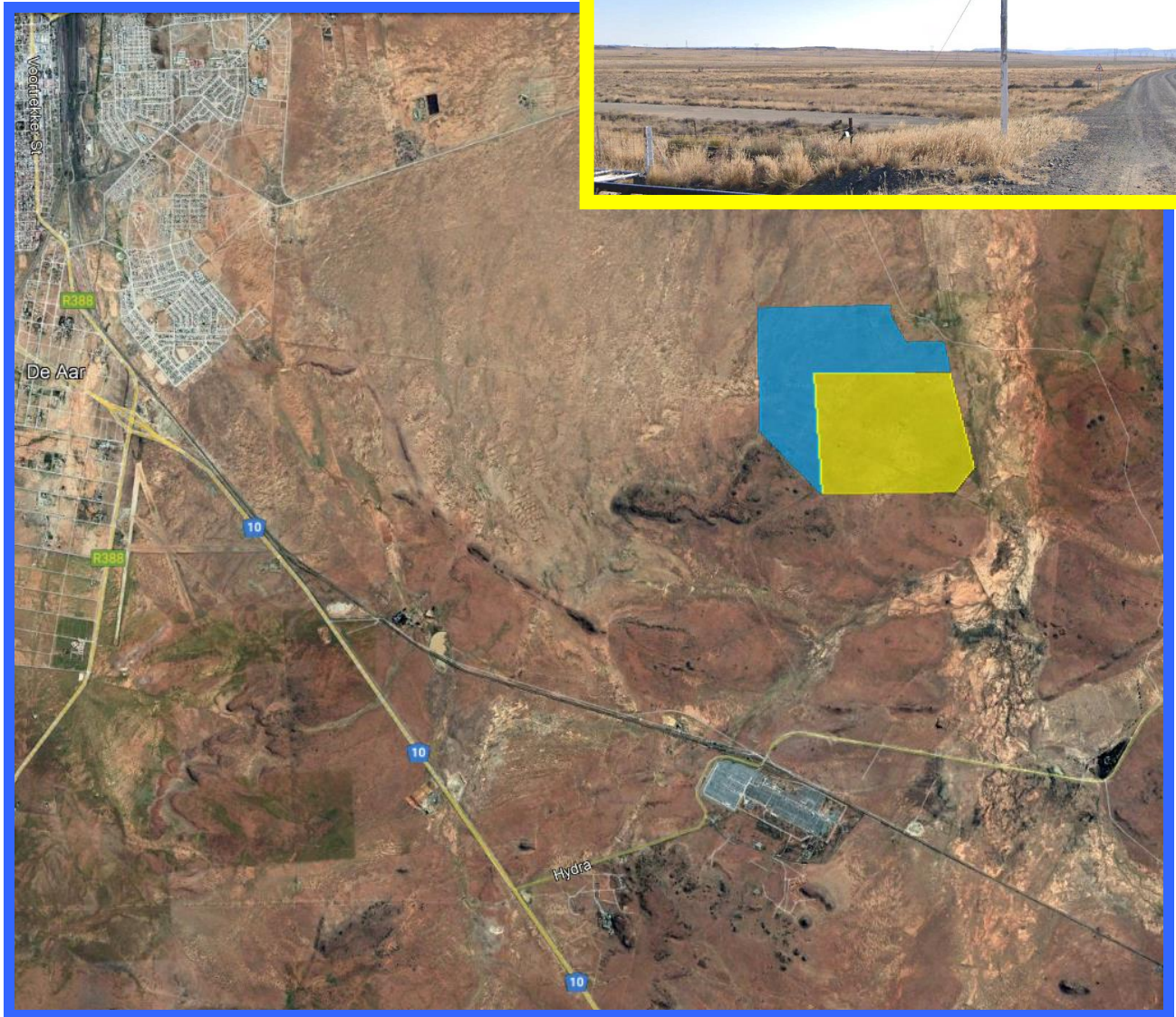


UPDATED TRAFFIC MANAGEMENT PLAN

UKUQALA SOLAR PV PROJECT

22 March 2023



Report prepared by:



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DECLARATION

1.	BACKGROUND.....	1
2.	METHODOLOGY	1
3.	SITE LOCATION AND ACCESSIBILITY.....	2
3.1	ALTERNATIVE ROUTE A.....	3
3.2	ALTERNATIVE ROUTE B.....	5
3.3	ACCESS TO DE AAR FROM N10	7
4.	TRIP GENERATION FOR A TYPICAL PLANT	7
4.1	CONSTRUCTION PHASE	7
4.2	OPERATIONAL PHASE	8
5.	PEAK TRAFFIC HOURS.....	8
6.	EXISTING PEAK HOUR TRAFFIC DEMAND.....	9
7.	SIMILAR DEVELOPMENTS IN THE AREA	10
8.	PROPOSED TRAFFIC MANAGEMENT PLAN.....	11
8.1	ACCESS ROUTES.....	11
8.2	INTERNAL ROADS	12
8.3	EXTERNAL ROADS.....	12
8.4	CONSTRUCTION WORKING HOURS	13
8.5	RAILWAY CROSSING.....	13
9.	RECOMMENDATION.....	13
10.	REFERENCES.....	13

ANNEXURE

FIGURE 1: SITE LOCATION PLAN

FIGURE 2: ACCESS ROUTES TO PORTION D AND PORTION E

SANRAL DRAWING NO. TD-R-JI-001-V1



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DECLARATION

It is herewith certified that this UPDATED TRAFFIC MANAGEMENT PLAN, UKUQALA SOLAR PV PROJECT has been prepared according to the requirements of the South African Traffic Impact and Site Traffic Assessment Manuals.

Signed:

DATE: 22 March 2023

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UPDATED TRAFFIC MANAGEMENT PLAN

UKUQALA SOLAR PV PROJECT

1. BACKGROUND

A traffic management plan for the seven solar PV facilities on the Vetlaagte farm, east of De Aar was done in 2013 by Corli Havenga Transportation Engineers ⁽¹⁾. This updated traffic management plan is done in support of the process to extend the validity period of the Environmental Authorisations for two authorised solar PV facilities on Portion D and Portion E (and now called the Ukuqala Solar PV facility) on the Vetlaagte farm (Remaining Extent of the Farm Vetlaagte No 4) as depicted on the Google Earth aerial photo below.



The plant will comprise of a 75MW photovoltaic (PV) facility. The expected construction time for a facility is approximately 18 months and it is planned to construct the two facilities simultaneously.

The construction phase of this type of development is generally the worst-case traffic scenario on the surrounding road network from a trip generation point of view. During the operational phase the trip generation is normally significantly lower.

2. METHODOLOGY

The basis of this report will be done in accordance with the South African Traffic Impact and Site Traffic Assessment Manuals ^(2 & 3). Although this is a traffic management plan, the same methodology will be followed. From the Manual⁽²⁾ Section 2.4 the following section pertaining to traffic impact assessments will be highlighted:

The purpose of the traffic impact assessment is to investigate and assess the feasibility of accommodating the impact of a proposed change in land use rights on the roads and transportation system. An acceptable assessment means that the proposed change in land use can be accommodated to an acceptable standard by the transportation system, possibly with the implementation of mitigation measures or improvements. However, an acceptable traffic assessment does not necessarily imply any approval or otherwise of the land use application itself.

It is important to note that a traffic impact assessment is essentially a feasibility study.

The specific objectives of a traffic impact assessment are to determine:

- *The local impact of a proposed change in land use on the road and transportation system surrounding the proposed development.*
- *Whether it is possible to accommodate the proposed change in land use, with or without the implementation of mitigation measures within acceptable norms specified in the manual.*
- *The mitigation measures and improvements that may be required to accommodate the proposed change, including:*
 - *Demand side mitigation measures aimed at reducing traffic generation, such as mixed-use developments and reducing the size or changing the type of the development.*
 - *Supply side mitigation measures aimed at improving transportation infrastructure, such as roads and public transport infrastructure.*
 - *The estimated cost of the required improvements and services.*

Where these guidelines are lacking, past experience with similar projects will be applied as well as the input of other members of the project team.

3. SITE LOCATION AND ACCESSIBILITY

The proposed plant is located approximately 6km east of De Aar along the National Road, N10 as depicted in Figure 1. The access routes to the plant identified in the EIA process are depicted in Figure 2.

Access to the plant can be obtained from the N10 via the existing access road, Road P3061 (± km 53.2 on the N10-6), also the access road to Hydra Substation. The existing intersection on the N10 is depicted in the photo below.



Intersection: N10 and Road P3061

From the N10, Road P3061 is a surfaced road, approximately 6.6m wide as depicted in the photos below. This road is in a good condition and was probably surfaced to serve the Hydra Substation.



Road P3061

The road runs around the Hydra Substation and crosses the railway line at a level crossing as depicted in the photo below. The surfaced section of the road ends at the railway line crossing.



At grade rail crossing along Road P3061

Access to the plant can be obtained from the other side of this crossing via the same route that used to give access to the railway siding. The route from the N10 to the point where access to the plant can be taken is approximately 3km long. The road is depicted in the photo below.



Access road to railway siding

3.1 ALTERNATIVE ROUTE A

There is another access road further west at \pm km 56.3 on the N10. This road probably also served the railway siding but it is currently closed at the farm house on the opposite side of the railway line.

This route also crosses the railway line with an at-grade crossing. The intersection on the N10 and conditions along the route are depicted in the photos below.



Intersection on the N10



At-grade railway line crossing



Gate on the road next to the farmhouse

The pavement and road width of this section of the road are clearly not designed for heavy vehicles.

This access is not considered as an access route option anymore because it is indicated as a no-entry road from the N10, see photo below.



Alternative A: Access off N10

3.2 ALTERNATIVE ROUTE B

There is an existing gravel road through De Aar towards the plant. This road runs through residential areas and can be accessed from the town or from Road R48. From the R48 the Caroluspoort Road can be used. This route is approximately 8.1km long. The first approximately 2km runs through the residential areas and is a surfaced road. The remaining section of the road is gravel. Typical sections along the route are depicted in the photos below.



Caroluspoort Road from R48



Typical section along Caroluspoort Road



Typical section along gravel road



Typical section at the fork along the gravel section of the road

The section from Main Road and Wentworth Street passing the church/school is depicted in the photo below. It eventually ties in with the other gravel road at the fork. This route is 6.5km long from Wentworth Street. Typical sections of the road along this route are depicted in the photos below.



Church/school along Wentworth Street



Typical section along the gravel road

3.3 ACCESS TO DE AAR FROM N10

The access from the N10 to De Aar is via an interchange on the N10 as depicted in the photo below.



De Aar interchange on the N10

4. TRIP GENERATION FOR A TYPICAL PLANT

The solar farm is not a land use for which trip generation figures are available in the South African Trip Data Manual ⁽⁴⁾. The construction phase of this type of development represents the worst-case traffic scenario. Once the plant is commissioned the trip generation is insignificant compared to that during the construction phase.

4.1 CONSTRUCTION PHASE

Based on information provided to us, the following will be used for the purposes of this plan:

Employment, 200 to 300 people residing in De Aar
Truck loads: 55 - 70 trips per 10MW

We undertook a similar project in another area, and construction activities generate daily trips with deliveries of materials, diesel, concrete, maintenance, plant, etc. The major trip generation however occurs once the solar panel deliveries commence.

It is important to note that one delivery is not only one trip but two, since a delivery takes place and an empty truck normally leaves the site thereafter.

For the purposes of this report, we made the following assumptions for trip generation purposes:

Employment:

One shift per day.

We assume 200 employees per shift.

70% of the workers will use developer's transport, 35-seater bus or 15-seater bus.

20% of the workers will use own transport with average occupancy of 2.5 persons per car.

10% of the workers will use own transport with an average occupancy of 1.5 persons per car.

Trips are to site in the morning and from site in the afternoon.

Construction activities:

20 - 30 light vehicle trips to site per day.

4 to 6 heavy vehicle trips to site per day.

Based on the above assumptions the typical number of trips that the 75MW facility can generate per day is as follows:

Bus/car and light vehicles: 62 trips to site and 62 from site.

Trucks: 2 to 3 trips to site per day and 2 to 3 trips from site per day.

(This can vary significantly depending on the construction stage.)

4.2 OPERATIONAL PHASE

During the operational phase typical activities include meter readings, cleaning panels, cutting grass and security. These activities are not regarded as normal weekday morning and afternoon peak hour trip generators.

In terms of COTO TMH 16 Volume 1⁽²⁾, *"A Traffic Impact Assessment shall be undertaken and submitted when an application is made for a change in land use and when the highest total additional hourly vehicular trip generation as a result of the application exceeds 50 trips per hour"*

This is not expected during the operational phase.

5. PEAK TRAFFIC HOURS

The peak traffic hours in De Aar will coincide with starting times of local schools and opening and closing times of businesses. We expect peak traffic hours to be around 7:30 in the morning and 16:30 in the afternoon.

Normal working hours on construction sites in general are between 07:00 and 17:00 on weekdays and 07:00 and 15:00 on alternative Saturdays.

Planning at this stage is that all the staff/contractors will be accommodated in De Aar. With a project of this size, supervisory staff can be accommodated in guesthouses, rental accommodation, camp sites, and for those sourced locally, in their own homes.

Breaking down the trip generation indicated above to expected peak hour trips to and from the construction site, the following peak hour trip generation can be expected with two plants constructed at the same time:

For this purpose, we assume a worst-case scenario with approximately 200 people working on site at a time.

Bus/car and light vehicles: Estimated 37 trips to site during the morning peak hour
Estimated 37 trips from site during the afternoon peak hour

If this is split between the two potential access routes, the following can be expected during peak traffic hours:

Vehicles using the N10 route: Estimated 27 trips to site during the morning peak hour

Vehicles using the gravel road route:

- Estimated 27 trips from site during the afternoon peak hour
- Estimated 10 trips to site during the morning peak hour
- Estimated 10 trips from site during the afternoon peak hour

Taking the surrounding road network into consideration, we expect the bulk of the truck trips to be from the N1's side and along the N10. Truck trips from De Aar are expected to be more the day-to-day consumables with materials for the plant coming from the N1's side.

6. EXISTING PEAK HOUR TRAFFIC DEMAND

Peak hour traffic counts were conducted on the N10 at the Hydra intersection on 16 and 17 January 2013 during the morning peak hour to obtain an indication of traffic flow during this period. The total peak hour traffic count representing all vehicles through the intersection was 58 vehicles, of which 31 vehicles were to the Hydra Substation.

The brief for the updated report was to conduct a desktop study. No new traffic counts were therefore conducted.

SANRAL has counting stations on the N10 in the area as depicted below.



SANRAL Counting Stations

The available data is presented in Table 1.

Station No	Year of data	ADT	ADTT	% Heavy
13123	2018	308	58	19%
13124	2018	517	69	13%
13262	2014	205	55	27%
	2020	205	55	27%
1300	2017	567	73	13%

Station No	Year of data	ADT	ADTT	% Heavy
	2018	561	73	13%
	2019	571	84	15%

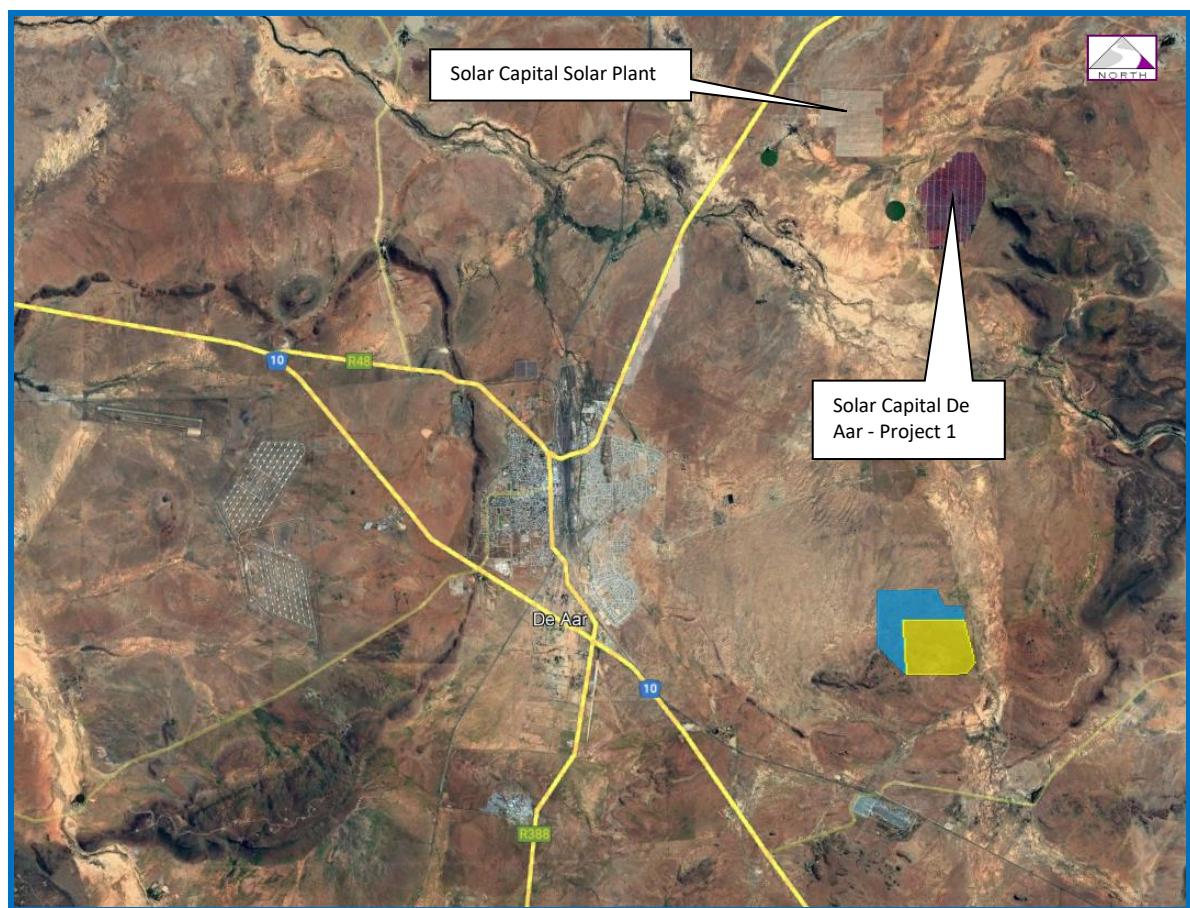
Table 1: SANRAL counting station data

The traffic data shows that the average daily traffic at all the counting stations remain below 600 vehicles per day. Stations 1300 and 13262 on the N10 indicate virtually no traffic growth. Station 13262 at the De Aar interchange indicates the same data for 2014 and 2020.

The peak hour traffic counts conducted during the site visit in 2013 is therefore not expected to change significantly.

7. SIMILAR DEVELOPMENTS IN THE AREA

The Solar Capital, De Aar Plant was developed since the initial study was done. Construction of this solar plant started in 2013. Solar Capital Plant is located approximately 10km north of the proposed Ukuqala Solar PV Project. The location of this plant is depicted below.



Location of Solar Capital

Access to this plant is off Road R48.

The cumulative traffic impact of this facility (Solar Capital) would have been noticeable if both were developed during the same period. This is not the case.

The Screening Tool report highlights 29 authorised energy facilities within a 30km radius of the Ukuqala Solar PV Project. Without any detailed information on these the cumulative traffic impact of these facilities cannot be quantified. If all of them are constructed over the same period the traffic impact might be substantial

during the construction phase. Not all of them will however utilise the same routes. The current traffic volumes are relatively low which indicates spare traffic capacity.

It is however unlikely that all of them will develop simultaneously. The cumulative traffic impact of all of them, when they are operational, will not be extensive because of the very low expected peak hour trip generation of such facilities.

8. PROPOSED TRAFFIC MANAGEMENT PLAN

The following plan is recommended for this plant during the construction phase (5 years).

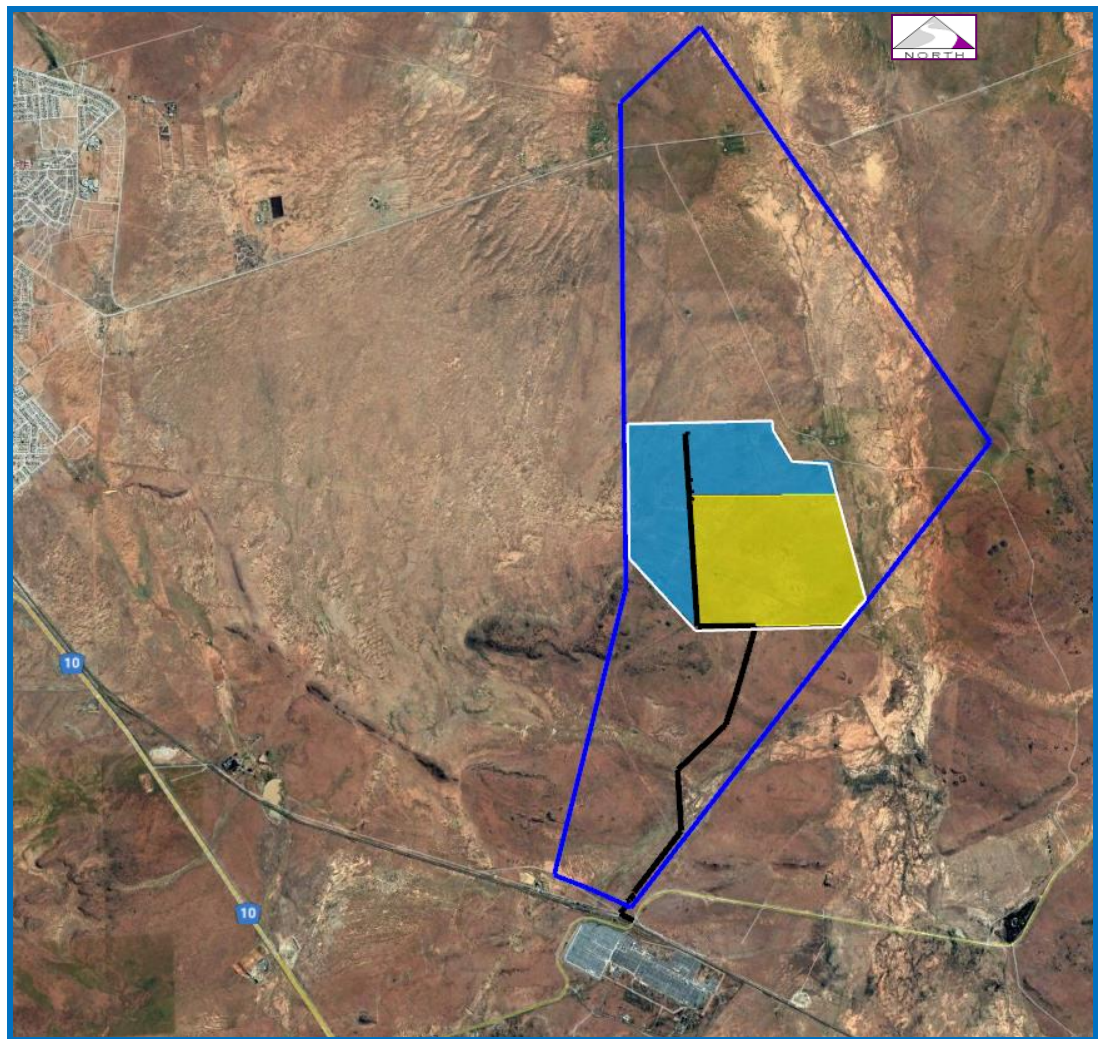
8.1 ACCESS ROUTES

From De Aar via the interchange on the N10 to Road P3061 and along the surfaced section of P3061 up to the railway line then on gravel section of P3061.

Access to the site will be taken off Road P3061. Access to this road should be in accordance with and subject to approval by the Roads Department.

Internal roads to be designed to serve the two plants from this point up to the existing gravel road from De Aar. Access is required for the plant from the north and the south. Access to the gravel road running north of the plant should also be in accordance with and subject to approval by the Roads Department.

No changes to the proposals made in the original study are required. A route is however now proposed through the site as depicted in Figure 2 and the Google Earth image below.



Proposed internal access road (indicated in black)

8.2 INTERNAL ROADS

Dust is a major issue during construction, and dust suppression will be required continuously on the internal construction roads. Regular maintenance on these roads should be done as and when required. Figure 2 depicts the proposed internal road.

8.3 EXTERNAL ROADS

7.3.1 From De Aar to the N10 and Road P3061:

We expect the bulk of the trucks to come from the N1, turning right into the N10 and then right onto Road P3061. The traffic from De Aar's side will be left-turning movements. This intersection should be upgraded in accordance with SANRAL's design standards to eliminate conflicting movements with through traffic on the N10. The layout as depicted in the Typical T-junction & Intersection layout of SANRAL is recommended as follows:

- 60m right-turn lane on the N10, from the N1's side; and
- 60m left-turn lane from De Aar's side.

7.3.2 Access to the site from Road P3061:

This can remain a gravel road. The intersection on Road P3061 should be upgraded geometrically to accommodate large delivery vehicles. Dust suppression on a daily basis (on the gravel section) and maintenance as and when required is also applicable to this section, the same as on the internal construction roads.

7.3.3 Gravel road from De Aar:

This road must be managed from an access point of view, and travel on this road should be limited to employees using it to and from work during the morning and afternoon. No construction/heavy vehicles should be allowed to use this route.

Dust suppression should be done during the periods around working hours. Maintenance of this section of road should be done as and when required, the same as that required on the internal and other external gravel road sections for the duration that it is in use.

8.4 CONSTRUCTION WORKING HOURS

For the purposes of this report:

07:00-17:00 on normal weekdays.

07:00-15:00 on Saturdays if required.

With these working hours, the expected traffic demand to and from the construction site will not have a significant impact on the peak period traffic flow in De Aar.

8.5 RAILWAY CROSSING

This is an existing crossing on Road P3061. All the necessary road signs were in place on the day the visit to the area was conducted. These signs tend to disappear, and this crossing should be maintained during the construction phase to ensure that all the warning signs are in place at all times.

The following plan is recommended during the operational phase of Portion D and Portion E (after construction):

➤ The access route from the N10 via Road P3061 is used

➤ Intersection: N10 and Road P3061:

The intersection should be upgraded to a Typical T-junction & Intersection layout of SANRAL (see SANRAL Drawing No. TD-R-JI-001-V1 presented in the Annexure) with the following additional lanes:

- 60m right-turn lane on the N10, from the N1's side; and
- 60m left-turn lane from De Aar's side.

➤ The maintenance work and dust suppression should tie in with that of the internal roads of Portion D and Portion E.

9. RECOMMENDATION

The environment in terms of my specialist field has not changed significantly since 2012; therefore, there is no objection to the extension of the validity of the Environmental Authorisation.

10. REFERENCES

- (1) Corli Havenga Transportation Engineers, Traffic Management Plan De Aar Solar Facility 3 February 2013.
- (2) COTO, TMH 17, South African Trip Data Manual, Committee Draft 2.0, May 2018.
- (3) COTO, TMH 16, Volume 1, South African Traffic Impact and Site Traffic Assessment Manual, Committee Draft 2.0, May 2018.
- (4) COTO, TMH 17, South African Trip Data Manual, Committee Draft 2.0, May 2018.

ANNEXURE

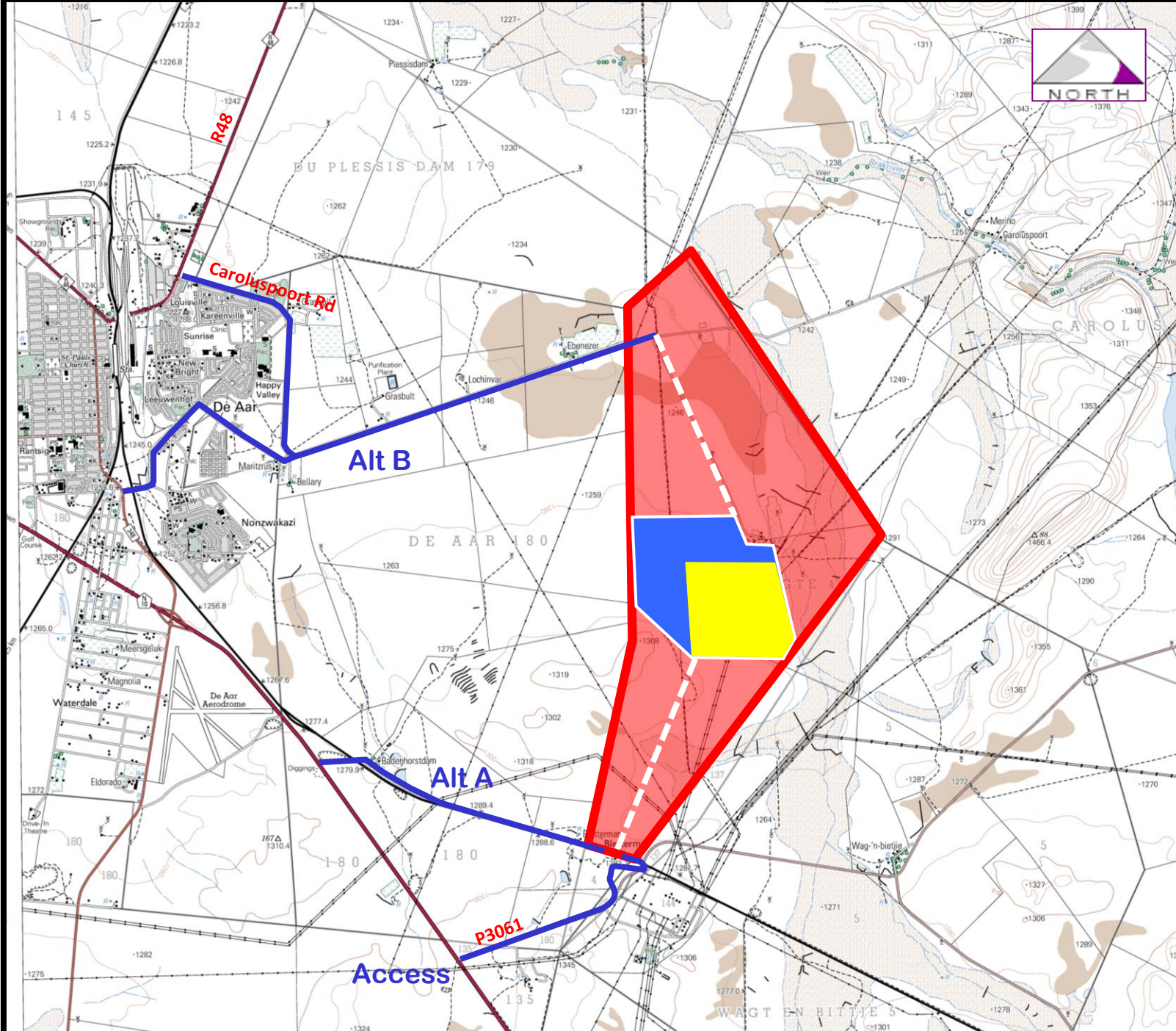


TRAFFIC MANAGEMENT PLAN PROPOSED UKUQALA SOLAR PV PROJECT (PORTION D AND PORTION E)

FIGURE 1: SITE LOCATION PLAN

SCALE : N/A

PP20852



Routes —

**TRAFFIC
MANAGEMENT
PLAN:
UKUQALA SOLAR
PV PROJECT
DE AAR**

**FIGURE 2:
Access routes
to Portions D & E**

