



SCOPING REPORT:

UMMBILA EMOYENI RENEWABLE ENERGY FACILITY: SOLAR PV FACILITY, MPUMALANGA PROVINCE

TRANSPORT STUDY

MARCH 2022

First Issue

Prepared by:

JG AFRIKA (PTY) LTD

Branch: Cape Town

PO Box 38561

Postal code: 7430

Telephone: 021 530 1800

VERIFICATION PAGE	Qual-frm-026
	Rev 14

TITLE:
SCOPING REPORT: PROPOSED UMMBILA EMOYENI RENEWABLE ENERGY FACILITY: SOLAR PV FACILITY, MPUMALANGA PROVINCE

JGA REF. NO. 5735-RPT-001	DATE: 22/03/2022	REPORT STATUS First Issue
-------------------------------------	----------------------------	-------------------------------------

CARRIED OUT BY: JG AFRIKA (PTY) LTD CAPE TOWN 14 Central Square Pinelands 7405 Tel.: +27 21 530 1800 Email: wink@jgafrika.com	COMMISSIONED BY: Savannah Environmental (Pty) Ltd WOODMEAD First Floor, Block 2 5 Woodlands Drive Office Park Cnr Woodlands Drive & Western Service Road Woodmead, 2191 Tel: 27 011 656 3237 Email: jana@savannahsa.com
---	--

AUTHOR A Stander	CLIENT CONTACT PERSON J de Jager
----------------------------	--

SYNOPSIS
Preparation of a Transport Study for the proposed Ummbila Emoyeni Renewable Energy Solar PV facility near Bethal in the Mpumalanga Province, pertaining to all relevant traffic and transportation engineering aspects.

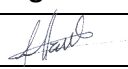


KEY WORDS:
Scoping Report, Solar Energy, Transport Study, Photovoltaic, PV

© COPYRIGHT: JG Afrika (Pty) Ltd.

QUALITY VERIFICATION

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



Verification	Capacity	Name	Signature	Date
By Author:	Senior Engineer	A Stander		22/03/2022
Checked by:	Associate	I Wink		22/03/2022
Authorised by:	Director	D Petersen		22/03/2022

Filename: https://jgafrika.sharepoint.com/sites/Job5735-team-100-WIP-Internal-Eng/Shared Documents/100-WIP-Internal-Eng/104-Studies/5735_Umbbila Emoyeni WEF Solar Scoping Report_First Issue.docx

**PROPOSED UMMBILA EMOYENI RENEWABLE ENERGY
SOLAR PV FACILITY,
MPUMALANGA PROVINCE**

TABLE OF CONTENTS

1	INTRODUCTION AND METHODOLOGY	3
1.1	Scope and Objectives	3
1.2	Terms of Reference	4
1.3	Approach and Methodology	5
1.4	Assumptions and Limitations	6
1.5	Source of Information	6
2	DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE TRANSPORT STUDY.....	8
2.1	Port of Entry	8
2.2	Transportation requirements.....	8
2.3	Abnormal Load Considerations	8
2.4	Further Guideline Documentation	9
2.5	Permitting – General Rules.....	9
2.6	Load Limitations	9
2.7	Dimensional Limitations.....	10
2.8	Transporting Other Plant, Material and Equipment	10
3	DESCRIPTION OF THE AFFECTED ENVIRONMENT.....	11
3.1	Description of the site	11
3.2	National Route to Site for Imported Components.....	13
3.3	Route for Components manufactured locally.....	14
3.4	Route from Cape Town to Proposed Site.....	15
3.5	Route from Johannesburg to Proposed Site	15
3.6	Route from Pinetown / Durban to Proposed Site.....	16
3.7	Route from Johannesburg Area to Site – Abnormal Load	17
3.8	Proposed main access road and access points to the Proposed Development.....	18
3.9	Main Route for the Transportation of Materials, Plant and People to the proposed site	19
4	APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS.....	20
5	IDENTIFICATION OF KEY ISSUES	21
5.1	Identification of Potential Impacts.....	21
6	NO-GO ALTERNATIVE	22
7	POTENTIAL IMPACT ASSESSMENT SUMMARY	23
7.1	Construction Phase.....	23

7.2	Operational Phase	24
7.3	Decommissioning Phase.....	24
8	CUMULATIVE IMPACTS.....	25
9	CONCLUSION AND RECOMMENDATIONS.....	26
10	REFERENCES.....	27
11	ANNEXURES.....	28

TABLES

Table 3-1:	Farm Portions comprising the project site.....	11
Table 7-1:	Potential Impact - Construction Phase – Traffic Congestion	23
Table 7-2:	Potential Impact – Operational Phase	24
Table 7-3:	Potential Impact - Decommissioning Phase.....	24
Table 8-1:	Potential Cumulative Impact.....	25

FIGURES

Figure 1-1:	Proposed Umbila Emoyeni Renewable Energy Facilities.....	3
Figure 3-1:	Aerial View of the proposed Umbila Emoyeni Renewable Energy Facility.....	11
Figure 3-2:	Preferred and Alternative Routes.....	14
Figure 3-3:	Route from Cape Town to Proposed Site	15
Figure 3-4:	Route from Johannesburg to Proposed Site.....	16
Figure 3-5:	Route from Durban / Pinetown to Proposed Site.....	17
Figure 3-6:	Proposed Main Access Roads and alternatives	18
Figure 3-7:	Proposed site access points	19

ANNEXURES

Annexure A –	SPECIALIST EXPERTISE	28
--------------	----------------------------	----

PROPOSED UMMBILA EMOYENI RENEWABLE ENERGY SOLAR PV FACILITY, MPUMALANGA PROVINCE

1 INTRODUCTION AND METHODOLOGY

1.1 Scope and Objectives

Emoyeni Renewable Energy Farm (Pty) Ltd is proposing the development of renewable energy facilities, collectively known as the Ummbila Emoyeni Renewable Energy Facility, consisting of a commercial wind farm, solar PV facility, and associated grid infrastructure, including a battery energy storage system, located approximately 6km southeast of Bethal in the Mpumalanga Province of South Africa.

The proposed solar PV facility has a contracted capacity of 150MW. It is the developer's intention to bid the proposed project under the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme (or similar programme), with the aim of evacuating the generated power into the national grid. This will aid in the diversification and stabilisation of the country's electricity supply, in line with the objectives of the Integrated Resource Plan (IRP), with the proposed facilities set to inject up to 150MW into the national grid.

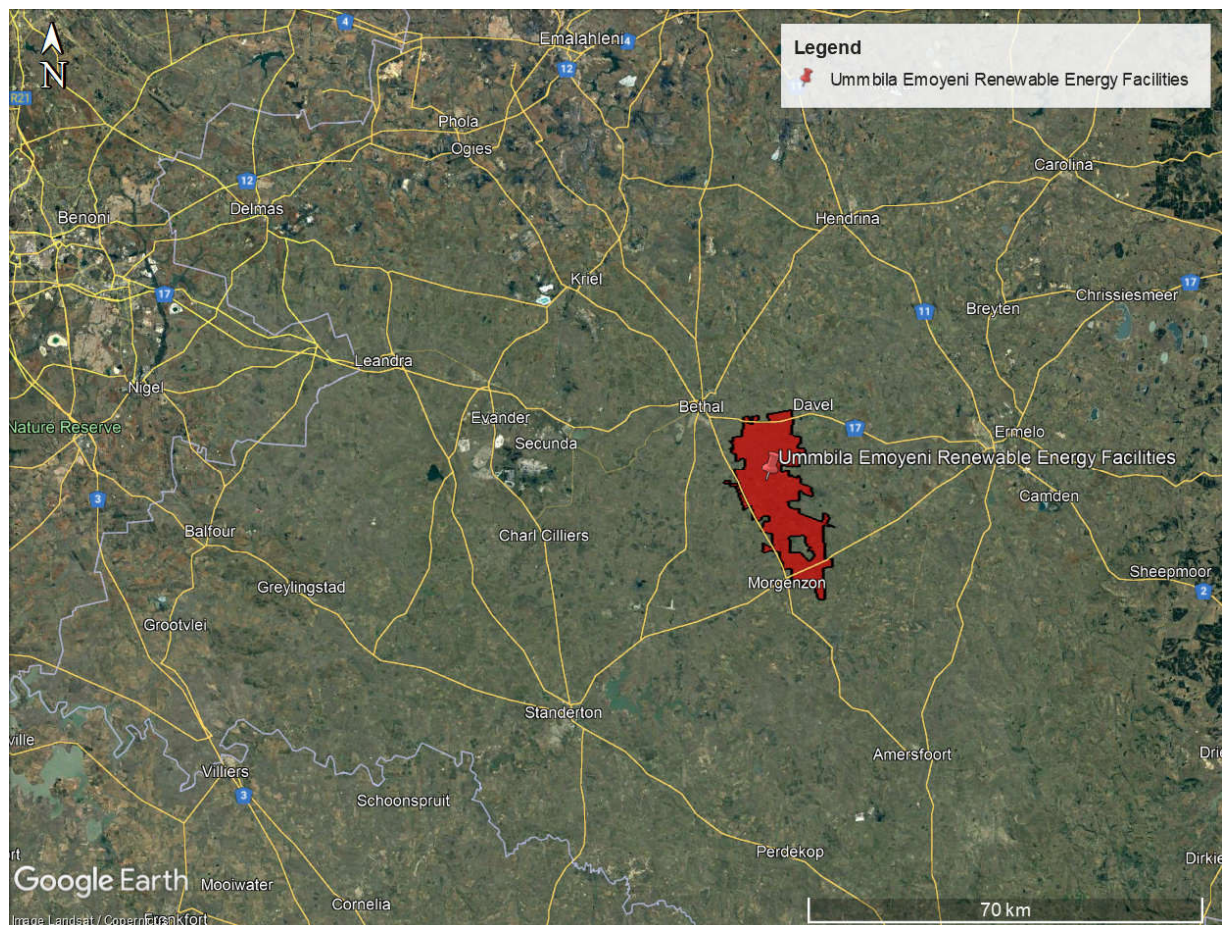


Figure 1-1: Proposed Ummbila Emoyeni Renewable Energy Facilities

As part of the Environmental Impact Assessment (EIA) process undertaken, the services of a Transportation Specialist are required to conduct a Transport Study and JG Afrika (Pty) Ltd was consequently appointed to conduct the Traffic Impact Assessment for both the commercial wind farm and the solar PV facility. This report focuses on the solar PV facility only.

The following two main transportation activities will be investigated:

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

The transport study will aim to provide the following objectives:

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

1.2 Terms of Reference

General:

A specialist report prepared in terms of the Regulations must contain the following:

- (a) details of-
 - (i) the specialist who prepared the report; and
 - (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;
- (c) an indication of the scope of, and the purpose for which, the report was prepared;
 - (cA) an indication of the quality and age of base data used for the specialist report
 - (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;
- (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;
- (f) details of an assessment of the specific 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;
- (g) an identification of any areas to be avoided, including buffers;
- (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;

- (i) a description of any assumptions made and any uncertainties or gaps in knowledge;
- (j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;
- (k) any mitigation measures for inclusion in the EMPr;
- (l) any conditions for inclusion in the environmental authorisation;
- (m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;
- (n) a reasoned opinion-
 - (i) whether the proposed activity, activities or portions thereof should be authorised; and (considering impacts and expected cumulative impacts).
 - (iA) regarding the acceptability of the proposed activity or activities, and
 - (ii) if the opinion is that the proposed activity, activities 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;
- (p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and
- (q) any other information requested by the competent authority.

Specific:

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

1.3 Approach and Methodology

The report deals with the traffic impact on the surrounding road network in the vicinity of the proposed sites:

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

This transport study was informed by the following:

Project Assessment

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

The transport study considered and assessed the following:

Traffic and Haul Route Assessment

- Estimation of trip generation;
- Discussion on potential traffic impacts;
- Assessment of possible haul routes; and
- Construction and operational (maintenance) vehicle trips.

Site layout, Access Points and Internal Roads Assessment per Site

- Description of the surrounding road network;
- Description of site layout;
- Assessment of the proposed access points; and
-

1.4 Assumptions and Limitations

The following assumptions and limitations apply:

- This study is based on the project information provided by Savannah Environmental (Pty) Ltd.
- According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000mm, total maximum width 4 300mm and total maximum length 10 500mm.
- Maximum vertical height clearances along the haulage route is 5.2m for abnormal loads.
- Imported elements will be transported from the most feasible port of entry, which is deemed to be the Port of Richard's Bay.
- If any elements are manufactured within South Africa, these will be transported from their respective manufacturing centres, which would be either in the greater Johannesburg area for the transformer, inverter and the support structures and in Pinetown/Durban, Cape Town or Johannesburg for the PV modules.
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads.
- Construction materials will be sourced locally as far as possible.
- Approximately 30 full-time employees will be stationed at each of the four sites during the operational phase.

1.5 Source of Information

Information used in a transport study includes:

- Project Information provided by the Client;
- Google Earth.kmz provided by the Client;
- Google Earth Satellite Imagery;
- Road Traffic Act, 1996 (Act No. 93 of 1996)
- National Road Traffic Regulations, 2000

- SANS 10280/NRS 041-1:2008 - Overhead Power Lines for Conditions Prevailing in South Africa
- The Technical Recommendations for Highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads; and
- Project research of all available information.

2 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE TRANSPORT STUDY

2.1 Port of Entry

It is assumed that if components are imported to South Africa, it will be via the Port of Richard's Bay, which is located in KwaZulu-Natal. The Port is located approximately 460km from the proposed site. The Port of Richard's Bay is a deep-sea water port boasting 13 berths. The terminals handle abnormal loads and among others dry bulk ores, minerals and break-bulk consignments. The terminal exports over 30 varied commodities from magnetite to ferrochrome, woodchips to aluminium and steel. A large percentage of dry bulk commodities are handled via a computer-controlled network of conveyor belts extending 40 km to seven harbour bound industries. The Richards Bay Port is operated by Transnet Port Terminal.

Alternatively, components can be imported via the Port of East London, located approximately 1130km from the proposed site, or from the Port of Ngqura, approximately 1200km from the proposed site, both being located in the province of the Eastern Cape. Please note that shorter routes exist between the Port of East London and the proposed site, but the poor condition of these roads aren't suitable for transport with heavy and/or abnormal vehicles.

2.2 Transportation requirements

It is anticipated that the following vehicles will access the site during construction:

- Conventional trucks within the freight limitations to transport building material to the site;
- 40ft container trucks transporting solar panels, frames and the inverter, which are within freight limitations;
- Flatbed trucks transporting the solar panels and frames, which are within the freight limitations;
- Light Differential Vehicle (LDV) type vehicles transporting workers from surrounding areas to site;
- Drilling machines and other required construction machinery being transported by conventional trucks or via self-drive to site; and
- The transformers will be transported as abnormal loads.

2.3 Abnormal Load Considerations

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

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

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

2.4 Further Guideline Documentation

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

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

2.5 Permitting – General Rules

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

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

2.6 Load Limitations

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

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

2.7 Dimensional Limitations

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

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

2.8 Transporting Other Plant, Material and Equipment

In addition to transporting the specialised equipment, the normal Civil Engineering construction materials, plant and equipment will need to be transported to the site (e.g. sand, stone, cement, gravel, water, compaction equipment, concrete mixers, etc.). Other components, such as electrical cables, pylons and substation transformers, will also be transported to site during construction. The transport of these items will generally be conducted with normal heavy loads vehicles, except for the transformer which requires an abnormal load vehicle.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Description of the site

The proposed Ummbila Emoyeni Renewable Energy Facility, consisting of a commercial wind farm and solar PV facility, will be located approximately 6km southeast of Bethal in the Mpumalanga Province, as shown in **Figure 3-1**. The proposed site is bounded by the N17 to the north, the R39 to the east and south and the R35 to the west.

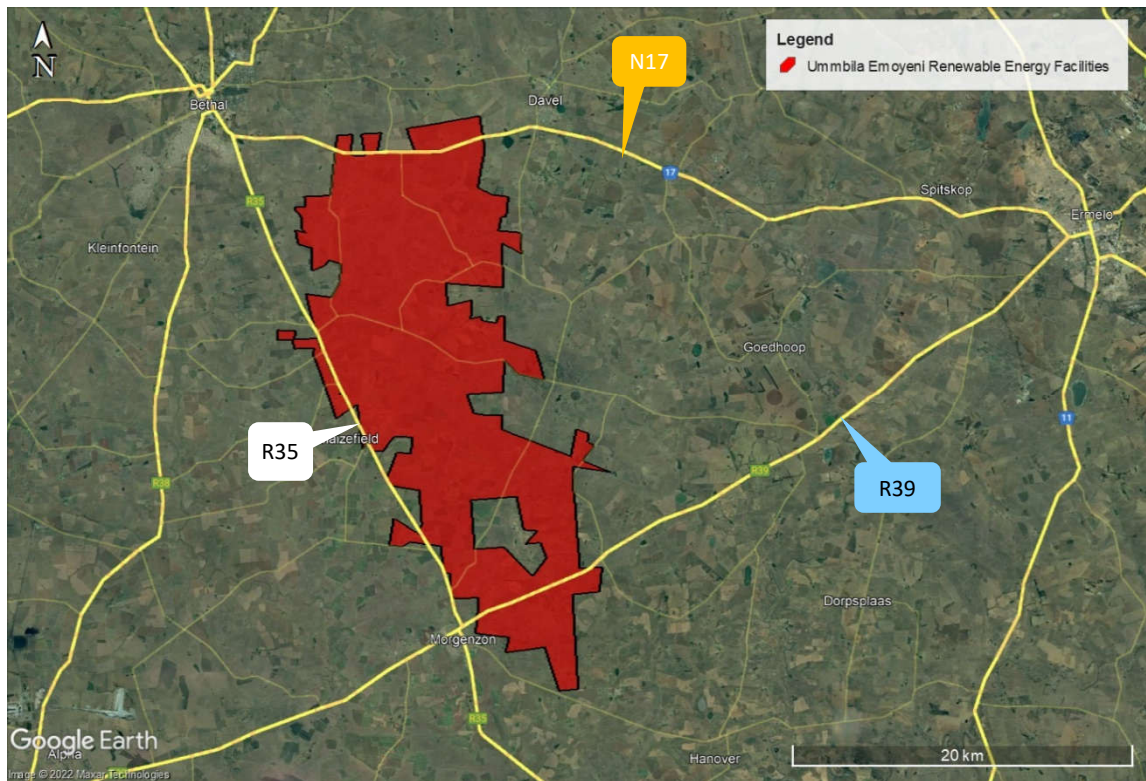


Figure 3-1: Aerial View of the proposed Ummbila Emoyeni Renewable Energy Facility

A preferred project focus area with an extent of 27 819ha been identified by Emoyeni Renewable Energy Farm (Pty) Ltd as a technically suitable area for the development of the Ummbila Emoyeni Renewable Energy Farm with a contracted capacity of up to 666MW of wind energy and 150MW of solar energy.

The project site comprises the following farm portions:

Table 3-1: Farm Portions comprising the project site

Parent Farm Number	Farm Portions
Farm 261 – Naudesfontein	15, 21
Farm 264 – Geluksplaats	0, 1, 3, 4, 5, 6, 8, 9, 11, 12
Farm 268 – Brak Fontein Settlement	6,7,10,11,12
Farm 420 – Rietfontein	8,9,10,11,12,15,16,18,19,22,32
Farm 421 - Sukkelaar	2, 2, 7, 9, 9 10, 10 11, 11 12, 12 22 ,25, 34, 35, 36, 37, 37, 38, 39, 40, 42, 42

Farm 422 – Klipfontein	0, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23
Farm 423 – Bekkerust	0, 1, 2, 4, 5, 6, 10, 11, 12, 13, 14, 15, 17, 19, 20, 22, 23, 24, 25
Farm 452 – Brakfontein	5
Farm 454 – Oshoek	4, 13, 18
Farm 455 – Ebenhaezer	0, 1, 2, 3
Farm 456 – Vaalbank	1, 2, 3, 4, 7, 8, 13, 15, 16, 17, 18, 19
Farm 457 – Roodekrans	0, 1, 4, 7, 22, 23, 23
Farm 458 – Goedgedacht	0, 2, 4, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 21, 22, 25, 26, 27, 28, 29, 31, 32, 33, 34, 35, 37, 39
Farm 467 – Twee Fontein	0, 1, 4, 5, 6, 7, 8, 10
Farm 469 – Klipkraal	5, 6, 7, 8
Farm 548 – Durabel	0

The solar PV facility is proposed to accommodate the following infrastructure:

- PV modules and mounting structures with a capacity per panel of 350W to 450W and dependent on optimization and cost.
- Inverters and transformers
- 33kV/132kV onsite collector substation
- Battery Energy Storage System (BESS)
- Cabling between project components
- Laydown and O&M hub (approximately 300m x 300m):
 - Construction compound (temporary),
 - Maintenance office
- Access roads (up to 12m wide)

The project will include associated grid infrastructure that is required to connect the Umbila Emoyeni Renewable Energy Facility to the national grid. The grid connection solution entails establishing a 400/132 kV MTS, between Camden and SOL Substations, which will be looped in and out of the existing Camden-Sol 400 kV line. The location of the MTS will be refined through an ongoing process of communication with Eskom Planning but will be within close proximity to the 400kV line in order to cut into this line.

It is anticipated that the power generated by the project will be bid into the Department of Mineral Resources and Energy's (DMRE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme and/or into private off take opportunities.

3.2 National Route to Site for Imported Components

There are three viable options for the port of entry for imported components - the Port of Richard's Bay in KwaZulu-Natal, and the ports of East London and Ngqura in the Eastern Cape.

The Port of Richard's Bay is located approximately 460km travel distance from the proposed site whilst the Port of East London and Ngqura is respectively located approximately 1130km and 1200km travel distance from the proposed site. The Port of Richard's Bay is the preferred port of entry, however, the Ports of East London and Ngqura can be used as alternatives should the Port of Richard's Bay not be available.

The preferred route from the Port of Richard's Bay is shown in yellow in **Figure 3-2** below. The route is approximately 460km and follows the N2 north, passing through Pongola and Piet Retief before turning off on to the N17 in Ermelo that leads to an unnumbered gravel road towards the proposed site.

The alternative route from the Port of East London, shown in green in **Figure 3-2**, will follow the N6 north-west to Bloemfontein before taking the N1 north-east to Johannesburg. Vehicles will head east on the N12 and N17, passing through Bethal before turning off onto an unnumbered gravel road that leads to the proposed site.

The Port of Ngqura can also be considered as an alternative and the route is shown in blue in **Figure 3-2**. The route is approximately 1200km long and follows the N10 north up to Cradock before taking the R390 further north, passing through the town of Steynsburg and turning onto the N1 at Gariiep. The route will continue north-east along the N1, through Bloemfontein, up to Johannesburg. Vehicles will head east on the N12 and N17, passing through Bethal before turning off onto an unnumbered gravel road that leads to the proposed site.

It should be noted that, although shorter routes exist, travel on national routes are proposed as the condition of some of the roads on the shorter routes are poor and not deemed suitable for hauling with heavy vehicles. There are also a number of toll plazas located on the national routes, but alternative roads can be considered in order to bypass these toll roads. This can however only be done at a later stage when more information is available regarding the type of heavy/abnormal vehicles, number of trips, etc.



Figure 3-2: Preferred and Alternative Routes

It is critical to ensure that the abnormal load vehicle will be able to move safely and without obstruction along the preferred route. The preferred route should be surveyed prior to construction to identify any problem areas, e.g. intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification. After the road modifications have been implemented, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that the delivery will occur without disruptions.

It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.

3.3 Route for Components manufactured locally

As mentioned in Section 1.4 (Assumptions and Limitations), it is anticipated that elements manufactured within South Africa will be transported to the site from the Cape Town, Johannesburg and Pinetown/Durban areas. It is also assumed that the transformer, which will be transported with an abnormal load vehicle, will be transported from the Johannesburg area and therefore it needs to be verified that the route from the manufacturer to the site does not have any load limitations for abnormal vehicles. At this stage, only a high-level assessment can be undertaken as no information of the exact location of the manufacturer is known and all road structures (such as bridges and culverts) need to be confirmed for their load bearing by SANRAL or the respective Roads Authority.

3.4 Route from Cape Town to Proposed Site

Components, such as PV modules, manufactured in Cape Town will be transported to site via road as shown in **Figure 3-3**. Haulage vehicles will travel from Cape Town on N1 to Johannesburg, passing through Beaufort West and Bloemfontein. Vehicles will continue east on the N12 and N17 before turning off on to an unnumbered gravel road that leads to the proposed site.

Haulage vehicles will mainly travel on the national highway and the total distance to the proposed site is approximately 1570km.



Figure 3-3: Route from Cape Town to Proposed Site

3.5 Route from Johannesburg to Proposed Site

It is assumed that the inverters and support structure will be manufactured in the Johannesburg area and transported to site via the N12 and N17. The travel distance is around 185km, and no road limitations are expected on this route for normal loads vehicles as it will mainly follow national and provincial roads. The route is shown in **Figure 3-4**.

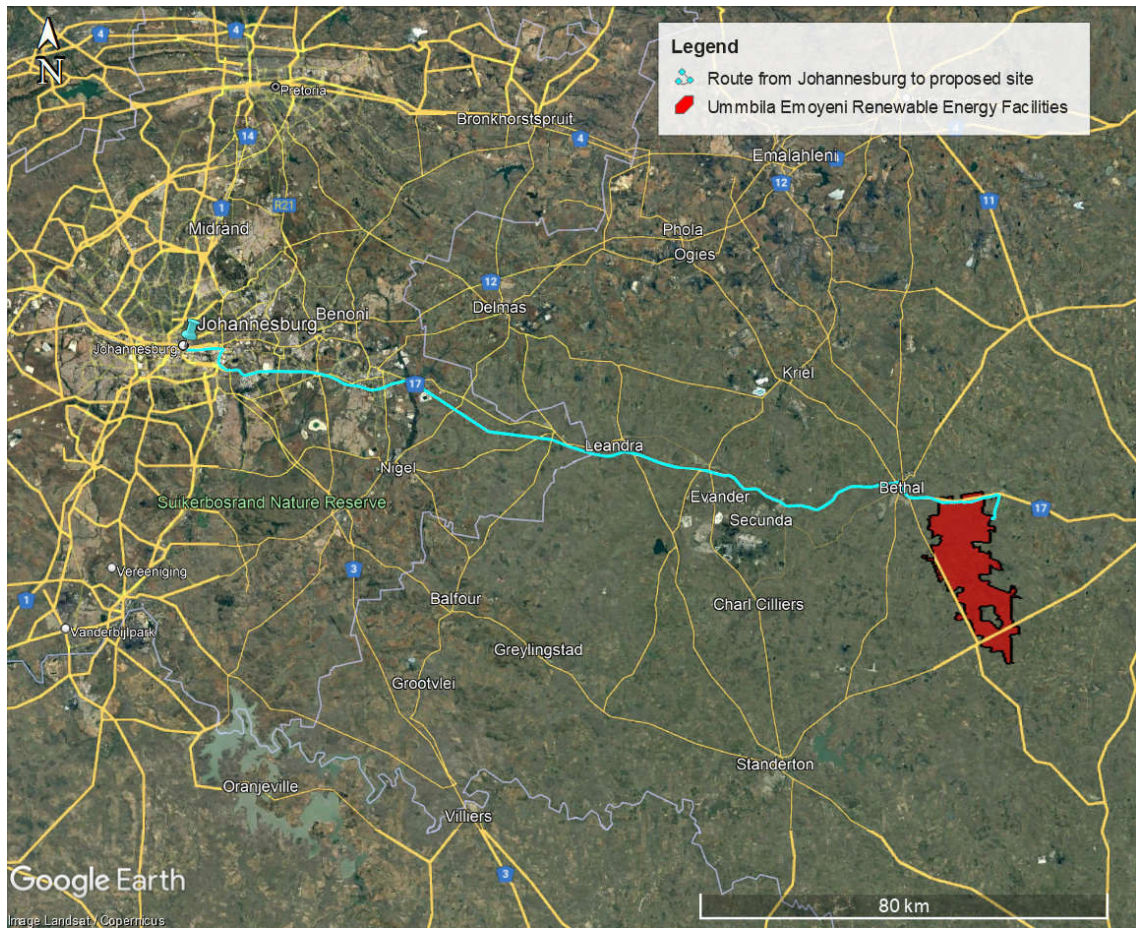


Figure 3-4: Route from Johannesburg to Proposed Site

3.6 Route from Pinetown / Durban to Proposed Site

If the PV modules are manufactured in South Africa, they could possibly be manufactured in the Pinetown area, close to Durban and transported to site via road. These elements are normal loads, and no road limitations are expected along the routes, which is shown in **Figure 3-5**. Haulage vehicles will mainly travel on national and provincial roads and the total distance to the proposed site is approximately 540km.

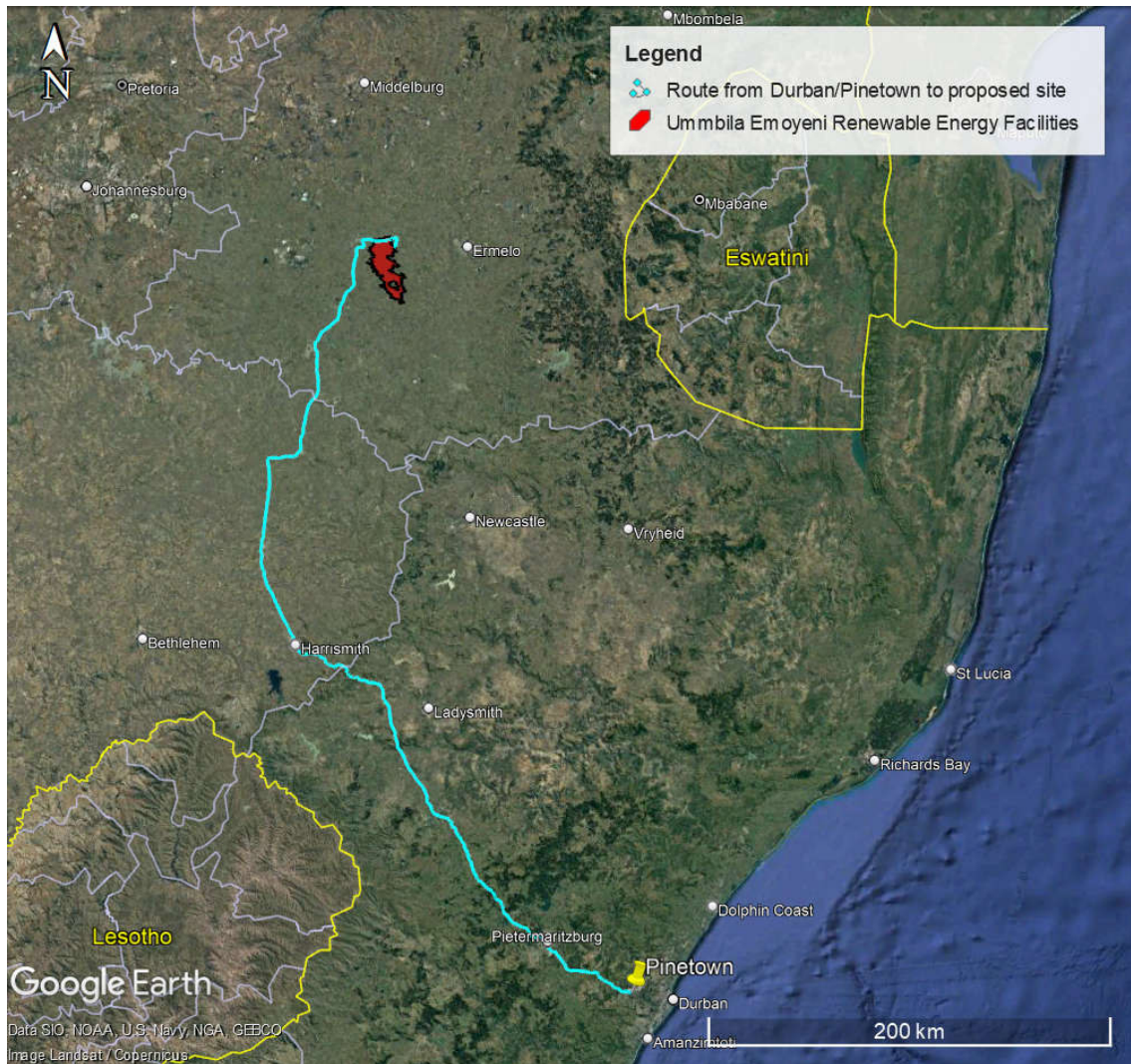


Figure 3-5: Route from Durban / Pinetown to Proposed Site

3.7 Route from Johannesburg Area to Site – Abnormal Load

It is assumed that the transformer will be manufactured locally in South Africa and be transported from the Johannesburg area to site. As the transformer will be transported with an abnormal load vehicle, the route planning needs a more detailed investigation of the feasible routes considering any limitations due to existing road features. Furthermore, a load of abnormal dimensions may cause an obstruction and danger to other traffic and therefore the transformers need to be transported as far as possible on roads that are wide enough for general traffic to pass. It is expected that the transformers can be transported to site via the same route used for normal loads.

There are several bridges, culverts and toll plazas along this route, which need to be confirmed for load bearing and height clearances. The road is fairly straight and will pass through the town of Bethal en route to the site. According to the desktop study, all turning movements along the route are manageable for the abnormal vehicle.

However, there are a number of alternative routes which can be investigated if the above route or sections of the route should not be feasible.

3.8 Proposed main access road and access points to the Proposed Development

The proposed site is bounded by the N17 in the north, the R39 in the south and the east and the R35 in the west, as shown in **Figure 3-6**. Access to the proposed site can be obtained from any of these three roads, depending on the traffic volumes of each road. The road carrying the least traffic will be considered as the best option. However, the N17 is a toll route and should be avoided as main access if other alternatives exist along either the R39 or the R35.

There is also an existing network of unnumbered gravel roads that might be suitable as a main access road to the proposed site as shown in pink and blue in **Figure 3-6**. Once the site layout and project capacity has been reduced as a result of the environmental constraints identified during the EIA and Scoping process, the options for a main access road and access points can be further investigated.

The proposed main access road should link to the site access road, and possible access points are shown in **Figure 3-7**.

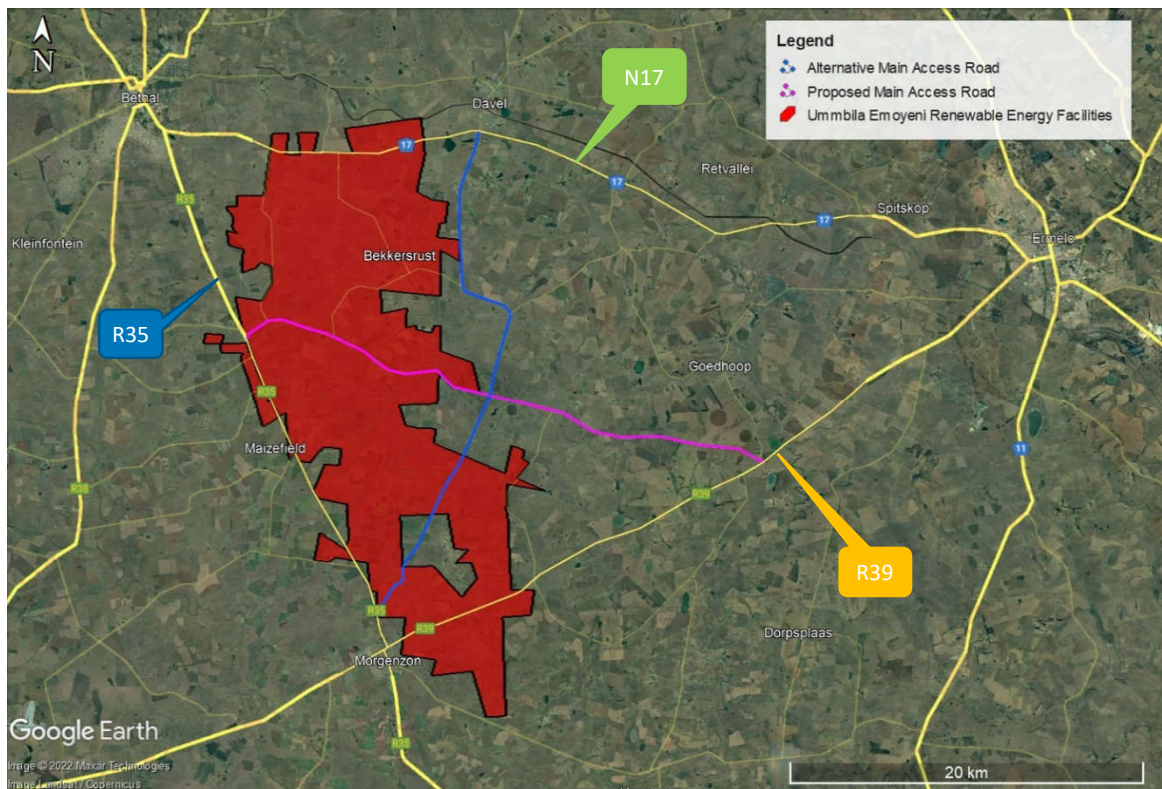


Figure 3-6: Proposed Main Access Roads and alternatives

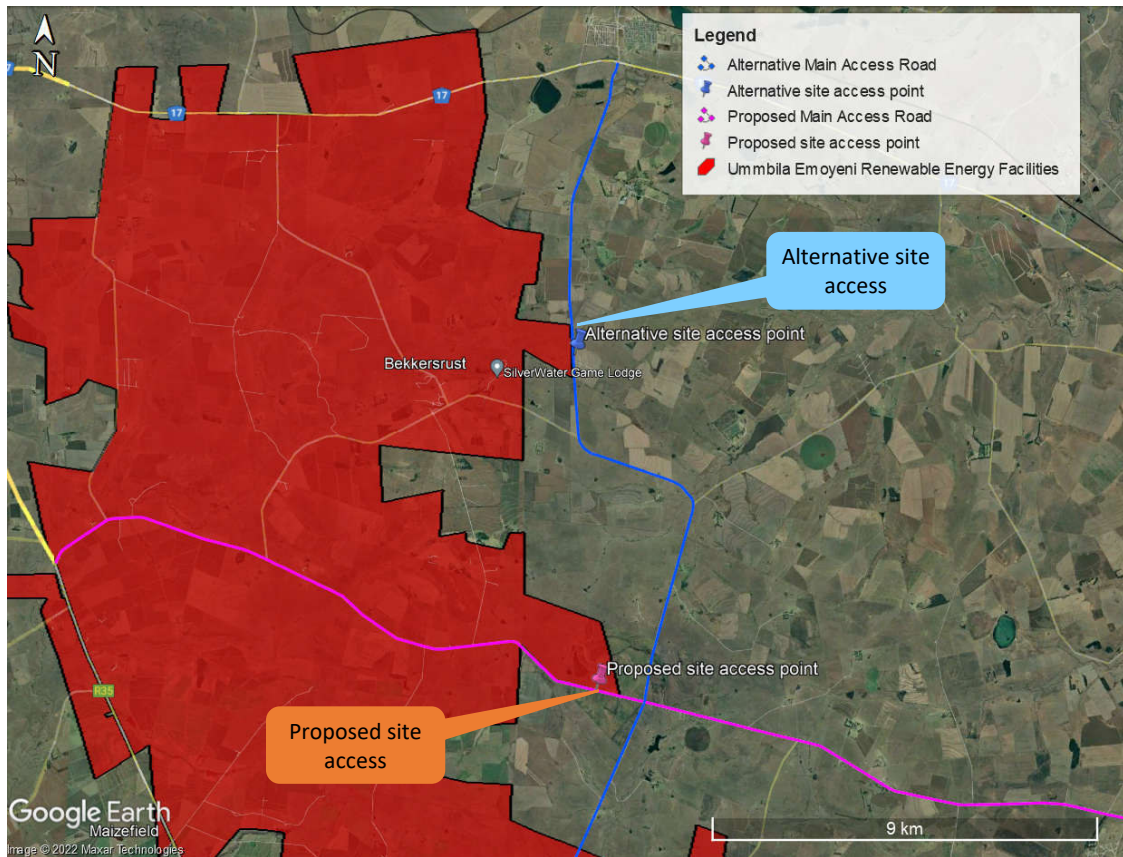


Figure 3-7: Proposed site access points

Other alternative site access roads and points can be investigated at a later stage once the project area has been more clearly defined. All options should however conform to the requirements of access spacing and sufficient shoulder sight distances at these locations.

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

The nearest towns in relation to the proposed development site are Standerton, Secunda, Bethal and Kriel. It is envisaged that most materials, water, plant, services and people can be procured within an 60km radius of the proposed facility. However, this would be informed by the REIPPPP requirements. The nearest city, Johannesburg, is located approximately 180km from the proposed development site.

Concrete batch plants and quarries in the vicinity could be contracted to supply materials and concrete during the construction phase, which would reduce the impact on traffic on the surrounding road network. Alternatively, mobile concrete batch plants and temporary construction material stockpile yards could be commissioned on vacant land near the proposed site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

4 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

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

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

5 IDENTIFICATION OF KEY ISSUES

5.1 Identification of Potential Impacts

The potential transport related impacts are described below.

5.1.1 Construction Phase

Potential impact

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

5.1.2 Operational Phase

During operation, it is expected that staff and security will periodically visit the facility. It is assumed that approximately 30 full-time employees will be stationed on the site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.

5.1.3 Cumulative Impacts

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

6 NO-GO ALTERNATIVE

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

7 POTENTIAL IMPACT ASSESSMENT SUMMARY

The assessment of potential impacts discussed above are collated in the tables below.

7.1 Construction Phase

Table 7-1: Potential Impact - Construction Phase – Traffic Congestion

<p>Impact: Traffic congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site</p> <p>Desktop Sensitivity Analysis of the Site: Traffic congestion possible along the N17, R39 and R35, depending on the main access route selected.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Traffic congestion	Potential traffic congestion and delays on the surrounding road network. The associated noise and dust pollution due to the increase in traffic.	Local	None identified
<p>Description of expected significance of impact The significance of the transport impact during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level. Traffic will return to normal levels after construction is completed.</p> <p>Noise and dust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. These potential impacts are limited to the construction period.</p>			
<p>Gaps in knowledge & recommendations for further study</p> <p>Gaps The following items need to be clarified:</p> <ul style="list-style-type: none"> - Existing traffic volumes along the N17, R35 and R39 - Alternative routes to bypass toll routes if required - Condition of the existing gravel road network if used as main access road - Local or imported components - Water source to be clarified – borehole or transported to site. - Number of components - Number of abnormal loads - Dimensions and weight of components - Size of water bowser to be used - Construction period - Number of site staff - Fleet size - Site layout (depending on environmental constraints identified during the EIA and scoping processes), site access road and internal road layouts <p>Recommendations</p> <ul style="list-style-type: none"> - It is recommended to avoid staggered intersections on the main access road. Intersections should rather be consolidated or realigned as far as possible. - Site visit to determine the condition of the preferred main access road once decided on. - Stagger component delivery to site - Reduce the construction period - The use of mobile batch plants and quarries in close proximity to the site 			

- Staff and general trips should occur outside of peak traffic periods.

7.2 Operational Phase

Table 7-2: Potential Impact – Operational Phase

POTENTIAL IMPACT TABLE – OPERATION PHASE
<i>The traffic generated during this phase will be negligible and will not have a significant impact on the surrounding road network. However, the Client/Facility Manager is to ensure that regular maintenance of gravel roads occurs during operation phase to minimise/mitigate dust pollution.</i>
Gaps in knowledge <ul style="list-style-type: none"> - The number of permanent employees - Availability of acceptable gravel sources required for maintenance of gravel roads - Water source for cleaning of modules. - Frequency at which modules will be cleaned.

7.3 Decommissioning Phase

Table 7-3: Potential Impact - Decommissioning Phase

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

8 CUMULATIVE IMPACTS

The assessment of the potential cumulative impacts is shown in the table below.

Table 8-1: Potential Cumulative Impact

<p>Impact: Traffic congestion due to an increase in traffic.</p> <p>Desktop Sensitivity Analysis of the Site: Traffic congestion and associated noise and dust pollution possible along the N17, R35, R39 and the existing gravel road network, depending on the main access route selected.</p>			
Issue	Nature of Impact	Extent of Impact	No-Go Areas
Traffic congestion	Potential traffic congestion and delays on the surrounding road network and associated noise and dust pollution.	Regional	None identified
<p>Description of expected significance of impact The significance of the transport impact can be rated as high. <i>The increase in traffic cannot be completely mitigated but mitigation measures will significantly reduce the impact. Noise and dust pollution is limited to the construction and decommissioning periods.</i></p> <p><i>It should be noted that even if both the wind energy and solar PV facilities are constructed and decommissioned at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.</i></p>			
<p>Gaps in knowledge & recommendations for further study</p> <ul style="list-style-type: none"> - List of approved and planned renewable energy developments in the area/region. 			

9 CONCLUSION AND RECOMMENDATIONS

This scoping report addressed key issues and alternatives to be considered for the proposed Umbhila Emoyeni Solar PV facility:

- The preferred Port of Entry for imported components is the Port of Richard's Bay.
- The main access road to the site still needs to be identified as soon as the site layout has been finalised.
- Alternative route should be determined where needed to avoid toll routes where abnormal and heavy vehicles cannot be accommodated, or to avoid excessive toll costs.
- It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will hence need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed. The gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage.
- The construction phase traffic, although significant, will be temporary and can be mitigated to an acceptable level.
- During operation, it is expected that staff and security will periodically visit the facility. It is assumed that approximately 30 full-time employees will be stationed on the site. The traffic generated during this phase will be minimal and will not have an impact on the surrounding road network.
- The construction and decommissioning phases of the development is the only significant traffic generator and therefore noise and dust pollution will be higher during this phase. The duration of this phase is short term i.e. the impact of the traffic on the surrounding road network is temporary and solar facilities, when operational, do not add any significant traffic to the road network.

The following will be assessed in the EIA phase:

- Confirmation of trip generation based on the activities related to traffic movement for the construction and operation (maintenance) phases of the facility.
- Preferred access routes and access points to the site, depending on site layout
- Existing traffic volumes on the N17, R35 and R39, depending on the main access road selected
- Impact assessment and mitigation measures
- Cumulative impact assessment

10 REFERENCES

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

Annexure A – SPECIALIST EXPERTISE

IRIS SIGRID WINK

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

SUMMARY OF EXPERIENCE

Iris is a Professional Engineer registered with ECSA (20110156). She joined JG Afrika (Pty) Ltd. in 2012. Iris obtained a Master of Science degree in Civil Engineering in Germany and has more than 19 years of experience in a wide field of traffic and transport engineering projects. Iris left Germany in 2003 and has worked as a traffic and transport engineer in South Africa and Germany. She has technical and professional skills in traffic impact studies, public transport planning, non-motorised transport planning and design, design and development of transport systems, project planning and implementation for residential, commercial and industrial projects and providing conceptual designs for the abovementioned. She has also been involved with transport assessments for renewable energy projects and traffic safety audits.

Iris is registered with the International Road Federation as a Global Road Safety Audit Team Leader.

PROFESSIONAL REGISTRATIONS & INSTITUTE MEMBERSHIPS

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

EDUCATION

1996 - Matric – Matric (Abitur) – Carl Friedrich Gauss Schule, Hemmingen, Germany

1998 - Diploma as Draughtsperson – Lower Saxonian State Office for Road and Bridge Engineering

2003 - MSc Eng (Civil and Transportation) – Leibniz Technical University of Hanover, Germany

SPECIFIC EXPERIENCE (Selection)

JG Afrika (Pty) Ltd (Previously Jeffares & Green (Pty) Ltd)

2016 – Date

Position – Associate

- **Transport Impact Assessments and Management Plan** - Euronotus Wind&Solar Energy Cluster in the Western Cape, Client: WSP on behalf of G7 Energies
- **Transport Impact Assessment for De Aar Solarfarm** - Client: Mulilo
- **Transport Impact Assessments for the Mpumalanga Windfarms** - Client: Enertrag
- **Transport Impact Assessment for the Hyperion Thermal Plant** - Client: Red Rocket
- **Transport Impact Assessment for the Richards Bay Gas to Power Facility** - Client: Savannah
- **Transport Impact Assessment for the Pienaarspoort Wind Energy Facility** - Client: Savannah
- **Transport Impact Assessment for Oya Black Mountain Solar Farm** - Client: G7 Energies
- **Traffic Impact Assessment for the Nooiensfontein Housing Development** - Client: City of Cape Town
- **Kudusberg Windfarm** – Transport study for the proposed Kudusberg Windfarm near Sutherland, Northern Cape – Client: G7 Renewable Energies
- **Kuruman Windfarm** – Transport study for the proposed Kuruman Windfarm in Kuruman, Northern Cape – Client: Mulilo Renewable Project Developments
- **Coega West Windfarm** – Transportation and Traffic Management Plan for the proposed Coega Windfarm in Coega, Port Elizabeth – Client: Electrawinds Coega
- **Traffic and Parking Audits** for the Suburb of Groenvallei in Cape Town – Client: City of Cape Town Department of Property Management.
- **Road Safety Audit** for the Upgrade of N1 Section 4 Monument River – Client: Aurecon on behalf of SANRAL
- **Sonop Windfarm** – Traffic Impact Assessment for the proposed Sonop Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Universal Windfarm** - Traffic Impact Assessment for the proposed Universal Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Road Safety Audit** for the Upgrade of N2 Section 8 Knysna to Wittedrift – Client: SMEC on behalf of SANRAL
- **Road Safety Audit** for the Upgrade of N1 Section 16 Zandkraal to Winburg South – Client: SMEC on behalf of SANRAL
- **Traffic and Road Safety Studies** for the Improvement of N7 Section 2 and Section 3 (Rooidraai and Piekenierskloof Pass) – Client: SANRAL
- **Road Safety Appraisals** for Northern Region of Cape Town – Client: Aurecon on behalf of City of Cape Town (TCT)
- **Traffic Engineering Services** for the Enkanini Informal Settlement, Kayamandi - Client: Stellenbosch Municipality
- **Lead Traffic Engineer** for the Upgrade of a 150km Section of the National Route N2 from Kangelana to Pongola in KwaZulu-Natal, Client: SANRAL
- **Traffic Engineering Services** for the Kosovo Informal Settlement (which is part of the Southern Corridor Upgrade Programme), Client: Western Cape Government

- **Traffic and Road Safety Studies** for the proposed Kosovo Informal Housing Development (part of the Southern Corridor Upgrade Program), Client: Western Cape Government.
- **Road Safety Audit** Stage 3 – Upgrade of the R573 Section 2 between Mpumalanga/Gauteng and Mpumalanga/Limpopo, Client: AECOM on behalf of SANRAL
- **Road Safety Audit** Stage 1 and 3 – Upgrade of the N2 Section 5 between Lizmore and Heidelberg, Client: Aurecon on behalf of SANRAL
- **Traffic Safety Studies** for Roads Upgrades in Cofimvaba, Eastern Cape – Client: Cofimvaba Municipality
- **Road Safety Audit** Stage 1 and 3 – Improvement of Intersections between Olifantshoek and Kathu, Northern Cape, Client: Nadeson/Gibb on behalf of SANRAL
- **Road Safety Audit** Stage 3 – Upgrade of the Beacon Way Intersection on the N2 at Plettenberg Bay, Client: AECOM on behalf of SANRAL
- **Traffic Impact Assessment** for a proposed Primary School at Die Bos in Strand, Somerset West, Client: Edifice Consulting Engineers
- **Road Safety Audit** Stage 1 and 3 – Improvement of R75 between Port Elizabeth and Uitenhage, Eastern Cape, Client: SMEC on behalf of SANRAL