farms (indicated in blue) and Hoogland South Wind Farms (indicated in red). There are several other developments proposed around the Gamma Substation, shown in orange, the status of these developments has not been finalised.



Figure 27 - Adjacent Proposed Renewable Energy Project

7 TRAFFIC VOLUMES

The South African Trip Data Manual (TMH 17), as provided by COTO, does not make provision for expected trip generation for the construction of transmission lines. Thus, the traffic trip generation for the construction, operation and decommissioning phases used in this document is based on data obtained for similar projects.

The movement of personnel to and from the site is referred to as commuter trips. While the transportation of equipment and material required for the project is referred to as freight trips.

The estimated traffic generation delineated below represents a worst-case scenario.

7.1 STATUS QUO

The current traffic volumes on the public road network in the Western Cape are based on information extracted from the Western Cape Road Information System. The data is obtained from counting stations and strip charts.

The traffic volumes on the public road network in the Northern Cape are not that freely available and limited information has been provided by Northern Cape Road authorities, which has been used in this report.

The traffic volumes on the national roads are provided by SANRAL. However, since SANRAL does not have an active data collecting program in place, the data obtained from SANRAL is outdated. Based on comparisons from more reliable sources the SANRAL data has been adjusted, and the adjusted information has been used in this report.

7.1.1 Traffic Counting Stations

The Western Cape Government operates and maintains a Road Network Information System (RNIS) for most of the surface and gravel roads in the province. This system collects and analyses various types of data which includes, inter alia, a network inventory, traffic data (expressed as AADT), condition data as well as structure and surface history. SANRAL and the Northern Cape Government do not have a similar system for the road network within their jurisdiction.

The location of the counting stations used in this assessment is provided in Figure 28.



Figure 28 - Counting Stations

It should be noted that the latest available data for these stations was captured in 2021, and the traffic volumes should not have changed significantly since then.

7.1.2 Baseline Traffic Volumes

The baseline traffic volumes for the road network adjacent to the proposed developments are based on the AADT values obtained from the various counting stations. The values used are the average values between intersections, which have been adjusted by a growth factor relevant to the road. The adjusted AADT values used in this assessment are provided in Figure 29.



Figure 29 - Baseline AADT

7.2 ROAD NETWORK

The road network has been comprehensively delineated in Section 6.1 above and is shown in Figure 30.



Figure 30 - Road Network

7.3 CONSTRUCTION PHASE

The construction phase of the Grid Connection will increase the existing traffic volumes on the local road network. Construction traffic will include vehicles transporting equipment, material and personnel. Except for the transformers, no abnormal loads are envisaged.

A construction period of twenty-four months is anticipated for the construction of the transmission line and expansion of the Gamma Substation. The construction activities and duration might vary depending on the construction schedule.

The two most significant activities, that will impact on traffic volumes during the construction phase, are:

- Commuter traffic - which is the commuting of personnel, to and from the site; and
- Freight traffic - which is the delivery of equipment and material to the site.

The simultaneous occurrence of these two activities is highly unlikely.

The movement of personnel, to and from the site, are two distinct activities, one occurring at the beginning of the working day (constituting the morning peak) and the other occurring at the end of the working day (constituting the afternoon peak). These activities contribute to Peak Traffic. Traffic movement statistics have shown that there is a noticeable difference between morning and afternoon traffic peaks, although the same number of trips are generated during these peaks, the morning peak is more concentrated than the afternoon peak, as the afternoon peak is spread over a longer period. Thus, for analysis purposes, the morning traffic shall be adopted for both morning and afternoon peaks to demonstrate a worst-case scenario.

The delivery of equipment and materials to the site is envisaged to occur during normal working hours, throughout the day. No night deliveries are anticipated and are strongly discouraged. Given the distance from the origin of the material and components and the development, it is assumed that most deliveries will only start arriving at the site an hour or two after work on site commences and will stop an hour or two before work on site concludes for the day. These activities constitute the Diurnal Traffic.

The envisaged timeframes for these activities, as adopted in this assessment, are:

- Morning Peak Traffic - between 6:30 to 7:30;
- Diurnal Traffic - between 7:30 to 16:30;
- Afternoon Peak Traffic - between 16:30 to 17:30.

7.3.1 Peak Traffic

It has been estimated that during peak construction of the Grid Connection, a total manpower complement of approximately 110 individuals will be required, 50 individuals will be involved with various stages of the Gamma Substation expansion and the other 60 will be involved with the transmission line construction. Since no accommodation is to be provided on-site, the personnel will have to be accommodated in the surrounding area and commute to the site. It should be noted that these numbers are a worst-case scenario, during peak construction activities of the Gamma Substations expansion, which includes the excavation and casting of concrete foundations, stormwater reticulation, structural steelwork, buildings, fencing, electrification, etc. The impact caused by these activities will not be for the full construction period.

Based on similar projects, the anticipated breakdown of the manpower is as follows:

- Senior Staff, i.e. construction managers, supervisors and other key staff, constitute 10% of the total manpower. The senior staff will reside within the community and will commute to the site in pairs, using light vehicles. It is envisaged that the senior staff are deployed to the area, and will either be accommodated in Beaufort West or Victoria West. There is a strong possibility that they will change accommodation during the project to minimise the travelling distance.
- The workforce, comprising skilled, semi-skilled and unskilled workers, will constitute 90% of the total manpower. It is envisaged that the skilled workforce will be deployed to the area by the main contractor, while the semi-skilled and unskilled workforce will be drawn from the local communities, and will travel to the site by various size minibuses, as the situation arises. The capacity of the transport to be provided will depend on the number of people to be transported from the various destinations. It is envisaged that the workforce will be drawn from Beaufort West and Victoria West, and any location along these routes. There is a strong possibility that they will change accommodation during the project to minimise the travelling distance.

Summary

Based on the information above and in section 6.2, a summary of the trip per road during the various zones of the construction period, generated by personnel, during the morning peak is provided in Table 7. The afternoon peak will consist of the same number of trips as the morning peak.

Table 7 - Construction Phase – Peak Traffic

Road	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	MAX
DR02311	5 vph	5 vph	5 vph	5 vph						5 vph
DR02317/1-4	10 vph	10 vph	3 vph							10 vph
DR02317/5					4 vph					4 vph
DR02317/6-7					3 vph					3 vph
DR02318	5 vph	5 vph	7 vph	5 vph	4 vph					7 vph
DR02321	5 vph	5 vph	5 vph	3 vph						5 vph
DR02405	3 vph		3 vph			3 vph		7 vph		7 vph
FARM ROAD 1	8 vph									8 vph
FARM ROAD 2			8 vph							8 vph
N1/N						3 vph	6 vph	8 vph	5 vph	8 vph
N1/S					3 vph	3 vph	6 vph	5 vph	5 vph	6 vph
N12	5 vph	5 vph	5 vph	3 vph	4 vph	3 vph				5 vph
OP08881		8 vph								8 vph

Road	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	MAX
OP08895					3 vph					3 vph
OP09225							6 vph			6 vph
RWS/N						3 vph				3 vph
RWS/S						3 vph				3 vph
TR05801	8 vph	3 vph	3 vph							8 vph
TR01608							7 vph	9 vph	9 vph	9 vph

The information provided above is an informed estimate. Construction-related traffic may however vary and be different from the information provided above, due to the availability of contractors' resources.

The maximum number of vehicles on any section of the roads commuting personnel to the various zones along the grid corridor, within a given hour, is not expected to exceed 10.

Based on the information table above, the most significant increase in traffic volumes resulting from the morning and evening peaks will be on the;

- DR02317/1-4, during the connection activities at the Nuweveld Collector Substation and Zone 1 of the Transmission Line, and
- TR01608, during the construction activities at Gamma Substation and Zone 9 of the Transmission Line.

The information provided above is an informed estimate. Construction-related traffic may however vary and be different from the information provided above, due to the availability of contractors' resources and schedules.

7.3.2 Diurnal Traffic

Substation Construction

The construction phase activities at the Gamma Substation which will increase the traffic volumes include the delivery of:

- gravel for the construction of the roads, terraces and sub-station platforms;
- raw material (i.e. cement, sand, stone) for batching of concrete; and
- construction material (i.e. scaffolding, formwork, reinforcing steel, brick, roof sheeting, fencing, structural steelwork, transformers, switchgear, cables, etc.).

Except for the transformers, no abnormal loads are envisaged.

Various types of vehicles will be used to deliver the construction equipment and materials to the site. The increase in traffic volume for the construction activities of the substations is conservatively estimated to be in the order of four return trips per day. This equates to one vehicle per hour. For the purpose of this report, it is assumed that all Freight Traffic to the Gamma Substation will be transported on the TR01608 from either the N1 (TR01608/S) or the N12 (TR01608/N).

Transmission Line Construction

The construction activities of the proposed Transmission Line, within the Grid Corridor, which will increase the traffic volumes include the delivery of:

- Initial mobilisation of the construction plant required to excavate the foundations and mix concrete will be mobilised to the site and will only leave the site when the plant is demobilised. This equipment will gradually migrate along with the servitude, without impacting the public road network. Unless the servitude crosses

a public road or travelling along the servitude is no longer possible, due to rivers, mountains, railway lines, etc.;

- Delivery of material and equipment to laydown areas within the servitude, including inter alia:
 - gravel and rock for the construction/stabilisation of the roads, terraces, embankments, etc.;
 - raw material (i.e. cement, sand, stone) for batching of concrete required for the casting of foundations;
 - construction material (i.e. formwork, reinforcing steel, etc.);
- Delivery of the structural steel components, either lattice self-supporting pylons or standard cross-rope suspension Transmission Line pylons;
- Delivery of miscellaneous items, which include i.e. conductors, insulators, etc.

All equipment and material required shall be transported by standard vehicles, no abnormal loads are envisaged.

Various types of vehicles will be used to deliver the construction equipment and materials to the site. The increase in traffic volumes for the construction activities of the Transmission Line is conservatively estimated to be in the order of one return trip per day. This equates to 0.25 vehicles per hour. This is based on the installation of the double 400 kV transmission line. The steel components for the 400 kV transmission lines will be delivered to a laydown area per zone, where the tower section will be preassembled into lengths that will be transported to the tower positions.

The envisaged deliveries to the various zones of the Transmission Line construction are provided in section 6.2 above.

Summary

Based on the information above, a summary of the trip generated (vph) per road for the various activities during the construction phase is presented in Table 8.

Table 8 - Construction Phase – Diurnal Traffic

Road	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	MAX
DR02317/1-4										0.00 vph
DR02317/5	0.50 vph	0.50 vph	0.25 vph							0.50 vph
DR02318		0.25 vph	0.25 vph	0.25 vph	0.25 vph					0.25 vph
DR02405										0.00 vph
FARM ROAD 1		0.25 vph	0.25 vph	0.25 vph	0.25 vph					0.25 vph
FARM ROAD 2										0.00 vph
N1/N						0.25 vph		0.25 vph		0.25 vph
N1/S	0.25 vph									0.25 vph
N12			0.25 vph							0.25 vph
OP08881	0.25 vph	0.25 vph	0.25 vph	0.25 vph	0.25 vph	0.25 vph	1.25 vph	1.25 vph	1.25 vph	1.25 vph
OP09225	0.25 vph	0.25 vph	0.25 vph	0.25 vph	0.25 vph	0.25 vph	1.25 vph	1.25 vph	1.25 vph	1.25 vph
RWS/N	0.25 vph	0.25 vph	0.25 vph	0.25 vph	0.25 vph	0.25 vph	0.25 vph			0.25 vph
RWS/S		0.25 vph								0.25 vph
TR05801										0.00 vph
TR01608							0.25 vph			0.25 vph

The information provided above is an informed estimate. Construction-related traffic may however vary and be different from the information provided above, due to the availability of contractors' resources.

The maximum number of vehicles on the roads in any given hour resulting from deliveries of equipment and material to the site is expected to be in the order of

1.25 vph for the expansion of the Gamma Substations, and 0.25 vph for the Transmission Line. The maximum number of additional vehicles on any one section of the road, within a given hour, is not expected to exceed 1.25.

Based on the information table above, the most significant increase in traffic volumes resulting from deliveries to the sites will be on the N1 and TR01608.

The information provided above is an informed estimate. Construction-related traffic may however vary and be different from the information provided above, due to the availability of contractors' resources and schedules.

7.4 OPERATIONAL PHASE

The overhead transmission line from Nuweveld Collector Substation to the Gamma Substation, will be operated and maintained by Eskom. It is envisaged that the overhead transmission line will be inspected biannually. The operator will use the public road to gain access to the servitude and conduct the inspection of the overhead transmission line along with the servitude, before emerging on the public road at the other end. Thus, the impact of the overhead transmission line inspection on the public road is negligible.

7.5 DECOMMISSIONING PHASE

At the end of the operational phase of the transmission line, it may be decommissioned. The components will be disassembled, reused, recycled or disposed of in accordance with the relevant regulatory requirements. The decommissioning procedures will be undertaken in line with an EMP and the site will be rehabilitated and returned to its pre-construction state.

As part of the decommissioning process, a separate traffic impact assessment should be undertaken since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes, etc. would have changed over the operational life of the development. Thus, a specific decommissioning assessment has not been undertaken at this stage.

8 TRAFFIC ASSESSMENT

The activities of the Grid Connection consist of three portions, the construction work at the Gamma Substations, construction of the transmission line within the Grid Corridor, and connection of the transmission lines at the Nuweveld Collector Substation.

The access to the various Zones of the Grid Corridor development has been comprehensively delineated in Section 6.2 of this document.

8.1 CONSTRUCTION PHASE

The duration of the construction phase is estimated to be in the order of twenty-four months. During the construction phase traffic will be generated through two distinct sources:

- The commuting of personnel to and from the site (Peak Traffic); and
- The delivery of materials and equipment to the site (Diurnal Traffic).

It is envisaged that the transportation of the site personnel will result in Peak Traffic, while the delivery of equipment and materials to the site will be distributed throughout the day.

The traffic volumes generated, for both Peak Traffic and Diurnal Traffic, resulting from the expansion of the Gamma Substations, connection of transmission lines at Nuweveld Collector Substation and installation of the transmission lines have been addressed in Section 7. Thus, the combined expected increase in the traffic volumes on various roads, during the construction phase of the development is summarised in Table 9.

Table 9 - Construction Phase – Traffic Volumes

Roads	Day (divided into three-time frames)		
	06:30 Morning Peak Traffic (vph)	07:30 Diurnal Traffic (vph)	16:30 Afternoon Peak Traffic (vph) 17:30
DR02311	5 vph	0.00 vph	5 vph
DR02311	5 vph	0.00 vph	5 vph
DR02317/1-4	10 vph	0.50 vph	10 vph
DR02317/5	4 vph	0.25 vph	4 vph
DR02317/6-7	3 vph	0.00 vph	3 vph
DR02318	7 vph	0.25 vph	7 vph
DR02321	5 vph	0.00 vph	5 vph
DR02405	7 vph	0.25 vph	7 vph
FARM ROAD 1	8 vph	0.25 vph	8 vph
FARM ROAD 2	8 vph	0.25 vph	8 vph
N1/N	8 vph	1.25 vph	8 vph
N1/S	6 vph	1.25 vph	6 vph
N12	5 vph	0.25 vph	5 vph
OP08881	8 vph	0.25 vph	8 vph
OP08895	3 vph	0.00 vph	3 vph
OP09225	6 vph	0.25 vph	6 vph
RWS/N	3 vph	0.25 vph	3 vph
RWS/S	3 vph	0.25 vph	3 vph
TR05801	8 vph	0.50 vph	8 vph
TR01608	9 vph	1.25 vph	9 vph

Based on the information provided in the table above there are no traffic volumes that are increased by more than 50 trips per hour, thus satisfying section 2.6 of the "South African Traffic Impact and Site Traffic Assessment Manual", which reads as follows; "A Traffic Impact Assessment shall be undertaken and submitted when an application is made for a change in land use and when the highest total additional hourly vehicular trip generation (including pass-by and diverted trips) as a result of the application exceeds 50 trips per hour".

Traffic volumes generated during the construction phase of the Grid Connection are in the order of:

- **Peak Traffic:** 10 vph on both the DR02317/1 and DR02317/3, which is expected to occur during the activities at the Nuweveld Collector Substation and construction of the transmission line in Zone 1.
- **Diurnal Traffic:** 1.25 vph on the N1 during the majority of the project duration.

The average daily traffic generated during the peak construction phase on the various roads expressed as an "Increased ADT", is shown in Table 10.

Table 10 - Construction Phase - Traffic Assessment

Road	ADT Baseline	Additional Traffic Generated*	Increased ADT
DR02311	15	(10+0) = 10	25 (67%)
DR02311	15	(10+0) = 10	25 (67%)
DR02317/1-4	10	(20+4) = 24	34 (240%)
DR02317/5	18	(8+2) = 10	28 (56%)
DR02317/6-7	22	(6+0) = 6	28 (27%)
DR02318	14	(14+2) = 16	30 (114%)
DR02321		(10+0) = 10	10 (%)
DR02405	33	(14+2) = 16	49 (48%)
FARM ROAD 1		(16+2) = 18	18 (%)
FARM ROAD 2		(16+2) = 18	18 (%)
N1/N	3314	(16+10) = 26	3340 (1%)
N1/S	1330	(12+10) = 22	1352 (2%)
N12	1984	(10+2) = 12	1996 (1%)
OP08881		(16+2) = 18	18 (%)
OP08895		(6+0) = 6	6 (%)
OP09225		(12+2) = 14	14 (%)
RWS/N		(6+2) = 8	8 (%)
RWS/S		(6+2) = 8	8 (%)
TR05801	147	(16+4) = 20	167 (14%)
TR01608	118	(18+10) = 28	146 (24%)

* The first value represents the Peak Traffic, and the second value represents the Diurnal Traffic

Unfortunately, the author was unable to obtain the baseline traffic volumes for all the roads within the study area, thus resulting in gaps in the table above.

The largest additional traffic generated on the road network within the study area is 26 vehicles over eight hours, this is on the N1.

The DR02317/1 has the largest increase in daily traffic by percentage. The reason for the significant increase is because of the low baseline of only 10 vehicles per day, which equates to approximately one vehicle per hour.

The most significant traffic volume increase on the local road network is a result of peak traffic.

8.2 OPERATIONAL PHASE

As described in section 7.4 above, the only activity that impacts the public roads involves the inspection of the overhead transmission line from the Nuweveld Collector Substation to the Gamma Substation, which will be operated and maintained by Eskom. It is envisaged that the overhead transmission line will be inspected biannually. The operator will use the public road to gain access to the servitude and conduct the inspection of the overhead transmission line along with the servitude. Thus, the impact of the overhead transmission line inspection on the public road is negligible.

8.3 DECOMMISSIONING PHASE

As described in section 7.5 above, a separate traffic impact assessment should be undertaken as part of the decommissioning process, since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes, etc. would have changed over the operational life of the development.

Thus, no traffic assessment for the decommissioning phase has been undertaken in this report.

9 CUMULATIVE TRAFFIC ASSESSMENT

The assessment of the cumulative increased traffic volumes on the road network within the study area during the construction, operational and decommissioning phases of this Grid Connection is delineated below.

Based on the assumptions provided in Section 5.6 above, the only roads that would be affected by cumulative traffic effects are shown in Figure 31. The traffic on these roads is a result of the operational activities on the Nuweveld Wind Farms, construction of the Hoogland Wind farms and activities associated with this Grid Connection, which includes any work performed at the Nuweveld Collector Substation and construction activities performed in Zone 1.

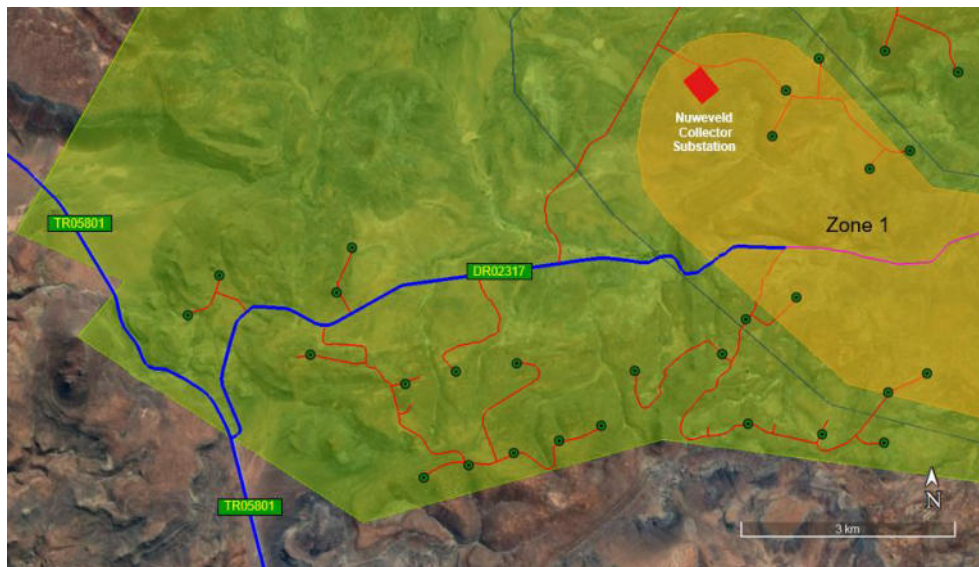


Figure 31 - Roads affected by Cumulative Load

The affected roads are limited to

- DR02317 (between the TR05801 and the last entrance to WTG)
- TR05801 (north of the DR02317)
- TR05801 (south of the DR02317)

All these roads are affected by the daily commuting of personnel to and from the site, as well as the occasional delivery of supplies.

9.1 CONSTRUCTION PHASE

The cumulative traffic volumes on the affected roads within the study area, for both Peak Traffic and Diurnal Traffic, during the construction of the Grid Connection are provided in Table 11.

Table 11 - Cumulative Constructional Phase - Traffic Volume

Roads	Day (divided into three-time frames)			
	06:30 Morning Peak Traffic (vph)	07:30	Diurnal Traffic (vph)	16:30 Afternoon Peak Traffic (vph)
DR02317	41 vph		2.5 vph	41 vph
TR05801/N	53 vph		22.5 vph	53 vph
TR05801/S	60 vph		21.0 vph	60 vph

Based on the information provided in the table above, the cumulative traffic volumes on several roads are increased by more than fifty trips an hour, thus justifying the requirements of section 2.6 of the "South African Traffic Impact and Site Traffic Assessment Manual", which reads as follows; "A Traffic Impact Assessment shall be undertaken and submitted when an application is made for a change in land use and when the highest total additional hourly vehicular trip generation (including pass-by and diverted trips) as a result of the application exceeds 50 trips per hour".

The cumulative traffic volumes generated on the various roads during the construction phase of the Grid Connection that exceeds 50 trips per hour only occur on the TR05801. It must be stated that this is a worst-case engineering assumption, based on the traffic volumes generated by the simultaneous construction phase of both the Hoogland North Wind Farms and Hoogland South Wind Farms, together with the operational phase of the three Nuweveld Wind Farms.

The assessment of the cumulative traffic impact on the various roads, generated during the construction of the Grid Connect as an "Increased ADT", is provided in Table 12.

Table 12 - Cumulative Constructional Phase - Traffic Assessment

Road	ADT Baseline	Additional Traffic Generated*	Increased ADT
DR02317	10	(82+20) = 102	112
TR05801/N	147	(106+180) = 286	433
TR05801/S	147	(120+168) = 288	435

*The first value represents the Peak Traffic, and the second value represents the Diurnal Traffic

The most significant expected increase is on DR02317, which increases from a baseline of 10 trips per day to approximately 112 trips per day. The majority of these occur during peak traffic. This equates to a flow density of 0.513 v/km at a speed of 80 km/h.

It should be noted that these figures are based on a worst-case scenario of a combined manpower complement of approximately five-hundred-and-seventy.

9.2 OPERATIONAL PHASE

As described in section 7.4 above, the only activity that impacts the public roads involves the inspection of the overhead transmission line from Nuweveld Wind Farms to the Gamma Substation, which will be operated and maintained by Eskom. It is envisaged that the overhead transmission line will be inspected biannually. The operator will use the public road to gain access to the servitude and conduct the inspection of the overhead transmission line along with the servitude. The impact of the overhead transmission line inspection on the public road is negligible. Thus, no cumulative traffic assessment for the operational phase, of the Grid Connection, has been undertaken in this report.

9.3 DECOMMISSIONING PHASE

As described in section 7.5 above, a separate traffic impact assessment should be undertaken as part of the decommissioning process, since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes, etc. would have changed over the operational life of the development. Thus, no cumulative traffic assessment for the decommissioning phase, of the Grid Connection, has been undertaken in this report.

10 IMPACTS ASSESSMENT

The road network within the study area, although limited, offer the opportunity of selecting alternative routes. All transportation routes evaluated for the Grid Connection are existing public roads and no new public roads need to be constructed. However, remedial action on various sections of the transportation routes might be required prior to the execution of the works.

Safety and road network integrity impacts for various phases of the Grid Connection have been assessed using an assessment tool provided by RedCap.

10.1 CONSTRUCTION PHASE

During the construction phase of the Grid Connection, the following safety and road network integrity impacts have been assessed.

Increased Road Incidents

The impact due to the increased traffic volumes on the public roads which will increase the potential of incidents on the road network within the study area is provided in Table 13.

Table 13 - Construction Phase - Increased Road Incidents

Project phase	Construction Phase			
Impact	Increased Road Incidents			
Description of impact	The increased traffic volumes on the public roads will increase the potential of incidents on the road network within the study area			
Mitigatability	Low	Mitigation does not exist, or mitigation will slightly reduce the significance of impacts		
Potential mitigation	<p>Post relevant road signage along affected routes; Create a local WhatsApp Group, notifying users of expected deliveries and proposing alternative routes; Transport Management Plan, this is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. The Transport Management Plan needs to address, inter alia:</p> <ul style="list-style-type: none"> - clearly define the route to the site for specific vehicles needed to transport equipment and materials - schedule delivery to avoid local congestion - all equipment and material transported via the DR02311 and the TR05801 shall be limited to a gross vehicle mass of ten tonnes <p>Ensure all vehicles are roadworthy, visible, properly marked, and operated by an appropriately licenced operator. Provide drivers with advanced driver training Make drivers aware of the extremely treacherous conditions through the passes on both the TR 05801 and the DR02311. The developer shall implement the necessary steps to protect the pedestrians and livestock on the roads, specifically where the roads pass through farming homesteads, as these are a serious safety concern</p>			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	the impact will last between 1 and 5 years	Short term	the impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Very high	Natural and/ or social functions and/ or processes are majorly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will occur	Certain / definite	There are sound scientific reasons to expect that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from	Low	The affected environment will not be able to recover

		the impact - permanently modified		from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Medium - negative		Medium - negative	
Comment on Significance	Reversibility: Low – if the incident results in a fatality Resource irreplaceability: High - if the incident results in a fatality			

Road Degradation

The impact due to the increased traffic volumes on the public roads which will increase the potential of localised degradation of the road network within the study area is presented in Table 14.

Table 14 - Construction Phase - Road Degradation

Project phase	Construction Phase			
Impact	Road Degradation			
Description of impact	The increased traffic volumes on the public roads will increase the potential for localised degradation of the road network within the study area.			
Mitigatability	Medium	Mitigation exists and will notably reduce the significance of impacts		
Potential mitigation	<p>Create a local WhatsApp Group and post notices of road conditions and propose alternatives. Developer to contribute to the maintenance of the public roads during the construction phases of the development</p> <p>A photographic record of the road condition should be maintained throughout the various phases of the development. This provides an objective assessment and mitigates any subjective views from road users.</p> <p>Upgrade unpaved roads to a suitable condition for proposed construction vehicles; Ensure that the roads are left in the same or better condition, post-construction.</p>			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Short term	the impact will last between 1 and 5 years	Short term	the impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Medium	Natural and/ or social functions and/ or processes are Mediumly altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environment will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low - negative		Low - Positive	
Comment on Significance	Intensity: Medium – due to risk of mechanical damage to vehicles. Low – due to the reduced risk of mechanical damage to vehicles.			

Dust

The larger the vehicle the more dust is likely to be generated, this dust hinders the drivers wishing to overtake without a clear view for overtaking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences. The impact due to the increased traffic volumes on the unpaved public roads which will generate dust is presented in Table 15.

Table 15 - Construction Phase - Dust

Project phase	Construction Phase
Impact	Dust

Description of impact	The increased traffic volumes on unpaved public roads will generate more dust. The larger the vehicle the more dust is likely to be generated, this dust hinders the drivers wishing to over-take without a clear view for over-taking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences			
Mitigatability	Low	Mitigation does not exist, or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Reduce travel speed on the gravel road to reduce dust Dust suppression of the roads Regular preventative maintenance of roads should be conducted over weekends to minimise the impact on the normal construction period.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	the impact will last between 1 and 5 years	Short term	the impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Low- negative		Low - negative	
Comment on Significance	Reversibility: Low – if the incident results in a fatality Resource irreplaceability: High - if the incident results in a fatality			

Intersection Safety

The impact due to the increased traffic volumes at various intersections which will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, is presented in Table 16. Especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.

Table 16 - Construction Phase – Intersection Safety

Project phase	Construction Phase			
Impact	Intersection Safety			
Description of impact	The increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities. Especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.			
Mitigatability	Medium	Mitigation exists and will notably reduce the significance of impacts		
Potential mitigation	Compile TMP Reduce speed at intersections and use appropriate traffic warning signs Identify alternative routes where possible Request the assistance of local law enforcement Ensure that all construction vehicles are roadworthy Ensure all vehicles are roadworthy, visible, properly marked, and operated by an appropriately licenced operator. Consultation with the local road authorities, regarding the upgrading of several intersections on the public road network			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	the impact will last between 1 and 5 years	Short term	the impact will last between 1 and 5 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site

Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Low - negative		Low - negative	
Comment on Significance	Reversibility: Low – if the incident results in a fatality Resource irreplaceability: High - if the incident results in a fatality			

Stringing Transmission Lines Across Existing Infrastructure

The impact generated by stringing the overhead transmission lines across existing infrastructure, which results in a temporary delay in traffic, is presented in Table 17.

Table 17 - Construction Phase - Stringing Transmission Lines Across a Road

Project phase	Construction Phase			
Impact	Stringing Transmission Lines Across Existing Infrastructure			
Description of impact	During the stringing of overhead transmission lines across public roads, the traffic will be temporarily delayed.			
Mitigatability	Low	Mitigation does not exist, or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Construct temporary structures on either side of the road to support the transmission lines over the public road thus mitigating road closure			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Immediate	The impact will self-remedy immediately	Brief	The impact will not last longer than 1 year
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	Very low	Natural and/ or social functions and/ or processes are slightly altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will occur	Certain / definite	There are sound scientific reasons to expect that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Very Low - negative		Very Low - negative	
Comment on Significance	This will occur whenever the overhead transmission line crosses a public road. All work is to be done in accordance with the local authorities requirements.			

10.2 OPERATIONAL PHASE

The overhead transmission line from Nuweveld Collector Substation to the Gamma Substation will be operated and maintained by Eskom. It is envisaged that the overhead transmission line will be inspected biannually. The operator will use the public road to gain access to the servitude and conduct the inspection of the overhead

transmission line along with the servitude. Thus, the impact of the overhead transmission line inspection of the public road is negligible and has not been formally rated.

10.3 DECOMMISSIONING PHASE

As part of the decommissioning process, a separate traffic impact assessment should be undertaken since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes, etc. would have changed over the operational life of the development. Thus, the impact assessment for the decommissioning phase has not been provided.

10.4 CUMULATIVE IMPACTS

The cumulative impacts on the road network, as described in Section 9, are provided below.

Increased Road Incidents

The cumulative impact due to the increased traffic volumes on the public roads which will increase the potential of incidents on the road network within the study area is presented in Table 18.

Table 18 - Cumulative Impact - Increased Road Incidents

Project phase	Construction Phase			
Impact	Increased Road Incidents			
Description of impact	The increased traffic volumes on the public roads will increase the potential of incidents on the road network within the study area			
Mitigatability	Low	Mitigation does not exist, or mitigation will slightly reduce the significance of impacts		
Potential mitigation	<p>Post relevant road signage along affected routes; Create a local WhatsApp Group, notifying users of expected deliveries and proposing alternative routes; Transport Management Plan, this is to be compiled once the contractor has been appointed and all the relevant details of the construction process are known. The Transport Management Plan needs to address, inter alia:</p> <ul style="list-style-type: none"> - clearly define the route to the site for specific vehicles needed to transport equipment and materials - schedule delivery to avoid local congestion - all equipment and material transported via the DR02311 and the TR05801 shall be limited to a gross vehicle mass of ten tonnes <p>Ensure all vehicles are roadworthy, visible, properly marked, and operated by an appropriately licenced operator.</p> <p>Provide drivers with advanced driver training</p> <p>Make drivers aware of the extremely treacherous conditions through the passes on both the TR 05801 and the DR02311.</p> <p>The developer shall implement the necessary steps to protect the pedestrians and livestock on the roads, specifically where the roads pass through farming homesteads, as these are a serious safety concern</p>			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	the impact will last between 1 and 5 years	Short term	the impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Very high	Natural and/ or social functions and/ or processes are majorly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will occur	Certain / definite	There are sound scientific reasons to expect that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge

Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Medium - negative		Medium - negative	
Comment on Significance	Reversibility: Low – if the incident results in a fatality Resource irreplaceability: High - if the incident results in a fatality			

Road Degradation

The cumulative impact due to the increased traffic volumes on the public roads which will increase the potential of localised degradation of the road network within the study area is presented in Table 19.

Table 19 - Cumulative Impact – Road Degradation

Project phase	Construction Phase			
Impact	Road Degradation			
Description of impact	The increased traffic volumes on the public roads will increase the potential for localised degradation of the road network within the study area.			
Mitigatability	Medium	Mitigation exists and will notably reduce the significance of impacts		
Potential mitigation	<p>Create a local WhatsApp Group and post notices of road conditions and propose alternatives. Developer to contribute to the maintenance of the public roads during the construction phases of the development</p> <p>A photographic record of the road condition should be maintained throughout the various phases of the development. This provides an objective assessment and mitigates any subjective views from road users.</p> <p>Upgrade unpaved roads to a suitable condition for proposed construction vehicles; Ensure that the roads are left in the same or better condition, post-construction.</p>			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Positive	
Duration	Short term	the impact will last between 1 and 5 years	Short term	the impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Medium	Natural and/ or social functions and/ or processes are Mediumly altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environment will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Low - negative		Low - Positive	
Comment on Significance	Intensity: Medium – due to risk of mechanical damage to vehicles. Low – due to the reduced risk of mechanical damage to vehicles.			

Dust

The cumulative impact due to the increased traffic volumes on the unpaved public roads which generate dust is presented in Table 20. The larger the vehicle the more dust is likely to be generated, this dust hinders the drivers wishing to overtake without a clear view for overtaking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences.

Table 20 - Cumulative Impact - Dust

Project phase	Construction Phase			
Impact	Dust			
Description of impact	The increased traffic volumes on unpaved public roads will generate dust. The larger the vehicle the more dust is likely to be generated, this dust hinders the drivers wishing to over-take without a clear view for over-taking, resulting in drivers taking unnecessary chances, which could result in unfavourable consequences			
Mitigatability	Low	Mitigation does not exist, or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Reduce travel speed on the gravel road to reduce dust Dust suppression of the roads Regular preventative maintenance of roads should be conducted over weekends to minimise the impact on the normal construction period.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	the impact will last between 1 and 5 years	Short term	the impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Low - negative		Low - negative	
Comment on Significance	Reversibility: Low – if the incident results in a fatality Resource irreplaceability: High - if the incident results in a fatality			

Intersection Safety

The cumulative impact due to the increased traffic volumes at various intersections which will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities, is presented in Table 21. Especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.

Table 21 - Cumulative Impact – Intersection Safety

Project phase	Construction Phase		
Impact	Intersection Safety		
Description of impact	The increased traffic volumes at intersections will increase the potential risk of accidents at the intersections, resulting in serious injuries or even fatalities. Especially at the intersection on the main roads, when vehicles from the site need to cross over oncoming traffic.		
Mitigatability	Medium	Mitigation exists and will notably reduce the significance of impacts	
Potential mitigation	Compile TMP Reduce speed at intersections and use appropriate traffic warning signs Identify alternative routes where possible Request the assistance of local law enforcement Ensure that all construction vehicles are roadworthy Ensure all vehicles are roadworthy, visible, properly marked, and operated by an appropriately licenced operator. Consultation with the local road authorities, regarding the upgrading of several intersections on the public road network		
Assessment	Without mitigation		With mitigation

Nature	Negative		Negative	
Duration	Short term	the impact will last between 1 and 5 years	Short term	the impact will last between 1 and 5 years
Extent	Very limited	Limited to specific isolated parts of the site	Very limited	Limited to specific isolated parts of the site
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Low - negative		Low - negative	
Comment on Significance	Reversibility: Low – if the incident results in a fatality Resource irreplaceability: High - if the incident results in a fatality			

10.5 NO-GO ALTERNATIVE

If the proposed development does not materialise the increase in the traffic volume will not transpire, resulting in the following impacts:

Road Degradation

Less traffic on the roads means that the rate of degradation of the roads will be less. However, the maintenance of the roads will not be augmented by the proposed development. Improved maintenance of the roads will improve the quality of life for the road users and increase the economic opportunities in the area.

Road Safety

Less traffic on the roads means less probability of an incident, reducing the likelihood of a fatality.

Statement

The negative impacts on the road network due to the development are counteracted by the improved road maintenance and economic prospects the development will bring to the local community, and the impact the development has on a national scale.

11 CONCLUSION AND RECOMMENDATIONS

Red Cap proposes developing a grid connection between Nuweveld Collector Substation and the Eskom Gamma Substation.

This report represents the traffic impact assessment for this Grid Connection.

11.1 CONCLUSION

Based on the information provided in this document, the following conclusions can be drawn:

Assessment Assumptions

- A 24-month construction phase is expected;

- *Traffic generated during the construction phase of the Grid Connection extends over several zones;*
- *The servitude for the transmission line is still to be finalised and registered;*
- *The design of the transmission line is still to be finalised;*
- *The construction manpower complement of 110 people has been conservatively assumed for the construction of the Grid Connection. It is assumed that approximately 50 people will be employed for the expansion of the Gamma Substations, while the other 60 will be employed in the construction of the transmission lines;*
- *Cumulative impact during the construction phase, worst-case scenario, includes simultaneous construction of the Hoogland North Wind Farms and Hoogland South Wind Farms, and the operational phase of the Nuweveld Wind Farms. These impacts are limited to TR05801 and the western portion of the DR02317 for a period of a few months, which includes connection to the Nuweveld Collerot Substation and construction of the transmission line in Zone 1.*
- *Cumulative impact during the operational phase of the Grid Connection is anticipated to be negligible;*
- *It is not possible to determine the volume of traffic that will be generated during the decommissioning phase. It can, however, be expected that the volumes will be lower than during the construction phase. As part of the decommissioning process a separate traffic impact assessment should be undertaken, since many of the characteristics related to the traffic impact assessment, i.e. access routes, road geometry, traffic volumes etc., would have changed over the operational life of the development;*

Road Conditions

- *The TR05801 (North), between Loxton and DR02317, is relatively flat with minor inclination. The road surface is very stony with lots of loose gravel that can damage the vehicle's tyres. The condition of this road is expected to further deteriorate due to the envisaged traffic volumes and nominal maintenance of the road. It is anticipated that the condition of this road would have been improved by the developer during the construction phase of the Nuweveld Wind Farms;*
- *The gravel section of the TR05801 (South), between Beaufort West and DR02317, traverses Nuweveld Mountains through a trio of passes, which are extremely treacherous, with very few barriers, steep drop-offs, very tight corners, negative banking and loose gravel. It is anticipated that the condition of this road would have been improved by the developer during the construction phase of the Nuweveld Wind Farms;*
- *The horizontal alignment of the DR02317 is unacceptable for the movement of heavy vehicles and needs to be addressed. It is anticipated that the required improvements to this road would have been implemented by the developer during the construction phase of the Nuweveld Wind Farms;*
- *The DR02317 pass through several homesteads along the route and the necessary mitigation measures will need to be implemented to prevent traffic incidents in these areas;*
- *The developer, in consultation with the local road authorities, would need to investigate the possibility of upgrading several intersections from the public road network to the various Zones in which the Grid Connection is to be constructed;*

- *The expected traffic increase on the road network during the construction phase of the Grid Connection will lead to greater wear and tear on the roads but will not have an undue detrimental impact on the structure of the roads if the roads are properly maintained. The developer shall contribute towards the maintenance of the public road network affected by the development as identified by the local road authorities. It is proposed that the developer contribute to the maintenance of the road network during the construction period and the operational phase, commencing the year after successfully achieving Commercial Operation;*
- *Additional ongoing funding from the wind farms towards the maintenance of the roads will have a positive impact on the local road conditions and community;*

Transportation Route

- *The various Zones in which the Grid Connection is to be constructed are all accessed from an existing road network;*
- *The final route selection is subject to the limitations specified in the transport permits and the transportation vehicles to be used by the appointed logistics company;*
- *All new and existing intersection and road alignments that require upgrading to accommodate the transportation requirements of equipment and material, are to comply with geometric standards and be approved by the relevant road authorities;*
- *All equipment and material transported to the construction Zones from Beaufort West, via the DR02311 and the TR05801 shall be limited to a gross vehicle mass of ten tonnes;*
- *Any constraints along the proposed transportation routes will have to be resolved once the final route has been identified by the appointed logistics company;*
- *No anomalies associated with the proposed transportation routes were observed or identified that will compromise the development. However, this will have to be confirmed by the appointed logistics company;*

Traffic Volumes

- *The most significant impact on traffic volumes is as a result of commuting personnel to and from the site, in the morning and the afternoon, during peak traffic;*
- *At no point during the construction phase of this project does the traffic volumes on the road network to the various construction Zones exceed 50 trips per hour, which is the threshold for a detailed Traffic Impact Assessment;*
- *The maximum traffic volumes generated during the construction phase of the Grid Connection are in the order of:*
 - *Peak Traffic: 10 vph is anticipated on the DR02317/1-4;*
 - *Diurnal Traffic: 1.25 vph is anticipated on various roads, including the N1 and TR01608.*
- *The maximum cumulative traffic volumes generated, are limited to three specific roads, these are DR02317, TR05801/N and TR05801/S;*
- *The maximum cumulative traffic volumes generated are in the order of:*
 - *Peak Traffic: 60 vph is predicated on the TR05801/S;*
 - *Diurnal Traffic: 22.5 vph is anticipated on the TR05801/N*

It must be stated that this is a worst-case engineering assumption, based on the traffic volumes generated by the construction of Hoogland North Wind Farms, Hoogland South Wind Farms, and the operational phase of Nuweveld Wind Farms.

Safety

- *The winding road through the Molteno and De Jager's Passes are serious safety concerns that need to be addressed by the developer in consultation with the local road authority;*
- *This is a rural area, home to many species of small fauna. Which often stray onto or crossing the road, which could result in a collision;*
- *Excessive fine and loose material was observed along the road creating visibility concerns in dry weather and slippery conditions in wet weather;*
- *Pedestrians and livestock on the roads, specifically where the roads pass through farming homesteads, are a serious safety concern;*
- *Additional vehicles on the road network increase the potential risk of accidents.*

11.2 RECOMMENDATIONS

Based on the conclusions of this report, the following recommendations are made and should be included in the conditions of the environmental authorisation:

- *All remedial work or modifications to any of the public roads shall be done in consultation with and have the approval of the local road's authority (as is standard practice this will be finalised during and be a requirement of the municipal planning approval process);*
- *The treacherous southern section of the gravel road, between Beaufort West and site, TR05801, is to be upgraded by the developer, to improve the safety of the road for all road users, including the personnel commuting to and from the site on a daily basis;*
- *The various intersections will need to be accessed and upgraded by the developer to accommodate the expected transportation requirements. This upgrade would need to be implemented to facilitate the delivery of loads to the site;*
- *The developer shall contribute to the maintenance of the road network, affected by the development, during the construction and operational phases of the development;*
- *A Traffic Management Plan is required. The TMP is to be compiled once the contractor has been appointed and all the relevant details of the construction processes are known. The TMP needs to address:*
 - *outline specific traffic management measures across all phases of the development;*
 - *include measures to minimise impacts on existing road users;*
 - *define the repair and maintenance strategy to be adopted during the various phases of the development;*
 - *schedule deliveries by heavy vehicles to avoid the formation of convoys. Sufficient distance must be maintained between heavy vehicles to allow light vehicles to overtake safely.*
- *The developer shall implement the necessary steps to protect the pedestrians and livestock on the roads, specifically where the roads pass through farming homesteads, as these are a serious safety concern;*

- *The TMP should consider the scope of the development and take cognisance of the existing condition of the road network at the time the project commences;*
- *The developer shall ensure that the contractor provides the necessary driver training to key personnel, to minimise the potential of incidents on the public road network;*
- *Temporary signs warning motorists of construction vehicles should be erected on the approaches to the access roads;*
- *The developer shall ensure that the condition of the roads impacted by the construction of the development is left in a similar or better state once the construction phase is complete;*
- *The implementation of the relevant transport impact mitigation measures. Which includes inter alia;*
 - *Provide regular information to the local community and individuals on the volumes of traffic particularly heavy vehicles, anticipated on the road during construction and operation phases.*
 - *Implement mitigation measures specifically where the roads pass through farming homesteads*

Taking the above findings into consideration it can be concluded that the construction of the Gamma Grid Connection will have an increase in traffic volumes on the road network during the construction phase. However, this report has assessed the impact of this additional traffic on the surrounding road network and found that the existing road network is currently operating at well below its capacity and provides an adequate level of service, although the road network is not well maintained due to budgetary constraints within various spheres of government. The increase in traffic volumes will lead to greater wear and tear, especially during construction, but will not have an undue detrimental impact on the road network within the study area if the mitigation measures are undertaken.

It is the reasoned opinion of the author, from a traffic and transportation perspective, that the construction of the transmission lines within the Grid Corridor can be approved, as there are no constraints or notable impacts that would jeopardise the implementation of the Grid Connection, subject to the specific requirements included within this report.

12 APPENDICES

Appendix 1: Declaration

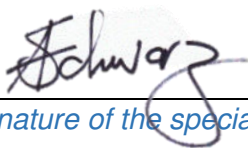
Appendix 2: NEMA Requirements for Specialist Reports

Appendix 3: Curriculum Vitae

APPENDIX 1 - DECLARATION

I, Athol Carl Schwarz, as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- *in terms of the general requirement to be independent:*
 - *other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or*
 - *am not independent, but another specialist that meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);*
- *in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any of the requirements may result in disqualification;*
- *have disclosed/will disclose, to the applicant, the Department and interested and affected parties, all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;*
- *have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation by interested and affected parties was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;*
- *have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application;*
- *have ensured/will ensure the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;*
- *have kept/will keep a register of all interested and affected parties that participated in the public participation process; and*
- *am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.*



Signature of the specialist:

Athol Schwarz

Name:

25th September 2022

Date:

APPENDIX 2 - NEMA REQUIREMENTS FOR SPECIALIST REPORTS

Appendix 6	Specialist Report content as required by the NEMA 2014 EIA Regulations, as amended	Section
1 (1)(a)	(i) the specialist who prepared the report; and	Appendix 3
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix 1
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 3.2
(cA)	an indication of the quality and age of the base data used for the specialist report;	Section 7.1.2
(cB)	a description of existing impacts on the site, cumulative impacts of the development and levels of acceptable change;	Section 8 & 9
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process, inclusive of equipment and modelling used;	Section 5.4
(f)	details of an assessment of the specifically identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 6.1
(g)	an identification of any areas to be avoided, including buffers;	NA
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	NA
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5.5
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;	Section 10
(k)	any mitigation measures for inclusion in the EMPr;	Section 11.2
(l)	any conditions for inclusion in the environmental authorisation;	Section 11.2
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	NA
(n)	a reasoned opinion-	Section 11.2
	(i) whether the proposed activity or portions thereof should be authorised; and	
	(iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	NA
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	NA
(q)	any other information requested by the competent authority.	NA
2	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

APPENDIX 3 - CURRICULUM VITAE

ATHOL SCHWARZ Pr Tech Eng

Independent Author

Athol, is a Professionally Registered Civil Engineering Technologist with more than 35 years of experience, specialising in Civil and Structural Engineering services for renewable energy facilities and infrastructure. These services range from the concept phase all the way through to project close-out, including inter alia: design, contract and construction management phases.

Since 2010, Athol was employed by Hatch, as a Civil Engineering Author working on numerous infrastructure and renewable energy projects (including wind farms, fixed and rotating PV solar plants, and CPV solar plants) for various Independent Power Producers (IPP) / Developers.

Athol has experience in traffic impact assessments, transportation route analysis, infrastructure development and design, construction and project management (NEC), with a keen eye for detail.

SPECIFIC RELEVANT EXPERIENCE

- Red Cap Energy (Pty) Ltd - Impofu Wind Farms consisting of Impofu North Wind Farm, Impofu West Wind Farm and Impofu East Wind Farm
- juwi Renewable Energies (Pty) Ltd – Paulputs Traffic Impact Assessment
- CPV1 Solar - Touwsriver Solar, Western Cape, 36 MW Concentrated Photovoltaic Plant (1500 trackers), supervised civil infrastructure activities
- juwi Renewable Energies (Pty) Ltd - Moorreesberg Wind Energy Facility, Moorreesberg, Western Cape, consisting of 25 wind Turbine Generators - feasibility study for the routing of the access roads.
- juwi Renewable Energies (Pty) Ltd - Garob Wind Farm, Copperton, Northern Cape, consists of 46 Acciona 3.0 MW Wind Turbine Generators - conducted a hydrological study to determine the potential impact of the flood levels on the development,
- juwi Renewable Energies (Pty) Ltd - Wolf Wind Farm, Kleinpoort, Eastern Cape, consisting of 28 Wind Turbine Generators - identify the most viable access point onto the property and internal access road.
- Scatec Solar AS (Norway) - Dreunberg Filter Yard (Capacitor bank), 75 MW Single-axis PV plant – Burgersdorp, Eastern Cape – Quality control of civil activities.
- Scatec Solar AS (Norway) - Linde Filter Yard (Capacitor bank), 36.8 MW Single-axis PV plant – Hanover, Northern Cape – Quality control of civil activities.
- Scatec Solar AS (Norway) - Kalkbult Filter Yard (Capacitor bank), 75 MW Single-axis PV plant – De Aar, Northern Cape – Quality control of civil activities.
- juwi Renewable Energies (Pty) Ltd - Keiskammahoek Wind Farm, King William's Town, Eastern Cape, consisting of 16 Wind Turbine Generators - feasibility study to minimise the impact on the commercial plantation due to the development of Keiskammahoek Wind Farm
- South Africa Mainstream Renewable Power De Aar PV (Pty) Ltd - 50 MW PV Plan – De Aar, Northern Cape – clients engineer
- South Africa Mainstream Renewable Power Droogfontein PV (Pty) Ltd - 50 MW PV Plan - Kimberly, Northern Cape – clients engineer
- juwi Solar ZA Construction 3 (Pty) Ltd - Aries, 9.7 MW PV Plant - Kenhardt, Northern Cape - civil author services and Traffic Impact Assessment
- juwi Solar ZA Construction 3 (Pty) Ltd - Konkoonsies, 9.7 MW PV Plan – Pofadder, Northern Cape - civil author services and Traffic Impact Assessment
- juwi Renewable Energies (Pty) Ltd - Namies Wind Energy Facility, near Aggeneys, Northern Cape, consists of between 46 and 58 wind turbine generators - transportation route assessment



EDUCATION

Master's Diploma in Technology – Civil: Structures (1989)

National Higher Diploma (1987)

National Diploma (1986)

LANGUAGES

- English
- Afrikaans
- French (limited)

PROF AFFILIATIONS

- ECSA - Professional Engineering Technologist,
- SAICE - South African Institution of Civil Engineering - Member

COMPETENCES

- Structural Design (concrete and steel),
- Project and Construction Management

SOFTWARE

- MS Office
- MS Projects
- Micro Station and Autocad
- Prokon
- Model Maker

- *juwi Renewable Energies (Pty) Ltd - Outeniqua Wind Farm (North), Uniondale, Western Cape - transportation route assessment*
- *juwi Renewable Energies (Pty) Ltd - Wolf Wind Farm, Kleinpoort, Eastern Cape consisting of 25 Wind Turbine Generators - feasibility study for the access routes*
- *juwi Renewable Energies (Pty) Ltd - Outeniqua Wind Farm (South), Uniondale, Western Cape, 16 Wind Turbine Generators - feasibility study for the access routes*
- *UMOYA ENERGY (Pty) Ltd - Hopefield Wind Farm, approximately 6 km southeast of the town of Hopefield, Western Cape, consisting of 37, Vestas 1.8 MW WTG – ACS HV Yard and Substation.*
- *South Africa Mainstream Renewable Power Jeffreys Bay (Pty) Ltd - Jeffreys Bay Wind Farm, Humansdorp, Eastern Cape, consists of 60 Siemens 2.3 MW WTG - review the foundation design for the wind towers - review the designs for compliance to the national standards.*
- *juwi Solar ZA Construction 3 (Pty) Ltd - RustMo1, 6.8 MW PV Plant – Rustenburg, North-West - author services regarding access and internal gravel roads*
- *Barrick Africa (Pty) Ltd - Buzwagi Gold Mine in Tanzania – a feasibility study.*
- *juwi Renewable Energies (Pty) Ltd - Garob Wind Farm, Copperton, Northern Cape, consists of 46 Acciona 3.0 MW Wind Turbine Generators - transportation management plan.*
- *Slim Sun Swartland Solar Park - SlimSun Solar - 5 MW PV Plant – Malmesbury, Western Cape – ACS for HV Yard and Substation.*
- *Cennergi (Pty) Ltd - Kopleegte Switching Station at Amakhala Emoyen Phase 1, Bedford, Eastern Cape, consisting of 56 Nordex, 2,4 MW Wind Turbines Generators- ACS for HV Yard and Substation.*
- *EXXARO Resources Ltd And Watt Energy (Pty) Ltd - Wittekleibosch Switching Station at Tsitsikamma Community Wind Farm, Tsitsikamma, Eastern Cape, consists of 31 Vestas 3.0 MW WTG - ACS for HV Yard and Substation.*
- *Windlab Developments South Africa (Pty) Ltd - AMAKALA EMOYENI – Phase 2, Bedford, Eastern Cape, consisting of 66 WTG - feasibility study for access and internal road network*
- *Windlab Developments South Africa (Pty) Ltd – Phase 1, Bedford, Eastern Cape, consisting of 56 Nordex, 2,4 MW Wind Turbines Generators - feasibility study for access and internal road network*
- *IBEDRROLA - Klip Heuwel Switching Station at Caledon Wind Farm, Caledon, Western Cape, consisting of 9, Sinovel 3.0 MW Wind Turbines Generators – ACS for HV Yard and Substation.*
- *EXXARO Resources Ltd - Lephalale 60 MW PV Plant, 13 km northwest of the town of Lephalale, Limpopo - ACS for HV Yard and Substation.*
- *SASOL Technology - 3.6 MW PV Demonstration Plant – civil author services*
- *Solafrica Pty (Ltd) - Bokpoort CSP Project, a 50 MW Concentrating Solar Thermal Power Station (CSP – parabolic trough) located approximately 80 km east-south-east of Upington, Northern Cape - prepared enquiry documentation for the geotechnical investigation and topographic survey*



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

(For official use only)

File Reference Number:

NEAS Reference Number:

Date Received:

DEA/EIA/

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

GAMMA GRID CONNECTION

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at <https://www.environment.gov.za/documents/forms>.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:

Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	ATHEL SCHWARZ		
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition
			100%
Specialist name:	ATHEL SCHWARZ		
Specialist Qualifications:	MASTERS DIPLOMA IN TECHNOLOGY		
Professional affiliation/registration:	ECSA. 9270085		
Physical address:	45 RAVEN STREET, WEST BEACH, CAPE TOWN		
Postal address:	PO BOX 50105, WEST BEACH		
Postal code:	7449	Cell:	082 777 1961
Telephone:		Fax:	
E-mail:	SCHWARZATHEL@GMAIL.COM		

2. DECLARATION BY THE SPECIALIST

I, ATHEL SCHWARZ, declare that -

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.


 Signature of the Specialist

 Name of Company:

4 NOV 2022
 Date

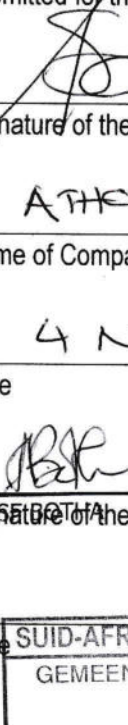
Details of Specialist, Declaration and Undertaking Under Oath


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SFB

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, ATHOL SCHWARZ., swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

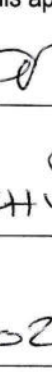

Signature of the Specialist

ATHOL SCHWARZ.

Name of Company

4 NOV 2022.

Date


7162650-f

Signature of the Commissioner of Oaths

Date 