JUWI RENEWABLE ENERGY (PTY) LTD

# Roos Solar Energy Facility

## Transportation Study

Issue Date: 21 June 2023
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| Document Title: | **Roos Solar Energy Facility**<br>Transportation Study | |
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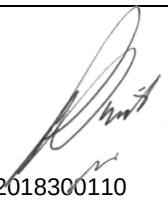
| Author: | Ntuthuko Hlanguza (Pr. Eng) | |
| Signature: |  <br>Pr. No: 202202263 | Date: 21 July 2023 |
| Reviewed by: | Richard Hirst (Pr. Tech Eng) | |
| |  <br>Pr. No: 2018300110 | Date: 21 July 2023 |
| Client: | Juwi Renewable Energy (Pty) Ltd | |

**This report is prepared in line with the Requirements for Specialist Reports (Appendix 6) of the Environmental Impact Assessment Regulations, 2014 (as amended).**

| **Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6** | **Section of Report** |
|---|---|
| 1. (1) A specialist report prepared in terms of these Regulations must contain-<br>a) details of-<br>i. the specialist who prepared the report; and<br>ii. the expertise of that specialist to compile a specialist report including a curriculum vitae; | Refer Section 1.3 and Appendix A |
| b) a declaration that the specialist is independent in a form as may be specified by the competent authority; | Refer Appendix B |
| c) an indication of the scope of, and the purpose for which, the report was prepared; | Refer Section 1.2 |
| (cA) an indication of the quality and age of base data used for the specialist report; | Refer Section 4.2 |
| (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change; | Refer Section 6 and Section 6.2 |
| d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment; | Refer Section 4.3 |
| e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used; | Refer Section 4 |
| 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; | Refer Section 6.3 |
| 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; | Refer Figure 5-5 |
| i) a description of any assumptions made and any uncertainties or gaps in knowledge; | Refer Section 4.3 |
| 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; | Refer Section 6 and Section 6.3 |
| k) any mitigation measures for inclusion in the EMPr; | Refer Section 6 |
| l) any conditions for inclusion in the environmental authorisation; | Refer Section 6 |
| m) any monitoring requirements for inclusion in the EMPr or environmental authorisation; | Refer Section 6 |
| n) a reasoned opinion-<br>i. (as to) whether the proposed activity, activities or portions thereof should be authorised;<br>(iA) regarding the acceptability of the proposed activity or activities; and<br>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; | Refer Section 9 |

| | |
|---|---|
| o) a description of any consultation process that was undertaken during the course of preparing the specialist report; | Refer Section 4.1 |
| p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and | N/A |
| q) any other information requested by the competent authority. | N/A |
| 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

## OBJECTIVE

Juwi South Africa (Pty) Ltd proposes to construct and operate the Roos Solar Energy Facility approximately 15 km south-west of the town of Belfast in the Mpumalanga province. The overall objective is to generate electricity by means of renewable energy technology capturing solar energy to feed into the national grid. The facility is to have a generating capacity of 50 MW

The main objective of the Transportation Study is to determine the traffic impact/s of the proposed development on the existing road network, assess the significance of these impacts, and propose mitigation measures for any potential negative impacts. The study includes an assessment of potential impacts pertaining to the construction phase, the operation and maintenance phase, as well as the decommissioning phase of the development. The assessment of the potential impacts in these phases considers the transportation of normal and abnormal loads to site, which include inter alia: Solar PV Facility components, construction materials, equipment, and the transportation of staff and labour.

## KEY FINDINGS

The development is located along the N2 national route. It is reachable from likely points of supply through an existing road network that is in good and suitable condition, including for the transportation of abnormal loads.

Two accesses to the facility already exist in the form of private farm access roads off the N2. These accesses are deemed suitable for the proposed adjusted land use but will require minor upgrades to accommodate the anticipated traffic.

The construction phase of this development is estimated to generate ±18 peak hour trips, the operation and maintenance phase ± 56 peak hour trips, and the decommissioning phase ±15 peak hour trips. Overall, the traffic impacts of the proposed development are considered to be nominal.

Several mitigation measures are proposed to accommodate the development and to reduce the impact to the surrounding road network.

## RECOMMENDATION

With reference to this report, associated assessment and the findings made within, the Roos Solar Energy Facility will have a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transport perspective provided the recommendations and mitigations measures proposed herein are implemented, and hence the Environmental Authorisation (EA) should be granted.

# JUWI SOUTH AFRICA (PTY) LTD
# ROOS SOLAR ENERGY FACILITY

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# JUWI SOUTH AFRICA (PTY) LTD
# ROOS SOLAR ENERGY FACILITY

## 1. INTRODUCTION

### 1.1. BACKGROUND

SiVEST (Pty) Ltd was appointed by Juwi South Africa (Pty) Ltd to undertake transportation studies for the proposed Roos Solar PV Energy Facility with a generating capacity of 50 MW.

This Transportation Study applies to the proposed solar PV facility, also referred to in this report as the proposed development, and excludes the grid connection for the solar PV facility which is addressed in a separate report.

### 1.2. OBJECTIVE AND SCOPE OF WORK

The main objective of the Transportation Study is to determine the traffic impact/s of the proposed development on the existing road network, assess the significance of these impacts, and propose mitigation measures for any potential negative impacts. The study includes an assessment of potential impacts pertaining to the construction phase, the operation and maintenance phase, as well as the decommissioning phase of the development. The assessment of the potential impacts in these phases considers the transportation of normal and abnormal loads to site, which include inter alia: Solar PV Facility components, construction materials, equipment, and the transportation of staff and labour.

### 1.3. SPECIALIST DETAILS

The Transportation Study is undertaken by Ntuthuko Hlanguza of the civil engineering division of SiVEST SA (Pty) Ltd. Ntuthuko is a professionally registered civil engineer with a BSc.Eng (Civil) qualification and a post-graduate certificate in Energy Efficiency and Sustainability (UCT). He has over 8 years' experience in a wide range of civil engineering applications including specialist studies in the renewable energy sector, wherein he has undertaken transportation studies, access and internal road designs, glint and glare assessments and stormwater management plans for renewable energy developments. Ntuthuko Hlanguza's credentials are summarised in Table 1-1 while his curriculum vitae is included in Appendix A.

**Table 1-1** Specialist Credentials and Experience

| | | | | |
|---|---|---|---|---|
| **Company** | SiVEST (Pty) Ltd | | | |
| **Contact Details** | ntuthukoh@sivest.com | | | |
| **Qualifications** | BSc.Eng (Civil) (UKZN)<br>Cert. Energy Efficiency & Sustainability (UCT) | | | |
| **Prof. Registrations & Memberships** | • Pr. Eng – Engineering Council of South Africa (Pr No. 202202263)<br>• MSAICE – Member of South African Institute of Civil Engineers | | | |
| **Transportation Studies for Similar Developments** | **Development** | **Capacity** | **Province** | **Developer** |
| | Beaufort West SEF<br>Lesaka SEF Cluster<br>Heuweltjies WEF<br>Ingwe 1&2 WEFs<br>Padloper SEF Cluster | 415 MW<br>480 MW<br>200 MW<br>817 MW<br>900 MW | Western Cape<br>Northern Cape<br>Western Cape<br>Eastern Cape<br>Western Cape | Upgrade Energy<br>Enertrag South Africa<br>Klipkraal (Pty) Ltd<br>ABO Wind<br>African Clean Energy Developments |

# 2. PROJECT DESCRIPTION

## 2.1. LOCATION

The Roos SEF will be developed on various portions of the farms listed below.

- Farm Leeubank No 427
- Farm Zoekop No426
- Farm Wintershoek No 390
- Farm Wintershoek No 423
- Farm Generaalsdraai No 423

The solar PV development area is approximately 270 ha and is situated approximately 15 km south-west of the town of Belfast within the Emakhazeni Local Municipality in the Nkangala District Municipality, Mpumalanga province.

Access to the development area is obtained via the N4 national route.

Figure 2-1 below depicts the locality map of the proposed development.

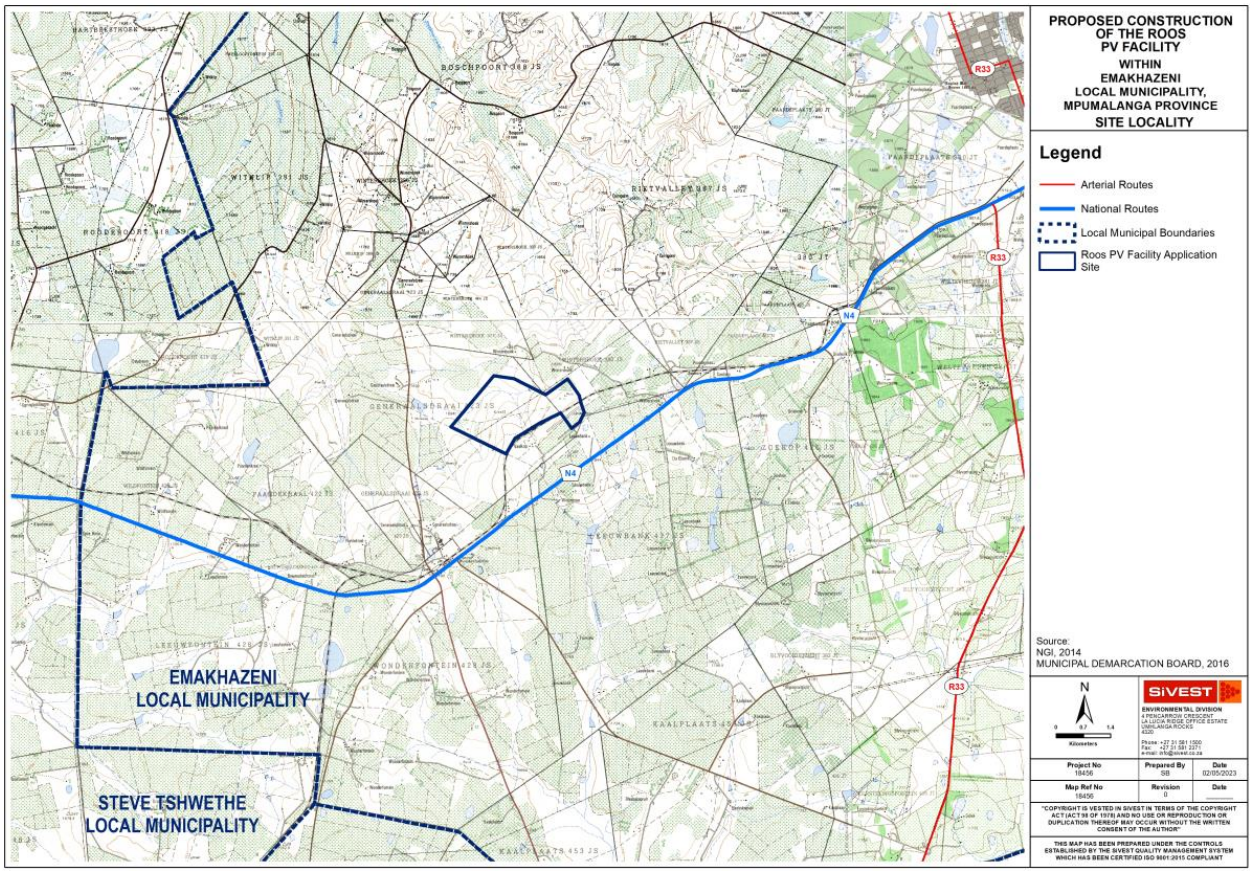



**Figure 2-1** Locality Map

## 2.2. DEVELOPMENT COMPONENTS

The proposed facility will comprise the typical components tabulated below. It is noted that many of the tabulated aspects are subject to finalisation during the detail design phase.

**Table 2-1** Development Components

| Component | Description |
|---|---|
| Solar PV panels | Monofacial/bifacial, up to 3.5 m |
| Panel mounting structures | Fixed-tilt, single-axis/dual-axis tracking technology |
| Electrical reticulation | 22 or 33kV underground cabling wherever possible, to a maximum depth of 1.5m, with overhead cables where necessary |
| On-site IPP substation | 22/33-to-88/132 kV onsite IPP step-up substation utilised for collection and connection of the internal LV and MV reticulation, max. height up to 10 m |
| Inverter-transformers | Located at the IPP substation |
| Battery energy storage system | Lithium-ion solid-stafe/redox flow technology BESS located within the IPP substation, up to 500 MWh |
| Operation and maintenance centre | Located near the IPP Substation and including site offices, staff lockers, ablution facilities, warehouses, an operations centre, a workshop, stores, etc |
| Security guardhouse | At or near the facility access |
| Temporary laydown areas | For temporary storage, assembly, concrete batching etc |
| Associated infrastructure | Fencing, lighting, telecommunication infrastructure etc |
| Access and internal roads | Access road width up to 8 m, internal road width approx. 4-5 m |
| Borehole and storage tanks | If required, a 10 kl storage tank for on-site water storage |

## 2.3. DEVELOPMENT LAYOUT

### 2.3.1. Facility Areas

The areas of the various components of the proposed facility are tabulated below.

**Table 2-2** Facility Area

| Aspect | Approximate Area |
|---|---|
| Development area | 270 ha |
| O&M Centre | 5000 m² |
| Laydown Area / Construction Camp | 7 ha |
| On-site Substation | 4 ha |
| BESS | Included |
| On-Site Switching Station | Included |
| Access and Internal Roads | TBC |

### 2.3.2. Site Layout

The proposed layout for the Roos Solar Energy Facility is shown in Figure 2-2 below.

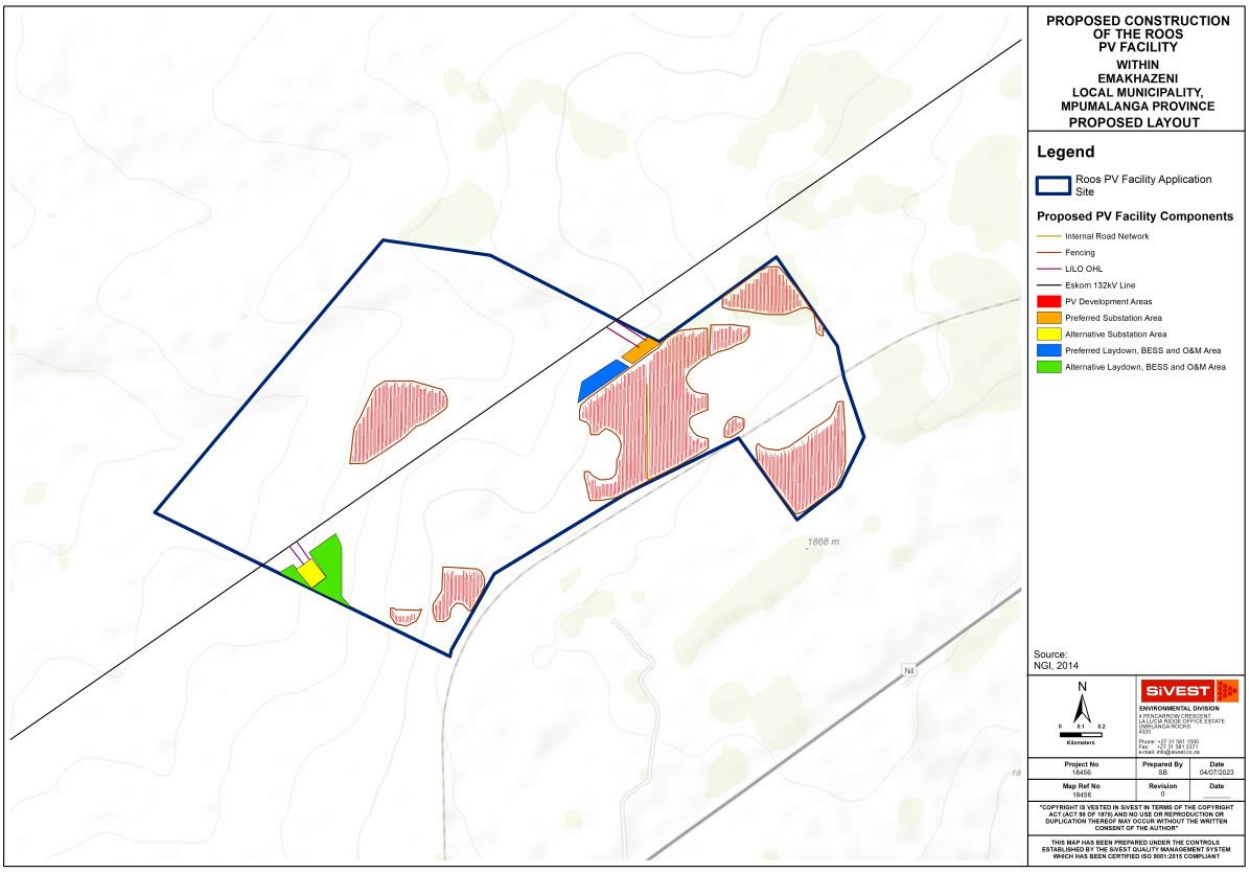



**Figure 2-2** Proposed Site Layout

# 3. LEGAL REQUIREMENTS AND GUIDELINES

## 3.1. LEGAL REQUIREMENTS

Key legal requirements for studies of this nature in relation to the proposed development are as follows:

- Government Notice 509 (GN509), as published in Government Gazette 40229 of 2016 with reference to the National Water Act, 1998 (Act No. 36 of 1998)
- National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA)
- National Water Act, 1998 (Act No 36 of 1998) (NWA)
- Road Safety Act (Act No 93 of 1996)
- National Road Traffic Regulations, 2000

## 3.2. GUIDELINES

Key guidelines for studies of this nature in relation to the proposed development are as follows:

- TMH 15: South African Engineering Service Contribution Manual for Municipal Road Infrastructure
- TMH 16 Vol 1: South African Traffic Impact and Site Traffic Assessment Manual
- TMH 16 Vol 2: South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual
- TMH 17: South African Trip Data Manual

- TRH 11: Dimensional and Mass Limitations and Other Requirements for Abnormal Load Vehicles
- TRH 26: South African Road Classification and Access Management Manual

# 4. METHODOLOGY

## 4.1. ADOPTED APPROACH

The approach and methodology followed in undertaking the Transportation Study is outlined below.

**a) Desktop Assessment**

Available project-related information was reviewed for the study, including master plans, municipal integrated development plans, previous TIAs, the specialist terms of reference and project specific maps and layout drawings.

**b) Site Investigation**

A site investigation was conducted in the summer season on 15 March 2023 wherein the geometric and traffic characteristics of the road network surrounding the proposed development area was assessed, including existing and potential site access alternatives.

**c) Route and Trip Projections**

The nature, origin and transportation of project-specific construction plant, materials, equipment, staff and labour were considered, including abnormal load requirements.

**d) Assessment of Impacts**

The potential traffic impacts associated with the construction, operation and decommissioning phases of the proposed development were explicitly identified, assessed and rated using the impact rating methodology provided in the specialist terms of reference. Recommendations were provided to mitigate the identified impacts for all phases of development.

**e) Presentation of Findings**

The outcomes of the specialist study were collated, synthesised and presented in this report.

## 4.2. BASE INFORMATION

Below is the primary base information utilised for the Transportation study:

- Nkangala District Municipality Integrated Development Plan 2020/2021
- Mpumalanga Spatial Development Framework (2018)
- Record Traffic Data (2016)
- TIAs for relevant proposed developments (2022)
- GIS Information (2011-2021)

## 4.3. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are to be noted:

- The analysis is based on the information provided at the time of reporting by Juwi South Africa (Pty) Ltd and their representatives.
- The design horizon for the proposed facility is assumed to be 20 years.

- The study and its findings are limited to the technical specifications described in Section 2.2 as provided by the client.
- Traffic Station Data / Counts and trip generation calculations are for one direction only and do not include return trips, unless indicated.
- This assessment is limited to the impact the development traffic will have on the existing road network and not on the wider traffic known as background traffic. Such impacts can only be addressed in a detailed Traffic Impact Study which includes undertaking actual traffic counts during the peak periods.
- The information provided in this report is an informed estimate. Construction related traffic may however vary as a result of supplier delivery schedule changes.
- Some of the figures provided are indicative figures as many of the components are still at design stage and will only be confirmed closer to construction.
- Seasonal impacts do not affect the assessment.

# 5. SPECIALIST FINDINGS

## 5.1. TRANSPORTATION

### 5.1.1. Ports of Entry

Various renewable energy components and equipment are available within South Africa, particularly at the country's major economic centres of Johannesburg, Durban, Gqeberha and Cape Town. However, due to the scale, logistics and technological requirements of industrial renewable energy developments, it is common to import many renewable energy components.

The recommended port of entry for the proposed facility is the Port of Durban, located 635 km south of the development area. The recommended alternative port of entry is the Port of Richards Bay, located 511 km south east of the development area.

### 5.1.2. Abnormal Loads

Abnormal loads are described as loads that, for all practical purposes, cannot be transported on a vehicle without exceeding the limitations described in the National Road Traffic Regulations (2000). These loads are defined and identified in the technical guideline document titled TRH16: Dimensional and Mass Limitations and Other Requirements for Abnormal Load Vehicles.

A vehicle (or combination of load and vehicle) can exceed stipulated limitations and hence be deemed an abnormal load as a result of one or more of the following:

- Dimension Abnormality
  - Length
    - Single vehicle - 12.5 m
    - Articulated vehicle - 18.5 m
    - Combination vehicle - 22.0 m
  - Width
    - General vehicles - 2.5 m
    - Goods vehicles - 2.6 m
    - Construction vehicles - 3.5 m
    - Agricultural vehicles - 4.5 m

- Height
  - All vehicles - 4.3 m
- Front Overhang
  - Vehicle front-end ≤ 1.7 m: 60% of wheelbase or 6.2 m less half of wheelbase
  - Vehicle front-end > 1.7 m: 60% of wheelbase or 5.8 m less half of wheelbase
  - Semi-trailer - 1.8 m
- Rear Overhang
  - All goods vehicles - 60% of wheelbase
- Front Load Projection
  - All vehicles - 300 mm
- Rear Load Projections
  - All vehicles - 1.8 m
- Wheelbase
  - Bus-trains - 15.0 m
  - Semi-trailers - 10.0 m
  - All other vehicles - 8.5 m
- Turning Radius
  - Bus-trains - 17.5 m
  - Twin-steer vehicles - 17.5 m
  - All other vehicles - 13.1 m
- Stability
  - Height/wheel track ratio: 2.0
  - Load width/wheel track ratio: 1.8
- Ground Clearance
  - All vehicles: - 150 mm

- Mass Abnormality
  - Loads on Tyres
  - Manufacturer's Ratings
  - Carrying Capacity of Roads
  - Carrying Capacity of Bridges and Culverts
  - Drawing Vehicle Limitations (Power to Mass Ratio)
  - Mass loads on Drive Axles (Traction Ratio)
  - Mass loads on Steering Axles (Steering Ratio)

In the development of solar energy facilities, abnormal loads can arise from the transportation of electrical components such as transformers; construction plant such as graders, compactors and cranes; and site facilities such as prefabricated offices.

Examples of such abnormal loads are depicted below.

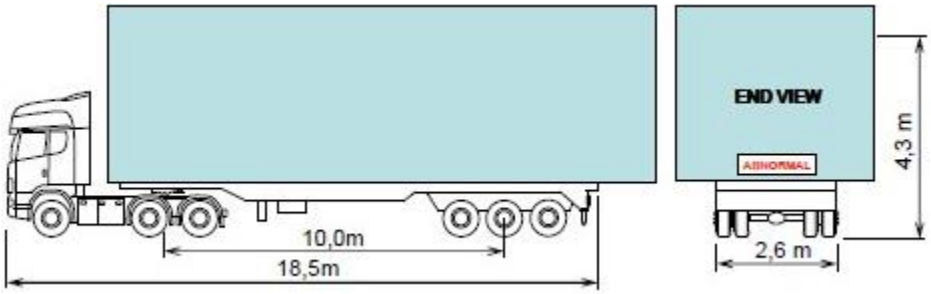



**Figure 5-1** Abnormal Load Example - Prefabricated Offices

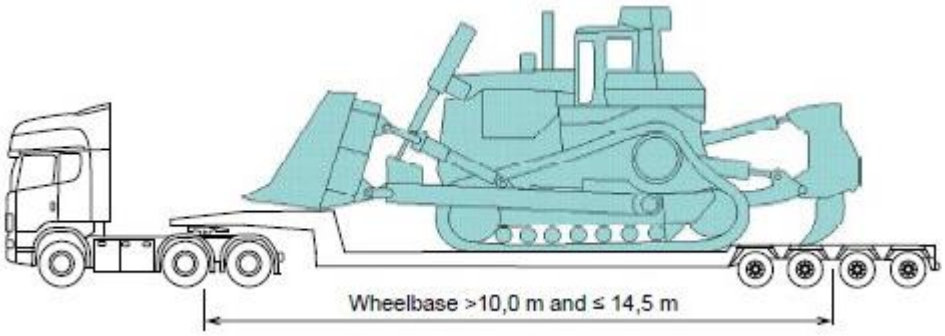



**Figure 5-2** Abnormal Load Example - Plant

Prior to transporting abnormal loads, approval must be obtained in the form of a permit from all the provincial departments of transport associated with the transportation route. The permit application is completed by specialists in the transportation of abnormal loads and must conform to 'The Road Traffic Act, 1996 (Act No 93 of 1996)'. The application includes route clearances from local, provincial and national road and transport authorities, as well as from utilities such as Telkom, Eskom and Transnet.

It is recommended that an Abnormal Load Study be undertaken once the (i) detail design, (ii) construction programme, and (iii) logistics plan are available.

The suitability of routes to the proposed facility for abnormal loads is considered in Section 5.1.3 below.

### 5.1.3. Long Haulage Routes

Solar energy components and construction equipment are assumed to come from the Port of Durban and from Johannesburg. Local labour is expected to come from residential areas in the surrounds of the development area. It is assumed that general construction material is obtainable locally.

Table 5-1 presents the expected/assumed trip origins for long haulage transportation. The trip destination for all trips is the site of the proposed facility some 15 km south-west of Belfast. The long haulage routes are further depicted in Figure 5-3 and discussed thereafter.

**Table 5-1** Long Haulage Routes

| TRIP ORIGIN | ROUTE DETAILS | | | |
|---|---|---|---|---|
| | Load | Distance | Province | Abn. Load Capability |
| **Durban** | Components, plant, equipment | ± 635 km | KZN, MP | Good/Moderate |
| **Richards Bay** | Components, plant, equipment | ± 560 km | KZN, MP | Moderate |
| **JHB** | Components, plant, equipment | ± 205 km | Gauteng, MP | Good |

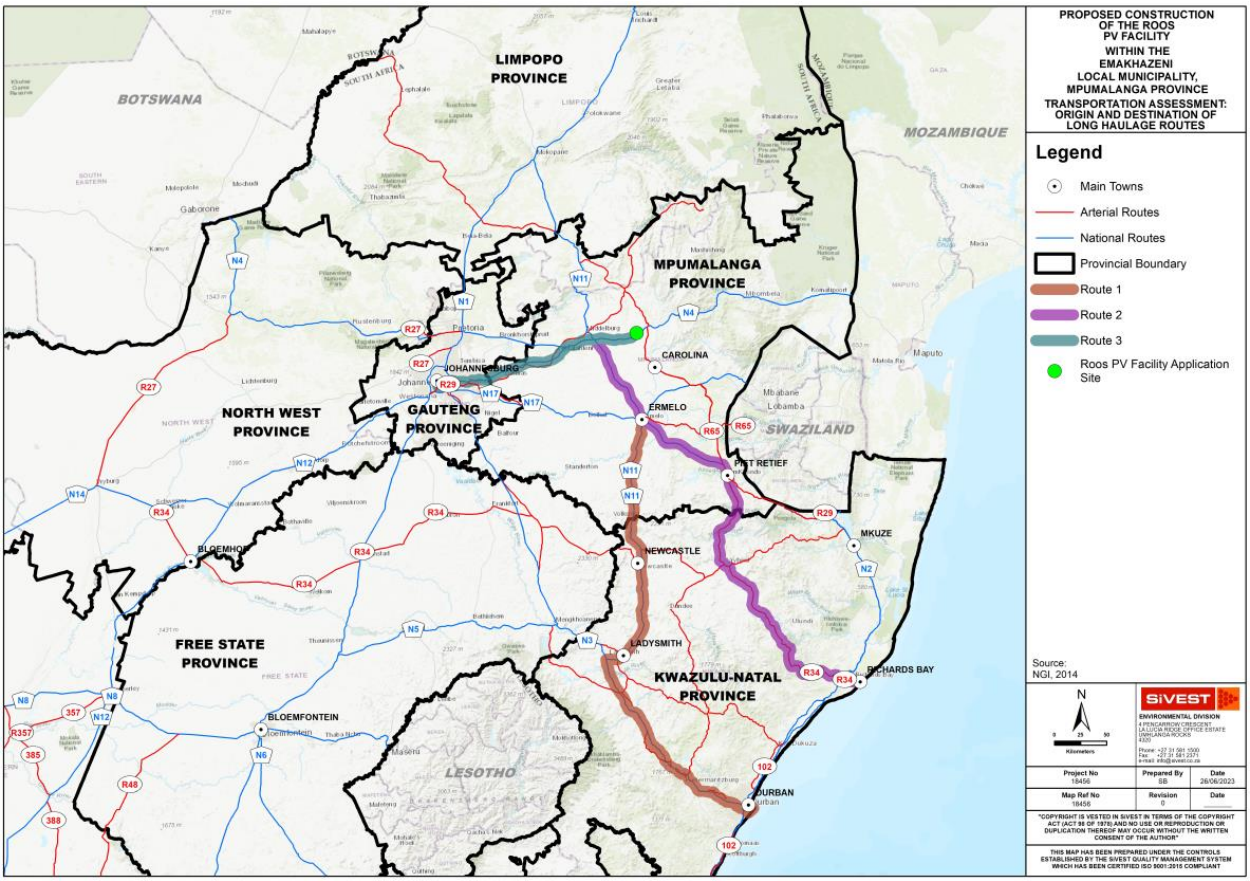



**Figure 5-3** Long Haulage Routes

### 5.1.3.1 Rout 1: Port of Durban to Proposed Development (Preferred)

This route consists predominantly of national roads which are the N3 (240 km four-lane dual carriageway), the N11 (353 km two-lane single carriageway), and the N4 (44 km four-lane dual carriageway and two-lane single carriage). Access to the site is obtained off the N4. The route traverses through the Amajuba Pass approximately 40 km north of the town of Newcastle along the N11, where the proclaimed speed limit decreases to 80 km in some sections.

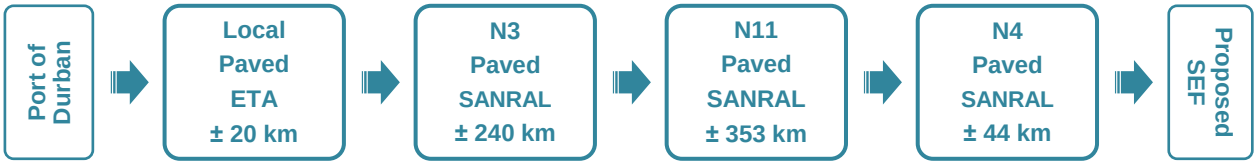
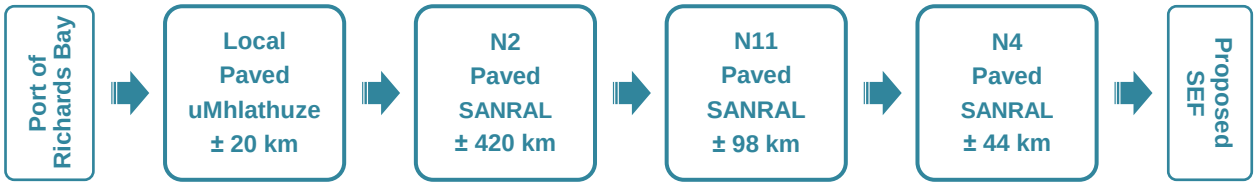



**Figure 5-4** Preferred Importation Route

### 5.1.3.2 Route 2: Port of Richards Bay to Proposed Development

This route also consists predominantly of national roads which are the N2 (420 km two-lane single carriageway), the N11 (96 km two-lane single carriageway) and the N4 (44 km four-lane dual carriageway and two-lane single carriageway). Notably, it has far less sections of four-lane dual carriageway and does not feature recent upgrades compared to the preferred route.




#### 5.1.3.3 Route 3: Johannesburg to Proposed Development

This route consists of the national routes N12 and N4, which are four-lane dual carriageway for the entire route.


### 5.1.4. External Transportation Network

Figure 5-5 shows the external road network in the immediate vicinity of the proposed Roos Solar Energy Facility including existing and/or proposed site access points.

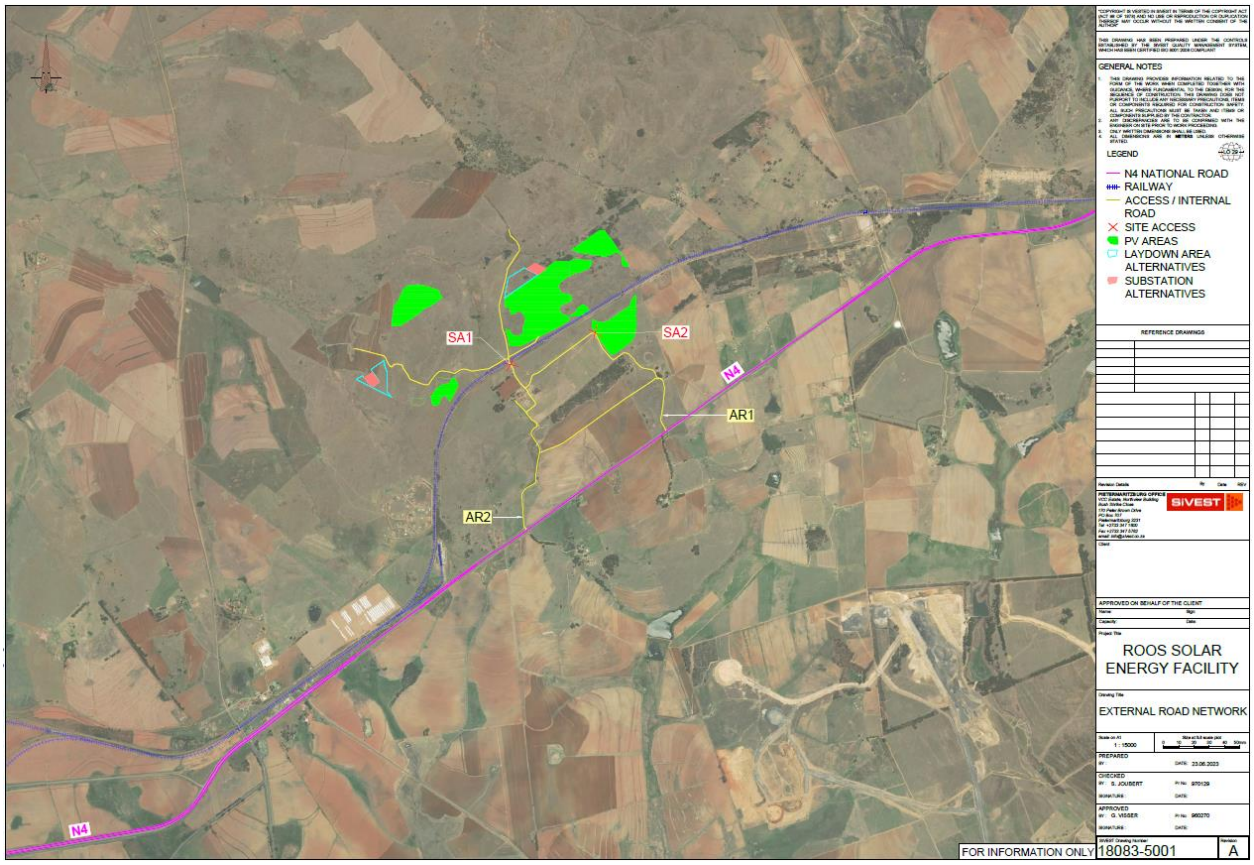



**Figure 5-5** External Road Network

#### 5.1.4.1 Existing Roads

The proposed development can be approached from the east and west directions using the N4 national route and then turning onto either Access Road 1 (AR1) or Access Road 2 (AR2) which lead to the common access point of the proposed facility.

The **N4** is a Class 1 primary distributor maintained by the South African National Roads Agency Limited (SANRAL). The route is the major link between the Gauteng cities of Johannesburg and Pretoria, and the Mpumalanga provincial capital of Mbombela, with several coal power stations and industrial activity along the way. At the time of the site visit, road upgrades were being carried out on the N4 in the vicinity of the development area but the road was comfortably usable by traffic in both directions. Engagements with SANRAL indicate that the road upgrades are scheduled to be completed in November 2024.

**AR1** and **AR2** are essentially private farm access roads spaced approximately 1.5 km apart. They are approximately 5 m wide gravel roads that are in good condition; however, the grassed verges require some maintenance to allow for safe passing of opposing vehicles and safe accommodation of foot traffic.

Images of the existing road network providing access to the site are presented below.

**Image 1** - N4 east-facing with Access Road 1 on the left

**Image 2** – Access Road 1

**Image 3** - N4 west-facing with Access Road 2 on right

**Image 4** - Access Road 2

**Image 5** - Access Road 2

**Image 6** - Access Road 2 approaching site access SA1

As shown in the images above, there are dedicated turning lanes off the N4 and onto the existing access roads, which means the impact of development traffic in the form of vehicular conflicts and congestion at these intersections will be minimal.

#### 5.1.4.2 Public Transportation

Formalised public transportation along the N4 is not available due to it being a national road.

#### 5.1.4.3 Non-Motorised Transportation

There are a number of commercial farms in the surrounds of the proposed development as well as a small residential area, several farmhouse clusters and a service station, which together form a community named Wonderfontein. Commuting by foot is common in the area, and most of the proposed development's local labour can be expected to travel on foot.

### 5.1.5. Site Access

The site can be accessed through Site Access SA1 - an existing access point which underpasses a railway through a culvert opening that is approximately 3 m wide and 3.5 m high. SA1 is depicted in the images below.

**Image 7** - Site Access 1

**Image 8** - Site Access 1

A portion of the proposed facility is bisected by the railway depicted above and hence can be considered to have a northern portion and a southern portion, with a proposed internal road linking these two portions. This proposed road will require a new railway crossing and will hence require the approval of Transnet. To

avoid the necessity of a new railway crossing, consideration should be given to two separate and independent accesses to the portions of the site on either side of the railway. The proposed additional access is depicted as SA2 in Figure 5-5.

### 5.1.6. Geometric Design Considerations

The nature of the proposed development requires that the following geometric design standards be satisfied at the intersections of the N4 with AR1 and AR2 as well as at the site access point. It is noted that these standards are formulated with dimensional abnormal loads in mind and may be relaxed for normal-load applications.

**Table 5-2** Access Design Considerations

| Design Element | Minimum | Recommended | AR1 | AR2 | SA1 |
|---|---|---|---|---|---|
| Sight Distance | 250 m | 300 m | ✓ | ✓ | ✓ |
| Turning Radii | 14 m | 18 m | × | × | N/A |
| Access Width Clearance | 6 m | 10 m | ✓ | ✓ | × |
| Access Height Clearance | 4 m | 6 m | ✓ | ✓ | × |

***Sight Distance***

The required site distance of 300 m is satisfied from all approach directions.

***Turning Radii***

AR1 and AR2 do not meet the minimum required turning radius. In order for large vehicles such as trucks and construction plant to access the site at these intersections, upgrades to the intersections will be required. The design of the upgrades must be undertaken by a duly qualified civil engineer and approved by SANRAL.

***Access Width Clearance***

There is ample space at the intersections of AR1 and AR2 with the N4 to accommodate the required access width clearance. No upgrades are anticipated in respect of this design criteria.

***Access Height Clearance***

SA1 has a height restriction of approximately 3.5 m imposed by the overhead railway. This should be sufficient for normal loads but will need to be confirmed for abnormal loads once an Abnormal Load Study has been undertaken.

The design of any new accesses or upgrades to existing accesses must be undertaken by an ECSA registered engineer and submitted to the Mpumalanga Department of Transport for approval. The expected traffic during the construction and O&M phases, the available sight distances including photographs, and the affected stormwater structures are to be included in the application.

### 5.1.7. Internal Transportation Network

The proposed PV site contains some two-track roads that are approximately 4 m wide which have been incorporated into the internal road network as far as possible. Two such internal roads are depicted below.

**Image 9** - Internal Gravel Road

**Image 10** - Internal Gravel Road

The internal road network will need to be designed in accordance with the final site development plan. Gravel roads of 4-5 m widths are proposed. The network layout ought to provide efficient access to all elements of the facility and effective accommodation of the anticipated internal traffic.

The geometrics of the roads must be designed to accommodate all normal and abnormal vehicles anticipated within the facility. The internal roads must further consider the facility's stormwater management plan so as to reduce the risks of possible erosion.

It is the requirement of the provincial roads authority that all internal access roads be designed according to TRH 17[1] and TRH 20[2].

## 5.2. TRAFFIC

The prescribed study area for direct traffic impact due to a proposed development includes accesses to the site and external roads in the immediate vicinity of the site, generally limited to Class 4 and 5 roads up to their first intersections with higher order roads, within a maximum distance of 1.5 km from all site accesses.

The traffic impact of the proposed development on the external road network identified in Section 5.1.4 is herein assessed for the various stages of development.

### 5.2.1. Pre-development Phase

The proposed development is situated in a farming area located along the N2 national route between two major cities, namely Johannesburg in the Gauteng province (± 205 km west) and the Mpumalanga provincial capital city of Mbombela (± 140 km east). The existing traffic conditions along the section of the N4 that passes the project area were established using record traffic data obtained from SANRAL as well as on-site traffic observations. These traffic conditions are presented in Table 5-3 below. It is noted that the depicted traffic data is crude but indicative. Should more accurate traffic data be required, a traffic count undertaken in accordance with TMH14[3] is recommended.

[1] TRH 17: Geometric Design of Rural Roads
[2] TRH 20: The Structural Design, Construction and Maintenance of Unpaved Roads

[3] TMH 14: South African Standard Traffic Data Collection Format

**Table 5-3** Existing Traffic Conditions

| Road | Position | Morning 07:00-08:00 | | | Weekday Midday 09:00-15:00 | | | Afternoon 16:00-17:00 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | LV | HV | T | LV | HV | T | LV | HV | T |
| N4 | Intxn with AR1 | 709 | 416 | 1125 | 864 | 576 | 1440 | 782 | 459 | 1241 |
| N4 | Intxn with AR2 | 709 | 416 | 1125 | 864 | 576 | 1440 | 782 | 459 | 1241 |
| AR1 | Intxn with the N4 | 2 | 0 | 2 | 5 | 2 | 7 | 2 | 0 | 2 |
| AR2 | Intxn with the N4 | 4 | 1 | 5 | 8 | 3 | 11 | 4 | 1 | 5 |

Intxn: Intersection

### 5.2.2. Construction Phase

The construction phase will generate the highest number of trips for the proposed facility. Construction will typically involve earthworks, access roads, foundations, trenching, on-site buildings, electrical cables, transformers, switch gears, substations, battery energy storage systems and pylons where overhead electric cables are required. The traffic impact on the surrounding road network will result from the delivery of the associated plant, materials, equipment and abnormal loads, as well as the commuting of construction labour. The nature of the impact will be an increase in intersection traffic conflicts, an increase in abnormal load and normal load traffic, an increase in pedestrian traffic, and an increased requirement for road maintenance.

Based on calculations and previous experience with solar energy facilities, an 18-month construction period has been estimated and is expected to generate a daily maximum of ±56 additional vehicle trips on the surrounding road network.

Of the total maximum daily vehicle trips, ±18 will be transporting staff and labour and will typically occur in the morning between 07:00 – 08:00 and in the afternoon between 16:00 – 17:00. These trips will therefore coincide with the morning and afternoon peak periods. Given the remote locality of the proposed development, it is anticipated that a fair amount of labour will travel to and from site in group transportation.

The remaining ±38 vehicle trips are expected to occur over the 6-hr period between the morning and afternoon peaks for the delivery of construction plant, material and equipment; and include both normal and abnormal loads. These equate to ±7 vehicle trips / hour.

The table below shows the expected generated trips on the affected roads during the construction phase of the proposed facility.

**Table 5-4** Expected Generated Trips During the Construction Phase

| Road | Morning 07:00-08:00 | | | Weekday Midday 09:00-15:00 | | | Afternoon 16:00-17:00 | | |
|---|---|---|---|---|---|---|---|---|---|
| | LV | HV | T | LV | HV | T | LV | HV | T |
| N4 | 18 | 0 | 18 | 12 | 26 | 38 | 18 | 0 | 18 |
| AR 1 / AR 2 | 18 | 0 | 18 | 2 | 26 | 38 | 18 | 0 | 18 |

In terms of TMH 16[4], developments that generate less than 50 peak hour trips are not required to undertake a detailed Traffic Impact Assessment (TIA). The Roos Solar Energy Facility is estimated to generate ±18 peak hour trips during the construction phase. The resulting traffic impact on the surrounding road network during this phase is therefore seen as nominal.

The proposed mitigation measures for the traffic impacts of this phase of the development are:

- Group transportation of construction labour as far as possible
- Off-peak scheduling of plant, material and equipment deliveries as far as possible
- Adequate traffic law enforcement
- Appropriate, timely and high quality maintenance of internal and access gravel roads
- Implementation of pedestrian safety initiatives
- Continuous engagement with the Mpumalanga Department of Transport.

### 5.2.3. Operation and Maintenance Phase

The Roos Solar Energy Facility is assessed at a design horizon of 20 years, which can be increased if financially viable. Based on similar existing facilities, the operation and maintenance of the proposed facility will be undertaken by a staff compliment of approximately 5-8 people. The traffic impact during this phase will result from employees commuting to and from the development, the occasional repair vehicle, and the occasional delivery of replacement components.

The development is estimated to add 5 vehicle trips per hour onto the surrounding road network during the morning and afternoon peaks over the life-span of the facility, while the occasional maintenance-related trips are deemed negligible. The overall traffic impact for this phase is therefore seen as nominal.

The table below shows the expected generated trips on the affected roads during the O&M phase of the proposed facility.

**Table 5-5** Expected Generated Trips During O&M Phase

| Road | Morning 07:00-08:00 | | | Weekday Midday 09:00-15:00 | | | Afternoon 16:00-17:00 | | |
|---|---|---|---|---|---|---|---|---|---|
| | LV | HV | T | LV | HV | T | LV | HV | T |
| N5 | 5 | 0 | 5 | 2 | 0 | 2 | 5 | 0 | 5 |
| AR 1 / AR 2 | 5 | 0 | 5 | 2 | 0 | 2 | 5 | 0 | 5 |

The proposed mitigation measures for the traffic impacts of this phase of the development are:

- Group transportation of facility staff as far as possible
- Off-peak scheduling of maintenance-related traffic as far as possible
- Appropriate, timely and high-quality maintenance of internal gravel roads

### 5.2.4. Decommissioning Phase

The decommissioning of the proposed facility and associated infrastructure will generate considerably less trips than the construction phase. It is estimated that the decommissioning phase will generate an additional ±42 vehicles / day over a period of 6 months, ±15 of which will occur during the peak periods and ±27 during the off-peak period. It is assumed that the material removed will be transported Johannesburg for recycling or disposal. The impact of this phase is considered to be low.

[4] TMH 16: South African Traffic Impact and Site Traffic Assessment Manual

The table below show the expected generated trips on the affected roads during the decommissioning phase.

**Table 5-6** Expected Generated Trips During Decommissioning Phase

| Road | Morning 07:00-08:00 | | | Weekday Midday 09:00-15:00 | | | Afternoon 16:00-17:00 | | |
|---|---|---|---|---|---|---|---|---|---|
| | LV | HV | T | LV | HV | T | LV | HV | T |
| N5 | 14 | 1 | 15 | 10 | 17 | 27 | 14 | 1 | 15 |
| AR 1 / AR 2 | 14 | 1 | 15 | 10 | 17 | 27 | 14 | 1 | 15 |

The proposed mitigation measures for the traffic impacts of this phase of the development are:

- Group transportation of staff and labour as far as possible
- Off-peak scheduling of plant, material and equipment haulage as far as possible
- Adequate traffic law enforcement
- Appropriate, timely and high-quality maintenance of gravel roads
- Implementation of pedestrian safety initiatives
- Continuous engagement with the Mpumalanga Department of Transport

### 5.2.5. Overall Traffic Implications

As seen above, the anticipated traffic resulting from the proposed development is nominal across all phases of the development. The highest additional peak traffic is ±18 vehicles/peak-hour which occurs during the construction phase and is hence considered a temporary impact. The estimated permanent traffic impact is an addition of ±5 vehicles/peak-hour. Both these traffic values are well below the Traffic Impact Assessment threshold of 50 vehicles/peak-hour.

# 6. ASSESSMENT OF IMPACTS

## 6.1. IMPACT RATING ASSESSMENT (IRA)

The 'Impact Rating System' takes into account the nature, scale and duration of the effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- Planning
- Construction
- Operation
- Decommissioning

A rating points-based system is applied to the potential impacts on the environment and includes objective evaluations of the mitigation of the impact. The assessment of impacts are given in the following tables for each proposed PV facility. An assessment of the cumulative impacts discussed in Section 6.2 is also included in the tables.

**Table 6-1** Impact Rating Table

| ROOS SOLAR ENERGY FACILITY | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENVIRONMENTAL PARAMETER | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION | | | | | | | | | RECOMMENDED MITIGATION MEASURES | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION | | | | | | | | |
| | | E | P | R | L | D | I / M | TOTAL | STATUS | S | | E | P | R | L | D | I / M | TOTAL | STATUS | S |
| **A) CONSTRUCTION PHASE** | | | | | | | | | | | | | | | | | | | | |
| a1) Normal Load Traffic | Increase in normal load traffic | 2 | 4 | 1 | 2 | 1 | 3 | 30 | - | Medium | • Group transportation of staff and labour<br>• Stagger the delivery of materials, plant and components<br>• Construction of an on-site concrete batching plant to reduce trips. | 2 | 4 | 1 | 2 | 1 | 2 | 20 | - | Low |
| | Increase of incidents with pedestrians | 2 | 4 | 2 | 4 | 1 | 2 | 26 | - | Medium | • Maintain verges of access and internal roads to provide safe walking space<br>• Implementation of pedestrian safety initiatives | 2 | 3 | 2 | 4 | 1 | 1 | 12 | - | Low |
| | Increased need for road maintenance | 2 | 3 | 2 | 2 | 2 | 2 | 22 | - | Low | • Implement a road maintenance program under the auspices of the Mpumalanga Department of Transport | 2 | 3 | 2 | 2 | 1 | 2 | 20 | - | Low |
| a2) Abnormal Loads | Additional Abnormal Loads | 3 | 2 | 1 | 2 | 1 | 1 | 9 | - | Low | • Schedule abnormal load transportation for off-peak periods<br>• Stagger the delivery of abnormal loads<br>• Adequate enforcement of traffic laws and Abnormal Load permit conditions | 3 | 2 | 1 | 2 | 1 | 1 | 9 | - | Low |
| a3) Access and Internal Roads | Need for new / Upgraded Access points | 1 | 4 | 1 | 2 | 1 | 1 | 9 | - | Low | • Adequate road signage according to the SARTSM<br>• Designs to be undertaken by a registered civil engineering professional<br>• Approval from the Mpumalanga Department of Transport and SANRAL | 1 | 4 | 1 | 2 | 1 | 1 | 9 | - | Low |
| **B) OPERATIONAL PHASE** | | | | | | | | | | | | | | | | | | | | |
| b1) Normal Load Traffic | Increase in normal load traffic | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low | • The increase in traffic for this phase of the development is negligible and will not have a significant impact | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low |
| | Increase of Incidents with pedestrians | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low | • The increase in traffic for this phase of the development is negligible and will not have a significant impact | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Increased need for road maintenance | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low | • The increase in traffic for this phase of the development is negligible and will not have a significant impact | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low |
| b2) Abnormal Loads | Additional Abnormal Loads | 3 | 1 | 1 | 2 | 3 | 1 | 10 | - | Low | • The increase in traffic for this phase of the development is negligible and will not have a significant impact | 3 | 1 | 1 | 2 | 3 | 1 | 10 | - | Low |
| b3) Access and Internal Roads | New / Upgraded Access points | 1 | 1 | 1 | 2 | 3 | 1 | 8 | - | Low | • Regular maintenance of upgraded accesses<br>• Adequate road signage according to the SARTSM | 1 | 1 | 1 | 2 | 3 | 1 | 8 | - | Low |
| **C) DECOMMISSIONING PHASE** | | | | | | | | | | | | | | | | | | | | | |
| c1) Normal Load Traffic | Increase in normal load traffic | 2 | 4 | 1 | 2 | 1 | 3 | 30 | - | Low | • Group transportation of staff and labour<br>• Stagger the transportation of materials, plant and components | 2 | 4 | 1 | 2 | 1 | 2 | 20 | - | Low |
| | Increase of Incidents with pedestrians | 2 | 4 | 2 | 4 | 1 | 2 | 26 | - | Medium | • Maintain verges of access and internal roads to provide safe walking space<br>• Implementation of pedestrian safety initiatives | 2 | 3 | 2 | 4 | 1 | 1 | 12 | - | Low |
| | Increased need for road maintenance | 2 | 3 | 2 | 2 | 2 | 2 | 22 | - | Low | • Implement a road maintenance program under the auspices of the Mpumalanga Department of Transport | 2 | 3 | 2 | 2 | 1 | 2 | 20 | - | Low |
| c2) Abnormal Loads | Additional Abnormal Loads | 3 | 2 | 1 | 2 | 1 | 1 | 9 | - | Low | • Schedule abnormal load transportation for off-peak periods<br>• Stagger the delivery of abnormal loads<br>• Adequate enforcement of traffic laws and Abnormal Load permit conditions | 3 | 2 | 1 | 2 | 1 | 1 | 9 | - | Low |
| c3) Access and Internal Roads | New / Upgraded Access points | 1 | 4 | 1 | 2 | 1 | 1 | 9 | - | Low | • Regular maintenance of upgraded accesses<br>• Adequate road signage according to the SARTSM | 1 | 4 | 1 | 2 | 1 | 1 | 9 | - | Low |

**Table 6-2** Cumulative Impact Assessment

| CUMULATIVE IMPACTS | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENVIRONMENTAL PARAMETER | ISSUE / IMPACT / ENVIRONMENTAL EFFECT/ NATURE | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION | | | | | | | | | RECOMMENDED MITIGATION MEASURES | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION | | | | | | | | |
| | | E | P | R | L | D | I / M | TOTAL | STATUS | S | | E | P | R | L | D | I / M | TOTAL | STATUS | S |
| **A) CONSTRUCTION PHASE** | | | | | | | | | | | | | | | | | | | | |
| a1) Normal Load Traffic | Increase in normal load traffic | 2 | 4 | 1 | 2 | 1 | 3 | 30 | - | Medium | • Group transportation of staff and labour<br>• Stagger the delivery of materials, plant and components<br>• Construction of an on-site concrete batching plant to reduce trips. | 2 | 4 | 1 | 2 | 1 | 2 | 20 | - | Low |
| | Increase of incidents with pedestrians | 2 | 4 | 2 | 4 | 1 | 2 | 26 | - | Medium | • Maintain verges of access and internal roads to provide safe walking space<br>• Implementation of pedestrian safety initiatives | 2 | 3 | 2 | 4 | 1 | 1 | 12 | - | Low |
| | Increased need for road maintenance | 2 | 3 | 2 | 2 | 2 | 2 | 22 | - | Medium | • Implement a road maintenance program under the auspices of the Mpumalanga Department of Transport | 2 | 3 | 2 | 2 | 1 | 2 | 20 | - | Low |
| a2) Abnormal Loads | Additional Abnormal Loads | 3 | 2 | 1 | 2 | 1 | 1 | 9 | - | Medium | • Schedule abnormal load transportation for off-peak periods<br>• Stagger the delivery of abnormal loads<br>• Adequate enforcement of traffic laws and Abnormal Load permit conditions | 3 | 2 | 1 | 2 | 1 | 1 | 9 | - | Low |
| a3) Access and Internal Roads | Need for new / Upgraded Access points | 1 | 4 | 1 | 2 | 1 | 1 | 9 | - | Low | • Adequate road signage according to the SARTSM<br>• Designs to be undertaken by a registered civil engineering professional<br>• Approval from the Mpumalanga Department of Transport and SANRAL | 1 | 4 | 1 | 2 | 1 | 1 | 9 | - | Low |

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **B) OPERATIONAL PHASE** | | | | | | | | | | | | | | | | | | | | | |
| b1) Normal Load Traffic | Increase in normal load traffic | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low | • The increase in traffic for this phase of the development is negligible and will not have a significant impact | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low |
| | Increase of Incidents with pedestrians | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low | • The increase in traffic for this phase of the development is negligible and will not have a significant impact | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low |
| | Increased need for road maintenance | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low | • The increase in traffic for this phase of the development is negligible and will not have a significant impact | 2 | 1 | 1 | 2 | 3 | 1 | 9 | - | Low |
| b2) Abnormal Loads | Additional Abnormal Loads | 3 | 1 | 1 | 2 | 3 | 1 | 10 | - | Low | • The increase in traffic for this phase of the development is negligible and will not have a significant impact | 3 | 1 | 1 | 2 | 3 | 1 | 10 | - | Low |
| b3) Access and Internal Roads | New / Upgraded Access points | 1 | 1 | 1 | 2 | 3 | 1 | 8 | - | Low | • Regular maintenance of upgraded accesses<br>• Adequate road signage according to the SARTSM | 1 | 1 | 1 | 2 | 3 | 1 | 8 | - | Low |
| **C) DECOMMISSIONING PHASE** | | | | | | | | | | | | | | | | | | | | | |
| c1) Normal Load Traffic | Increase in normal load traffic | 2 | 4 | 1 | 2 | 1 | 3 | 30 | - | Medium | • Group transportation of staff and labour<br>• Stagger the transportation of materials, plant and components | 2 | 4 | 1 | 2 | 1 | 2 | 20 | - | Low |
| | Increase of Incidents with pedestrians | 2 | 4 | 2 | 4 | 1 | 2 | 26 | - | Medium | • Maintain verges of access and internal roads to provide safe walking space<br>• Implementation of pedestrian safety initiatives | 2 | 3 | 2 | 4 | 1 | 1 | 12 | - | Low |
| | Increased need for road maintenance | 2 | 3 | 2 | 2 | 2 | 2 | 22 | - | Medium | • Implement a road maintenance program under the auspices of the Mpumalanga Department of Transport | 2 | 3 | 2 | 2 | 1 | 2 | 20 | - | Low |
| c2) Abnormal Loads | Additional Abnormal Loads | 3 | 2 | 1 | 2 | 1 | 1 | 9 | - | Medium | • Schedule abnormal load transportation for off-peak periods<br>• Stagger the delivery of abnormal loads<br>• Adequate enforcement of traffic laws and Abnormal Load permit conditions | 3 | 2 | 1 | 2 | 1 | 1 | 9 | - | Low |
| c3) Access and Internal Roads | New / Upgraded Access points | 1 | 4 | 1 | 2 | 1 | 1 | 9 | - | Low | • Regular maintenance of upgraded accesses<br>• Adequate road signage according to the SARTSM | 1 | 4 | 1 | 2 | 1 | 1 | 9 | - | Low |

## 6.2. CUMULATIVE IMPACT ASSESSMENT

SiVEST undertook every effort to obtain the relevant information for the surrounding developments within 35 km of the proposed PV facility, however many of the documents are not currently publicly available. To this extent, the information that could be obtained from the surrounding, planned renewable energy developments was considered in the cumulative impact assessment. The projects that were identified within a 35 km radius of the proposed development and included in the cumulative impact assessment are shown in Figure 6-1

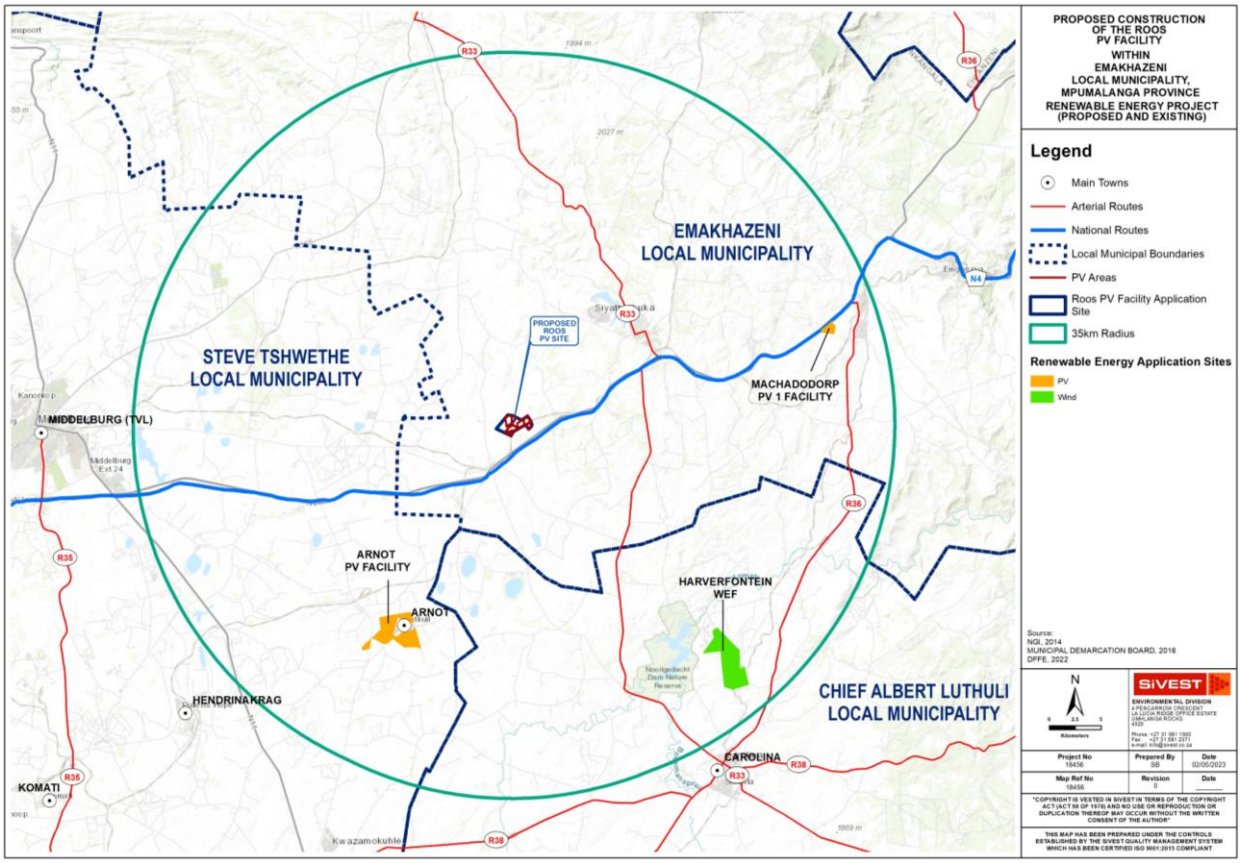



**Figure 6-1** Proposed Renewable Energy Developments within a 35 km Radius

## 6.3. COMPARATIVE ASSESSMENT OF ALTERNATIVES

Various alternatives were assessed as part of the Transportation Study. These include grid connection alternatives and facility layout alternatives. The assessments are reflected in **Table 6-4** and discussed thereafter.

**Table 6-3** Comparative Assessment Key

| | |
|---|---|
| **PREFERRED** | The alternative will result in a low impact / reduce the impact / result in a positive impact |
| **FAVOURABLE** | The impact will be relatively insignificant |
| **LEAST PREFERRED** | The alternative will result in a high impact / increase the impact |
| **NO PREFERENCE** | The alternative will result in equal impacts |

**Table 6-4** Comparative Assessment of Alternatives

| Alternative | Preference | Reasons (Incl. Potential Issues) |
|---|---|---|
| **SEF Layout Alternatives** | | |
| Substation location 1 | No Preference | Will not have an effect on the transportation study |
| Substation location 2 | | |
| Laydown, BESS and O&M area Location 1 | No Preference | Will not have an effect on the transportation study |
| Laydown, BESS and O&M area Location 2 | | |
| Grid connection corridor 2 | | |

### 6.3.1. Substation Location Alternatives

Two alternative locations are considered for the substation of the Roos Solar Energy Facility. In respect of this study, however; the exact location of the substation has no bearing on the overall traffic impacts of the proposed development.

### 6.3.2. Laydown Area Alternatives

Two alternative locations are considered for the construction/laydown area of the Roos Solar Energy Facility. In respect of this study, however; the exact location of the construction/laydown area has no bearing on the overall traffic impacts of the proposed development.

### 6.3.3. No-Go Alternative

The 'No-Go' alternative is the option of not undertaking the proposed Roos Solar Energy Facility. This alternative would result in no traffic impacts on the immediate or broader transport network. It would however mean forgoing the various benefits that the proposed facility offers, such as the creation of jobs, the boosting of the local economy, and primarily the sustainable generation of renewable energy. These benefits are considered to outweigh the avoidance of the traffic impacts associated with the proposed development, especially considering that the traffic impacts were found to be nominal (section 5.2.5) and can be effectively mitigated by the measures advanced herein. The "No-Go" alternative is therefore not preferred.

# 7. MANANGEMENT OF IMPACTS

Inputs to be included in the environmental management programme relating to this study are given in Table 7 1 below.

**Table 7-1** EMPr Inputs

| Impact/Aspect | Mitigation/Management Actions | Responsibility | Methodology | Mitigation/Management Objectives and Outcomes | Frequency |
|---|---|---|---|---|---|
| **PLANNING PHASE** | | | | | |
| Increase in road traffic | Identify type and condition of affected roads | Developer | Transportation study | Establish baseline | Once-off |
| | Deduce current traffic | Developer | Transportation study | Establish baseline conditions | Once-off |
| | Deduce expected additional traffic | | Transportation study | Understand extent of impact | Once-off |
| | Confirm ability of existing road network to absorb additional traffic | Developer | Transportation study | Ensure containment of impact | Once-off |
| Increase in traffic incidents with pedestrians and livestock | Assess current pedestrian conditions | Developer | Transportation study | Establish baseline | Once-off |
| | Confirm ability of existing road network to safely accommodate pedestrians | Developer | Transportation study | Ensure containment of impact | Once-off |
| Traffic disruptions and road damage due to abnormal loads | Identify required abnormal loads | Developer | Transportation study; Abnormal Load Study | Understand extent of impact | Once-off |
| | Identify suitable routes | Developer | Transportation study | Ensure containment of impact | Once-off |
| | Apply for abnormal load permits with the relevant authorities | Developer | Application | Ensure containment of impact | Once-off |

| | | | | | |
|---|---|---|---|---|---|
| Access and internal roads | Assess suitability of existing accesses and internal roads | Developer | Transportation study | Establish baseline | Once-off |
| | Design accesses and internal roads as per applicable criteria and standards | Developer | Civil engineering design | Ensure containment of impact | Once-off |
| | Design access and internal roads to minimise earthworks | Developer | Civil engineering design | Reduction of environmental disturbance | Once-off |
| | Design access and internal roads to minimise stormwater damage | Developer | Civil engineering design | Reduction of environmental disturbance | Once-off |
| | Submit access and road designs for approval with relevant authorities prior to construction | Developer | Application | Ensure compliance | Once-off |
| **CONSTRUCTION PHASE** | | | | | |
| Increase in road traffic | Group transportation of staff | Contractor | Planning | Reduce the magnitude of additional road traffic | Daily |
| | Stagger material, plant and equipment deliveries | Contractor | Programming of works | Reduce the concentration of additional road traffic | Weekly |
| | Schedule deliveries for off-peak times | Contractor | Programming of works | Reduce the concentration of additional road traffic | Weekly |
| | Adequate traffic law enforcement | Contractor | Traffic management plan | Safely manage additional road traffic | Daily |

| | | | | | |
|---|---|---|---|---|---|
| Increase in traffic incidents with pedestrians and livestock | Reduce and control speed of vehicles | Contractor | Traffic management plan | Avoid incidents with pedestrians and livestock | Daily |
| | Safe accommodation of pedestrians | Contractor | Traffic management plan | Avoid incidents with pedestrians | Daily |
| | Implement pedestrian safety initiatives | Contractor | Social facilitation | Avoid incidents with pedestrians | Monthly |
| | Regularly maintain farm fences & access cattle grids | Contractor | Inspections and communications | Avoid incidents with livestock | Monthly |
| Increase in road degeneration | Regularly conduct conditional assessments on gravel roads | Contractor | Visual inspections | Identify deterioration of local roads timeously | Monthly |
| | Implement a road maintenance program under the auspices of the respective transport department | Contractor, Local authority | Road maintenance | Reduce/address deterioration of local roads | Bi-annually |
| Addition of Abnormal Loads | Stagger abnormal load deliveries | Contractor | Programming of works | Reduce the disturbance of road users associated with the transporting of abnormal loads | |
| | Schedule abnormal load deliveries for off-peak time | Contractor | Programming of works | Reduce the disturbance of road users associated with the transporting of abnormal loads | |
| | Ensure compliance with permits | Contractor | Inspections | Safely manage abnormal loads | |
| | Adequate traffic law enforcement | Contractor | Traffic management plan | Safely manage abnormal loads | |

| OPERATIONAL PHASE | | | | | |
|---|---|---|---|---|---|
| Increase in road traffic | Group transportation of staff | Operator | Planning | Reduce the magnitude of additional road traffic | When required |
| Increase in traffic incidents with pedestrians and livestock | Safe accommodation of pedestrians | Operator | Monitoring | Avoid incidents with pedestrians | Weekly |
| | Reduce vehicle speed | Operator | Monitoring | Avoid incidents with pedestrians and livestock | Daily |
| | Regularly maintain farm fences & access cattle grids | Operator | Inspections and Reporting | Avoid incidents with livestock | Monthly |
| Addition of Abnormal Loads | Schedule abnormal load deliveries for off-peak time | Operator | Programming of maintenance | Reduce the disturbance of road users associated with the transporting of abnormal loads | When required |
| | Ensure compliance with permits | Contractor | Inspections | Safely manage abnormal loads | When required |
| | Adequate traffic law enforcement | Contractor | Traffic management plan | Safely manage abnormal loads | When required |

# 8. RECOMMENDATIONS

Following the extensive study of the transportation and traffic related aspects of the proposed development and their impacts on the immediate and broader transportation system, the following are recommended:

- An Abnormal Load Study should be undertaken once the (i) detail design, (ii) construction programme, and (iii) logistics plan are available.
- Dry runs along abnormal load routes should be conducted prior to transporting abnormal loads
- Internal access roads should be constructed according to *TRH20 – Unsealed Roads: Design Construction and Maintenance*
- Traffic calming and speed reduction should be implemented at the approaches to the site access during construction
- Proper and adequate construction road signage should be used on the approach roads which complies with the South African Road Traffic Signage Manual (SARTSM).
- The condition and quality of the gravel roads used should be monitored closely during and after construction, and any required maintenance should be undertaken timeously under the auspices of the relevant transport department.
- The implementation of the mitigation measures identified in the Impact Rating Table should be ensured and monitored.

# 9. CONCLUSION AND IMPACT STATEMENT

## 9.1. CONCLUSION

This Transportation Study assessed the anticipated traffic impact of the Roos Solar Energy Facility.

It was found that the highest traffic impact of the proposed development would occur during the construction phase, which was estimated to generate an additional ±18 peak hour vehicle trips.

The existing site accesses are deemed sufficient for the proposed facility but may require some upgrades.

No fatal flaws or preferences were identified for any of the proposed site alternatives for construction laydown areas and access points.

No environmentally sensitive areas are required and therefore no areas are to be avoided from a Transportation perspective.

## 9.2. IMPACT STATEMENT

With reference to this report, associated assessment and the findings made within, the Roos Solar Energy Facility has a nominal impact on the existing traffic network. The project is therefore deemed acceptable from a transport perspective provided the recommendations and mitigations measures in this report are implemented, and hence the Environmental Authorisation (EA) should be granted.

# 10. REFERENCES


- KZN Transport – *Concrete Causeway Details (1996)*
- South African National Roads Agency Limited – *Drainage Manual (5th Edition)*
- Technical Recommendations for Highways (TRH11) – *Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads (7th Edition - 2000)*
- Technical Recommendations for Highways (TRH17) – *Geometric Design of Rural Roads (1988)*
- Technical Recommendations for Highways (DRAFT-TRH20) – *Unsealed Roads: Design, Construction and Maintenance (2013)*
- Technical Recommendations for Highways (TRH26) – *South African Road Classification and Access Management Manual (2012)*

# APPENDIX A: CURRICULUM VITAE

# APPENDIX B: DECLARATION OF INDEPENDENCE

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**

**THE PROPOSED CONSTRUCTION AND OPERATION OF THE 50 MW Roos Solar Energy Facility LOCATED NEAR BELFAST IN THE MPUMALANGA 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: | SIVEST SA(PTY) LTD | | | |
| B-BBEE | Contribution level (indicate 1 to 8 or non-compliant) | 2 | Percentage Procurement recognition | 125% |
| Specialist name: | NTUTHUKO HLANGUZA | | | |
| Specialist Qualifications: | BSC.ENG (CIVIL) | | | |
| Professional affiliation/registration: | ECSA (PR ENG N° 202202263) | | | |
| Physical address: | 16 GRANTON PLACE, WEMBLEY, PIETERMARITZBURG, 3201 | | | |
| Postal address: | PO BOX 22637, SOUTHGATE, PIETERMARITZBURG | | | |
| Postal code: | 3200 | Cell: | 073 130 3679 | |
| Telephone: | 033 347 1600 | Fax: | N/A | |
| E-mail: | NTUTHUKOH@SIVEST.CO.ZA | | | |

## 2. DECLARATION BY THE SPECIALIST

I, NTUTHUKO HLANGUZA, 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

SIVEST SA (PTY) LTD

Name of Company:

21 June 2023

Date:

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, NTUTHUKO HLANGUZA, 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

SIVEST SA (PTY) LTD
Name of Company

21 June 2023
Date

Signature of the Commissioner of Oaths

Date

**SiVEST Civil Engineering Division**

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Victoria Country Club Estate
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