

4.4.2 R369 Provincial Main Road

This provincial road runs from the R48 intersection (to Luckhof) towards Hopetown via Orania. The affected road section is only 1,5km in length from the Luckhof intersections onwards to the 'Site Access No.2' entrance. This road is a single carriageway surfaced road (approximately 6,4m wide), with only gravel shoulders and no or poor line markings. The road surface and geometry are in an acceptable condition, but may require periodical minor pothole repairs and crack seal maintenance work.

Vehicles can at this intersection either turn left (southwards) onto the Kalkpoort Road (North) and gain access to the site from the 'Site Access No.2' northern entrance.



Photo 13: Easterly view of Provincial Main Road (R369) at the position of 'Site Access No.2'. The northern parts of Farm RE/18 is situated on the right (south) of this provincial road. Note the storm water inlet structure, collecting over-land flow from the proposed development areas.



Photo 14: Southern view of 'Site Access No.2' with a view of the existing entrance gate at the Kalkpoort Road running southwards to the proposed Solar Farm development.

4.4.3 Provincial District Gravel Road

The route number of this provincial road is unknown. This road starts at the centre of Petrusville at the intersection with the surfaced Main Road (R48). Vehicles can at this intersection either turn left (westwards) along the Provincial District Gravel road, and access the site via the Kalkpoort Road (South), or can continue straight on the R48 Provincial road, and gain access to the site from the northern 'Site Access No.2' entrance, as discussed above.

The first 130m of this road is surfaced and runs through a residential area of the town, where after it becomes a gravel road for approximately 7,97km before it reaches the Kalkpoort Road (South) intersection. This road is in an acceptable condition, but will require regular routine maintenance work such a blading and mitre drain repair work to maintain the acceptable road condition.



Photo 15: Google aerial view (looking westwards) of the Provincial District Road, from the centre of Petrusville, to gain access to the site via the Kalkpoort Road (South).

4.4.4 Kalkpoort Road

This road runs from the R369 surfaced Provincial Main Road in the north (see photos 13 and 14 above), southwards for approximately 13km to reach the Provincial Gravel District Road as discussed above. This provincial minor road is known as the Kalkpoort Road (the route number is unknown).

The existing farm houses, warehouses and outer buildings are located approximately 4,9km from the northern entrance 'Site Access No.2', along this Kalkpoort Road. **The proposed laydown area for the Phase 1 development will be approximately another 2km further south, for which a new internal main road will be required – see section 4.4.5 below.**



Photo 16: Southern view of the Kalkpoort Road from the northern entrance at 'Site Access No.2'. Note the narrow two-track path and open flat topography available to upgrade the existing road.



Photo 17: View of the Kalkpoort Road from the northern entrance at 'Site Access No.2'. Note the narrow two-track path and open flat topography available to upgrade the existing road.



Photo 18: View of the Kalkpoort Road from the northern entrance at 'Site Access No.2'. Note the narrow two-track path and open flat topography available to upgrade the existing road

The Kalkpoort Road (Northern section) needs to be re-constructed for the 4,9km distance, to a 6m wide road, to accommodate the expected construction and transport vehicle volumes. Ripping, widening, possible importation of quality material, re-grading and compaction will be required. Sufficient allowance to accommodate overland surface drainage will also be required.

4.4.5 New Internal Main Gravel Road

The proposed laydown area for the Phase 1 development will be located approximately 1,7 to 2km further south of the existing farm house buildings, with the new electrical sub-station another approximately 900m further south. A new 6m wide internal main gravel road will have to be constructed from the Kalkpoort Road at the farm house buildings, to access these proposed areas and infrastructure for Phase 1.

Vegetation clearance and topsoil stripping will be required, before ripping, importation of quality material, grading and compaction can be done. Sufficient allowance to accommodate overland surface drainage will also be required.

4.4.6 *New Internal Ring Roads*

New internal ring roads will be required to provide access around the various blocks of PV Solar panels, to be installed as part of the Phase 1 development. New unsurfaced 3,5m wide ring roads will have to be planned and designed as part of the Detail Design Stage and will be constructed to access the proposed areas and infrastructure for Phase 1.

Vegetation clearance and topsoil stripping will be required, before ripping, importation of quality material, grading and compaction can be done. Sufficient allowance to accommodate overland surface drainage will also be required.

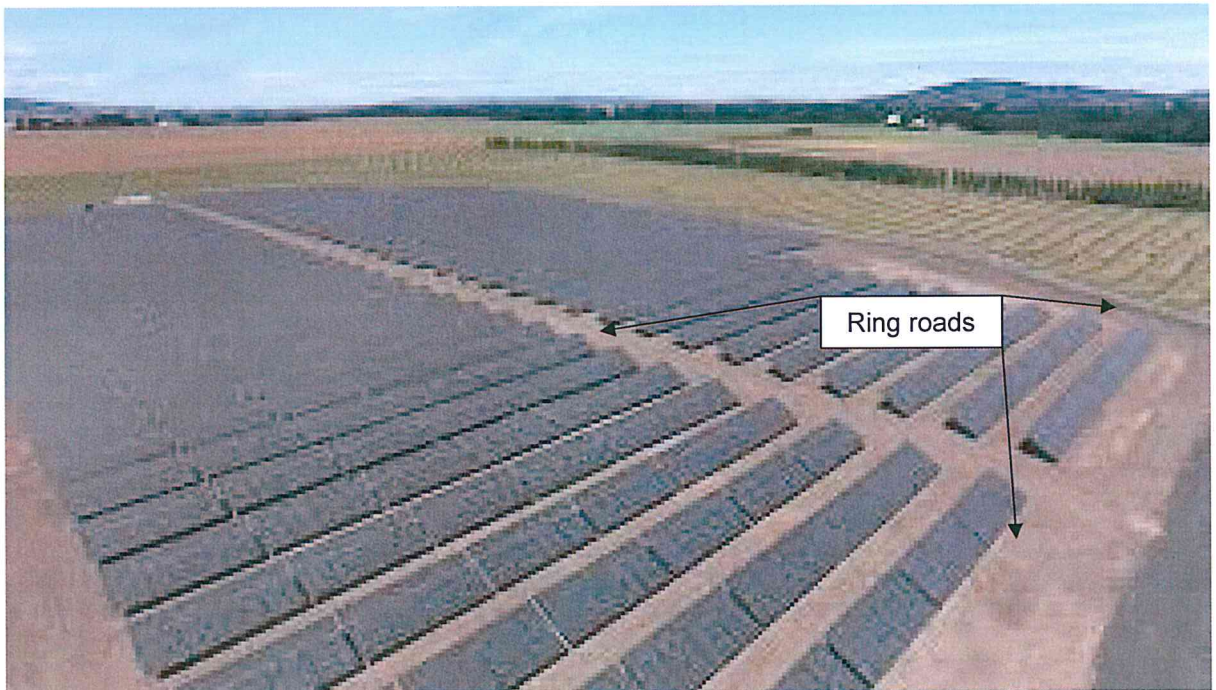


Photo 19: View of typical Ring Roads around blocks of PV Solar panels

4.4.7 *New Internal Minor Service Roads*

New internal minor service roads will be required to provide access in-between the various arrays of the PV Solar panels, to be installed as part of the Phase 1 development. New unsurfaced 2,2m wide service roads will have to be planned and designed as part of the Detail Design Stage and will be constructed to allow smaller vehicle access to each PV panel of the Phase 1 development.

These roads will be less travelled after installation, and will only be used during the scheduled bi-annual routine maintenance periods, to clean the PV panels. It is therefore recommended that only minor vegetation clearance be done and that no topsoil stripping will be required. Minor grading and compaction will be required to create a safe access road, which can easily be rehabilitated to a two-track path after the construction stage. Depending of the local gradient of the topography, it is not foreseen that any significant allowance to accommodate overland surface drainage will be required along these minor service roads.



Photo 20: View of typical Internal Service Roads in-between arrays of PV Solar panels. Note the condition of good rehabilitated roads.

4.5 Summary of Transport Routes

Based on the discussions of the various available access roads (Section 4.4 above), **two available Routes Alternatives exist to travel between Petrusville and the site laydown area for Phase 1**, as follow :

1) Mainly Surfaced Roads : (23,5km)

Follow the R48 from Petrusville to the R369, to the northern entrance "Access No.2 to Site – 16,6km
Follow the gravel Kalkpoort Road (North) from Farm entrance to Phase 1 laydown area – 6,9km

2) Only Gravel Roads : (18,07km)

Follow the Provincial District Road from Petrusville to the Kalkpoort Road (South) – 7,97km
Follow the Kalkpoort Road (South) to the Farm buildings and southwards to Phase 1 – 10,1km

Should an entire access road closure occurs, eg. during extreme flood events or major upgrade work for extended periods, during the Solar Farm construction or the component transportation stages, all vehicles can still be accommodated by using the other Alternative Site Access option above, to reach the Solar Farm.

It is assumed that 70% of construction and transportation vehicles will use Alternative 1 above and only 30% will use Alternative 2.

4.6 Impacted Traffic Nodes

Table 1 below summarises all the major the traffic nodes which will be affected by the Kloofsig PV Solar Farm Phase 1 development – refer to drw no. R2004-RD-TP-01, bound into Annexure A for the location of these Traffic Nodes.

Table 1 : Location and Description of affected Traffic Nodes for the Phase 1 Development.

Traffic Node Number	Description	Latitude (South)	Longitude (North)
T1	“Access No.1” : Intersection with the Kalkpoort Road (South) and the Provincial Minor Gravel Road	30°03'33.63"S	24°34'45.47"E
T2	“Access No.2” : Intersection with the Kalkpoort Road (North) and the Provincial Main Road (R369)	29°57'47.12"S	24°35'29.13"E
T4	Intersection at centre of Petrusville, between Main Road (R48) and the Minor Provincial Road	30° 4'54.72"S	24°39'29.68"E
T5	Intersection between Provincial Main Road (R48) and the “Van Der Kloof Dam” Road	30° 1'7.76"S	24°39'39.72"E
T6	Intersection with the Main Provincial Roads R48 (to Luckhoff) and the R369 (to Hopetown)	29°58'12.98"S	24°36'14.88"E

The directional movement of traffic volumes at each of these nodes are discussed in Section 5 below.

5 TRAFFIC VOLUMES

5.1 Current Status Quo Traffic Scenario

Available traffic data (Annual Average Daily Traffic – AADT) for the Provincial Roads R48 and R369 (refer to Sections 4.4.1 and 4.4.2 above) was requested from the Department of Roads and Public Works, Northern Cape Province at their Kimberley office, (053-861-9667), contact person is Nametso Molaolwe. Unfortunately at the time to print this report, no information was yet obtained despite several follow-up correspondence.

Nevertheless, due to the remote location of the proposed PV Solar Farm and the small towns surrounding the proposed development for Phase 1, it is expected that the AADT traffic volumes at all of the affected major traffic nodes (refer to Section 4.5 above) are low to very low. Seasonal higher than the average traffic volumes will be experienced during the harvesting season, along the R369 / R48 route running between Hopetown (at the N12) and Coleberg (at the N1) - running roughly along the Orange River corridor. Although this is a regional link road, it still carries peak traffic volumes far below capacity.

5.2 Expected Future Traffic Volumes for the Phase 1 Development

5.2.1 Construction Traffic Volumes of Phase 1

The expected temporary traffic volumes during the Construction and Transportation stages of the Phase 1 Development are summarised below :

Table 2 : Expected Construction and Transport Traffic Volumes for Phase 1

Route Alternative	Affected Nodes (see Table 1)	Movement at Node	Std Vehicles and LDV's (AADT)	Totals for Construction & Installation Period			
				Construction Trucks & Plant	Std 40 feet Trucks ^(Note 1)	Abnormal Vehicles (eg for Cranes)	Ave Heavy Vehicles / day ^(Note 2)
1	T4	straight	21	672	837	17	7
	T5	left	21	672	837	17	7
	T6	straight	21	672	837	17	7
	T2	left	21	672	837	17	7
2	T4	left	9	288	359	8	3
	T1	right	9	288	359	8	3

Note 1 : A worst case scenario for the total number off standard 40-foot Transport Trucks was assumed, ie 230 PV Solar panels per truck.

Note 2 : The construction and transportation period is accepted as 10 months, in order to calculate the Average Daily Heavy Traffic volumes

Based on the calculated traffic volumes as summarized in Table 2 above, it is clear that the additional expected traffic volumes, for both standard light vehicles (AADT), as well as expected Daily Heavy Vehicles, are low and will not have any major impact on the Transport Routes and affected major Nodes.

5.2.2 Operational and Maintenance of Phase 1

The Operational and Maintenance period for the PV Solar Farm will be for a minimum period of 20 years from date of commissioning, with the option to extend for a further period. The expected average traffic volumes will be very low, as it will be limited to the plant management staff, the operational staff to regularly clean the PV Solar panel, as well as for periodical maintenance on the plant. Expected traffic volumes for the Phase 1 development are summarised below :

Table 3 : Expected Operational and Maintenance Traffic Volumes for Phase 1

Route Alternative	Affected Nodes (see Table 1)	Movement at Node	Std Vehicles and LDV's	Maintenance Water Trucks & Plant	Ave Vehicles / day (AADT)
1	T4	straight	7	12	19
	T5	left	7	12	19
	T6	straight	7	12	19
	T2	left	7	12	19
2	T4	left	3	5	8
	T1	right	3	5	8