POSTMASBURG SOLAR PV ENERGY FACILITY 2 PROJECT

TRANSPORT STUDY AND TRAFFIC MANAGEMENT PLAN

Reference: A43277

Prepared for: Atlantic Renewable Energy Partners (Pty) Ltd

Revision: 1

28 October 2014

Document control record

Document prepared by:

Aurecon South Africa (Pty) Ltd

Aurecon Centre

1 Century City Drive

Waterford Precinct
Century City, Cape Town, 7441

T +27 21 526 9400
F +27 21 526 9500
E capetown@aurecongroup.com
W www.aurecongroup.com

Document control						aurecon
Report title		TRANSPORT STUDY AND TRAFFIC MANAGEMENT PLAN				
Document ID		A43277/TP/1 Postmasburg	**Project number**		A43277	
File path		P:\Projects_RSK Projects\PRCPTENE03\A43277 AREP Postmasburg Solar Facility\03 PRJ Del\6 REP\Postmasburg PV\A43277 PostmasburgSolarPVFacility2_TransportStudy&TrafficManagementPlan_Oct2014-R1.docx				
Client		Atlantic Renewable Energy Partners (Pty) Ltd	**Client contact**		David Peinke	
Rev	**Date**	**Revision details/status**	**Prepared by**	**Author**	**Verifier**	**Approver**
0	**22 October 2014**	Draft	HS	HS	JHBC	JHBC
1	**28 October 2014**	Final	HS	HS	JHBC	JHBC
Current Revision		**1**				

Approval			
Author signature		Approver signature	
Name		Name	
Title		Title	

POSTMASBURG SOLAR PV ENERGY FACILITY 2 PROJECT

Date 28 October 2014
Reference A43277
Revision 1

Aurecon South Africa (Pty) Ltd
Aurecon Centre
1 Century City Drive
Waterford Precinct
Century City, Cape Town, 7441

T +27 21 526 9400
F +27 21 526 9500
E capetown@aurecongroup.com
W www.aurecongroup.com

Contents

Figures

Tables

EXECUTIVE SUMMARY

The transport needs for the proposed PV facility on the Rem of Farm 436 Kapstewel near Postmasburg was investigated to confirm the access route and site access for the development of a solar facility.

The general requirements are:

- Legal limits for normal heavy vehicle freight
- Abnormal Permits required for transport of transformers
- Maximum vertical clearance on most routes is 5,2m for Abnormal Load but should preferably be limited to 4,8m.

The general freight for the solar facility comprise of building materials, solar panels and frames and an 80MVA transformer. The imported freight will be transported from South African ports to the respective sites. Building materials will be transported from sources in surrounding towns while certain elements will be transported from various manufacturing centres in South Africa.

The preferred import origin of the imported elements to the proposed Postmasburg Solar PV Energy Facility 2 on the Rem of Farm 436 Kapstewel will be from the Port Elizabeth/Coega port. The route comprises of 1010 km surfaced roads and approximately 3 km of new / upgraded gravel road (excluding internal roads). However, should this port not be capable of handling the freight at the require time, then Saldanha port could be used as an alternative port. The transport distance in this case is 1020km but the expected travelling time will be slightly longer.

No toll fees are required in the port to site access route. Abnormal Permits will be required for transport of the transformer in any event.

The route is predominantly on National or Provincial roads with suitable standards for transport of container freight. It is also suitable for abnormal loads with permits. There is a limited risk of delays for normal periodic maintenance works (repairs and reseals) depending on the time of transport and scheduling of roads contracts.

The transport of element from manufacturing centres within South Africa is predominantly on National and Provincial roads, which presents no limitations for normal freight.

The access position on the Provincial road (R325) is at an acceptable safe point with sufficient sight distance and also more than 500m from the nearest access which is acceptable.

In general no obvious problems are expected with freight transport along the proposed routes to the site necessary for the construction and maintenance of the site.

1 INTRODUCTION

Atlantic Renewable Energy Partners (Pty) Ltd has engaged Aurecon to prepare a Transport Management Plan for the proposed Postmasburg Solar PV Energy Facility 2 approximately 22km north of Postmasburg on the Remainder of the Farm 436 Kapstewel next to the R325. The site is indicated on the Key Plan below:

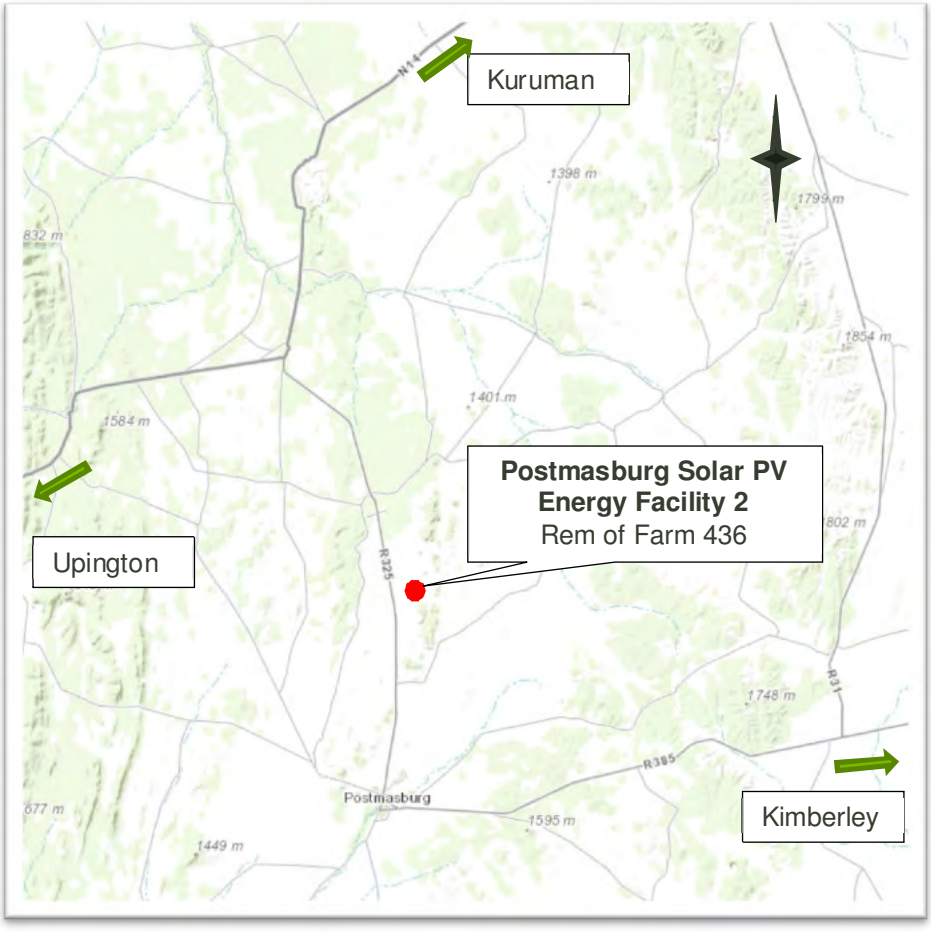


Figure 1: Key Plan

The solar site will be developed to 75 MW capacity.

The scope of the study is to evaluate the transport requirements to support the development of the Postmasburg Solar PV Energy Facility 2.

The scope of the Transport Management Plan includes inter alia:

- Determine the access freight routes between points of delivery and departure for the components.
- Confirm the associated clearances required for the necessary equipment to be transported from the point of delivery to the various sites.
- Confirm freight requirements.
- Propose origins and destinations of equipment.
- Determine (Abnormal) Permit requirements if any.
- Propose traffic accommodation measures during potential upgrading of the access on the Provincial Road.

2 DEFINITIONS / ASSUMPTIONS

The following assumptions are made:

- Imported elements are imported and transported from the nearest or most practical South African Port to the site.
- Certain elements are transported from manufacturing centres within South Africa.
- Material for concrete foundations or piles and road construction are obtained locally from closest available commercial source.
- The largest potential load will be a single 80MVA transformer with a payload of approximately 70t.
- Freight will be transported predominantly on surfaced roads.
- Foundation type will be dictated by site conditions but generally comprise of concrete piles to reduce risk.
- The access location is approximately at km 22,2 on the R325 (north of Postmasburg) based on the current road markers.

3 EVALUATION OF SITE TRANSPORT

3.1 General Freight Requirements

3.1.1 Legislation

The general current limitations on road freight transport are:

- Axle load limitation of 7,7t on front axle, 9,0t on single rear axles.
- Axle unit limitations are 18t for dual axle unit and 24t for 3 axle unit.
- Bridge formula requirements to limit concentration of loads and to regulate load distribution on the vehicle.
- Gross vehicle mass of 56t. This implies a typical payload of about 30t.
- Maximum vehicle length of 22m for interlink, 18,5m for horse and trailer and 13,5 for a single unit.
- Width limit of 2,6m.
- Height limit 4,3m.

Abnormal permits are required for vehicles exceeding these limits.

3.1.2 Solar Facility Freight

Materials and equipment transported to the site comprise of:

- Building materials (concrete aggregates, cement and gravel)
- Construction equipment such as piling rigs, road building equipment (graders, rollers) and cranes
- Solar panels (panels and frames)
- Transformer and cables

The following is anticipated:

a) Building materials comprising of concrete materials for strip footings or piles will be transported using conventional trucks which should adhere to legal limits.

b) Solar Panels and frames will most likely be transported in containers using conventional heavy vehicles within the legal limits from nearest South African port. The number of loads will be a function of the capacity of the solar farm and the extent of the frames.

c) Transformers will be transported by abnormal vehicles from the nearest South African port.

3.1.3 Traffic Statement

It is estimated from experience on other projects that the number of heavy vehicles per 7MW installation would be between 300 and 400 heavy vehicle trips depending on the site condition and founding requirements. The total trips for the 75MW would be between 3000 and 4000 heavy vehicle trips. These trips would be made over an estimated period of 9 to 12 months.

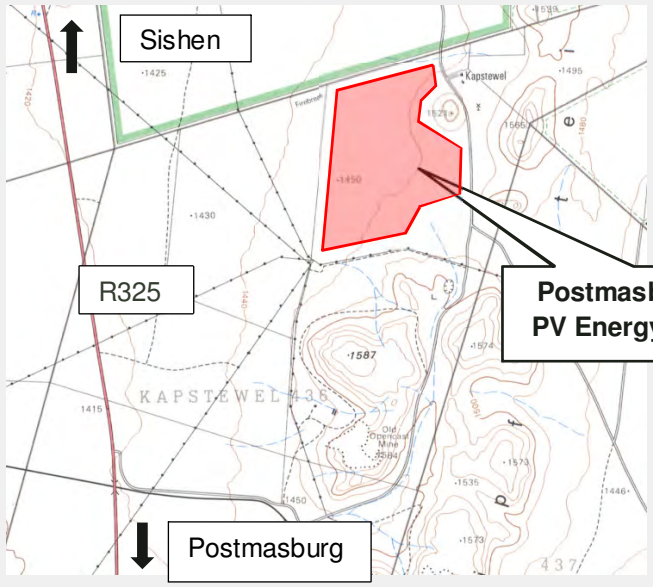
In the worst case the number of heavy vehicle trips per day would be in the order of 15 - 20 trips. The impact of this on the general traffic would therefore be negligible as the additional peak hour traffic would be at most 2 trips.

It can therefore be stated that the construction traffic and the post construction traffic would be low without any significant impact on the existing traffic.

3.2 Postmasburg Solar PV Energy Facility 2 - Access Route

3.2.1 Site Description

The site description is as follows:



Location	28°7'12.01"S 23°6'41.77"E
Distance North from Postmasburg	22 km
Net Generation (Contracted) Capacity	75MW
Distance from Ports **Port Elizabeth/Coega** **Saldanha**	 1010 km (13hour) 1020 km(13,8hour)
Farm	Rem of Farm 436 Kapstewel

Figure 2: Site Description & Location

3.2.2 Preferred Route from Port

The route for transportation of imported equipment is either from Port Elizabeth/Coega or Saldanha. Port Elizabeth/Coega is the preferred port with the shortest travelling time as indicated in the figure below.

It should be noted that the Ports Authority also has preferences on freight distribution which should be respected. The relative small difference in route length implies that either could be used. Both routes are acceptable as freight routes.

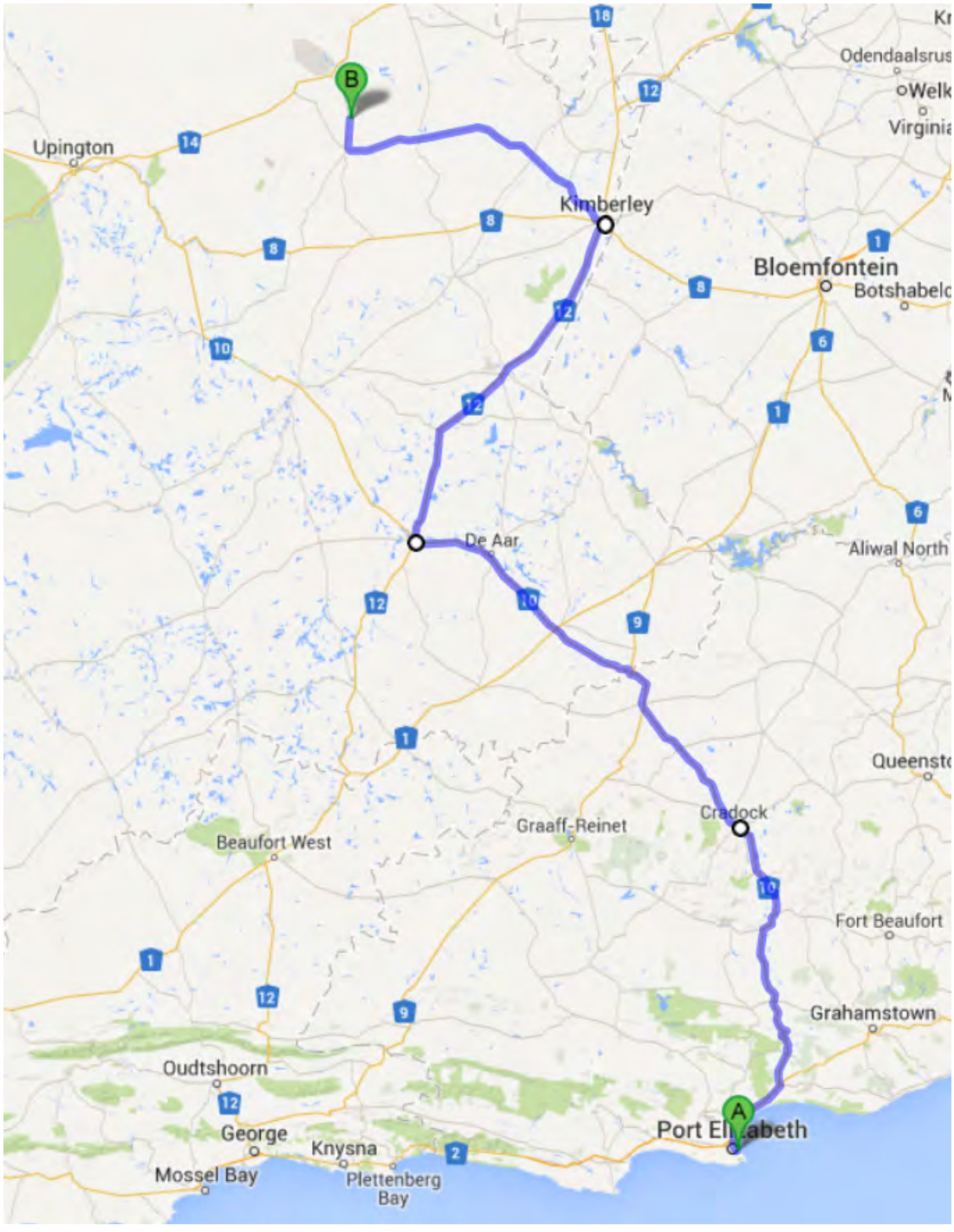


Figure 3: Preferred Freight Route

The route elements are as follows:

Table 1: Route Elements - Details

Element	Route Name	From	To	Distance [km]	Type
1	N2	Port Elizabeth	Nanaga	52	Surfaced National Road
					N2 is a divided or un-divided 4 lane road and becomes a 2 lane road with surfaced shoulders towards Nanaga
2	N10	Nanaga	Britstown	489	Surfaced National Road
					N10 is a surfaced 2 lane road with surfaced shoulders in places

Element	Route Name	From	To	Distance [km]	Type
3	N12	Britstown	Kimberley	255	Surfaced National Road
					N12 is a single carriageway two lane road with surfaced shoulders
4	R31 / R385	Kimberley	Postmasburg	192	Surfaced Provincial Road
					R31 and R385 are single carriageway two lane roads with gravel shoulders

Element	Route Name	From	To	Distance [km]	Type
5	R325	Postmasburg	Site Access	22	Surfaced Provincial Road
					This section of R325 is a surfaced 2 lane road with gravel shoulders
6	Site access road	R325	site	3	Gravel Access Road 6m wide
	TOTAL DISTANCE [km]			**1010**	

Note: The recommended route indicated in the table

3.2.3 Route for Construction Materials

Material sources for road building and concrete works is available in Postmasburg and Kimberley and all material will most likely be transported from these and possibly other surrounding towns on the Provincial and local roads.

3.2.4 Alternative Route from Port

Should the preferred port not be available for any reason – especially in view of the large volume of wind turbine equipment which is currently imported - , then the Saldanha port could be used as alternative. The route from Saldanha (a distance of 1020km but with longer expected travelling time) is shown in the following figure:

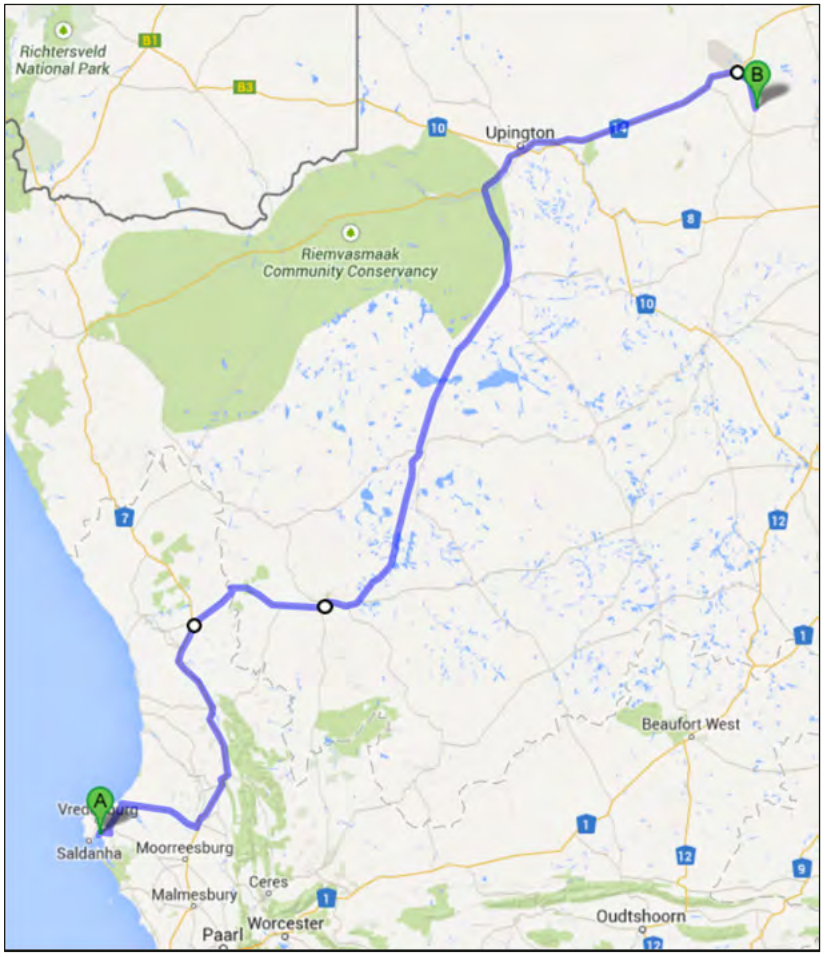


Figure 4: Alternative Port Route

3.2.5 Routes from other Larger Manufacturing Centres

The other main manufacturing centres include:

- Gauteng - greater Johannesburg area (Modderfontein, Edenvale, Nigel, Germiston, Brakpan, Elandsfontein) for inverters and support structures.
- Pinetown (Kwazulu-Natal) for modules.

The routes to the site from these centres are predominantly on Provincial and National roads. The following figure shows the most probable routes.

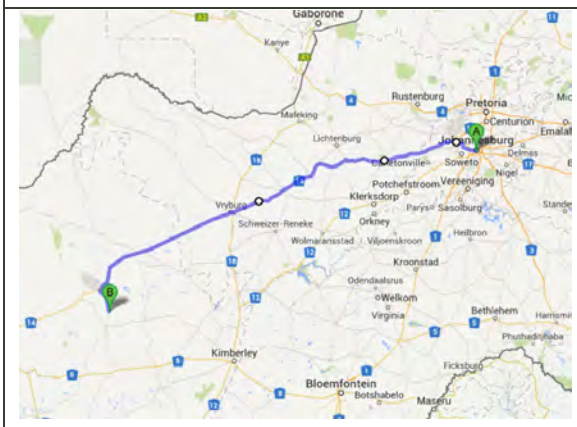
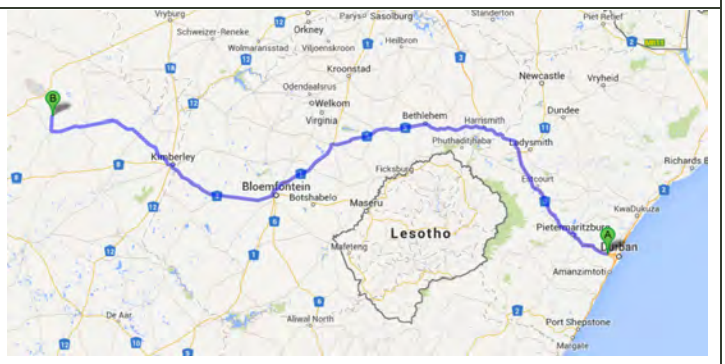
Gauteng to the site	Pinetown to the site
	
Distance : 630 km	Distance : 990 km

Figure 5: Routes from Other Manufacturing Centres

There are no limitations on normal freight on these routes.

3.2.6 Authority and Permit Requirements

The following is required:

a) No toll fees required on the routes from the port. On the routes from the other manufacturing centres certain portions of the National routes are tolled.

b) Abnormal permit will be required for the transport of the transformer. The estimated permit value will be a function of the actual vehicle configuration but is estimated at R7000 – R9000 per trip.

3.2.7 Route Limitations on the Preferred Route from the Port

The routes elements are evaluated as follows:

Table 2: Route Elements - Evaluated

Element	Road	Remark	Comment
General		No limitations on normal heavy vehicles Permits required from the Provincial Authorities for abnormal loads such as the transformer. Vertical clearance of bridges in general 5,2m. However, should the transformer exceed 5,2m then the route will have to be confirmed or altered as required but the permit conditions will direct the load on an approved route.	
1	N2	None	

Element	Road	Remark	Comment
2	N10	Possible delays due to periodic maintenance required by SANRAL	Currently no contracts active.
3	N12	none	Currently no contracts active.
4	R31/R385	None	Currently no contracts active.
5	R325	Possible delays due to periodic maintenance required by Provincial Authority	Currently no contracts active.
6	Access Road	About 3 km of new gravel road 6m wide	Upgrading of existing service / access road

3.2.8 Site Access Road

The access to the site is proposed off the Provincial road (R325) at km 22,2 (north of Postmasburg).

There are two potential access roads following existing roads/tracks to the site (refer figure below).

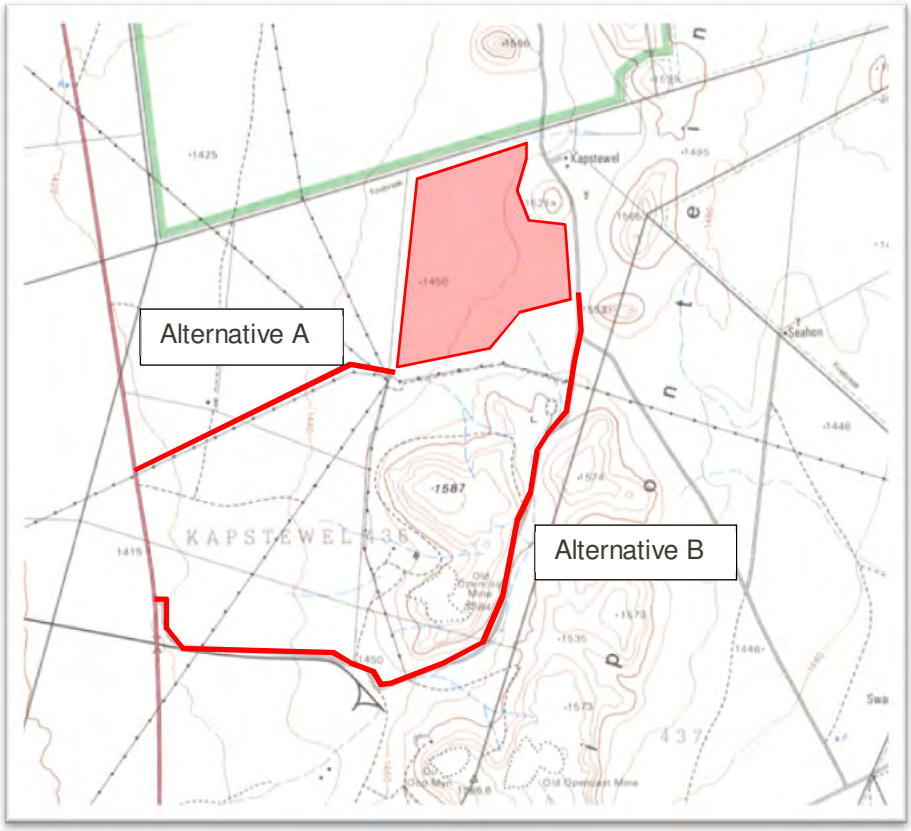


Figure 6: Site Access Route

Alternative A (2,7km length) is obviously the best option and follows a service road along the power line route. If there is consent by the property owner and the service road user / owner, that the road could be used as an access, then Alternative A should be used as access road.

Alternative B (6,9 km length) crosses through neighbouring properties and before this alternative could be considered, approval should be obtained from the relevant owners.

Irrespective of the Alternative followed, the existing roads (which are low standard roads) should be upgraded to at least 5m but preferably 6m width. Natural drainage should be maintained by suitable drainage elements.

Approval should then be obtained from the Provincial authority for using the access during construction and operation.

3.2.9 Accommodation of Traffic during Construction

During construction of the access road, traffic will have to be accommodated as per SADC Road Traffic Signs Manual requirements for any works along public roads. The following typical minimum signage requirements will have to be implemented to ensure safety if the road needs closure during construction on the public road.

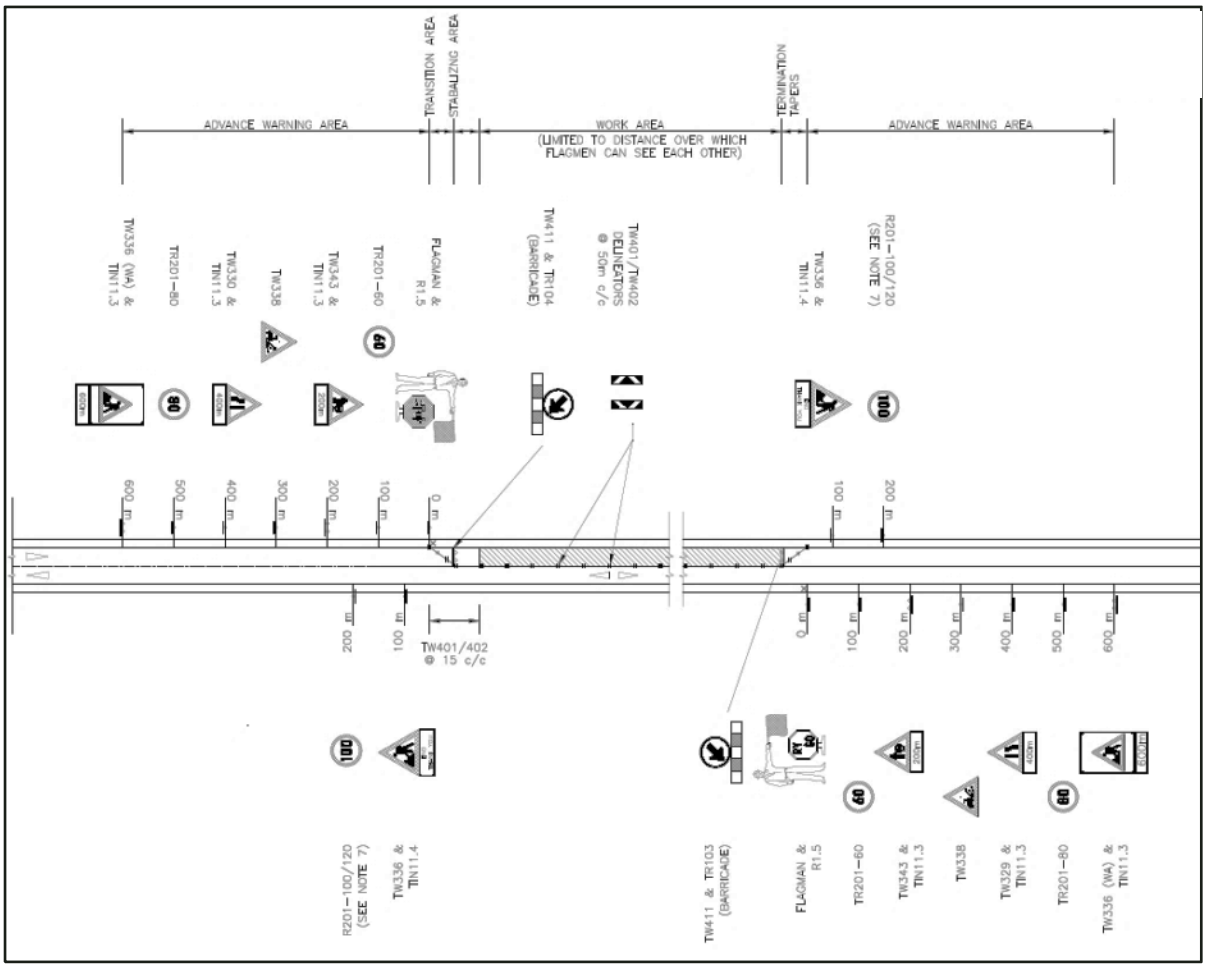


Figure 7: Accommodation of Traffic - Typical Layout

4 CONCLUSION

The transport needs for the proposed PV facility on the Rem of Farm 436 Kapstewel near Postmasburg was investigated to confirm the access route and site access for the development of a solar facility.

The general requirements are:

- Legal limits for normal heavy vehicle freight
- Abnormal Permits required for transport of transformers
- Maximum vertical clearance on most routes is 5,2m for Abnormal Load but should preferably be limited to 4,8m.

The general freight for the solar facility comprise of building materials, solar panels and frames and an 80MVA transformer. The imported freight will be transported from South African ports to the respective sites. Building materials will be transported from sources in surrounding towns while certain elements will be transported from various manufacturing centres in South Africa.

The preferred import origin of the imported elements to the proposed Postmasburg Solar PV Energy Facility 2 on the Rem of Farm 436 Kapstewel will be from the Port Elizabeth/Coega port. The route comprises of 1010 km surfaced roads and approximately 3 km of new / upgraded gravel road (excluding internal roads). However, should this port not be capable of handling the freight at the require time, then Saldanha port could be used as an alternative port. The transport distance in this case is 1020km but the expected travelling time will be slightly longer.

No toll fees are required in the port to site access route. Abnormal Permits will be required for transport of the transformer in any event.

The route is predominantly on National or Provincial roads with suitable standards for transport of container freight. It is also suitable for abnormal loads with permits. There is a limited risk of delays for normal periodic maintenance works (repairs and reseals) depending on the time of transport and scheduling of roads contracts.

The transport of element from manufacturing centres within South Africa is predominantly on National and Provincial roads, which presents no limitations for normal freight.

The access position on the Provincial road (R325) is at an acceptable safe point with sufficient sight distance and also more than 500m from the nearest access which is acceptable.

In general no obvious problems are expected with freight transport along the proposed routes to the site necessary for the construction and maintenance of the site.

Aurecon South Africa (Pty) Ltd
Aurecon Centre
1 Century City Drive
Waterford Precinct
Century City, Cape Town, 7441
T +27 21 526 9400
F +27 21 526 9500
E capetown@aurecongroup.com
W www.aurecongroup.com

Aurecon offices are located in:
Angola, Australia, Botswana, China, Ethiopia, Ghana, Hong Kong, Indonesia, Lesotho, Libya, Malawi, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam.