DOCUMENT CONTROL SHEET

Document Title	**Traffic Assessment for the Proposed Construction of the Boshoek Solar PV 1 facility and associated infrastructure, near the town of Boshoek in the Northwest Province.**
Electronic Reference	https://techsosmartsolutions-my.sharepoint.com/personal/steve_techso_co_za/Documents/TECHSO/Projects/Projects 2023/Rustenburg Solar/Boshoek Solar PV 1/TA - Boshoek Solar PV 1 (20240614).docx TJ2311
Date	14 June 2024
Short Description	This Traffic Assessment Report provides input to the Basic Assessment for the construction, operations and decommissioning of the proposed Boshoek Solar PV 1 facility.
Contact Person	Stephen Fautley steve@techso.co.za

ERM The business of sustainability	*Prepared for:* ***ERM Southern Africa (Pty) Ltd***
TECHSO smart solutions	*Prepared by* ***Techso*** Techso (Pty) Ltd PO Box 35 The Innovation Hub 0087 Tel: 021 557 7730 E-mail: steve@techso.co.za

	Name	**Signature**	**Date**
Compiled by:	Stephen Fautley (Pr. Tech Eng. - ECSA Reg # 200270171)		14 June 2024
Reviewed by			

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1. PROJECT DESCRIPTION

The proposed Boshoek Solar PV 1 development site is located approximately 30 kilometers north-east of the town of Rustenburg in the Matzikama Local Municipality, in the Nort West Province.

Boshoek Solar 1 (Pty) Ltd proposes the establishment of a solar photovoltaic (PV) cluster (including associated grid connection and infrastructure) near Boshoek, within the Rustenburg Local Municipality and the Bojanala District Municipality, in the Northwest Province.

The facility will comprise several arrays of Solar PV panels and associated infrastructure and will have a contracted capacity of up to 150 MW.

The development area for the Solar PV facility and associated infrastructure will be located on the following properties:

Boshoek Solar PV 1 facility

Farm Name	Farm No.	Portion No.
Rhenosterdoorns	531	0
Zwaarverdiend	234	1

The project is planned as part of a larger cluster, which includes two additional Solar PV facilities (Boshoek Solar PV 2 and Boshoek Solar PV 3) up to 150 MW and 50 MW respectively.

An assessment area of approximately 290 ha is being assessed as part of this EIA process and the infrastructure associated with the 150 MW Boshoek 1 Solar PV facility includes:

- PV modules (mono- or bifacial) and mounting structures.
- Inverters and transformers.
- Battery Energy Storage System (BESS).
- Site access road.
- Internal access roads.
- Auxiliary construction (switch room, gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.).
- Temporary and permanent laydown area.
- Grid connection infrastructure, including:
  - Underground medium-voltage cabling between the project components and the facility substation;
  - Up to 132kV facility substation;
  - Switching station;

A network of gravel internal access roads and a perimeter road (cumulatively up to 33 km in length), each with a width of up to ± 6 m, will be constructed to provide access to the various components of the PV development.

An area of up to 1 ha will be occupied by construction which will include (but not limited to) a 33 kV switch room, a gate house, ablutions, workshops, storage and warehousing areas, site offices and a control centre.

The Battery Energy Storage System (BESS) will take up approximately 5 Ha.

On-site cabling will largely follow the road infrastructure where possible, and will be either overhead, or underground.

2. BASELINE CONDITIONS

The R565 route to site, passing though Boshoek, was observed during a typical PM peak period (around 17:00 on a weekday on 11 September 2023, and in the off-peak period (around 11:00 on a weekday, on 13 September 2023). These are typical normal days to assess traffic conditions in urban context as per COTO TMH 16 guidelines below:

> " 2.2.2 The assessment hours must be selected from normal or abnormal days of the year or both, as follows:
> a) In urban areas, the assessment hours must be selected from normal days, except when land uses are specifically focussed on abnormal days, such as holiday resorts."

The section of the R565 at the Boshoek OK local shopping hub is expected to be at its busiest in the PM peak period and this location was visited at this period and assessed as it also coincides with the Solar PV peak development trips.

The proposed 150 MW Solar PV Facility site is accessed via a gravel public access road (called "site access road" in this report) as indicated in red in **Figure 2-1** below.

Figure 2-1: Site Location

Access from the D114 is attained via a gravel site access road. The road is 6 m wide and is of sufficient width to accommodate two-way traffic.

The gravel site access road has a low trip generation, evidenced by the unsurfaced nature of the road and as observed during a site visit on the morning of 12 September 2023, which is regarded as a normal traffic day relevant for assessment of traffic conditions.

Electrical Grid Connection and Associated Infrastructure:
A single circuit 132 kV power line is proposed from the switching station to the future planned Eskom collector switching station some 3.5 km north of the site.

The connection infrastructure associated with this grid solution (i.e. between the collector switching station and the MTS) falls outside of the scope of this report and will be assessed as part of a separate Environmental Application.

3. PURPOSE OF REPORT

This report assesses the expected traffic and transport impact for the project lifecycle.

4. TRAFFIC SPECIALIST CREDENTIALS

This Site Assessment is undertaken by Mr. Stephen Mark Fautley, who is a Professional Engineering Technologist registered with the Engineering Council of South Africa (ECSA) and is a member of SAICE (see Curriculum Vitae Annexure A).

His career encompasses the civil, traffic and transportation engineering discipline for ten (10) years at the Western Cape Government, 1,5 years with Kantey and Templer Consulting Engineers and 10 years at local authority (City of Cape Town) before joining Techso in 2008, as a Senior Transport Engineer.

Stephen has extensive experience in Traffic Impact Assessments and Site Assessments, including Impact Assessments for various renewable energy plants in South Africa, and is a registered Road Safety Auditor.

5. IMPACT ASSESSMENT METHODOLOGY

This report assesses the expected traffic and transport impact during the Construction Phase, Operation Phase and Decommissioning Phase of the proposed Solar PV Facility.

The requirements in the TMH 16 Vol 1 & 2 South African Traffic Impact and Site Traffic Assessment Manual, August 2012, compiled by the Committee of Transport Officials (COTO) were used for this study.

The requirements as per EIA Regulations of 4 December 2014, as amended by GNR 326 on 7 April 2017, Appendix 6, are adhered to (see Annexure C).

Trip generation rates were based on the Scope of Work and an anticipated construction programme.

A site visit was conducted on 11, 12 and 13 September 2023 to assess the routes providing access to the site and to gain insight to possible issues and constraints along the local road network / various routes surrounding the site.

The National Road network and high order arterials (R565) that from part of the abnormal road network are assumed to be used for long distance equipment deliveries to site with abnormal loads being transported under permit to be obtained by the abnormal load transport carrier.

Traffic impacts resulting from other similar developments within 35 km of the site were estimated, based on previous experience of similar developments, and understanding of their cumulative impact on traffic and road network associated with the subject Solar PV Facility.

The Impact Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment. The environmental impact is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts is undertaken through an assessment of the significance of the impacts.

SIGNIFICANCE OF ENVIRONMENTAL ASPECTS

The significance of environmental aspects can be determined and ranked by considering the criteria presented in Table 1. In some cases, it may be necessary to undertake the impact assessment to determine whether a particular aspect is significant. Therefore, a fair degree of iteration is unavoidable during the assessment process.

Table 1 – Criteria used to determine the significance of environmental aspects

Significance Ranking	Negative Aspects	Positive Aspects
H (High)	Will always/often exceed legislation or standards. Has characteristics that could cause significant negative impacts.	Compliance with all legislation and standards. Has characteristics that could cause significant positive impacts.
M (Moderate)	Has characteristics that could cause negative impacts.	Has characteristics that could cause positive impacts.
L (Low)	Will never exceed legislation or standards. Unlikely to cause significant negative impacts.	Will always comply with all legislation and standards. Unlikely to cause significant positive impacts.

The aspect identification and ranking process is largely a screening exercise whereby the aspects that do not have the potential to cause significant impacts are eliminated. Aspects ranked "high" and "moderate" are significant and the possible impacts associated with their presence will need to be determined. Aspects ranked "low" do not warrant further attention.

The significance of the aspects should be ranked on the assumption that the management recommended in the EIA will be in place i.e. *with management*. This represents the scenario that the proponent wishes to have considered for approval. The environmental aspects associated with the proposed project activities during the construction, operational, closure phases (where appropriate) need to be identified. The influence of various project alternatives on the significance of the aspects must also be considered.

It may be desirable to also undertake a *without management* aspect ranking, since this highlights the sensitivity of the key risk areas to management and, hence, the management priorities. However, the dilemma in such an exercise is deciding on how much management to include. In the case of a mining project, for example, does one assume that the tailings dam will be completely absent or merely operated poorly?

A useful rule of thumb is to assume that all the management required for operational reasons will be in place, but that any management specifically for environmental control will be absent. The danger in presenting *without management* ranking scenario in an EIA report is that it does not represent the scenario that the proponent wishes to have approved.

SIGNIFICANCE OF ENVIRONMENTAL IMPACTS

Where significant environmental aspects are present ("high" or "moderate"), significant environmental impacts ***may*** result. The significance of the impacts associated with the significant aspects can be determined by considering the risk:

Significance of Environmental Impact (Risk) = Probability x Consequence

The consequence of impacts can be described by considering the severity, spatial extent and duration of the impact.

Severity of Impacts

Table 2 presents the ranking criteria that can used to determine the severity of impacts on the bio- physical and socio-economic environment. Table 3 provides additional ranking criteria for determining the severity of negative impacts on the bio-physical environment.

Table 2 – Criteria for ranking the *Severity* of environmental impacts.

<table>
<tr><th rowspan="2">Type of Criteria</th><th colspan="3">Negative</th><th colspan="3">Positive</th></tr>
<tr><th>H-</th><th>M-</th><th>L-</th><th>L+</th><th>M+</th><th>H+</th></tr>
<tr><td>Qualitative</td><td>Substantial deterioration. Death, illness or injury.</td><td>Moderate deterioration . Discomfort.</td><td>Minor deteriora tion. Nuisance or minor irritation.</td><td>Minor improve-ment.</td><td>Moderate improve-ment.</td><td>Substantial improvement .</td></tr>
<tr><td rowspan="2">Quantitative</td><td colspan="2">Measurable deterioration.</td><td colspan="2">Change not measurable i.e., will remain within current range.</td><td colspan="2">Measurable improvement.</td></tr>
<tr><td>Recommended level will often be violated.</td><td>Recommended level will occasionally be violated.</td><td colspan="2">Recommended level will never be violated.</td><td colspan="2">Will be within or better than recommended level.</td></tr>
<tr><td>Community Response</td><td>Vigorous community action.</td><td>Widespread complaints.</td><td colspan="2">Sporadic complaints.</td><td>No observed reaction.</td><td>Favourable publicity</td></tr>
</table>

Table 3 – Criteria for ranking the *Severity* of negative impacts on the bio-physical environment.

Environment	Ranking Criteria		
	Low (L-)	**Medium (M-)**	**High (H-)**
Soils and land capability	Minor deterioration in land capability. Soil alteration resulting in a low negative impact on one of the other environments (e.g. ecology).	Partial loss of land capability. Soil alteration resulting in a moderate negative impact on one of the other environments (e.g. ecology).	Complete loss of land capability. Soil alteration resulting in a high negative impact on one of the other environments (e.g. ecology).
Ecology (Plant and animal life)	Disturbance of areas that are degraded, have little conservation value or are unimportant to humans as a resource. Minor change in species variety or prevalence.	Disturbance of areas that have some conservation value or are of some potential use to humans. Complete change in species variety or prevalence.	Disturbance of areas that are pristine, have conservation value or are an important resource to humans. Destruction of rare or endangered species.
Surface and Groundwater	Quality deterioration resulting in a low negative impact on one of the other environments (ecology, community health etc.)	Quality deterioration resulting in a moderate negative impact on one of the other environments (ecology, community health etc.).	Quality deterioration resulting in a high negative impact on one of the other environments (ecology, community health etc.).

Spatial Extent and Duration of Impacts

The duration and spatial scale of impacts can be ranked using the following criteria:

Table 4 – Ranking the *Duration* and *Spatial Scale* of impacts.

	Ranking Criteria		
	L	**M**	**H**
Duration	Quickly reversible Less than the project life Short-term	Reversible over time Life of the project Medium-term	Permanent Beyond closure Long-term
Spatial Scale	Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread. Far beyond site boundary Regional/national

Where the severity of an impact varies with distance, the severity should be determined at the point of compliance or the point at which sensitive receptors will be encountered. This position corresponds to the spatial extent of the impact.

Consequence of Impacts

Having ranked the severity, duration and spatial extent, the overall consequence of impacts can be determined using the following qualitative guidelines:

Table 5 – Ranking the *Consequence* of an impact.

			SEVERITY = L		
DURATION	Long-term	**H**			
	Medium-term	**M**			**MEDIUM**
	Short-term	**L**	**LOW**		
			SEVERITY = M		
DURATION	Long-term	**H**			**HIGH**
	Medium-term	**M**		**MEDIUM**	
	Short-term	**L**	**LOW**		
			SEVERITY = H		
DURATION	Long-term	**H**			
	Medium-term	**M**			**HIGH**
	Short-term	**L**	**MEDIUM**		
			L	**M**	**H**
			Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/national
			SPATIAL SCALE		

To use Table 5, firstly go to one of the three "layers" based on the severity ranking obtained from Table 2 and/ or Table 3. Thereafter determine the consequence ranking by locating the intersection of the appropriate duration and spatial scale rankings.

Overall Significance of Impacts

Combining the consequence of the impact and the probability of occurrence, as shown by Table 6, provides the overall significance (risk) of impacts.

Table 6 – Ranking the *Overall Significance* of impacts.

PROBABILITY	Definite Continuous	**H**	**MEDIUM**		**HIGH**
	Possible Frequent	**M**		**MEDIUM**	
	Unlikely Seldom	**L**	**LOW**		**MEDIUM**
			L	**M**	**H**
			CONSEQUENCE (from Table 5)		

The overall significance ranking of the negative environmental impacts provides the

following guidelines for decision making:

Table 7 – Guidelines for decision-making

Overall Significance Ranking	Nature of Impact	Decision Guideline
High	Unacceptable impacts.	Likely to be a fatal flaw.
Moderate	Noticeable impact.	These are unavoidable consequence, which will need to be accepted if the project is allowed to proceed.
Low	Minor impacts.	These impacts are not likely to affect the project decision.

6. TRAFFIC ASSESSMENT

6.1 Routes to site

750 km

Considering the site location, Durban Harbour is the preferred port for particularly large equipment and machinery for the proposed Solar PV Facility. The most prominent equipment are the Solar PV panels and support/mounting infrastructure. The latter would likely be sourced from Johannesburg.

The N3, N1 Summit Road, R511, N4, R565 and D114 (Lindley Road) and a short section of gravel site access road will be used to transport equipment from the Port of Durban (Durban Harbour) to site. The last leg of the journey leading from the D114 is a 1km short section of gravel site access road. The gravel site access road intersects with D114 at 25°27'40.34"S"S/ 26°58'54.86"E.

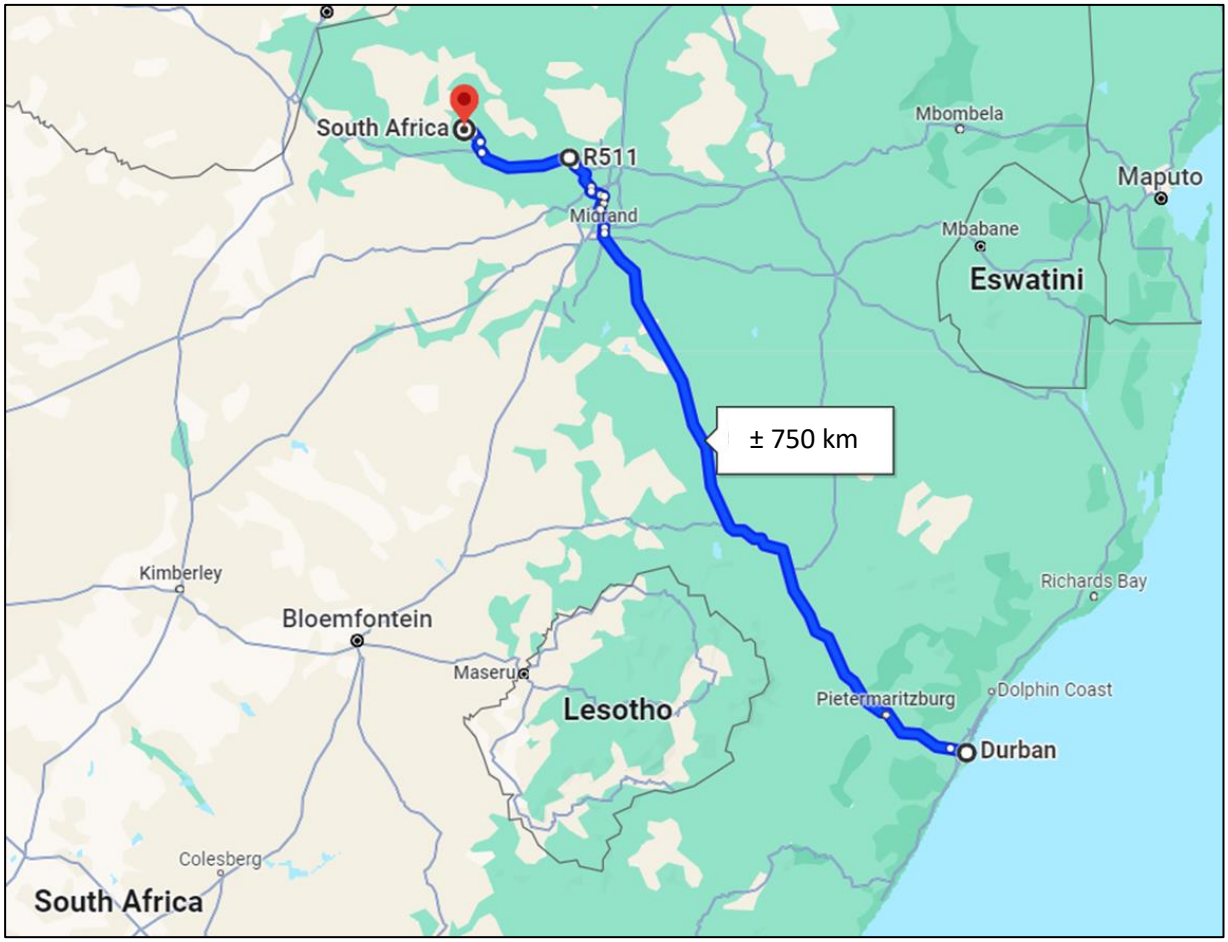


Figure 6-1: Route for Durban Harbour to site

It is noted that the gravel site access road intersection with D114 has a concrete edge beam and is not hard surfaced. The edge beam has some edge drop-off that poses a traffic hazard.

6.2 Construction Period and Trip Generation

The Solar PV facility construction period is expected to last 16 months (stages 1 to 5). The construction period will generate the most traffic, both on public roads and on-site.

Anticipated Project Execution Plan (Construction, Operations and Decommissioning Stages)								
STAGE	**ACTIVITY DESCRIPTION**	**Stage 1**	**Stage 2**	**Stage 3**	**Stage 4**	**Stage 5**	**Stage 6**	**Stage 7**
	# Months	**1**	**2**	**6**	**5**	**2**	**300**	**2**
1	Site Establishment and Civils	X						
2	Delivery of PV Modules and Structures		X					
3	Construction of Trackers and Mounting Modules		X	X				
4	Electrical Works			X	X	X		
5	Commissioning					X		
6	Operations						X	
7	De-commissioning							X

The trip generation and average daily trips to site are insignificant, as detailed below:

Construction:

» The construction period has the highest trip generation as below: (see Tables below).

- Solar PV equipment and mounting modules arrive at site on an average of 12 off-peak trips to site and 12 from site per day over Stage 2 (2 months).
- An average of 108 light vehicles and 6 buses to site per day during Stages 4 and 5 (total of 7 months), with same number departing in the PM peak hour.
- Some heavy earthmoving vehicles will be transport by abnormal load vehicles.

Table 6-1 - Summary of vehicle trips per development stages

Anticipated Project Execution Plan (Construction, Operations and Decommissioning Stages)								
SUMMARY OF SITE STAFF AND VEHICLE LOADS								
ITEM	**DESCRIPTION**	**Stage 1**	**Stage 2**	**Stage 3**	**Stage 4**	**Stage 5**	**Stage 6**	**Stage 7**
	# Months	1	2	6	5	2	300	2
	From	1	2	4	10	15	17	317
	To	1	3	9	14	16	316	318
1	Site Staff / Employees on site (Day shift only)	269	556	541	464	464	15	267
	MONTHLY ARRIVE AT START OF STAGE AND LEAVE AT END OF PHASE							
4a - 4i	Miscellaneous vehicles arrive (and stay on site for extended periods) and leave site at end of period.	27	5	32	0	0	0	10
	PER MONTH (ARRIVE OUTSIDE PEAK HOURS)							
5	Tipper Truck Packaging Waste Removal (Monthly)	0	229	0	0	0	0	0
6	Steel Structure to site (Interlinks from Johannesburg) (Monthly)	0	76	0	0	0	0	0
7	PV Panels to site (ISO Container Trucks) (Monthly)	0	154	0	0	0	0	0
8	BESS Containers to site (Monthly)	0	0	34	0	0	0	0
4i	Anxillary Buildings, etc. Heavy vehicles - trucks and lowbed		9					0
4j	10 and 20 m3 trucks (50/50 split)							120
4k - 5	Calculated - Average # vehicles per day (outside Peak Hours)	0	18	1	0	0	0	5
	DAILY (IN PEAK HOUR)							
2a	Light Vehicles to site **daily** (arrive in AM Peak Hour, remain on site, depart in PM Peak Hour)	23	70	52	108	108	5	14
3a	Buses / *Taxis* (arrive in AM Peak Hour, remain on site, depart in PM Peak Hour)	4	8	8	6	6	*1*	4

Monthly and Daily Solar Panels, Solar Packaging Waste removal and Solar Mounting trips to site are shown in the Tabe below:

Table 6-2 - Summary of PV related daily trips

Monthly	Daily	%	Description
229	9	50%	Tipper Solar PV Packaging waste removal
76	3	17%	PV structures and mountings
154	6	34%	PV Panels
460	**18**	**100%**	**Total**

The worker/staff component on site would peak around 560 persons in Stages 2 and 3 (as detailed below).

Table 6-3 - Summary of peak staff stages

Staff Category	Per shift (Stage 2)			Months	2
	Staff	Vehicle	Staff per veh type	Vehicle Occupancy	# Vehicles
Construction Labourers	445	Bus	473	60	8
Foremen	28				
Specialists	28	Private	83	1,2	70
Engineers	28				
Project Managers	28				
TOTAL	**556**				

Staff Category	Per shift (Stage 3)			Months	6
	Staff	Vehicle	Staff per veh type	Vehicle Occupancy	# Vehicles
Construction Labourers	448	Bus	479	60	8
Foremen	31				
Specialists	31	Private	62	1,2	52
Engineers	15				
Project Managers	15				
TOTAL	**541**				

Most of the worker/staff component would be transported by bus to site from nearby towns such as Boshoek and Rustenburg.

Note, the information provided is an informed estimate. Construction related traffic may however vary and be different from the information provided above due to suppliers' delivery schedule updates/changes, etc.

6.3 Potential Impacts

6.3.1 Construction Period

» **Traffic congestion.** Increased light and heavy vehicles traffic flow on R565 route to site, resulting in more traffic congestion at Boshoek OK Grocer shopping hub. Traffic congestion was noted during the site visit on 12 September 2023 with turning movements into the shopping hub and taxis parked / stopped in the road.

Note trucks parked alongside the R565 at Boshoek OK Grocer shopping hub

Taxis were noted stopped alongside R565 alongside the guardrail (should be stopped in the roofed taxi loading area). The main delay was due to a right-turn vehicle (i.e. movement as shown in image below) and taxi stopped alongside thus preventing vehicles bypassing the right-turn vehicle.

Note faded road markings and also block pedestrian crossing in the intersection.

This can be mitigated by improving traffic road markings on D114 in Boshoek and focussed traffic law enforcement particularly during the PM peak hours.

Alternate strategy to mitigate development traffic impacts in Boshoek would be to encourage light vehicles to/from site to travel outside the traffic peak hours, or by accommodating at least 50% of specialists and artisans in buses (1 bus equates to 50 vehicles) to/from site.

» **Road safety at D114/R565 intersection.** Poor road markings at the D114/R565 intersection in Boshoek (see pictures below) could result in vehicle crashes due to motorists misreading the intersection.

D114 approach to R565 lacks signage and is confusing giving the impression that one could possibly turn right.

View along D114 on its approach to R565

D114 intersection with R565

View along R565 towards Boshoek from D114/R565 intersection

This can be mitigated by improving traffic road markings on D114/R565 intersection in Boshoek, particularly to clearly indicate that vehicles need to keep-left of the splitter island.

» **Road safety at D114/site access road:** There is potential for vehicle crashes at D114/gravel site access road (site access road) intersection with motorists not expecting construction vehicles at the intersection, over an extended period.

This can be mitigated by ensuring construction vehicles are roadworthy, construction vehicle drivers are licensed, and by installation temporary roadworks "crossing vehicles" warning signage on the D114 approaches to the gravel site access road intersection. Road markings and stop signage are required on the access road approach to D114 and the site access road should be hard surfaced for 30 m from its intersection with D114 to limit material carry onto the D114. This will also effectively deal with the edge beam drop-off.

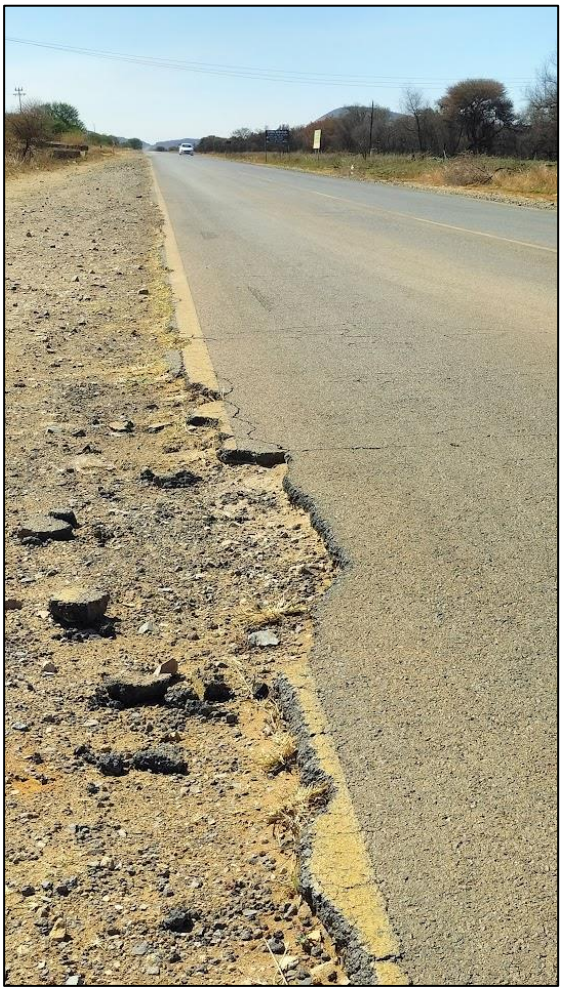
View of gravel site access road at its intersection with D114.

View of gravel site access road approach to D114 (Priority control road signage in place)

View to left of gravel site access road intersection with D114

View to right of gravel site access road intersection with D114. Note concrete edge beam.

Concrete edge beam drop-off close to road edge poses a traffic danger to motorists



Road edge breakaway on D114 opposite site access road in need of repair (damage due to large vehicles turning right from gravel site access road and / or through traffic passing vehicles turning right into gravel site access road).

» **Road safety at site access.** The site access is located close to a horizontal curve but has clear sight lines in both directions. The proposed site access needs to be designed to accommodate two-way traffic flow to avoid vehicles queuing outside the access gate.

Proposed site access position

View right of proposed access (towards D114)

View to left of proposed site access.

This can be mitigated by installing signage warning of trucks crossing on both approaches to the access. The access needs to be designed to accommodate two-way traffic flow.

» **Degradation of gravel site access road pavement** that has potential for vehicle damage or injury crashes.

The site access is via a gravel site access road section between D114 and the site access. Extensive use of the gravel site access road by heavy vehicles will lead to deterioration of the road structure that could result in vehicle crashes (see picture above).

This can be mitigated by regular maintenance of the gravel site access road section used by development traffic.

» **Dust on gravel site access road**: This has potential to cause accidents due to reduced forward visibility for motorists.

This can be mitigated by 50 km/h speed restriction signage for construction vehicles on the gravel site access road section. Consideration could also be given to the application of an appropriate dust suppressant where needed.

» **Vehicle / pedestrian safety on site:** Buses and light vehicles will arrive on site and park for extended periods in addition to large delivery vehicles driving on site. Site staff (skilled and semi-skilled) will need to walk to the site work area or be transported on site. This increases the risk of vehicle/pedestrian conflict and crashes on site.

This can be mitigated by a well-designed parking area (s) with clearly defined well-lit pedestrian walkways separated from general delivery and operational traffic and well considered on-site protocols (appropriate vehicles, boarding and alighting areas and routes on site).

6.3.2 Operations Period

The Solar PV site will be operational all hours except during maintenance, breakdowns or interruption of the connection to the Eskom grid.

Regular maintenance will be minimal with very few vehicles.

A small staff component (15 persons) is anticipated during the operation phase of the project, with technicians/maintenance and security personnel on site as required. This would generate very low vehicle trips (6 light vehicles to site), as shown in the Table below:

Staff Category	Per shift (Stage 6)			Months	300
	Staff	Vehicle	Staff per veh type	Vehicle Occupancy	# Vehicles
Construction Labourers	7	Taxi	8	12	1
Foremen	1				
Specialists	4	Private	6	1,2	5
Engineers	2				
Project Managers	1				
TOTAL	**15**				

» **Road safety at site access.** The proposed site access is located on the inside of a bend with sufficient motorist visibility, however approaching motorists might not anticipate intensified use of the access, that could lead to vehicle crashes.

This can be mitigated by installing temporary signage warning of trucks crossing on the approaches to the site access. The access needs to be widened to accommodate two-way traffic flow.

6.3.3 Decommissioning Period

The Solar PV Facility is expected to be operational for 25 years with the possibility of extending operations for a further 25 years.

Trip generation at the decommissioning stage is likely to be outside commuter peak hours.

Decommissioning will entail less traffic than the construction phase, and recyclable components would be transported to appropriate recycling facilities. Other materials would be transported to the local dump if not recyclable or sold to local scrap merchants or other buyers if the items have salvage value.

Decommissioning should be in accordance with the agreement reached with the affected landowners.

Daily trips for the decommissioning period are expected to be low and will typically comprise dump trucks or low-bed vehicles, with equipment and components cut to size on site.

» **Road Safety at D114/site access road:** There is potential for vehicle crashes at D114/gravel site access road (site access road) intersection with motorists not expecting construction vehicles at the intersection, over an extended period.

This can be mitigated by ensuring construction vehicles are roadworthy, construction vehicle drivers are licensed, and by installation temporary roadworks "crossing vehicles" warning signage on the D114 approaches to the gravel site access road intersection. In addition to this the hard surfaced intersection bell mouth requires maintenance and road markings and stop signage are required on the gravel site access road approach to D114.

» **Road safety at site access:** There is potential for vehicle crashes at D114/gravel access road (Site access road) intersection with motorists not expecting heavy vehicles at the intersection, over an extended period.

This can be mitigated by installing temporary signage warning of trucks crossing on both approaches to the access. The access needs to be widened to accommodate two-way traffic flow.

» **Road maintenance:** Degradation of gravel site access road pavement that has potential for vehicle damage or injury crashes.

The site access is via a gravel site access road section between D114 and the site access. Extensive use of the gravel site access road by heavy vehicles will lead to deterioration of the road structure that could result in vehicle crashes.

This can be mitigated by regular maintenance of the gravel site access road section used by development traffic.

» **Dust on site access road:** This has potential to cause accidents due to reduced visibility for motorists.

This can be mitigated by reduced travel speed for heavy vehicles on the gravel site access road.

6.4 Impact Assessment

The following impacts are identified for the Solar PV Facility project lifecycle.

» **Construction:**
* Traffic congestion in Boshoek
* Road safety at D114/R565 intersection
* Road safety at D114/site access road intersection
* Road safety at site access
* Degradation of gravel site access road
* Dust on gravel site access road
* Pedestrian safety on-site

» **Operations**
* Road safety at site access

» **Decommissioning:**
* Road safety at site access
* Degradation of gravel site access road
* Dust on gravel site access road
* Pedestrian safety on-site

» **Cumulative:**
* Traffic congestion in Boshoek

The Impact Assessment ratings for the proposed Solar PV Facility are shown in the Tables below.

6.4.1 Construction

Impact Phase: Construction							
Potential impact description: Traffic congestion Increased development related light and heavy vehicles traffic flow on the R565 route to site, resulting in more traffic congestion in the PM at the Boshoek OK Grocer shopping hub.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	High	Medium	Medium
With Mitigation	Low	Medium	Low	Negative	Medium	Medium	Medium
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			No				
Can the impact be avoided, managed or mitigated?			Yes, this can mitigated or managed				
Mitigation measures to reduce risk or enhance opportunities: • This can be mitigated by the following: * Improving traffic road markings on R565 in Boshoek. * Focussed traffic law enforcement on R565 at Boshoek shopping hub particularly during PM peak hours. * Plan for light vehicles to/from site to travel outside the traffic peak hours, and or accommodate at least 50% of specialists and artisans in buses (1 bus equates to 50 vehicles) to/from site. * Undertake a TIA * Produce a TMP							

Rationale for scoring as shown in the table above.

Severity: Medium**:** Moderate deterioration with higher level of traffic congestion (disruption and nuisance) on R565 in Boshoek in PM
Low: Minor deterioration with lower increase in traffic congestion (disruption and nuisance) on R565 in Boshoek in PM with mitigation measures

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, construction phase, short-term,

Probability: High: Definite possibility
Medium: Low probability

Confidence: Medium: Definite increase in traffic and traffic impacts in Boshoek

Impact Phase: Construction							
Potential impact description: Road safety at DR114/R565 intersection Poor road markings at the D114/R565 intersection in Boshoek (see pictures below) could result in vehicle crashes due to motorists misreading the intersection.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Medium	Low	Negative	High	Medium	High
With Mitigation	High	Medium	Low	Positive	Low	Low	High
Can the impact be reversed?			Yes. Improved road markings will extend beyond the project construction and benefit all road users				
Will the impact cause irreplaceable loss of resources?			Yes, loss of life or disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, this can mitigated or managed				
Mitigation measures to reduce risk or enhance opportunities: • This can be mitigated by the following: * improving road markings on D114/R565 intersection in Boshoek, particularly to clearly indicate that vehicles need to keep-left of the splitter island.							

Rationale for scoring as shown in the table above.

Severity: High: Likelihood of vehicle crashes with possible loss of life or disability and or injury

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, construction phase, short-term

Probability: High: Definite
Low: Low probability

Status: Negative: Current unsafe situation
Positive: Improvement to road markings creating safer road environment

Confidence: High: Definite increase in traffic and traffic impacts at intersection

Impact Phase: Construction							
Potential impact description: Road safety at DR114/Site access road intersection There is potential for vehicle crashes at D114/gravel site access road intersection with motorists not expecting construction vehicles at the intersection, over an extended period.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Medium	Low	Negative	Medium	Medium	Medium
With Mitigation	High	Medium	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			Yes, loss of life or disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, this can mitigated or managed				
Mitigation measures to reduce risk or enhance opportunities: • This can be mitigated by the following: * Ensure construction vehicles are roadworthy, construction vehicle drivers are licensed. * installation temporary roadworks "crossing vehicles" warning signage on the D114 approaches to the gravel site access road intersection. * Hard surfaced 30 m of site access road to reduce materials carry into D114. * Provide road markings and stop signage are on the gravel site access road approach to D114. * Repair D114 road edge opposite the site access road.							

Rationale for scoring as shown in the table above.

Severity: High: Likelihood of vehicle crashes with possible loss of life or disability and or injury

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, construction phase, short-term,

Probability: Medium: Probable that there will be crashes
Low: Low likelihood of crashes

Confidence: Medium: Definite increase in traffic and possible traffic impacts at intersection

Impact Phase: Construction							
Potential impact description: Road safety at site access The site access is located on the outside of a bend however motorists sight lines are compromised by vegetation, which could result in vehicle crashes.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			Yes, loss of life or disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, this can mitigated or managed				
Mitigation measures to reduce risk or enhance opportunities: • This can be mitigated by the following: * Install signage warning of trucks crossing on both approaches to the site access. * Design site access to accommodate two-way traffic flow.							

Rationale for scoring as shown in the table above.

Severity: Medium: Likelihood of vehicle crashes with possible disability and or injury
Low: Possibility of lower speed vehicle crashes with possible injury

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, construction phase, short-term,

Probability: Medium: Probable
Low: Low probability

Confidence: Medium: Definite increase in traffic and possible traffic impacts at site access

Impact Phase: Construction							
Potential impact description: Degradation of gravel site access road Additional heavy traffic on the site access road could degrade the existing road pavement with increased potential for vehicle damage or injury crashes.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	High
With Mitigation	Medium	Medium	Low	Negative	Low	Low	High
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			Yes, disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				
Mitigation measures to reduce risk or enhance opportunities: * Carry out regular maintenance of the gravel site access road to ensure that its condition is maintained or improved to good condition.							

Rationale for scoring as shown in the table above.

Severity: Medium: Likelihood of vehicle crashes with possible disability and or injury

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, construction phase, short-term,

Probability: Medium: Probable
Low: Low probability

Confidence: High: Definite substantial increase in heavy and light vehicle traffic leading to deterioration of the road surface

Impact Phase: Construction							
Potential impact description: Dust on gravel site access road Additional traffic on gravel site access road will result in more dust. This reduces forward visibility and increased potential for crashes on the gravel site access road.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	High
With Mitigation	Medium	Medium	Low	Negative	Low	Low	High
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			No				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				
Mitigation measures to reduce risk or enhance opportunities: Reduce travel speed on gravel site access road to reduce dust: * Post 50km/h speed restriction signage for construction vehicles on the gravel site access road. * Actively enforce construction vehicles to adhere to posted speed limits. * Where deemed necessary (due to wind conditions) apply appropriate dust suppressant.							

Rationale for scoring as shown in the table above.

Severity: Medium: Likelihood of vehicle crashes with possible disability and or injury

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, less than the project life cycle, short-term,

Probability: Medium: Probable
Low: Unlikely

Confidence: High: Definite substantial increase in heavy and light vehicle traffic leading to increased likelihood of dust reducing motorists' visibility.

Impact Phase: Construction							
Potential impact description: Pedestrian safety on-site Buses and light vehicles will arrive on site and park for extended periods in addition to large delivery vehicles driving on site. Site staff (skilled and semi-skilled) will need to walk to the site work area or be transported on site. This increases the risk of vehicle/pedestrian conflict and crashes on site.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Low	Low	Negative	High	Medium	Medium
With Mitigation	High	Low	Low	Negative	Low	Low	High
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			Yes, possible death or disability				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				
Mitigation measures to reduce risk or enhance opportunities: This can be mitigated by: * Designing and implementing a well-designed parking area (s) with clearly defined well-lit pedestrian walkways separated from delivery and operational traffic. * Implementing well considered on-site protocols (appropriate vehicles, boarding and alighting areas and routes on site).							

Rationale for scoring as shown in the table above.

Severity: High: Likelihood of vehicle crashes with possible disability and or injury

Spatial Extent: Low: On-site

Duration: Low: Quickly Construction Phase, short-term,

Probability: High: Probable
Low: Low possibility

Confidence: Medium: Definite substantial increase in buses, light vehicles and heavy vehicle traffic leading to likelihood of vehicle/pedestrian conflicts on-site
High: Well-planned measures to separate vehicle and pedestrian conflicts on site will increase pedestrian safety

6.4.2 Operations

Impact Phase: Operations							
Potential impact description: NONE							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation							
With Mitigation							
Can the impact be reversed?							
Will the impact cause irreplaceable loss of resources?							
Can the impact be avoided, managed or mitigated?							
Mitigation measures to reduce risk or enhance opportunities: • This can be mitigated by the following:							

Rationale for scoring as shown in the table above.

No impact identified for this phase.

6.4.3 Decommissioning

Impact Phase: Decommissioning							
Potential impact description: Road safety at site access The site access is located on the outside of a bend however motorists sight lines are compromised by vegetation, which could result in vehicle crashes.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			Yes, loss of life or disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, this can mitigated or managed				
Mitigation measures to reduce risk or enhance opportunities: • This can be mitigated by the following: * Install signage warning of trucks crossing on both approaches to the site access.							

Rationale for scoring as shown in the table above.

Severity: Medium: Likelihood of vehicle crashes with possible disability and or injury
Low: Possibility of lower speed vehicle crashes with possible injury

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, decommissioning phase, short-term,

Probability: Medium: Probable
Low: Low probability

Confidence: Medium: Definite increase in traffic and possible traffic impacts at access in distant future

Impact Phase: Decommissioning							
Potential impact description: Degradation of gravel site access road Additional heavy traffic on the site access road could degrade the existing road pavement with increased potential for vehicle damage or injury crashes.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium	Medium	Low	Negative	Medium	Medium	Medium
With Mitigation	Medium	Medium	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Decommissioning				
Will the impact cause irreplaceable loss of resources?			Possibly, disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				
Mitigation measures to reduce risk or enhance opportunities: • This can be mitigated by the following: * Carry out regular maintenance of the gravel site access road to ensure that its condition is maintained or improved to good condition.							

Rationale for scoring as shown in the table above.

Severity: Medium: Likelihood of vehicle crashes with possible disability and or injury

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, decommissioning phase, short-term,

Probability: Medium: Probable
Low: Low probability

Confidence: Medium: Definite substantial increase in heavy and light vehicle traffic leading to possible deterioration of the road surface

Impact Phase: Decommissioning							
Potential impact description: Dust on gravel site access road Additional traffic on gravel site access road will result in more dust. This reduces forward visibility and increases potential for crashes on the gravel road.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Low	Low	Negative	Medium	Medium	Medium
With Mitigation	Low	Low	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Decommissioning				
Will the impact cause irreplaceable loss of resources?			Possibly, disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				
Mitigation measures to reduce risk or enhance opportunities: Reduce travel speed on gravel site access road to reduce dust: * Post 50km/h speed restriction signage for construction vehicles on gravel site access road. * Actively enforce construction vehicles to adhere to posted speed limits							

Rationale for scoring as shown in the table above.

Severity: High: Likelihood of vehicle crashes with possible disability and or injury
Low: Possibility of vehicle crashes with possible injury

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, decommissioning phase, short-term

Probability: Medium: Probable
Low: Low probability

Confidence: Medium: Definite substantial increase in heavy and light vehicle traffic leading to increased likelihood of dust reducing motorists' visibility

Impact Phase: Decommissioning							
Potential impact description: Pedestrian safety on site Buses and light vehicles will arrive on site and park for extended periods in addition to large delivery vehicles driving on site. Site staff (skilled and semi-skilled) will need to walk to the site work area or be transported on site. This increases the risk of vehicle/pedestrian conflict and crashes on site.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Low	Low	Negative	Medium	Medium	Medium
With Mitigation	Medium	Low	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Decommissioning				
Will the impact cause irreplaceable loss of resources?			Possibly, disability due to crashes				
Can the impact be avoided, managed or mitigated?			Yes, impacts can be managed and mitigated				
Mitigation measures to reduce risk or enhance opportunities: This can be mitigated by: * Designing and implementing a well-designed parking area (s) with clearly defined well-lit pedestrian walkways separated from delivery and operational traffic. * Implementing well considered on-site protocols (appropriate vehicles, boarding and alighting areas and routes on site).							

Rationale for scoring as shown in the table above.

Severity: High: Likelihood of vehicle/pedestrian crashes with possible disability and or injury
Medium: Possibility of vehicle/pedestrian crashes with possible injury

Spatial Extent: Low: On-site

Duration: Low: Quickly reversible, decommissioning phase, short-term,

Probability: Medium: Possible
Low: Low probability

Confidence: Medium: Definite substantial increase in buses, light vehicles and heavy vehicle traffic leading to increased likelihood of vehicle/pedestrian conflicts on-site but over short period

6.4.4 Solar PV Facility Cumulative Impacts

The Table below shows a list of similar projects within 35 km radius of the Boshoek 2 Solar PV Facility. The cumulative capacity of the nearby Solar Polar Voltaic (PV) sites is 200 MW. It is pointed out that these facilities are within 5 km of the subject site.

Table 6-4: Similar developments within 35 km from site (Cumulative development)

#	Project Title	Application Received	Applicant	EAP	Local Mun	Technology	Megawatt	Project Status
1	Proposed Boshoek Solar PV 2	NA	Atlantic Renewable Energy Partners (PTY) Ltd	ERM Southern Africa (Pty) Ltd	Rustenburg Local Municipality	Solar PV	150	Pre-submission
2	Proposed Boshoek Solar PV 3	NA	Atlantic Renewable Energy Partners (PTY) Ltd	ERM Southern Africa (Pty) Ltd	Rustenburg Local Municipality	Solar PV	50	Pre-submission
							200	TOTAL

These projects are by the same developer, and as a worst-case scenario, they could be completed within the same timeline and the subject project.

The estimated trip generation to site for the Boshoek Solar PV 1 facility and the other similar facilities (Boshoek Solar PV 2 and Boshoek Solar PV 3) within 35 km of the subject site are shown in the Table below.

Table 6-5: Summary of proposed and cumulative development vehicle trips per development stage

SOLAR PV PLANT - ANTICIPATED PLANT EXECUTION PLAN Anticipated Project Execution Plan (Construction, Operations and Decommissioning Stages) SUMMARY OF SITE STAFF AND VEHICLE LOADS								
ITEM	**DESCRIPTION**	**Stage 1**	**Stage 2**	**Stage 3**	**Stage 4**	**Stage 5**	**Stage 6**	**Stage 7**
	# Months	1	2	6	5	2	300	2
	From	1	2	4	10	15	17	317
	To	1	3	9	14	16	316	318
1	Site Staff / Employees on site (Day shift only)	627	1298	1262	1082	1082	35	623
	MONTHLY ARRIVE AT START OF STAGE AND LEAVE AT END OF PHASE							
4a - 4i	Miscellaneous vehicles arrive (and stay on site for extended periods) and leave site at end of period.	27	5	32	0	0	0	10
	PER MONTH (ARRIVE OUTSIDE PEAK HOURS)							
5	Tipper Truck Packaging Waste Removal (Monthly)	0	535	0	0	0	0	0
6	Steel Structure to site (Interlinks from Johannesburg) (Monthly)	0	178	0	0	0	0	0
7	PV Panels to site (ISO Container Trucks) (Monthly)	0	360	0	0	0	0	0
8	BESS Containers to site (Monthly)	0	0	11	0	0	0	0
4i	Anxillary Buildings, etc. Heavy vehicles - trucks and lowbed		18					0
4j	10 and 20 m3 trucks (50/50 split)							281
4k - 5	Calculated - Average # vehicles per day (outside Peak Hours)	0	42	0	0	0	0	11
	DAILY (IN PEAK HOUR)							
2a	Light Vehicles to site **daily** (arrive in AM Peak Hour, remain on site, depart in PM Peak Hour)	54	162	120	252	252	13	32
3a	Buses / *Taxis* (arrive in AM Peak Hour, remain on site, depart in PM Peak Hour)	9	18	19	13	13	2	10

Cumulative monthly and daily solar panels, solar packaging waste removal and solar mounting vehicle trips to site are shown in the Tabe below:

Table 6-6 - Summary of cumulative PV related monthly and daily trips

Monthly	Daily	%	Description
535	21	50%	Tipper Solar PV Packaging waste removal
178	7	17%	PV structures and mountings
360	14	34%	PV Panels
1073	**41**	**100%**	**Total**

Assuming that all developments are built simultaneously and to similar project programme the cumulative solar PV Facility sites would generate approximately 252 peak hour light

vehicle trips and 13 buses to site per day. These are single directional trips (to site in AM / from site in PM). The 252 peak hour trips are significant.

This can be mitigated by constructing the three Solar PV facilities consecutively, or, assuming all facilities are built simultaneously, by encouraging artisan and specialist staff to travel outside peak hours or by providing at least 3 buses for artisans and specialist staff to the various sites.

The cumulative development impact assessment is shown in the Table below.

Impact Phase: Cumulative							
Potential impact description: Traffic congestion Increased development related light and heavy vehicles traffic flow on the R565 route to site, resulting in more traffic congestion in the PM at the Boshoek OK Grocer shopping hub.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	High	Medium	Low	Negative	High	Medium	Medium
With Mitigation	Low	Medium	Low	Negative	Low	Low	Medium
Can the impact be reversed?			Yes. This is temporary during Construction				
Will the impact cause irreplaceable loss of resources?			No				
Can the impact be avoided, managed or mitigated?			Yes, this can mitigated or managed				
Mitigation measures to reduce risk or enhance opportunities: • This can be mitigated by the following: * Constructing the Solar PV sites concurrently, * Improving traffic road markings on R565 in Boshoek. * Focussed traffic law enforcement on R565 at Boshoek shopping hub particularly during PM peak hours. * Plan for light vehicles to/from site to travel outside the traffic peak hours, and / or accommodate most of the specialists and artisans in buses (3 busses equates to 150 vehicles) to/from site. * Undertake a TIA * Produce a TMP							

Rationale for scoring as shown in the table above.

Severity: High**:** High deterioration with higher level of traffic congestion (disruption and nuisance) on R565 in PM
Low: Minor deterioration with lower increase in traffic congestion (disruption and nuisance) on R565 in PM with mitigation measures

Spatial Extent: Medium: Beyond site boundary

Duration: Low: Quickly reversible, construction phase, short-term,

Probability: High: Definite
Low: Low probability

Confidence: Medium: Definite increase in traffic and traffic impacts in Boshoek

7. TRAFFIC IMPACT ASSESSMENT AND TRAFFIC MANAGEMENT PLAN

The development traffic involving staff/worker transport will produce substantial commuter peak hour trips on the road network, where a few areas of concern are identified. This will be more so with a cumulative development scenario. Consequently, a Traffic Impact Assessment as outlined below is required to determine development traffic impact and to effectively manage the increase in traffic due to the development/solar PV facility.

Traffic Impact Assessment (TIA) particular requirements:

1. Determine weekday AM and PM peak hour capacity at D114 approach to R565.
2. Determine weekday AM and PM peak hour capacity at R565 accesses to OK Grocer shopping hub and Non-motorised Transport (NMT) safety.
3. Determine reasonable number of development trips that could be added to the above intersections to maintain acceptable Level of Service (LOS) and determine requisite intersection upgrading requirements to accommodate development traffic impact.
4. Determine effective development phasing and transport strategies to align with calculated peak hours development trips due to identified intersection capacity constraints (with or without intersection(s) upgrading). This must also consider the cumulative development scenario and determine appropriate phasing and / or transport strategies to mitigate development traffic impact.
5. Conceptual design proposals for:
   5.1. Collection areas for workers/staff in selected towns (consider safe transport locations for vehicle access and pedestrian boarding / alighting areas)
   5.2. On-site delivery and equipment transport areas separated from public and private transport accommodation including NMT safety in worker/staff parking area and to work areas).
6. Road signage drawings for the following intersection
   6.1. D114 / site access road intersection
   6.2. Site access road / site access
7. Include statement regarding signage maintenance required at D114/R565 intersection for attention by the local municipality/road authority.
8. Any other concerns /suggestions identified at areas of study.
9. Conclusions.
10. Recommendations.

Traffic Management Plan (TMP) requirements.

A short Traffic Management Plan should set out practical steps / means to implement the recommendations of the TIA.

8. CONCLUSIONS

It is concluded that:

Construction Phase:

1. The proposed Boshoek 1 Solar PV facility is expected to be built over a period of 16 months.
2. The Solar PV facility could generate significant traffic volumes on the road network.
3. A TIA and a TMP are required to address possible issues on the R565 in Boshoek at the OK Grocer shopping hub, and on-site pedestrian safety.
4. A few abnormal load vehicles transporting heavy machinery will operate under permit obtained by the transport carrier.
5. The R565/D114 intersection requires road markings and signage to improve readability by motorists and to avoid unnecessary crashes.
6. The site access road approach to D114 should be hardened for 30 m to reduce material carry onto the D114.
7. Increased traffic/construction traffic at the D114/site access road intersection could lead to vehicle crashes, and advance warning "truck crossing" signage should be erected on the D114 approaches.
8. Increased traffic/construction traffic at the site access could lead to vehicle crashes, and advance warning "truck crossing" signage should be erected on the gravel site access road approaches to the site access.
9. Increased vehicles / construction vehicles on the gravel site access road could lead to deterioration of the road pavement, and this requires monitoring and regular road maintenance.
10. Increased traffic on the site access road could lead in increased dust, with reduced forward visibility and higher risk of vehicle crashes, and construction vehicles travel speeds should be reduced to 50km/h reduce dust.
11. High number of pedestrians with light vehicles, buses and heavy and delivery vehicles on-site carries increased potential for serious pedestrian/vehicles crashes. This can be mitigated by separating delivery/construction vehicles from buses and light vehicles in a well-designed parking area with clear vehicle/pedestrian paths separation.

Operations Phase:

1. The facility will have a low trip generation over the 25 years operations phase and no impacts are identified for this phase.

Decommissioning Phase:

1. Increased traffic/construction traffic at the D114/site access road intersection could lead to vehicle crashes, and advance warning "truck crossing" signage should be erected on the D114 approaches t the site access road.
2. Increased traffic/construction traffic at the site access could lead to vehicle crashes, and advance warning "truck crossing" signage should be erected on the gravel site access road approaches to the site access.
3. During the 2 months decommissioning phase increased number of heavy vehicles on the gravel site access road could lead to deterioration of the pavement, which

increases risk of crashes. The condition of the site access road should be monitored and maintained to a good standard.

4. Increased traffic on the site access road increases dust which creates forward visibility issues for motorists and increases risk of crashes. This can be mitigated by implementing a 50 km/h speed restriction for heavy vehicles on the gravel site access road, with possible dust suppressant if really needed.
5. High number of pedestrians with light vehicles, buses and heavy and delivery vehicles on-site carries increased potential for serious pedestrian/vehicles crashes. This can be mitigated by separating delivery/construction vehicles from buses and light vehicles in a well-designed parking area with clear vehicle/pedestrian paths separation.

Cumulative Impact

1. The cumulative traffic impact of planned construction of various Solar PV facilities within 35 km (within 5 km from the site) could coincide with the Boshoek Solar PV 1 facility. The cumulative traffic is significant and could increase traffic congestion on the R565 at the OK Grocer shopping centre hub. This could be mitigated by development related light vehicles travelling outside peak hours and/or providing bus transport for the majority of artisans and specialists.
2. A TIA and a TMP is required to address the cumulative development impact traffic impact.

TIA and TMP:

1. A Traffic Impact Assessment (TIA) is required to address identified development traffic impacts and determine acceptable development trips and requisite road improvements and to address vehicle/pedestrian traffic conflict/safety on-site.
2. A short Traffic Management Plan (TMP) should set out practical steps / means to implement the recommendations of the TIA.

9. RECOMMENDATIONS

It is recommended that:

1. The traffic and transport related impacts of the proposed Solar PV facility construction, operations and decommissioning be mitigated as set out in this report, including a Traffic Impact Assessment (TIA) addressing aspects as outlined in this report along with a Traffic Management Plan in accordance with recommendations from the TIA.

10. SPECIALIST STATEMENT

Taking the above findings into consideration it can be concluded that the development of the Boshoek Solar PV 1 facility and associated infrastructure should not have undue detrimental impact on traffic and that identified impacts can be suitable mitigated.

It is the reasoned opinion of the specialist that the development of the Boshoek Solar PV 1 facility can be approved, from a traffic and transport engineering perspective, subject to the specific requirements / mitigation measures included within this report.

11. REFERENCES

1. TMH 16 Vol 1 & 2 South African Traffic Impact and Site Traffic Assessment Manual, August 2012, compiled by the Committee of Transport Officials (COTO)
2. South African Trip Generation Rates, Second Edition, Department of Transport – June 1995
3. Institute of Transport Engineers Trip Generation Manual 8th Edition
4. Committee of Transport Officials (COTO) TRH 11 - Dimensional and Mass Limitations and Other Requirements for Abnormal Load Vehicles (8th Edition 2010) as published by South African Department of Transport
5. An Innovative Approach to Structuring Environmental Impact Assessment Reports Part 2: Ranking the Significance of Environmental Aspects and Impacts By: T. Hacking Anglo American plc (Currently Environmental Manager at Konkola Copper Mines plc, Zambia)

ANNEXURE A – Curriculum Vitae

TECHSO
smart solutions

S Fautley
Abbreviated Curriculum Vitae

Profession
Traffic & Transportation Engineer

Current Position
Western Cape
Senior Transportation Engineer

Date and Place of Birth:
15 July 1961, Cape Town

Joined Techso:
2008

Nationality
South African

Academic Qualifications
NHD in Civil Engineering, Cape Technikon 1989

Professional Associations
The Engineering Council of South African (ECSA)

Specialisation
Traffic Engineering and Transportation Planning

Languages
Afrikaans, English

Appointments
- 1986– 1992: Principal Industrial and (1986 - 1991) Industrial Technician: Geometric Design: Provincial Administration: Western Cape
- 1993– 1994: Chief Industrial Technician: Mapping and Proclamations: Provincial Government: Western Cape
- 1994 – 1995: Chief Industrial Technician Regional Services: Provincial Government: Western Cape
- 1995 - 1996: Chief Industrial Technician, Urban Transportation: Provincial Government: Western Cape
- 1997 – 1998: Senior Technician, Kantey and Templer
- 1998 - 2006: Principal Technician: Traffic Engineering, City of Cape Town
- 2006 – 2008: Regional Head, Traffic Impact Assessments and Development Control, City of Cape Town
- 2008 - Senior Transportation Engineer, Techso

Contact Details
Phone: +27 (0) 21 5577730
Mobile: +27 (0) 84 300 7722
E-mail: steve@techso.co.za

Key Experience

Stephen is a traffic engineering technologist with 30 years of experience in traffic and transportation engineering. He has completed the Transportation Planning and Study Methodology course and the Highway Capacity course at the University of Stellenbosch. Stephen has been involved with civil, traffic and transportation engineering for ten (10) years at Provincial Government of the Western Cape, 1,5 years with Kantey and Templer Consulting Engineers and 10 yrs at local authority/city level and joined Techso in August 2008.

Traffic & Transportation:
- Transportation Planning
- Traffic Engineering
- Road Safety Audits

Projects:
- Local Traffic Engineering and Transportation Plans, such as Traffic Signal Design, Traffic Calming, Parking, Road Safety Audits, Road Design, Road Signs and Lane Marking for City of Cape Town.
- Developed Structure Parking Ramp Design Guidelines for the City of Cape Town.
- Project Management: Blaauwberg Road and Diep River Bridge Design, Milnerton
- Transport Systems Management Project Design and Implementation (City of Tygerberg & City of Cape Town)
- Technical Input to the City of Cape Town Kerbside Adjudication Bid Evaluation Committee.
- Project Management sub-consultant: City of Cape Town - Integrated Rapid Transport intersection and traffic signal design.
- Traffic Engineer sub-consultant: City of Cape Town - Conceptual design of Eastern Region non-motorised transport project
- Transport Impact Assessments – Commercial and Residential Developments, Schools, Gym, Hospital, Service Stations, Building lines, Sand-mines, Road Closures, Extensive housing development and road improvements
- Transportation Modelling – TIA for Windhoek Prime Ministers Offices
- Rustenburg Municipality – Integrated Rapid Transport System – AFC
- Ekhurleni Municipality – Integrated Rapid Public Transport Network – AFC and APTMS
- Nelson Mandela Bay Municipality – Integrated Public Transport System – AFC and APTMS
- Assessment of Road Safety Risk and Enforcement Measures -Various Municipal Area
- Traffic Management Plans - R21/2 in Gauteng – SANRAL
- Road Safety Audits – City of Cape Town - Integrated Rapid Transit Phase 1B, and R27 Reversible Bus lane, SANRAL- N1 in Polokwane
- Transport Studies – Input to Various Environmental Impact Assessment and Land Use Applications (residential developments, renewable energy plants, power stations, mines, industrial sites)
- **RESIDENTIAL / HOUSING:**
  - TIA – Erf 2900 Lotus River (58 Unit housing development - flats)
  - TIA – Rhodes square student accommodation Erf 31990 in Mowbray (600 units – for UCT students)
  - TIA – Campuskey Student Residence Erf 41665 in Rondebosch (536 units - for UCT students)
  - TIA – The Nest Student Residence and commercial development Erf 31993 in Rondebosch (for 610 units - for UCT students)
  - TIS Erf 309 – 44 Units flats Milnerton

ANNEXURE B – Specialist Declaration of Interest

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

Proposed Construction of the Boshoek Solar PV 1 facility and associated infrastructure, near the town of Boshoek in the Northwest 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

Details of Specialist, Declaration and Undertaking Under Oath

Page 1 of 3

1. SPECIALIST INFORMATION

Specialist Company Name:	Techso (Pty) Ltd			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	2	Percentage Procurement recognition	18
Specialist name:	Stephen Mark Fautley			
Specialist Qualifications:	Civil Engineering Technologist			
Professional affiliation/registration:	Civil Engineering Council of South Africa (ECSA) Registration Number 200270171 South African Institute of Civil Engineers (SAICE) Registration Number 201500599 South African Road Federation (SARF) Membership Number 29			
Physical address:	13 Riverside Drive, Milnerton, Cape Town			
Postal address:	13 Riverside Drive, Milnerton, Cape Town			
Postal code:	7441	Cell:	0843007722	
Telephone:	NA	Fax:	NA	
E-mail:	steve@techso.co.za			

2. DECLARATION BY THE SPECIALIST

I, ___Stephen Mark Fautley_____, 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

Techso (Pty) Ltd

Name of Company:

2024/02/29

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, ____Stephen Mark Fautley_____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

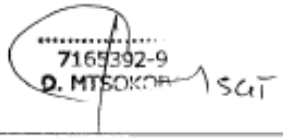
Signature of the Specialist

Techso (Pty) Ltd

Name of Company

2024/02/29

Date



Signature of the Commissioner of Oaths

2024 · 02 · 29

Date

ANNEXURE C – Site Verification Report

Head Office, Pretoria
Tel: +27 (0)12 844 0306
info@techso.co.za
Box 35, Mark Shuttleworth Street, The Innovation Hub, 0087, South Africa
Suite L11, The Enterprise Building Mark Shuttleworth Street, The Innovation Hub, Pretoria, Gauteng, South Africa

Cape Town
Tel: +27 (0)21 557 7730
info@techso.co.za
PostNet Suite #31, Private Bag X3, Bloubergrant, 7443, South Africa
3 Areuna Road Brackenfell Cape Town, Western Cape, South Africa

TECHSO smart solutions

My Ref: TJ2311
12 October 2023

ERM Southern Africa (PTY) LTD
1st Floor
Great Westerford
240 Main Road
Rondebosch
7700
South Africa

Attention: Anathi Manyakanyaka

Dear Madam

SITE SENSITIVITY VERIFICATION REPORT – PROPOSED CONSTRUCTION OF THE BOSHOEK SOLAR PV 1 FACILITY AND ASSOCIATED INFRASTRUCTURE, NEAR THE TOWN OF BOSHOEK IN THE NORTHWEST PROVINCE

1. SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS

In conducting the specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration identified by the national web based environmental screening tool (screening tool), was confirmed by undertaking a site sensitivity verification, with reference to the screening tool (https://screening.environment.gov.za/screeningtool) with relevant information as provided by the Environmental Practitioner for the project.

It is confirmed that:

a) there is no specific environmental theme protocol prescribed for traffic engineering specialist assessments,
b) the required level of assessment based on the findings of the site sensitivity verification are in compliance with Regulation GNR 326 of 4 December, as amended 1 April 2017, Appendix 6
c) a site visit was conducted on 12 September 2023 to assess the site, road accesses and surrounding road network from a transport perspective.

2. SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

The site sensitivity was assessed through the following:

a) desktop analysis, using satellite imagery (Google Earth), was undertaken prior to visiting the site.

Directors: Dr SJ Andersen Ms. MJ Ndlateng
Registration No 2005/007690/07

b) a site visit was conducted on 2023/09/12 to assess the current farming operations and to consider environmental issues.

The outcome of the above is contained in this report, that:

a) confirms the current farming activity and the environmental sensitivity of the proposed Solar PV energy facility, from a traffic and transportation perspective is low.
b) contains a motivation and evidence (map, photographs) of the current and proposed renewable energy and environmental sensitivity (environmental impact risk assessment); and
c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations1 (EIA Regulations).

Yours faithfully

Stephen Fautley (Pr Tech Eng)
for Techso (Pty) Ltd
https://techsosmartsolutions-my.sharepoint.com/personal/steve_techso_co_za/Documents/TECHSO/Projects/Projects 2023/Rustenburg Solar/Boshoek Solar PV 1/Boshoek Solar PV 1- Site Verification - 20231012.docx

Directors: Dr SJ Andersen Ms. MJ Ntlatleng
Registration No 2005/007690/07

ANNEXURE D – Contents of Specialist Report - Checklist

CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	**Section 4 & Annexure A**
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	**Annexure B**
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**Sections 1 & 3**
(cA) an indication of the quality and age of base data used for the specialist report;	**Section 2 (see site visits)**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	**Sections 2, 6.1, Section 6.2 and Section 6.4.4**
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**Section 2**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	**Section 5**
(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;	**Section 5**
(g) an identification of any areas to be avoided, including buffers;	**NONE**
(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;	**Section 2 Fig 2.1**
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	**Section 6.2**
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	**Sections 6.4**
(k) any mitigation measures for inclusion in the EMPr;	**Sections 6.4**
(l) any conditions for inclusion in the environmental authorisation;	**Section 6.4 and Section 7 and Section 9**
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	**NA**
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	**Section 10**
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	**NA**
(p) any other information requested by the competent authority	**NA**
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.	**NA**