iWink Consulting
Traffic & Transport Engineering
Road Safety

MAYOGI PHOTOVOLTAIC 1 & 2 FACILITIES EASTERN CAPE PROVINCE

Transport Impact Assessment

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MAYOGI PHOTOVOLTAIC 1 & 2 FACILITIES
TRANSPORT IMPACT ASSESSMENT

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(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	Section 1, Annexure A
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Annexure B
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1
(cA) an indication of the quality and age of base data used for the specialist report;	Throughout report
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	n/a
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 2
(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;	n/a
(g) an identification of any areas to be avoided, including buffers;	n/a
(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;	n/a
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities;	Section 6 and 7
(k) any mitigation measures for inclusion in the EMPr;	Section 7
(l) any conditions for inclusion in the environmental authorisation;	Section 7
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	n/a
(n) a reasoned opinion— i. whether the proposed activity, activities or portions thereof should be authorised; 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	Section 9

that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A -No feedback has yet been received from the public participation process regarding the visual environment
(p) any other information requested by the competent authority	N/A. No information regarding the visual study has been requested from the competent authority to date.
(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

EXECUTIVE SUMMARY

This report serves as the Transport Impact Assessment aimed at determining the traffic impact of the proposed Mayogi Photovoltaic (PV) 1 and 2 Facilities near Kirkwood in the Eastern Cape Province. The proposed project sites are located approximately 13 km south-west of Kirkwood and 35 km west of Addo and comprise:

- Mayogi PV 1 – up to 75 MW and
- Mayogi PV 2 – up to 75 MW

The two solar projects will be located adjacent to each other within the Sundays River Valley Local Municipality in the Sarah Baartman District of the Eastern Cape Province of South Africa. The sites will respectively accommodate a solar power facility and associated support structures and facilities to allow for the generation and evacuation of electricity.

Feasible accessibility was assessed considering sight lines, access spacing requirements and road safety aspects and are discussed in this report. It is recommended to ensure that the access point is kept clear of vegetation and any other obstructions to ensure sight lines are kept.

In general, non-motorised transportation (NMT) is a dominant mode of transportation in rural areas, with private cars and minibus/taxis being the second-most used mode of transport, followed by buses. Currently, there are no known future planned public transport facilities in the vicinity of the site. However, generally the developer or appointed contractor of a renewable energy project will provide shuttle busses for workers during the construction phase.

The highest trip generator for the projects is expected during the construction phase. The actual construction stage peak hour trips are dependent on the construction period, construction programming, material availability, component delivery, abnormal load permitting etc. The decommissioning phase is expected to generate similar trips as the construction phase. The traffic impact during the operational phase is considered negligible.

For the construction and decommissioning phases, the impact expected to be generated by the vehicle trips is an increase in traffic and the associated noise, dust, and exhaust pollution. Based on the high-level screening of impacts and mitigation, the projects are expected to have a negative low impact during the construction and decommissioning stages including the recommended mitigation measures.

1 INTRODUCTION

1.1 Project Description

JUWI South Africa (Pty) Ltd is proposing the development of two commercial solar energy generation facilities and associated infrastructure on a farm located near Kirkwood in the Eastern Cape Province. The proposed projects will be located in a rural environment around 13 km south-west of Kirkwood and 35 km west of Addo, adjacent to the R75 (see **Figure 1-1**) and comprise of a contracted capacity of up to 75 MW each.

Development areas have been identified and within these identified development areas, the development footprints have been defined in a manner which has considered the environmental sensitivities present on the affected property and intentionally remains outside of highly sensitive areas. The affected farm property is Farm No. 692. The project sites are located outside of the Renewable Energy Development Zone (REDZ) but within the Eastern EGI Corridor.

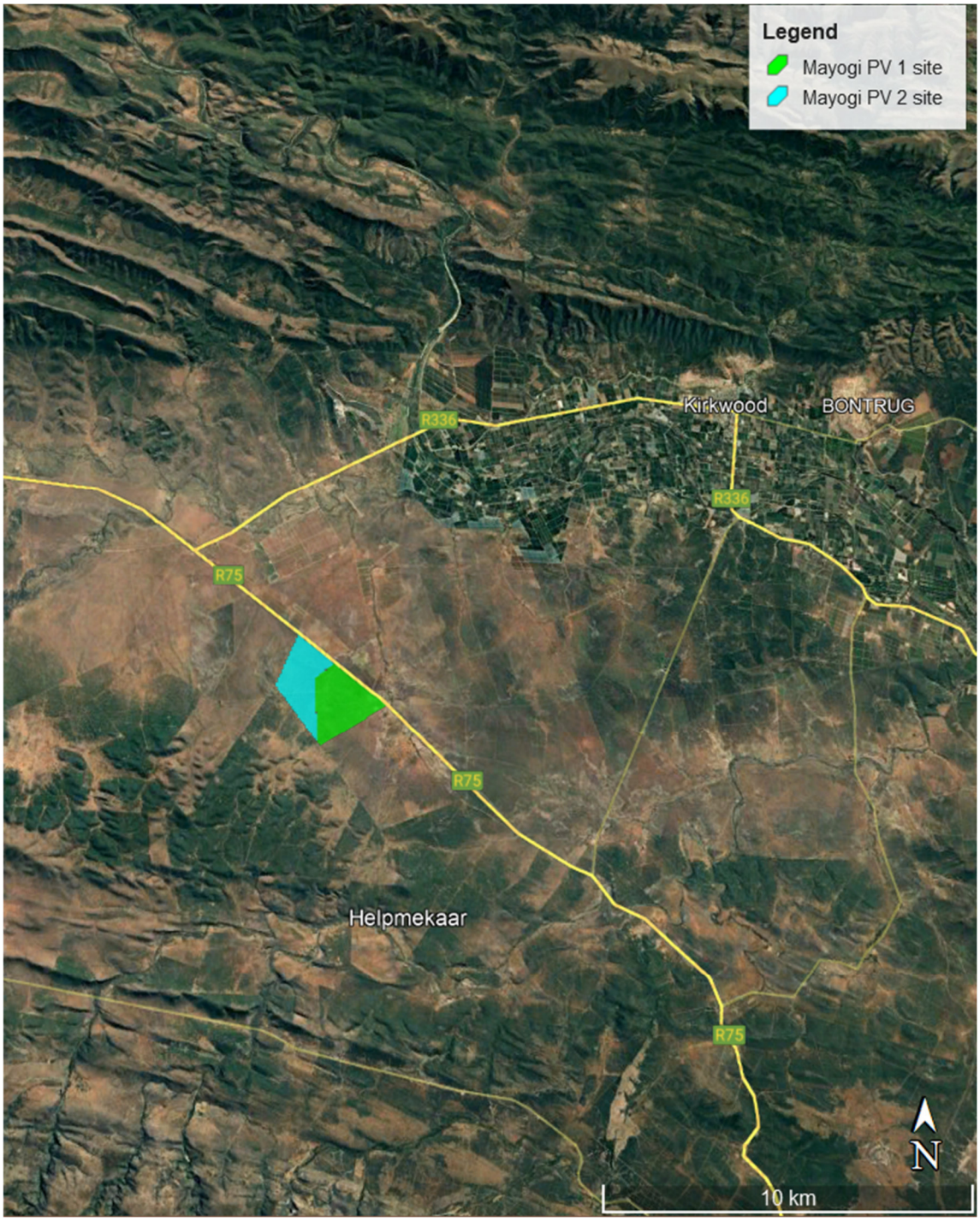

Figure 1-1: Aerial View of location of the Mayogi PV 1 and 2 project sites

The proposed project details are summarized in **Table 1-1.**

Table 1-1:Project information

Facility Name:	Mayogi Solar Energy Facilities (PV 1 & 2)
Applicant:	JUWI South Africa (Pty) Ltd
Farm property:	Farm No. 692
Province:	Eastern Cape
Capacity:	Up to 75 MW each – total 150 MW
Number of panels:	Estimated 150 000 panels each – total 300 000 panels
Type of Technology:	Photovoltaic/ 5m height
Structure orientation:	It is expected that the panels will consist of crystalline silicon or thin film technology (tbc) and be either: ▪ Fixed to a single-axis horizontal tracking structure where the orientation of the panel varies according to the time of the day, as the sun moves from east to west or tilted at a fixed angle towards North with the angle of tilt optimised for cost and system performance; or ▪ Constructed at a fixed tilt – north facing at a defined angle or tilt.
BESS:	Generally, either Lithium Battery (such as Lithium Iron Phosphate or Lithium Nickel Manganese Cobalt oxides) or Vanadium Redox technology is considered for a project of this nature. The main components of the BESS include the batteries, power conversion system and transformer which is assumed to be stored in various rows of containers. Footprint of BESS will be around 1 ha.
Inverter:	Sections of the PV array will need to be wired to inverters. The inverter is generally a pulse width mode inverter that converts direct current (DC) electricity to alternating current (AC) electricity at grid frequency. Cabling will comprise communication, AC and DC cables.
Operations and Maintenance (O&M) building footprint:	Operation and maintenance buildings (~0.1 ha) will include: ▪ Office (~250m²); ▪ Store room (~200m²); ▪ Staff lockers and changing room (~100m²); ▪ Security control (~40m²); ▪ Sanitation facilities with septic tank outside; ▪ Conservancy Tank and borehole (if possible).

Batching plant (temporary):	It is expected that gravel and sand will be stored in separate heaps whilst the cement will be contained in a silo. Alternatively, ready mix trucks may be utilized.
Construction Camp and Laydown area:	One construction camp will be required with offices and other facilities, such as toilets, septic tank, for the construction phase - ~10x 40ft containers (<0.1 ha footprint). Temporary laydown area proposed to be ~2 ha.
Internal Roads:	Internal roads need to be provided to the site and between project components inclusive of stormwater infrastructure. As far as possible, internal roads will follow existing gravel roads and paths, of which some may require widening/upgrading. Further internal roads will need to be constructed with a minimum width of 6 m. The total length of internal roads needs to be confirmed. The site access roads recommended to provide 8 m width. Where/if required, for turning circle/bypass areas will need to be constructed.
Fencing height/length:	Up to 2 m minimum height/16 km length
Grid infrastructure / Substation:	Connecting the array to the electrical grid requires transformation of the voltage from LV voltage to 33kV to 132kV. The normal components and dimensions of a distribution rated electrical substation will be required. Output voltage from the inverter is LV AC and this is fed into step up transformers to 33kV. From the inverter transformer an RMU is uses to connect to the onsite substation. Two on-site substations will be provided to step up the voltage from 33kV to 132kV, after which the power will be evacuated into the national grid. Footprint: ~ 1 ha. A switching substation (and associated infrastructure) will be positioned close to the existing Eskom Skilpad substation.
Cabling/Transformer/IPP Electrical Infrastructure:	High voltage transformer and high voltage overhead-lines connecting the transformer to the existing Eskom 132 kV grid line via an approximately 200m long underground cable. This area will include construction laydown area, construction camp facilities and storage area. Medium voltage cabling will link PV facility to grid connection infrastructure and internal underground cabling will be provided of up to 33 kV (22 kV or 33 kV). Cabling will be underground wherever possible and overhead 33 kV lines will group PV areas to cross valleys and ridges to get to on-site substation.
Site access:	From R75

1.2 Scope and Objectives

The Transport Impact Assessment is aimed at determining the traffic impact of the proposed land development proposal and whether such development can be accommodated by the external transportation system.

The report deals with the items listed below and focuses on the surrounding road network in the vicinity of the site:

- The proposed development;
- The existing road network and any future road planning proposals;
- Trip generation for the proposed development during the construction, operation, and decommissioning phases of the facility;
- Anticipated traffic impact of the proposed development;
- Access requirements and feasibility of proposed access points;
- Determine a main route for the transportation of components to the proposed project site;
- Determine a preliminary transportation route for the transportation of materials, equipment and people to site;
- Recommend alternative or secondary routes, where possible and required;
- Assess Public Transport accessibility;
- Assess Non-motorised Transport availability; and
- Recommended high-level upgrades to the road network, if necessary.

1.3 Details of Specialist

Iris Sigrid Wink of iWink Consulting (Pty) Ltd. is the Traffic & Transportation Engineering Specialist appointed to provide a Transport Impact Assessment for the proposed Mayogi PV Facilities. Iris Wink is registered with the Engineering Council of South Africa (ECSA), with Registration Number 20110156. A curriculum vitae is included in **Appendix A** of this report.

A signed Specialist Statement of Independence is included in **Appendix B**.

1.4 Terms of Reference

There is no protocol relevant to traffic impact assessments and therefore the specialist study is undertaken according to Appendix 6 of the EIA Regulations (GNR 982, as amended). A transport specialist report should 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 access;
- Assessment of freight requirements and permitting needed for abnormal loads; and
- Traffic accommodation during construction**.**

2 APPROACH AND METHODOLOGY

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

- Construction phase;
- Operational phase; and
- Decommissioning phase.

This transport study includes the following tasks:

Project Assessment

- Communication with the project team to gain sound understanding of the projects.
- Overview of available project background information including, but not limited to, location maps, site development plans, anticipated vehicles to the site (vehicle type and volume), components to be transported and any resulting abnormal loads.
- Research of all available documentation and information relevant to the proposed facility.

Access and Internal Roads Assessment

- Assessment of the proposed access points including:
    - Feasible location of access points
    - Motorised and non-motorised access requirements
    - Queuing analysis and stacking requirements, if required
    - Access geometry
    - Sight distances and required access spacing
    - Comments on internal circulation requirements and observations

Haulage Route Assessment

- Determination of possible haulage routes to site regarding:
    - National routes
    - Local routes
    - Site access points
    - Road limitations due to abnormal loads

Traffic Estimation and Impact

- Construction, operational, and decommissioning phase vehicle trips
    - Generated vehicles trips
    - Abnormal load trips
    - Access requirements
- Investigation of the impact of the development traffic generated during construction, operation, and decommissioning.

Report (Documentation)

- Reporting on all findings and preparation of the report.

2.1 Information Sources

The following guidelines have been used to determine the extent of the traffic study:

- Project Information provided by the Client;
- Google Earth.kmz provided by the Client;
- Google Earth Pro 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
- Manual for Traffic Impact Studies, Department of Transport, 1995;
- TRH26 South African Road Classification and Access Management Manual, COTO; and
- TMH 16 South African Traffic Impact and Site Traffic Assessment Manual (Vol 1/Vol2), COTO, August 2012.

2.2 Assumptions, Knowledge Gaps and Limitations

The following assumptions and limitations apply:

- This study is based on the project information provided by the client.
- According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000 mm, total maximum width 4 300 mm and total maximum length 10 500 mm.
  It is envisaged that for this project the inverter, transformer, and switchgear will be transported to site in containers on a low bed truck and trailer. The transport of a mobile crane and the transformer are the only abnormal loads envisaged. The crane will be utilised for offloading equipment, such as the transformer.
- Maximum vertical height clearances along the haulage route are 5.2 m for abnormal loads.
- If any elements are manufactured within South Africa, these will be transported from their respective manufacturing centres, which would be either in the greater Cape Town area, Johannesburg, or possibly in Pinetown/Durban.
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads.
- Material for the construction of internal access roads will be sourced locally as far as possible.
- The final access points are to be determined during the detailed design stage. Only recommended access points at conceptual level can be given at this stage.
- Planned or approved projects in the vicinity of the site to be considered as part of the cumulative impacts.
- An 18 to 24-months construction period is assumed with some of the construction period dedicated to site prep and civil works.

2.3 Consultation Processes Undertaken

The Transport Impact Assessment is based on available project information and consultation with the developer.

3 LEGISLATIVE AND PERMIT REQUIREMENTS

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

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

4 DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 General Description

The proposed Mayogi PV 1 and 2 sites are located in a rural environment approximately 13 km south-west of Kirkwood in the Eastern Cape Province. The affected farm is Farm No. 692. The project sites are both located on the south-western site of the R75 (see **Figure 4-1**).

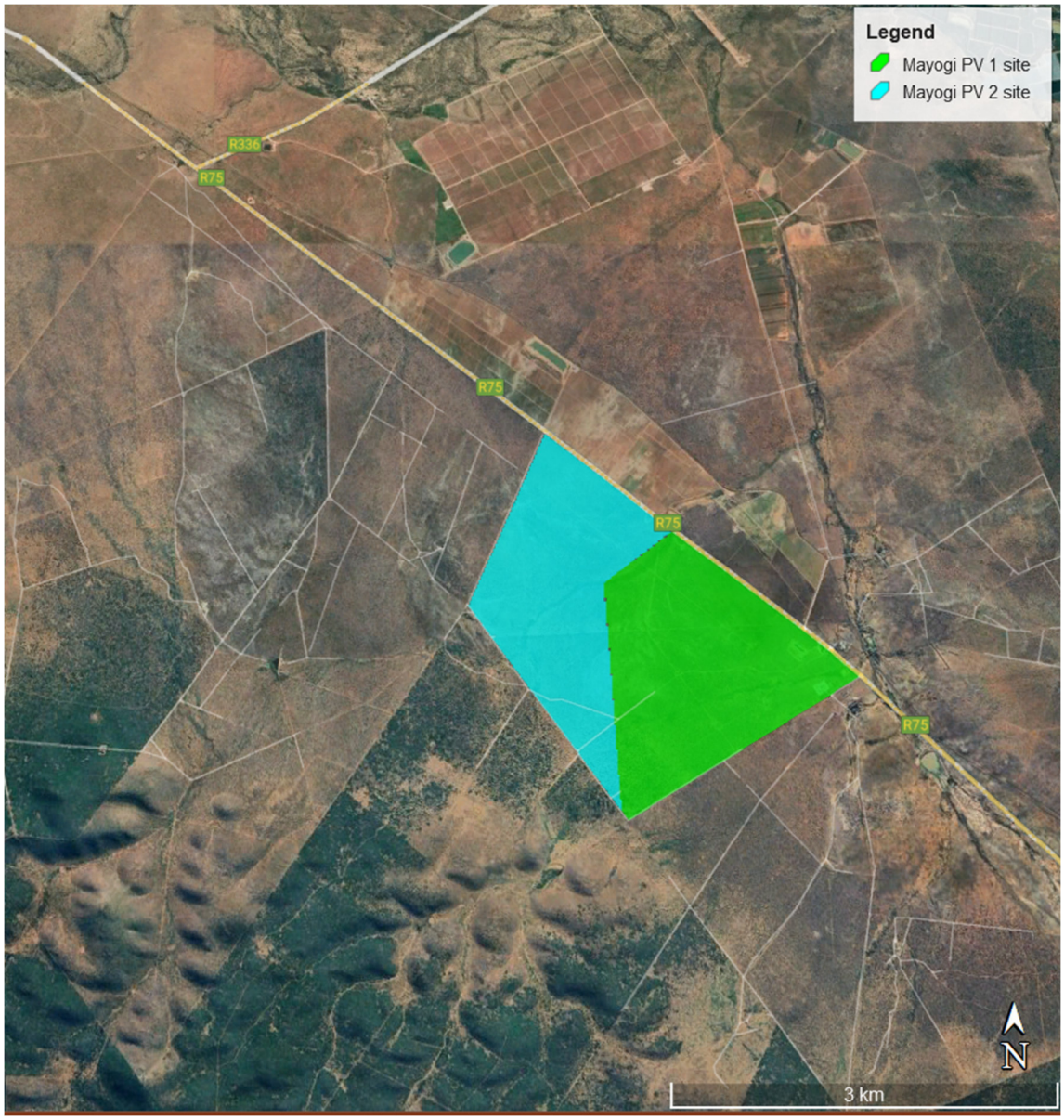

Figure 4-1: Aerial View of the proposed Mayogi PV 1 and 2 project sites

The sites are mostly undeveloped but for a farmstall (Mayogi Wildstal) and hunting business, located directly on the R75, opposite the Daniell African Arts and Cheetah Project (see **Figure 4-2** to **Figure 4-4**).

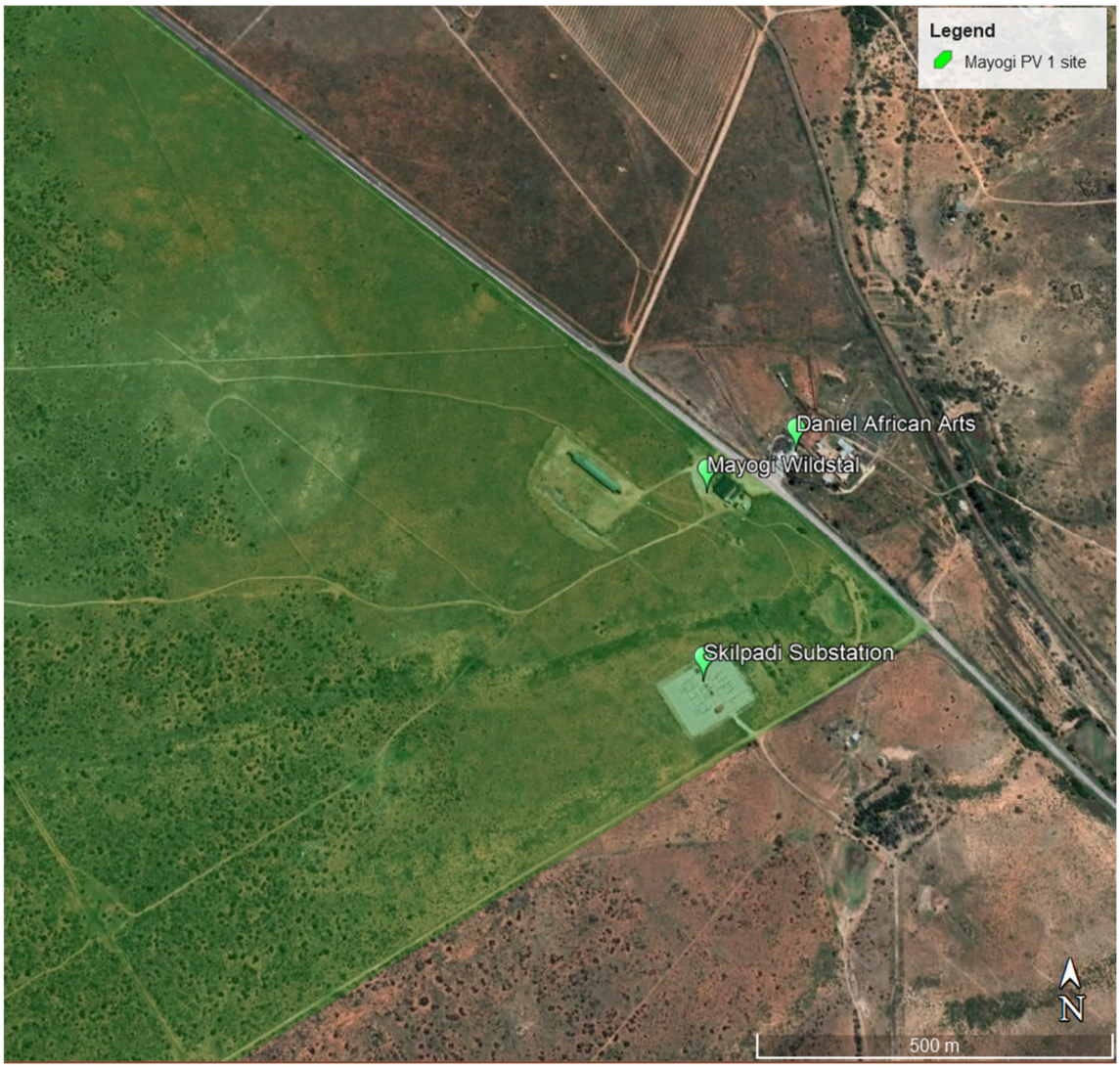

Figure 4-2: Aerial View of Mayogi Wildstal & Daniell African Arts

Figure 4-3: Mayogi Wildstal

Figure 4-4: Daniell African Arts & Cheetah Project

The development footprint will contain the following infrastructure to enable the Mayogi PV 1 and 2 facilities to generate up to 75 MW each:

- PV panels mounted on either a single axis tracking or fixed structure;
- Inverters and transformer;
- Low voltage cabling between the PV panels to the inverters;
- Fencing around the project development area;
- Up to 33kV cabling between the project components and the facility substation (where possible underground);
- Two 33kV/132kV on-site facility substation;
- Battery Energy Storage System (BESS);
- Site offices and maintenance buildings, including gate house and security building, control centre, offices, conservancy tank and potentially borehole(s);
- Laydown area and construction camp; and
- Access and internal distribution roads.

4.2 Alternatives

The Department of Environmental Affairs and Tourism (DEAT) 2006 guidelines on 'assessment of alternatives and impacts' proposes the consideration of four types of alternatives, namely, the no-go, location, activity, and design alternatives. It is, however, important to note that the regulation and guidelines specifically state that only 'feasible' and 'reasonable' alternatives should be explored. It also recognizes that the consideration of alternatives is an iterative process of feedback between the developer and EAP, which in some instances culminates in a single preferred project proposal. An initial site assessment was conducted by the developer and the farm portion was found favorable due to its proximity to grid connections, solar radiation, site access and relative flat terrain. The greater area was considered based on these factors. However, environmentally sensitive and "no-go" areas, as identified by the specialists, were considered and avoided as far as possible, where required.

The following alternatives were considered in relation to the proposed activity:

<u>Location Alternatives</u>

The site selection process for a PV facility is almost always underpinned by a good solar resource. Other key considerations include environmental and social constraints, proximity to various planning units and strategic areas, terrain and availability of grid connection infrastructure.

Need and Desirability:

- Increased surety of supply
- Lesser dependence on fossil fuel generated power
- Growing demand for electricity fuelled by economic growth, lack of generation capacity by Eskom etc.
- REIPP program opportunities
- Need for cleaner electricity/ CDM project etc.
- Employment opportunities etc.

BESS

As technological advances within battery energy storage systems (BESS) are frequent, two BESS technology alternatives are considered: Solid state battery electrolytes and Redox-flow technology. Solid state battery electrolytes, such as lithium-ion (Li-ion), zinc hybrid cathode, sodium ion, flow (e.g., zinc iron or zinc bromine), sodium sulphur (NaS), zinc air and lead acid batteries, can be used for grid applications. Compared to other battery options, Li-ion batteries are highly efficient, have a high energy density and are lightweight. As a result of the declining costs, Li-ion technology now accounts for more than 90% of battery storage additions globally (IRENA, 2019). Flow batteries use solid electrodes and liquid electrolytes. The most used flow battery is the Vanadium Redox Flow Battery (VRFB), which is a type of rechargeable flow battery that employs vanadium ions in different oxidative states to store chemical potential energy.

Design and layout alternatives

It is customary to develop the final/detailed construction layout of the solar PV facility only once an Independent Power Producer (IPP) is awarded a successful bid under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or an alternative programme, after which major contracts are negotiated and final equipment suppliers identified.

For the purpose of the application process, site layout alternatives will not be comparatively assessed, but rather a single layout will be refined as additional information becomes available throughout the EIA process (e.g., specialist input, additional site surveys, ongoing stakeholder engagement).

The development area has been selected as a practicable option for the facility, considering technical preference and constraints, as well as initial No-Go layers informed by specialist site surveys. Following further site screening by the specialists (scheduled to take place during the EIA phase), the development footprint will be finalised for impact assessment. Design and layout alternatives will be considered and assessed as part of the EIA. These include alternatives for the PV area, substation locations and also for the construction / laydown area.

Technology alternatives: Solar panels

There are several types of semiconductor technologies currently available and in use for PV solar panels. Two, however, have become the most widely adopted, namely crystalline silicon (Mono-facial and Bi-facial) and thin film. The technology that (at this stage) proves more feasible and reasonable with respect to the proposed solar facility is crystalline silicon panels, due to it being non-reflective, more efficient, and with a higher durability.

Due to the rapid technological advances being made in the field of solar technology the exact type of technology to be used, such as bifacial panels, will only be confirmed at the onset of the project.

No-go alternative

This alternative considers the option of ‘do nothing’ and maintaining the status quo. It is understood that the site is currently zoned for agricultural land uses. Should the proposed activity not proceed, the site will remain unchanged and will continue to be used for agricultural purposes. The potential

opportunity costs in terms of alternative land use income through rental for energy facility and the supporting social and economic development in the area would be lost if the status quo persist.

4.2.1 Specialist comment regarding alternatives

From a transport engineering perspective, the alternatives listed above (i.e., electrical infrastructure location alternatives and the technology options for the BESS) are equally acceptable as it does have a nominal impact on the traffic on the surrounding road network.

4.3 Proposed Accesses

The proposed access points for the two facilities have been assessed in line with access spacing requirements, required sight lines and road safety considerations.

For *Mayogi PV 1*, it is proposed to make use of the existing farm road (MN50455), from which the Skilpad Substation gains access as well (see **Figure 4-5** and **Figure 4-6**). The site access to Mayogi PV 1, as indicated in Figure 4-6, will need to provide a minimum stacking space of at least 25 m between the access control (i.e., boom) and MN50455 to ensure that at least one large construction vehicle can stack in front of the security control without obstructing vehicles on the farm road.

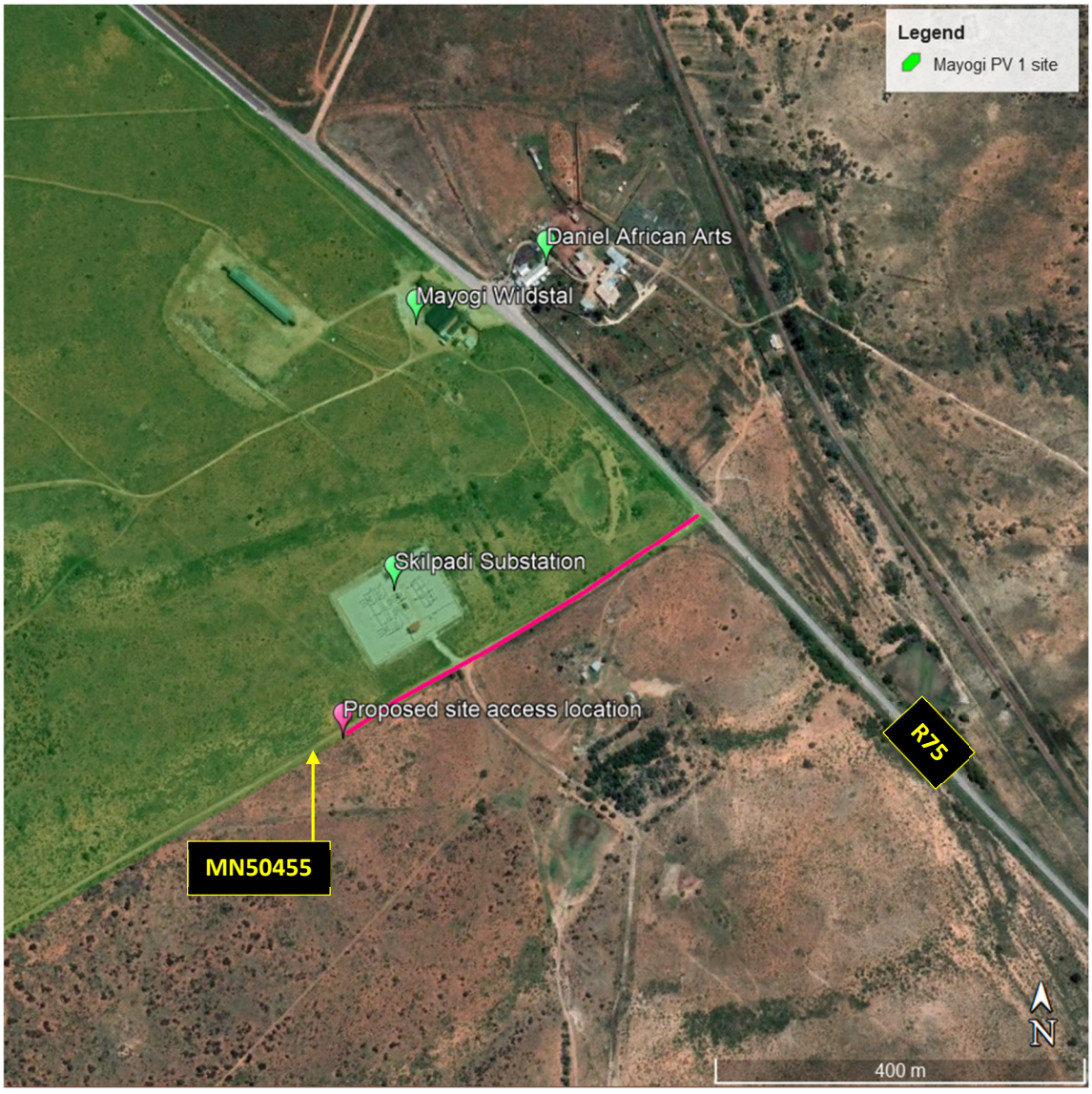

Figure 4-5 Aerial view of proposed access for Mayogi PV 1

Figure 4-6: MN50455 towards Skilpad Substation

For *Mayogi PV 2*, it is recommended to make use of an existing farm gate onto the site (see **Figure 4-7** and **Figure 4-8**). A minimum stacking space of at 25 m will need to be provided between any access control (i.e., boom) and the road edge of the R75 to ensure that at least one large construction vehicle can stack in front of the security control without obstructing vehicles on the external road.

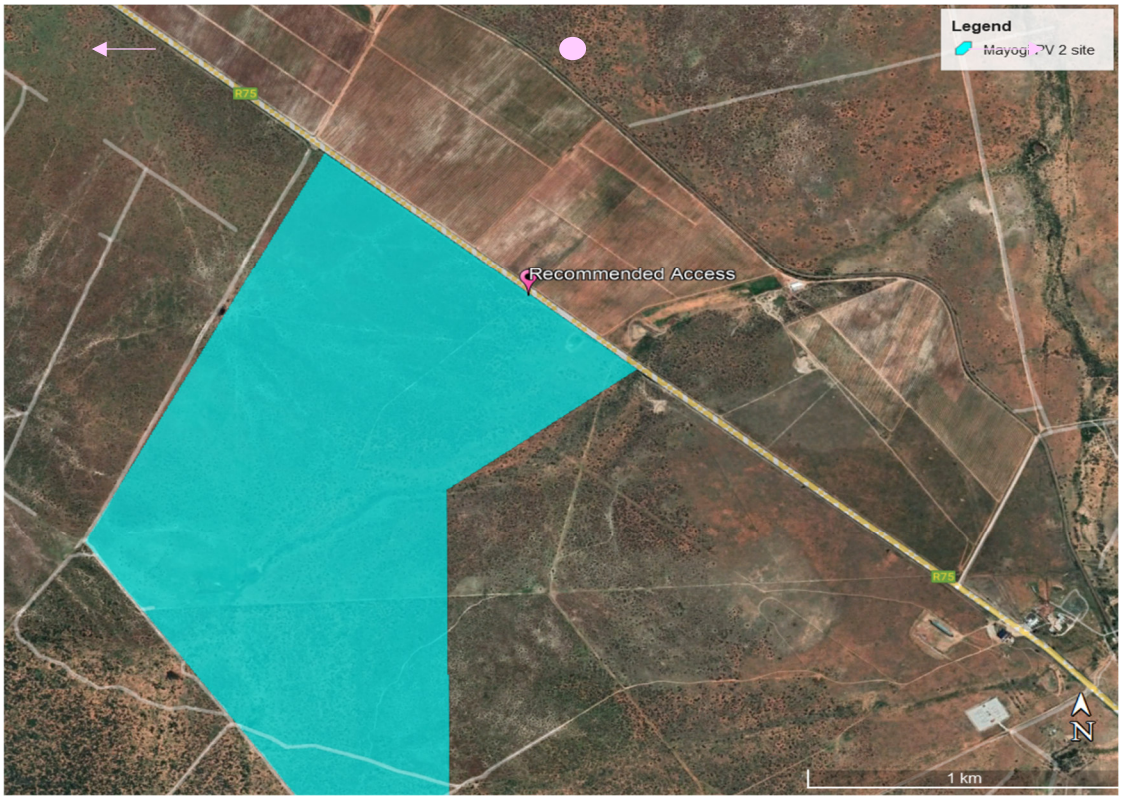

Figure 4-7 Aerial view of recommended access for Mayogi PV 2

Figure 4-8: Recommended Access to Mayogi PV 2 site

In accordance with *Figure 2.5.5(a) of the TRH17 Guidelines for the Geometric Design of Rural Roads* (see **Figure 4-9**), the shoulder sight distance for a stop-controlled condition on a road with a speed limit of 100 km/h, needs to be a minimum of 420 m for the largest vehicle (5m set back from the intersecting road).

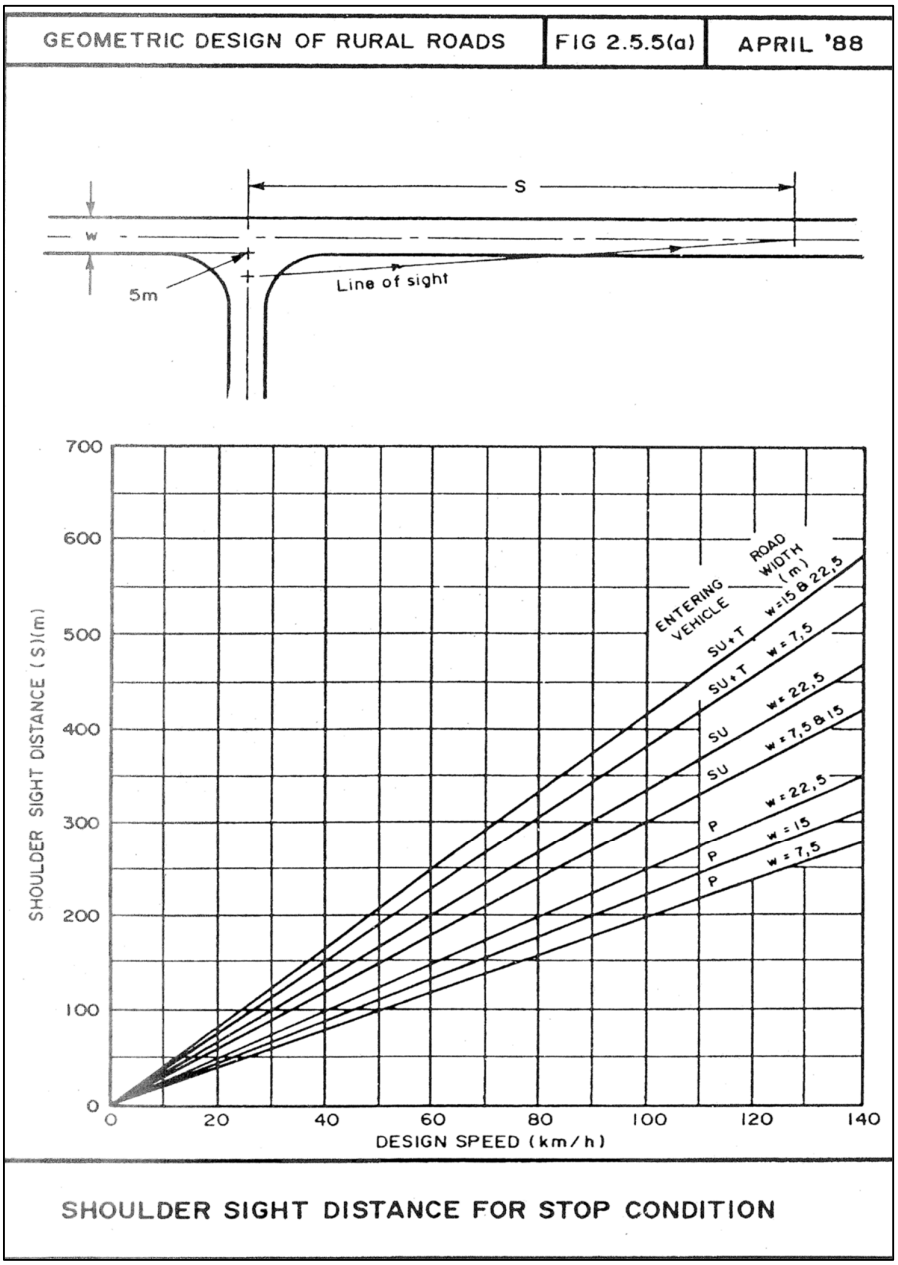

Figure 4-9: Shoulder sight distance (TRH17)

The required minimum shoulder sight distances are met in both directions at the two recommended access points (see **Figure 4-10** to **Figure 4-15**). However, it needs to be ensured that no signage or similar is erected , which could obstruct sight lines.

Figure 4-10: Required Sight distances at access road to Mayogi PV 1

Figure 4-11: View from intersection of R75 / MN50455 in a north-western direction (on R75)

Figure 4-12: View from intersection of R75 / MN50455 in a south-eastern direction (in R75)

Figure 4-13: Required Sight distances at access point for Mayogi PV 2

Figure 4-14: View from farm access on R75 in a north-western direction (Source: Google Earth Pro)

Figure 4-15: View from farm access on R75 in a south-eastern direction (Source: Google Earth Pro)

4.3.1 General

The section of MN50455 leading from the R75 to the site access for Mayogi PV 1 needs to be maintained if damaged by haulage vehicles. The radii at the access onto the site need to be large enough to allow for all construction vehicles to turn safely.

During the construction phase, temporary road signage in line with *South African Road Signs Manual (SARTSM*) will need to be erected along the R75 in the vicinity of the project site to alert drivers of construction vehicles turning into and out of MN50455. Any vegetation obstructing sight lines for vehicles traveling towards and from the site, needs to be cut back.

4.4 Internal Roads

The geometric design and layout for the internal roads from the recommended access points need to be established at detailed design stage. Existing structures and services, such as drainage structures, signage and pipelines will need to be evaluated if impacting on the roads. It needs to be ensured that the gravel sections remain in good condition and will need to be maintained during the additional loading of the construction phase and then reinstated after construction is completed.

The geometric design constraints encountered due to the terrain should be taken into consideration by the geometric designer. Preferably, the internal roads need to be designed with smooth, relatively flat gradients (recommended to be no more than 8%) to allow a larger transport load vehicle to ascend to the respective laydown areas.

4.4.1 Transportation of Materials, Plant and People to the proposed site

It is assumed that the materials, plant, and workers will be sourced from the surrounding towns as far as possible, such as Kirkwood.

4.4.2 Public Transport and Non-Motorised Transport

In terms of the National Land Transport Act (NLTA) (Act No.5 of 2009), the assessment of available public transport services is included in this report. The following comments are relevant in respect to the public transport availability for the proposed developments.

It is expected that minibus taxis travel along the R75. However, in many cases, the developer or appointed contractor of a large-scale project, such as many renewable energy projects, provides shuttle buses or similar for workers during the construction phase.

5 DESCRIPTION OF THE TRANSPORT ROUTES TO SITE

5.1 Port of Entry

It is envisaged that imported components will arrive in South Africa at the Port of Ngqura, being the closest port to the site. The Port of Ngqura is a world-class deep-water trans-shipment hub offering an integrated, efficient, and competitive port service for containers on transit. The Port forms part of the Coega Industrial Development Zone (CIDZ) and is operated by Transnet National Ports Authority.

This port is approximately 75 km travel distance from the proposed site (see **Figure 5-1**). The chosen route bypasses towns and settlements as much as possible to limit the impact on communities.

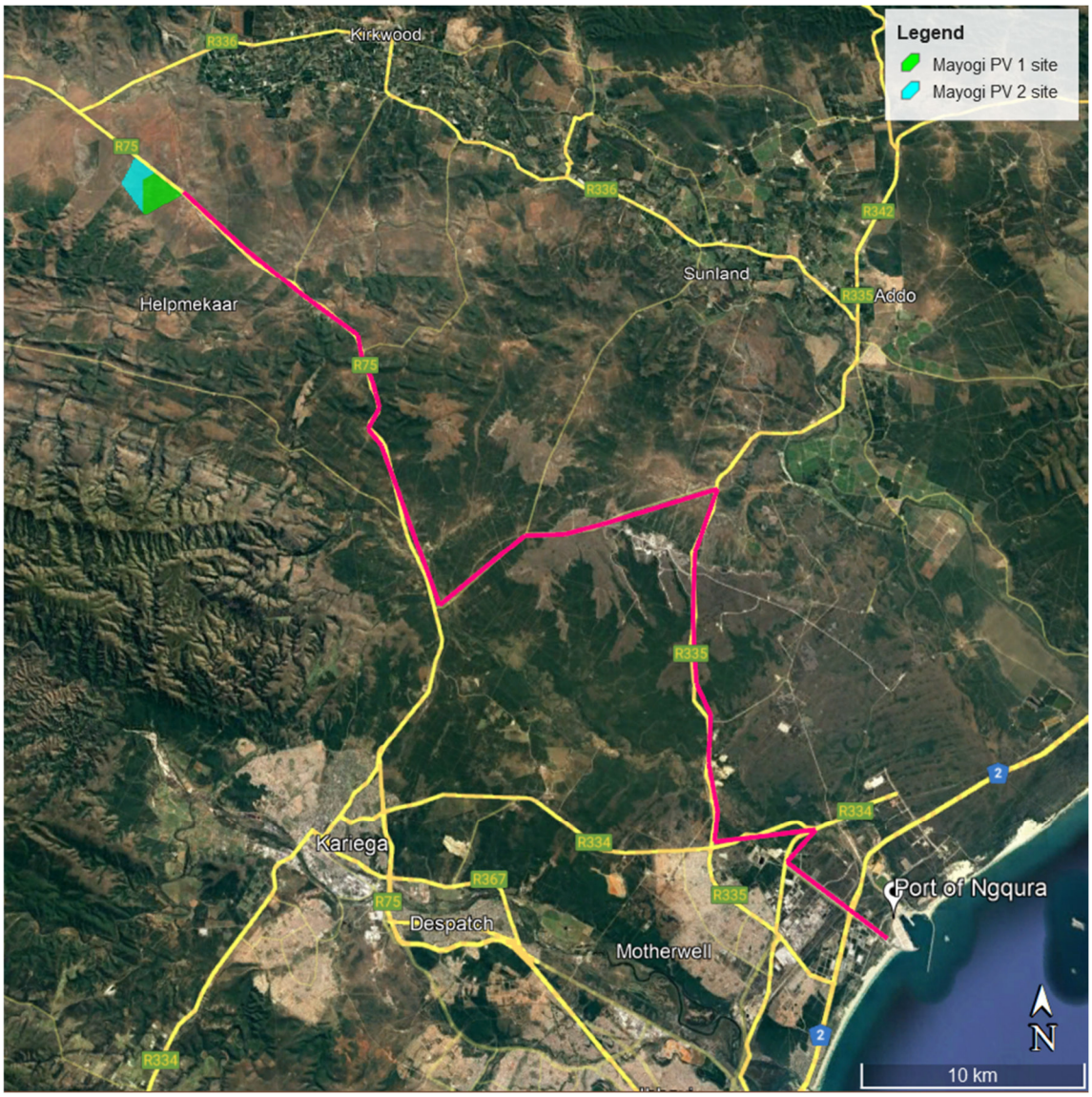

Figure 5-1: Route from Port of Ngqura to project sites

5.2 Transportation requirements

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

Solar PV:

- Conventional trucks within the freight limitations to transport building material to the site;
- 40ft container trucks transporting solar modules, frames, and the inverter, which are within freight limitations;
- Flatbed trucks transporting the solar modules 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.

Any grid/power lines:

- Conventional trucks within the freight limitations to transport building material to the site,
- Light vehicles and buses transporting workers from surrounding areas to site,
- Drilling machines and other required construction machinery being transported by conventional trucks or via self-drive to the site,
- The transformer transported in an abnormal load,
- Abnormal mobile crane for assembly on site, and
- Transmission tower sections transported by abnormal load.

5.3 Abnormal Load Considerations

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: 22 m for an interlink, 18.5 m for truck and trailer and 13.5 m for a single unit truck
- Width: 2.6 m Height: 4.3m measured from the ground. Possible height of load – 2.7 m.
- 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.

In addition to the above, the preferred routes for abnormal load travel 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, which may require modification. After the road modifications have been implemented, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, to ensure that the vehicle can travel without disruptions. It needs to be ensured that gravel sections (if any) of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.

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

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

5.4 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.

5.5 Permitting – General Rules

In general, 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.

5.6 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.

5.7 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 and length,
- Front Overhang,
- Rear Overhang,
- Front Load Projection,
- Rear Load Projection,
- Wheelbase,
- Turning Radius, and
- Stability of Loaded Vehicles.

5.7.1 Route for Components manufactured within South Africa

In South Africa, more than half (52%) of the manufacturing industry's national workforce resides in three metros - Johannesburg, Cape Town, and eThekwini. It is therefore anticipated that elements ,that can be manufactured within South Africa, will be transported to the site from the Cape Town, Johannesburg, or Pinetown/Durban areas. Components will be transported to site using appropriate National and Provincial routes. It is expected that the components will generally be transported to site with normal heavy load vehicles.

5.7.1.1 Route from Cape Town Area to Site – Locally sourced materials and equipment

Cape Town has a large manufacturing sector with twenty-six (26) industrial areas located throughout the metro. The proposed industrial hubs being considered to source the required materials and components is currently unknown. With quite an extensive and widespread industrial market, a specific route to the site cannot be considered at this point in time. However, no road limitations are envisaged along the routes (i.e., via N1 or N2) for normal load freight. The estimated a travel distance via the N2 is approximately 740 km and is shown in **Figure 5-2**.

Figure 5-2: Route from Cape Town area to project sites via N2

5.7.1.2 Route from Johannesburg Area to Site – Locally sourced materials and equipment

If components from the Johannesburg area are considered, normal loads from Johannesburg to the proposed site can be transported via the route as shown in **Figure 5-3** below. No road limitations are envisaged along the route for normal load freight. The travel distance from the Johannesburg area to site is approximately 1 000 km via the N1.

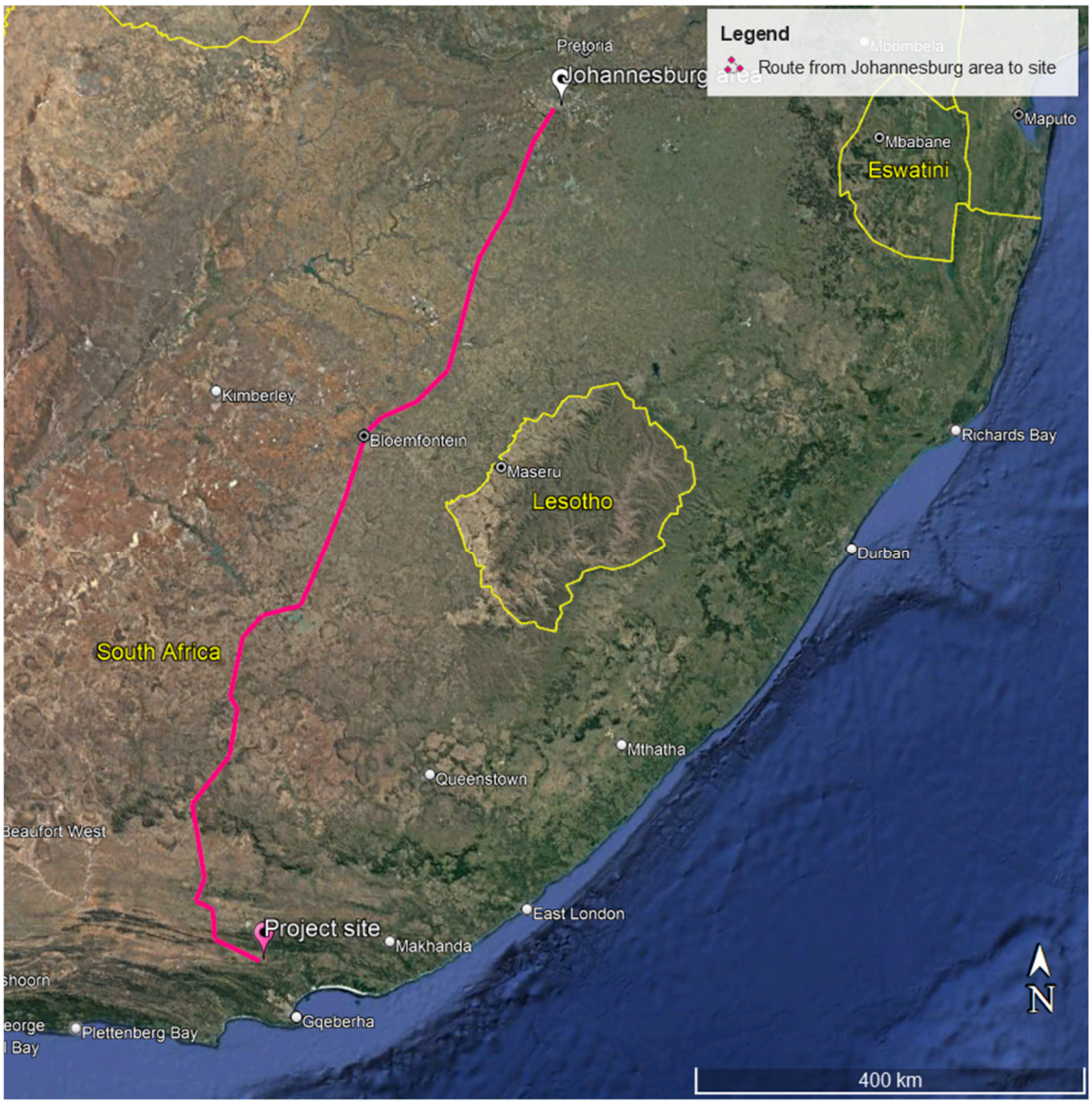

Figure 5-3: Route from Johannesburg area to project sites

5.7.1.3 Route from Pinetown area to Site - Locally sourced materials and equipment

Normal loads can transport elements via two potential routes from Durban and Pinetown to the site. No road limitations are envisaged along the route for normal load freight. The travel distance from Pinetown to the site via the N2 is approximately 925 km (see **Figure 5-4**).

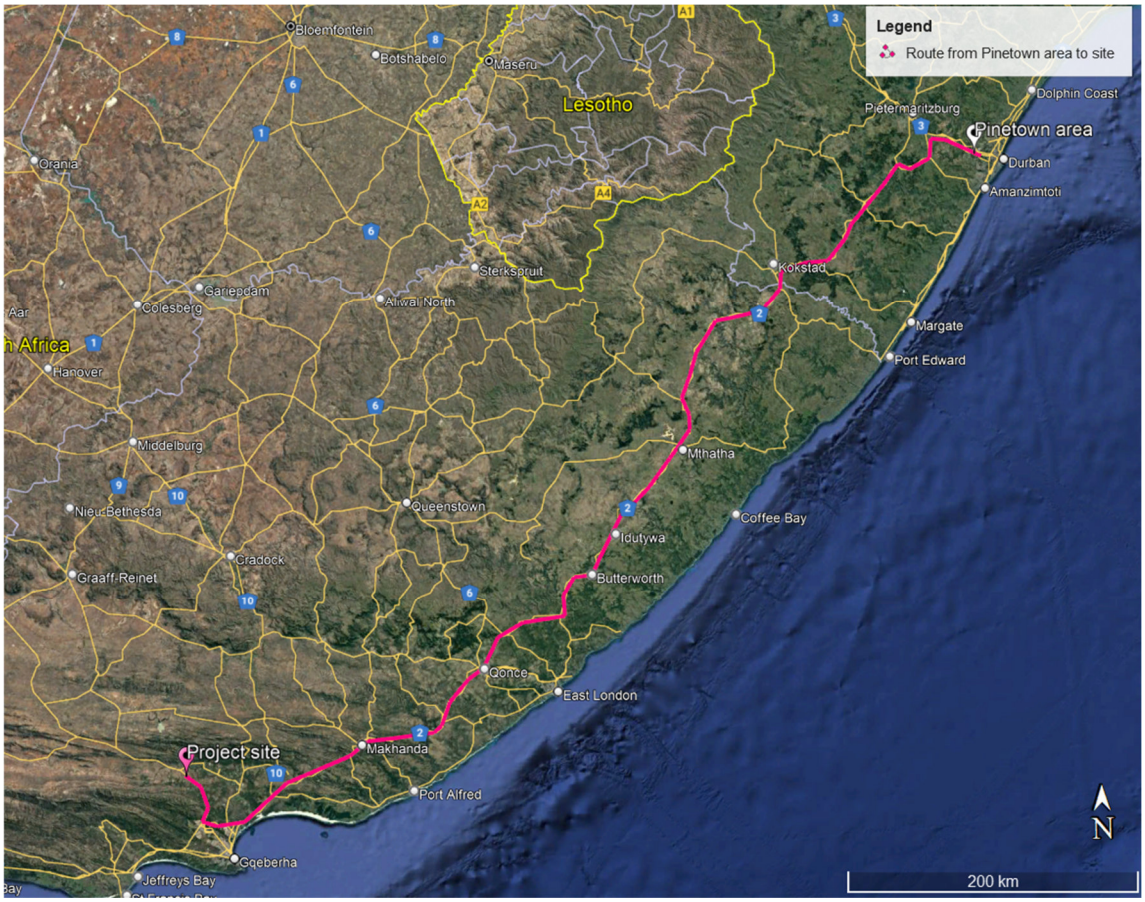

Figure 5-4: Route from Pinetown area to the project sites

5.7.2 Surrounding road network

The construction vehicles for the proposed Mayogi PV 1 and 2 Facilities will take access from the R75 as described under 4.3. The R75 runs from Gqeberha, passed the project site, all the way to Graaff Reinet (see **Figure 5-5**).

According to the road classification of the surrounding road network as per the *Road Infrastructure Strategic Framework for South Africa (RISFSA)* and *COTO's TRH26 South African Road Classification and Access Management Manual*, the R75 can be classified as **Class 2 rural major arterial**, which typically carries inter-regional traffic between:

- Smaller cities and medium to large towns (population typically greater than about 25 000);
- Smaller border posts;
- Class 1 and other Class 2 routes;
- Important regions, transport nodes and commercial areas that generate large volumes of freight and other traffic such as seaports and international airports.
- Smaller centres than the above when travel distances are relatively long (longer than 200 km).

Figure 5-5: Aerial View of R75

6 ISSUES, RISKS AND IMPACTS

6.1 Identification of Potential Impacts/Risks

The potential impact on the surrounding environment is expected to be generated by the development traffic, of which traffic congestion and associated noise, dust, and exhaust pollution form part of. It must be noted that the significance of the impact is expected to be higher during the construction and decommissioning phases because these phases generate the highest development traffic.

6.2 Construction phase

This phase includes the transportation of people, construction materials and equipment to the site. This phase also includes the construction of the solar power facility and associated infrastructure, including grid connections, construction of footings, roads, excavations, trenching, and ancillary construction works. This phase will temporarily generate the most development traffic.

6.2.1 Nature of impact

The nature of the impact expected to be generated at this phase would be traffic congestion and delays on the surrounding road network as well as the associated noise, dust, and exhaust pollution due to the increase in traffic.

6.2.2 Significance of impact without mitigation measures

Traffic generated by the construction of the solar facility will have a notable impact on the surrounding road network. The exact number of trips generated during construction can only be determined later in the project when the contractor and the haulage company are appointed and once more detail is available regarding the staff requirements and where equipment is sourced from. In the interim, an estimate will be made as follows for the purpose of this report.

6.2.3 Estimated peak hour traffic for the solar panel components

At present, solar panels are locally produced in South Africa by only a few select firms. The largest of them is located in Pinetown, Kwa-Zulu Natal. Owing to their limited annual production capacity of approximately 325MW, the bulk of solar modules being deployed on South African PV projects are imported, primarily from East Asia. Where panels are sourced locally, these are typically delivered to site via flatbed trucks.

For the purpose of the Transport study and calculation of trips, it is assumed that all panels will be imported. Considering a loading capacity of around 600 solar panels per 40tf container, the total number of trips will result in approximately 500 trips for the two 75 MW developments (i.e., 150 MW). Spacing the transport of the panels over a one-month period (i.e., 22 workdays), **the daily number of trips would result in approximately 22**. Looking at around 30% of these trips occurring during the peak traffic periods, the number of trips for the delivery of the panels during peak traffic will be around 7 trips, which can be accommodated by the external road network.

6.2.4 Estimated staff trips

Based on a 80MW PV plant, the estimated work force is around 350-700 workers during the first two years of construction. This includes skilled, semi-skilled and unskilled workers. Approximately 60-70%

could be locals. For the purpose of this study, in comparison with other renewable energy projects of similar size and to choose a feasible number of workers, it was estimated that around 400 staff will be overall on site during the construction phase. This number was assumed to double for the two projects as it is expected that Mayogi PV 1 and 2 will be constructed at the same time. The **resulting daily staff trips are then 58** (shown in **Table 6-1**).

Table 6-1: Estimation of daily staff trips

Vehicle Type	Number of vehicles	Max. Number of Employees
Car	12	12 (assuming 1 occupant)
Bakkie	12	18 (assuming 1.5 occupants)
Taxi – 15 seats	30	450
Bus – 80 seats	4	320
Total	***58***	***800***

6.2.5 Estimated material trips

The exact number of vehicle trips for the transportation of materials during the construction phase depends on the type of vehicles, planning of the construction, source/location of construction material, etc. However, for the purpose of this study, it was estimated that at the peak of construction, **approximately 200 construction vehicle trips will access the site per day**, which will result in a combined number of 400 trips per day.

The total estimated daily site trips, at the peak of construction, are shown in **Table 6-2** below.

Table 6-2: Estimation of daily site trips

Activity	Number of daily trips
Solar panel component delivery	22
Staff transport	58
Material delivery	400
Total	**480**

With the recommended mitigations in this report, the impact on the surrounding road network and the general traffic is deemed acceptable, as the 480 trips will be distributed over a 9-hour workday. It is expected that the majority of the trips will occur outside the peak hours.

It must also be noted that vehicle trips from material delivery vary depending on the construction task/program, fuel supply arrangements, as well as distance from the material source to the site. Project planning can be used to reduce material delivery during peak hours.

The development traffic impact during the construction phase can be assessed as manageable, considering that the construction phase is temporary in nature and mitigation measures, mentioned in this report, are adhered to and keep the impact level low.

6.3 Operational Phase

This phase includes the operation and maintenance of the Mayogi PV 1 and 2 Facilities throughout their life span.

6.3.1 Nature of impact

The nature of the impact expected to be generated at this phase would be traffic and the associated noise, dust and exhaust pollution due to the operational traffic trips.

6.3.2 Estimated peak hour traffic generated during operation

The exact number of permanent staff expected for the operational phase is still unknown. Based on similar studies, it can be estimated that approximately 25-30 full-time employees will be stationed per site (with ~4-5 skilled and ~16-25 un/semi-skilled workers, depending on contracts). Assuming a worst-case scenario of 30% of the trips occurring during peak traffic periods, a maximum of 9 peak hour trips per site and consequently 18 peak hours trips for both developments are estimated for the operational phase, which will have a nominal impact on the external road network.

It is assumed that the solar modules would need to be cleaned twice a year. No further information on which cleaning method and technology will be used is available at this point in time and if borehole water can be used. The following assumptions have been made to estimate the resulting trips generated from transporting water to the site:

- 5 000-liter water bowsers be used for transporting the water (water bowsers between 5 000-litre and 18 000-litre are available in South Africa. For the purpose of this study, the smallest bowser was chosen to assess a worst-case scenario);
- Approximately 5 litres of water needed per panel;
- Assuming that a maximum of a total of 300 000 panels are used, this would amount to approximately 300 vehicle trips; and
- Solar modules will be cleaned twice a year.

To limit any traffic impact on the surrounding road network, it is recommended to schedule these trips outside of peak traffic periods and to clean the solar modules over the course of a few days i.e., spread the trips over a 5-day work week, which would reduce the daily trips to 60 and the peak hour trips to max 18 (i.e., max ~30%). Additionally, the provision of rainwater tanks on site or borehole water would decrease the number of trips.

6.3.3 Proposed general mitigation measures

The following are general mitigation measures to reduce the impact that the additional traffic will have on the road network and the environment:

- The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- Dust suppression of gravel roads located within the site boundary, including the main access road to the site and the site access roads, during the construction phase, if required.
- Regular maintenance of gravel roads located within the site boundary, including the access roads to the site, by the Contractor during the construction phase and by the Owner/Facility Manager during the operational phase, if required.
- The use of mobile batch plants and quarries near the site would decrease the traffic impact on the surrounding road network, if available and feasible.

- Staff and general trips should occur outside of peak traffic periods as far as possible.
- Vehicular movements within the site boundary are the responsibility of the respective Contractor and the Contractor must ensure that all construction road traffic signs and road markings (where applicable) are in place. It should be noted that traffic violations on public roads are the responsibility of Law Enforcement, and the public should report all transgressions to Law Enforcement and the Contractor.
- If required, low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved (to be arranged by the haulage company and communicated beforehand with the service provider of the OHL) to accommodate the abnormal load vehicles. The Contractor and the Developer are to ensure that the haulage company is aware of this requirement.
- The haulage company is to provide evidence to the Contractor and the Developer that any affected overhead lines have been moved or raised.
- The preferred route should be surveyed by the developer to identify problem areas (e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, which may require modification). After the road modifications have been implemented, it is recommended to undertake a "dry-run" with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that delivery will occur without disruptions. This process is to be undertaken by the haulage company transporting the components and the contractor, who will modify the road and intersections to accommodate abnormal vehicles. The "dry-run" should be undertaken within the same month that components are expected to arrive. The haulage company is to provide evidence that the route has been surveyed and deemed acceptable for the transportation of the abnormal load.
- The Contractor needs to ensure that the gravel sections of the haulage routes (i.e., the site access road and the main access road to the site) remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.
- Design and maintenance of internal roads. The internal gravel roads will require grading with a grader to obtain a camber of between 3% and 4% (to facilitate drainage) and regular maintenance blading will also be required. The geometric design of these gravel roads needs to be confirmed at detailed design stage. This process is to be undertaken by a civil engineering consultant or a geometric design professional.

6.3.4 Significance of impact with mitigation measures

It should be noted that the construction phase is temporary and short term in nature and the associated impacts can be mitigated to an acceptable level.

The proposed mitigation measures for the construction traffic will result in a reduction of the impact on the surrounding road network and the impact on the local traffic will be low as the existing traffic volumes are deemed to be low. Dust suppression will result in significantly reducing the impact.

6.3.5 Decommissioning phase

This phase will have similar impacts and generated trips as the Construction Phase.

6.3.6 Cumulative Impacts

To assess a cumulative impact, it is generally assumed that all currently approved and authorized projects within a 30 km radius would be constructed at the same time. At the time of preparing this report, one solar PV project, approximately 25 km from the site, was approved (see **Table 6-3**).

Table 6-3: RE Developments within a 30 km radius from the proposed project site

No	Name/EIA Ref No	Classification	Status of Application	Distance from Project site
1	14/12/16/3/3/1/1172	Solar PV	Approved	~25 km

This is a precautionary approach as in reality, these projects would be subject to a highly competitive bidding process and not all the projects may be selected to enter into a Power Purchase Agreement. Even if the facilities are constructed and/or 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.

The construction and decommissioning phases of a renewable energy project are the only significant traffic generators. The duration of these phases is short term, i.e., the potential impact of the traffic generated during the construction and decommissioning phases on the surrounding road network is temporary and solar projects, when operational, do not add any significant traffic to the road network.

7 IMPACT ASSESSMENT

7.1 Potential Impact during the Construction Phase

The construction phase will generate traffic including transportation of people, construction materials, water, and equipment (abnormal trucks transporting the transformers). The exact number of trips generated will be determined at a later stage. Based on the high-level screening of impacts, a negative low impact rating can be expected during the construction phase with mitigation measures (see **Table 7-2**).

Nature of the impact

- Temporary increase in traffic, noise and dust pollution associated with potential traffic.

The impact methodology as provided by SiVEST was utilised (see **Annexure C**).

7.2 Potential Impact (Operational Phase)

Nature of the impact

- Noise and dust pollution associated with potential traffic.

The traffic generated during this phase will have a nominal impact on the surrounding road network. The impact evaluation is shown in **Table 7-2** . The following items need to be clarified:

- The number of permanent employees
- Water source to be clarified – borehole or transported to site
- Size of water tankers if water is to be delivered on site

7.3 Potential Impacts during the Decommissioning Phase

This phase will have a similar impact as the construction phase (i.e., traffic congestion, air pollution and noise pollution) as similar trips/movements and associated noise and pollution are expected (see **Table 7-2**).

7.4 Cumulative Impacts during the Construction Phase

For the cumulative impact during the construction phase, any planned or approved projects in a 30km radius are considered. At the time of preparing this report, there was only one solar PV project approved within this radius.

7.5 Impact Assessment Summary

The overall impact significance findings, following the implementation of the proposed mitigation measures, are shown in **Table 7-1** below.

Table 7-1: Summary of overall Impact Significance

Mayogi PV 1 Project	Overall Impact Rating
Construction (Pre-mitigation measures)	Negative Medium
Operational (Pre-mitigation measures)	Negative Low
Construction (Post-mitigation measures)	Negative Low
Operational (Post-mitigation measures)	Negative Low

Table 7-2: Impact Rating Table

ENVIRONMENTAL PARAMETER	ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION									RECOMMENDED MITIGATION MEASURES	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION								
		Extent [E]	Probability [P]	Reversibility [R]	Irreplaceable loss of resources [I]	Duration [D]	Intensity / Magnitude [I / M]	TOTAL	STATUS (+ OR -)	Significance Rating [S]		E	P	R	L	D	I / M	TOTAL	STATUS (+ OR -)	
Construction Phase / Decommissioning Phase																				
Development traffic impact / related noise & dust pollution	Temporary increase in traffic due to construction vehicle trips on the external road network / increase in noise and dust pollution levels during construction period	4	4	1	1	2	2	24	-	Medium	Stagger component delivery to site; Reduce the construction period if possible; Stagger construction phase tasks;Make use of any quarries in the vicinity of the site to decrease the impact of development trips on the external roads; Staff and general trips should occur outside of peak traffic periods as much as possible; Maintenance of haulage routes and design and maintenance of internal roads.	4	3	1	1	2	1	11	-	Low
Operational Phase																				
Traffic Impact due to maintenance and permanent site staff trips / periodical trips to site for transport of water.	Slight increase of vehicle trips due to permanent staff traveling to site, periodically (bi-annual) trips to site for transport of water and irregular maintenance trips	2	4	1	1	3	1	11	-	Low	Source on-site water supply as far as possible; Utilise cleaning systems for panels needing less vehicles trips; Schedule trips for the provision of water for the cleaning of panels outside peak traffic periods as much as possible.	2	3	1	1	3	1	10	-	Low
Cumulative (Construction Phase)																				
Cumulative traffic impacts	Further traffic impact due to planned and approved renewable developments in a 30km radius are developed at the same time	4	2	1	1	2	3	30	-	Medium	Same mitigation measures as above for construction phase. It is noted that it is unlikely that the approved developments will be constructed at the exact same time. However, for the event that the developments have similar constructions periods and use similar routes to site, it is recommended to agree on a delivery schedule between respective projects.	4	2	1	1	2	1	10	-	Low
Cumulative (Operational Phase)																				
Cumulative traffic impacts	Further traffic impact if the planned and approved renewable developments in a 30km radius are developed at the same time	2	2	1	1	3	2	18	-	Low	See operational phase above.	2	2	1	1	3	1	9	-	Low

8 NO-GO ALTERNATIVE

The no-go alternative implies that the proposed Mayogi PV 1 and 2 projects as well as the associated infrastructure do not proceed. This would mean that there will be no negative environmental impacts and no traffic impact on the surrounding network during the construction and decommissioning phases. 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 its targets for renewable energy. Hence, the no-go alternative is not a preferred alternative.

9 CONCLUSION AND RECOMMENDATIONS

The potential traffic and transport related impacts for the construction, operation and decommissioning phases of the proposed Mayogi PV 1 and 2 projects were identified and assessed.

- The main impact on the external road network will be during the construction phase. This phase is temporary in comparison to the operational period. The number of abnormal loads vehicles was estimated and to be found to be able to be accommodated by the road network including the recommended mitigation measures.
- During operation, it is expected that maintenance and security staff will periodically visit the facility and water be transported to site possibly twice a year for the cleaning of panels. The generated trips can be accommodated by the external road network and the impacts are rated **negative low** with mitigation measures.
- The traffic generated during the construction phase, although significant, will be temporary and impacts are considered to be of medium negative impact. However, after mitigation a rating of **negative low** impact can be given.
- The traffic generated during the decommissioning phase will be similar to or even less than the construction phase traffic and the impact on the surrounding road network will also be considered to be of **negative low** impact after mitigation.
- The cumulative impact can be rated as **negative low** with mitigation measures.

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

- Dust suppression of internal gravel roads and the access roads.
- Component delivery to/ removal from the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- The use of mobile batching plants and quarries near the site would decrease the impact on the surrounding road network, if available and feasible.
- Staff and general trips should occur outside of peak traffic periods.
- A “dry run” of the preferred route by the haulage company. Should the haulage company be familiar with the route, evidence is to be provided to the Client and the Contractor.
- Design and maintenance of the internal gravel roads and maintenance of the access roads.
- If required, any low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved (to be arranged by haulage company and agreed on with the service provider of the OHL) or raised to accommodate the abnormal load vehicles.

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

The proposed development of the Mayogi PV 1 and 2 Facilities is supported from a traffic engineering perspective provided that the recommended mitigation measures are adhere to.

10 REFERENCES

- 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
- Transnetportterminals.net. n.d. *Transnet Port Terminals*. [online] Available at: <https://www.transnetportterminals.net/Ports/Pages/default.aspx>
- 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

SUMMARY OF EXPERIENCE

Iris is a Professional Engineer registered with ECSA (20110156) and obtained her Master of Science degree in Civil Engineering in Germany in 2003. She has more than 20 years of experience in a wide field of traffic and transport engineering projects.

Iris left Germany in 2003 and has gained work experience 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.

Her passions are the renewable energies and road safety, and she is highly experiences in providing traffic and transport engineering advise.

Iris is registered with the International Road Federation as a Global Road Safety Audit Team Leader and is a regular speaker at conferences, seminars and similar.

PROFESSIONAL REGISTRATIONS & INSTITUTE MEMBERSHIPS

PrEng	Registered with the Engineering Council of South Africa No. 20110156 Registered Mentor with ECSA
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 – Chair
SARF RSC	South African Road Federation National Road Safety Committee
IRF	Registered as International Road Safety Audit Team Leader

EDUCATION

1996 – Matric (Abitur)	Carl Friedrich Gauss Schule, Hemmingen, Germany
1998 - Diploma (Draughtsperson)	Lower Saxonian State Office for Road Engineering
2002 – BSc Eng (Civil)	Leibniz Technical University of Hannover, Germany
2003 - MSc Eng (Civil & Transpt)	Leibniz Technical University of Hanover, Germany

Master Thesis on the Investigation of the allocation of access rights *to the European rail network infrastructure - Research of the feasibility of the different bidding processes to allocate access rights of railway operators in the European railway market. Client: Technical University of Berlin and German Railway Company.*

SUMMARY OF EXPERIENCE

iWink Consulting (Pty) Ltd – Independent Consultant

2022 – present
Position: Independent Consultant – working as an independent Specialist in the field of Traffic & Transport Engineering, Renewable Energies and Road Safety.

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

2016 – 2022
Position: Associate / Division Head: Traffic & Transport Engineering

Jeffares & Green (Pty) Ltd

2012 – 2016
Position: Senior Traffic & Transport Engineer

Arup (Pty) Ltd

2010 - 2012
Position – Senior Traffic & Transport Engineer

Arup (Pty) Ltd

2004 - 2010
Position – Traffic & Transport Engineer

Schmidt Ingenieursbüro, Hannover, Germany

2000
Position – Engineering Assistant

Leibniz University of Hannover, Germany

2000 - 2003
Position – Engineering Researcher - Institute for Road & Railway Engineering

SELECTION OF PROJECTS

Please note: The below lists show only a *selection* of projects that Iris has been involved in over the last 20 years. More information and a complete Schedule of Experience can be made available on request.

RENEWABLE ENERGY PROJECTS

Transport Impact Assessments /Traffic Management Plans for:

- Naos Solar PV Projects
- Ujekamanci Wind Energy Projects
- Mayogi Solar PV Project
- AGV Red Sands Solar Project
- Cradock – Kaladokhwe WEFs
- Britstown WEFs
- Highveld Solar Cluster
- Dealsville & Bloemfontein Solar PV
- Great Karroo Wind and Solar Cluster
- Ummbila Emoyeni Solar Project
- Poortjie Wind&Solar
- Hydra B Solar Cluster
- Choje Windfarm, Eastern Cape
- Richards Bay Gas to Power Project
- Oya Black Mountain Solar Project
- De Aar Solar Project
- Euronotus Wind & Solar Cluster
- Pienaarspoort Wind Energy Project
- Karreebosch Wind Energy Project
- Dyasonsklip Solar Project
- Kuruman Windfarm
- Bloemsmond Solar Farms
- Hendrina Wind Energy Project
- Orkney Solar Project
- Bulskop Solar Project
- Hyperion Solar & Thermal Project
- Gromis & Komas Wind Energy Projects
- Kudusberg & Rondekop Wind Energy Projects
- Bayview Windfarm
- Coega West Windfarm
- Suikerbekkie Solar Project

- Poortjie Solar Project
- Northam Solar Project
- Sibanye Solar Project
- Du Plessis Dam Solar Project
- Mercury Solar Project
- Aberdeen Wind Energy Project
- Saldanha Wind and Solar Projects
- Ummbila Emoyeni Wind Energy Project
- Springhaas Solar Project

Clients:

- G7 Energies
- ABO Wind Renewable Energies
- Atlantic Renewable Energy Partners
- Mulilo
- Acciona
- Enel
- Engie
- DNV GL
- Enertrag
- Scatec Solar
- Red Rocket Energies
- Windlab
- Mainstream
- Africoast
- Genesis

FURTHER PROJECTS

Traffic Impact Studies & Site Development Plan Input:

- Nooiensfontein Housing Development, City of Cape Town
- Belhar Housing Development, City of Cape Town
- Baredale Phase 7, City of Cape Town
- Beau Constantia Wine Farm
- Constantia Glen Wine Farm
- Eagles Nest Wine Farm
- Groenvallei Parking Audit, City of Cape Town
- Kosovo Housing Development, Western Cape Government
- Enkanini Housing Development, Stellenbosch
- Delft Housing Development, City of Cape Town
- Secunda Sasol, Free State
- Marula Platinum Mine
- InnerCity Transport Plan, City of Cape Town
- Stellenbosch Road Master Plan
- Nyanga Public Transport Interchange

- Crawford Campus Cape Town
- Durban RoRo Car Terminal, Transnet
- Durban Farewell Container Site
- Msunduzi Waterfront Housing Development
- Transnet Park Site – Traffic Management and Evacuation Plans
- UWC Bellville Medical Campus
- Bloekombos District Hospital
- Malabar Extension 3, Port Elizabeth

Traffic Engineering for Roads Projects:

- Ekhurhuleni Bus Stops and Intersection Safety Assessments
- Namibia Noordoewer to Rosh Pina, Road Agency Namibia
- N2 Section 19 Mthatha – NMT Studies
- R63 Alice to Fort Beaufort – NMT, Road Link and Intersection Studies
- N2 Kangela to Pongola Upgrade
- Cofimvaba Eastern Cape – NMT, Road and Intersection Upgrades
- Stellenbosch R44 Traffic Signals
- Secunda Traffic Signals
- Fezile Dabi District Gravel Roads Upgrade, Free State Province
- Zambia RD Rehabilitation Project
- R61 Eastern Cape – NMT Studies, SANRAL

CONTINUED PROFESSIONAL DEVELOPMENT (CPD)

*Last five years*full CPD list available*

2023 – International Traffic Safety Conference, Doha – Speaker

2022 – 7th Regional Conference for Africa & PIARC International Seminar on Rural Roads and Road Safety - Speaker

2022 – Non-motorised Transport Seminar (SARF) – Co-Organizer / Speaker

2021 – SARF KZN Road Safety Considerations (SARF) – Guest Speaker

2021 – Road Safety Audit Course (IRF) – Guest Speaker

2021 – Legal Obligations / Road Safety Act (SARF) – Presenter

2020 – Understanding Road Accidents (SARF)

2020 – Road Safety Auditor Course (SARF) – Co-Lecturer

2018 – African Road Conference (IRF/SARF/PIARC)

2018 – Road Safety in Engineering (SARF) – Presenter

2016 - SATC Road Safety Audit Workshop Pretoria (SARF)

2015 - Non-motorised Transport Planning (SARF

Annexure B: Specialist Statement of Independence

I, Iris Sigrid Wink, 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: iWink Consulting (Pty) Ltd

Date: 24-07-2023

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:	DEA/EIA/
Date Received:	

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

MAYOGI PHOTOVOLTAIC 1 FACILITY, EASTERN CAPE PROVINCE

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:	IWINK CONSULTING (PTY) LTD			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100
Specialist name:	IRIS WINK			
Specialist Qualifications:	MSC ENG (CIVIL)			
Professional affiliation/registration:	PRENG 20110156			
Physical address:	44 PLATTEKLOOF ROAD, PLATTEKLOOF GLEN			
Postal address:	SAME			
Postal code:	7460	Cell:	082 691 9096	
Telephone:	n/a	Fax:	n/a	
E-mail:	IRIS@IWINK.CO.ZA			

2. DECLARATION BY THE SPECIALIST

I, IRIS WINK, 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

iWink Consulting (Pty) Ltd

Name of Company:

19/05/2023

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, IRIS WINK, 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

iWink Consulting (Pty) Ltd

Name of Company

19/05/2023

Date

Signature of the Commissioner of Oaths

19/05/2023

Date

GUSTAV HEINRICH WEHMEYER
KOMMISSARIS VAN EDE
COMMISSIONER OF OATHS
PRAKTISERENDE PROKUREUR R.S.A.
PRACTISING ATTORNEY R.S.A.
MAHOGANYSINGEL 8, BELLVILLE
7530, R.S.A.

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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

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File Reference Number:	
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PROJECT TITLE

MAYOGI PHOTOVOLTAIC 2 FACILITY, EASTERN CAPE PROVINCE

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.
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1. SPECIALIST INFORMATION

Specialist Company Name:	IWINK CONSULTING (PTY) LTD			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100
Specialist name:	IRIS WINK			
Specialist Qualifications:	MSC ENG (CIVIL)			
Professional affiliation/registration:	PRENG 20110156			
Physical address:	44 PLATTEKLOOF ROAD, PLATTEKLOOF GLEN			
Postal address:	SAME			
Postal code:	7460	Cell:	082 691 9096	
Telephone:	n/a	Fax:	n/a	
E-mail:	IRIS@IWINK.CO.ZA			

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- 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

iWink Consulting (Pty) Ltd

Name of Company:

19/05/2023

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, IRIS WINK, 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

iWink Consulting (Pty) Ltd

Name of Company

19/05/2023

Date

Signature of the Commissioner of Oaths

19/05/2023

Date

GUSTAV HEINRICH WEHMEYER
KOMMISSARIS VAN EDE
COMMISSIONER OF OATHS
PRAKTISERENDE PROKUREUR R.S.A.
PRACTISING ATTORNEY R.S.A.
MAHOGANYSINGEL 8, BELLVILLE
7530, R.S.A.

Annexure C: Impact Rating Methodology

1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) METHODOLOGY

The Environmental Impact Assessment (EIA) Methodology assists in evaluating the overall effect of a proposed activity on the environment. Determining of the significance of an environmental impact on an environmental parameter is determined through a systematic analysis.

1.1 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (i.e. site, local, national or global), whereas intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in **Table 1**.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

1.2 Impact Rating System

The impact assessment must take account of the nature, scale and duration of effects on the environment and whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the various project stages, as follows:

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

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

The significance of Cumulative Impacts should also be rated (As per the Excel Spreadsheet Template).

1.2.1 Rating System Used to Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the possible mitigation of the impact. Impacts have been consolidated into one (1) rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 1: Rating of impacts criteria

ENVIRONMENTAL PARAMETER		
A brief description of the environmental aspect likely to be affected by the proposed activity (e.g. Surface Water).		
ISSUE / IMPACT / ENVIRONMENTAL EFFECT / NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity (e.g. oil spill in surface water).		
EXTENT (E)		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY (P)		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY (R)		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES (L)		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION (D)		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity.		

1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
INTENSITY / MAGNITUDE (I / M)		
Describes the severity of an impact (i.e. whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily).		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
SIGNIFICANCE (S)		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula: **Significance = (Extent + probability + reversibility + irreplaceability + duration) x magnitude/intensity.**		

The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
5 to 23	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
5 to 23	Positive Low impact	The anticipated impact will have minor positive effects.
24 to 42	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
24 to 42	Positive Medium impact	The anticipated impact will have moderate positive effects.
43 to 61	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
43 to 61	Positive High impact	The anticipated impact will have significant positive effects.
62 to 80	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
62 to 80	Positive Very high impact	The anticipated impact will have highly significant positive effects.

The table below is to be represented in the Impact Assessment section of the report. The excel spreadsheet template can be used to complete the Impact Assessment.