SMEC South Africa

Member of the Surbana Jurong Group

Proposed Grid Connection and associated infrastructure for the San Kraal Split 1, Phezukomoya Split 1, Hartebeesthoek East and Hartebeesthoek West

Basic Assessment

29 July 2019 JT0048

DOCUMENT CONTROL

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ABBREVIATIONS

BA	Basic Assessment
EMPr	Environmental Management Programme
HCM	Highway Capacity Manual
HBH	Hartebeesthoek
LOS	Level of Service
OHL	Overhead Line
PH	Phezukomoya
SK	San Kraal
SK-PH	San Kraal-Phezukomoya
TIA	Traffic Impact Assessment
TRH	Technical Recommendation for Highways
vpd	vehicles per day
WEF	Wind Energy Facility
WT	Wind Turbine

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NEMA 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*;	*Appendix B*
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	*Appendix B*
(c) an indication of the scope of, and the purpose for which, the report was prepared;	**1.2**
(cA) an indication of the quality and age of base data used for the specialist report;	**1.4**
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	**3.1**
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	**1.4**
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	**1.4**
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	**2.2**
(g) an identification of any areas to be avoided, including buffers;	**3.1.1 (b)**
(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;	**2.1**
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	**2.3**
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	**3.1**
(k) any mitigation measures for inclusion in the EMPr;	**3.2**
(l) any conditions for inclusion in the environmental authorisation;	**3.**
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	**-**
(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 Authorisation, and where applicable, the closure plan;	**4.**
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	-
(p) any other information requested by the competent authority	-
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.	

1. INTRODUCTION

SMEC South Africa (Pty) Ltd has been appointed by ARCUS Consultancy Services (Pty) Ltd to conduct a traffic specialist Basic Assessment (BA) report as part of the environmental authorisation process. EDF Renewables (Pty) Ltd wishes to apply for the development of a proposed grid connection and accompanying substation infrastructure.

The proposed development site is located in the Northern Cape and Eastern Cape, 8 km from the town of Noupoort, as shown in Figure 1-1. The site is accessible via the N9 and N10 national roads.

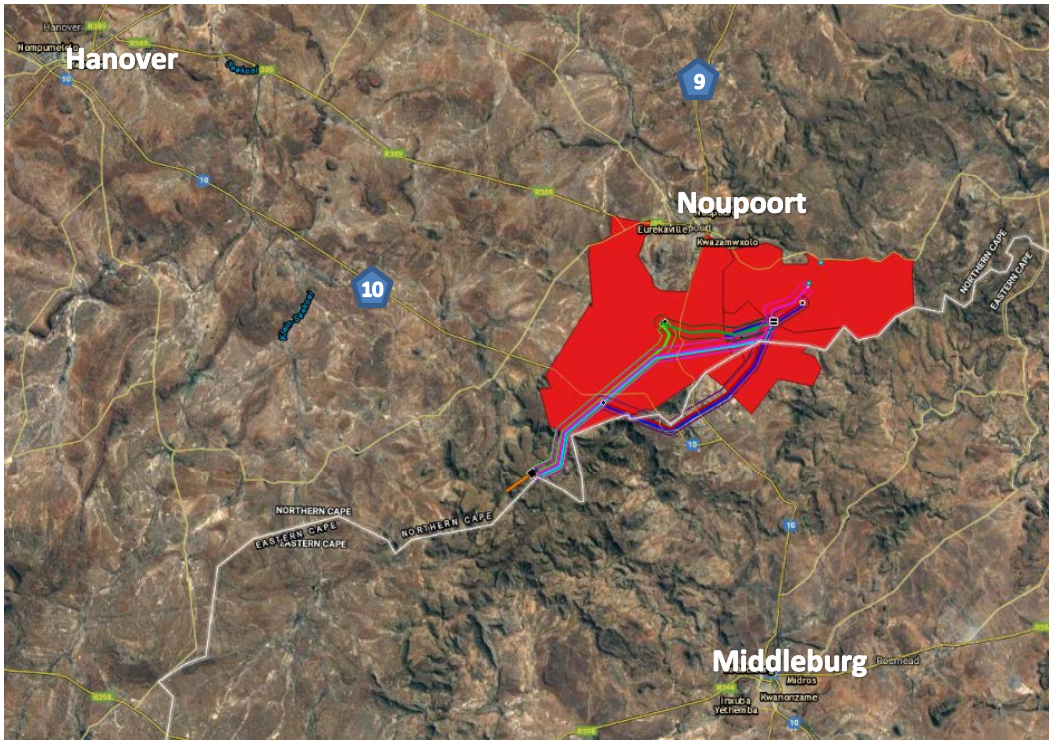


Figure 1-1: Site Locality

The proposed grid connection will serve four proposed new Wind Energy Facilities (WEF), namely:

- Phezukomoya WEF (Split 1);
- Hartebeesthoek West WEF (Split 2);
- San Kraal WEF (Split 1); and
- Hartebeesthoek East WEF (Split 2).

The San Kraal (Split 1) WEF and Phezukomoya (Split 1) will each have a capacity of up to 217 MW (35WT), Hartebeesthoek East WEF will have a capacity of 124MW (20WT), and Hartebeesthoek West WEF will have a capacity of 74.4MW (12WT).

It is envisaged that upon approval, the resulting WEFs will connect to the new SK-PH collector substation by way of approved corridors or the new grid corridor, from which electricity will be transferred via a 132kV overhead line to the Eskom Hydra D Substation located 5 km away.

As part of the basic assessment process, this traffic impact study considers the traffic characteristics of the surrounding road network and provides an assessment of the potential traffic impacts associated with the development of the proposed grid connection. Impacts are considered for the pre-construction, construction, operation, and decommissioning phases of the development. Recommendations are also made for mitigation measures associated with each identified impact, which should be included in the Environmental Management Programme (EMPr).

1.2 Scope of Study

- A description of the environment that may be affected by a specific activity and the manner in which the environment may be affected by the proposed project;
- A description and evaluation of environmental issues and potential impacts (including assessment of direct, indirect and cumulative impacts) that have been identified;
- A statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts;
- An indication of the methodology used in determining the significance of potential environmental impacts;
- An assessment of the significance of direct, indirect and cumulative impacts of the development;
- A description and comparative assessment of all alternatives including cumulative impacts;
- Recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Programme (EMPr);
- An indication of the extent to which the adoption of mitigation measures could address the issue;
- A description of any assumptions, uncertainties and gaps in knowledge; and
- An environmental impact statement which contains:
    - A summary of the key findings of the environmental impact assessment;
    - An assessment of the positive and negative implications of the proposed activity; and

- A comparative assessment of the positive and negative implications of identified alternatives.

1.3 Assessment Methodology

A capacity and safety assessment was undertaken to determine the anticipated operational performance of the surrounding road network and site access points to determine the extent of the traffic impact from which impact rating and possible mitigations were proposed.

The capacity analysis evaluated the existing and expected future traffic volumes, grown to an acceptable horizon year, to ensure the future flows can be accommodated on the road network.

The operational performance of an intersection is defined by the level of service (LOS), which ranges from A-F. The TMH 16: South African defines the acceptable level of service for rural Class 1 roads to be LOS B.

HCM: Highway Capacity Manual relate LOS to average delay at an intersection for individual turning movements, for each approach and the overall intersection. In addition, the TRH17: Geometric Design of Rural Roads also provides LOS in relation to the maximum road capacity in terms of average daily traffic (ADT) for two-lane two-way roads on flat terrain as presented in Table 1-1.

Table 1-1: Level of Service for Estimated Maximum Average Daily Traffic for a Flat Terrain (TRH17)

Level of Service (LOS)	Delay (s/veh) for stop and yield signs	Maximum ADT (veh/day)
A	d ≤ 10	2200
B	10 <d ≤ 15	4900
C	15 < d ≤ 25	8800
D	25 < d ≤ 35	14500
E	35 < d ≤ 50	24600
F	50 < d	> 24600

In the safety assessment of the site access points, the site visibility line, traffic safety through access management requirements, speed limits and road surface conditions were evaluated in order to determine their suitability to provide access to the grid connection

site. This study includes a site visit conducted in January 2018, where the traffic characteristics of the surrounding road network were observed. Traffic counts up to two years old are considered acceptable, and no significant changes to the area were observed within this period. The site visit was undertaken as part of the traffic impact assessment of the authorised San Kraal and Phezukomoya TIA conducted in 2018 and is deemed as acceptable for use.

2. PROJECT DETAILS

2.1 Infrastructure Included in the Assessment

As part of the assessment for the grid connection for the four WEFs, the following infrastructure was considered as shown in Figure 2-1, Figure 2-2, Figure 2-3; Figure 2-4 and Figure 2-5 respectively:

SAN KRAAL WEF INFRASTRUCTURE

1. San Kraal Split 1 132kV step-up substation.
2. The proposed establishment of a 132kV overhead power line (OHL) (located within the approved site) which will transfer electricity from the San Kraal Split 1 132kV step-up substation to the approved San Kraal substation.
3. The proposed establishment of a 132kV overhead power line (OHL) (located within the approved site) which will transfer electricity from the San Kraal substation to the approved Phezukomoya substation.
4. The proposed establishment of a 132kV overhead power line (OHL) (HBH Corridor).

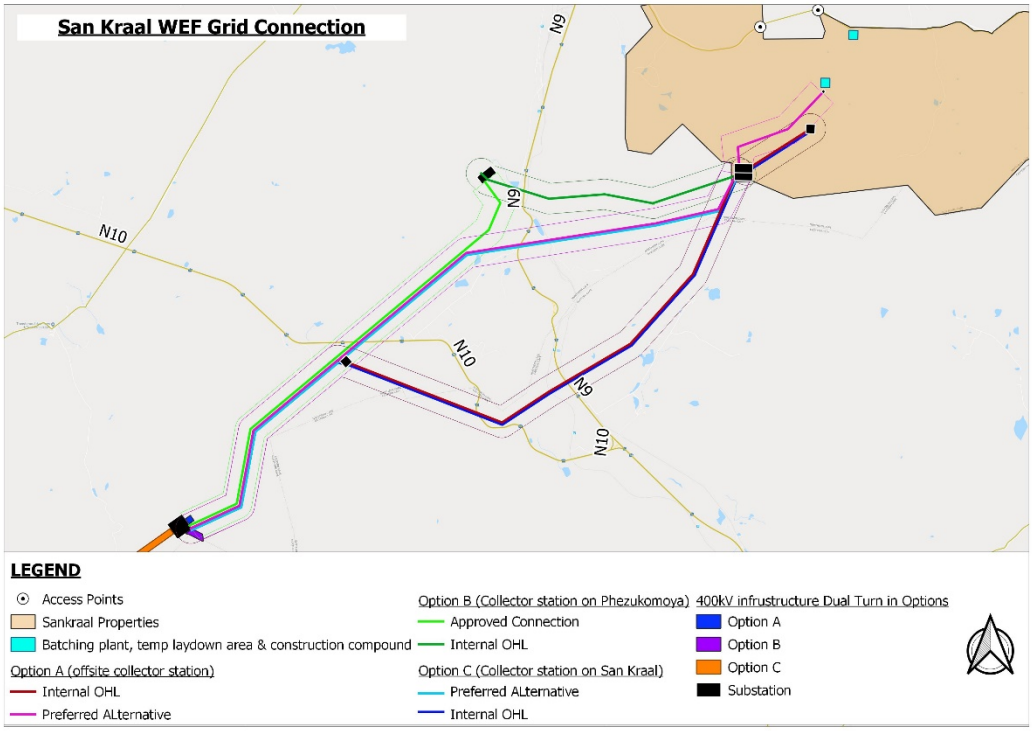


Figure 2-1: San Kraal Infrastructure

HARTEBEESTHOEK EAST WEF INFRASTRUCTURE

5. Hartebeesthoek (HBH) East on-site substation.
6. The proposed establishment of a 132kV overhead power line (OHL) (located within the approved site) which will transfer electricity from the proposed HBH East on-site substation to the San Kraal substation.
7. The proposed establishment of a 132kV overhead power line (OHL) (located within the approved site) which will transfer electricity from the proposed HBH East on-site substation to the approved Phezukomoya substation.
8. The proposed establishment of a 132kV overhead power line (OHL) (HBH Corridor).

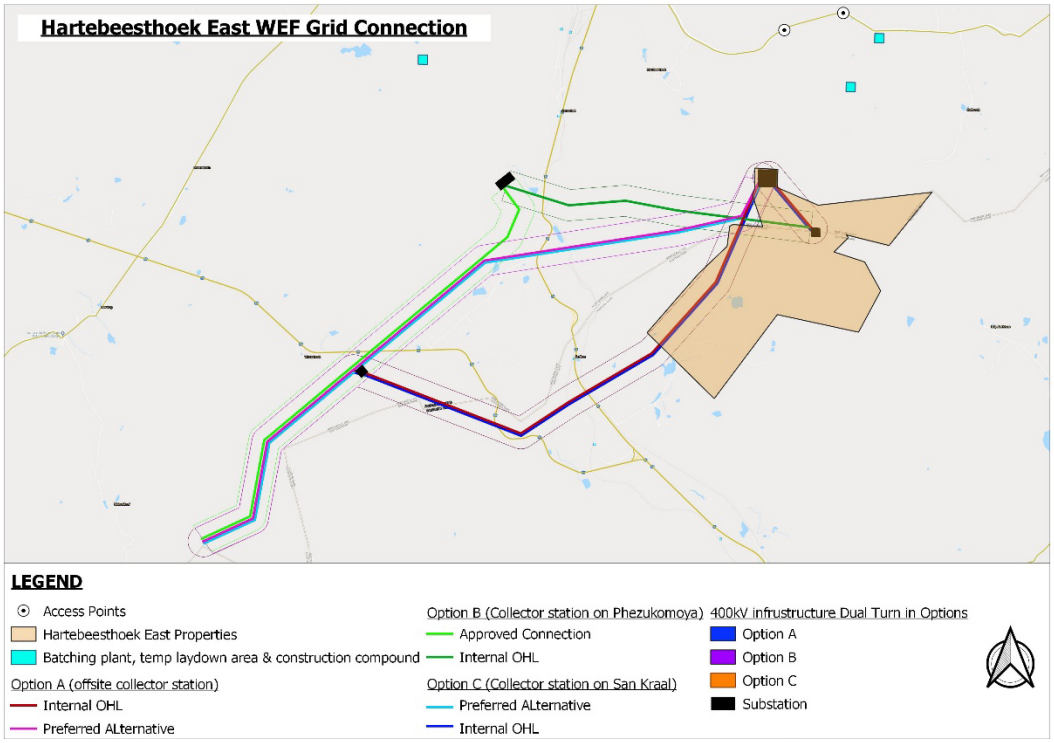


Figure 2-2: Hartebeesthoek East Infrastructure

PHEZUKOMOYA WEF INFRASTRUCTURE

9. Phezukomoya Split 1 batching plant.
10. Phezukomoya Split 1 substation.
11. The proposed establishment of a 132kV overhead power line (OHL) (located within the approved site) which will transfer electricity from the proposed Phezukomoya split 1 substation to the approved Phezukomoya substation.
12. The proposed establishment of a 132kV overhead power line (OHL) (located within the approved site) which will transfer electricity from the approved Phezukomoya substation to the San Kraal substation.
13. The proposed establishment of an overhead power line (OHL) (HBH Corridor).

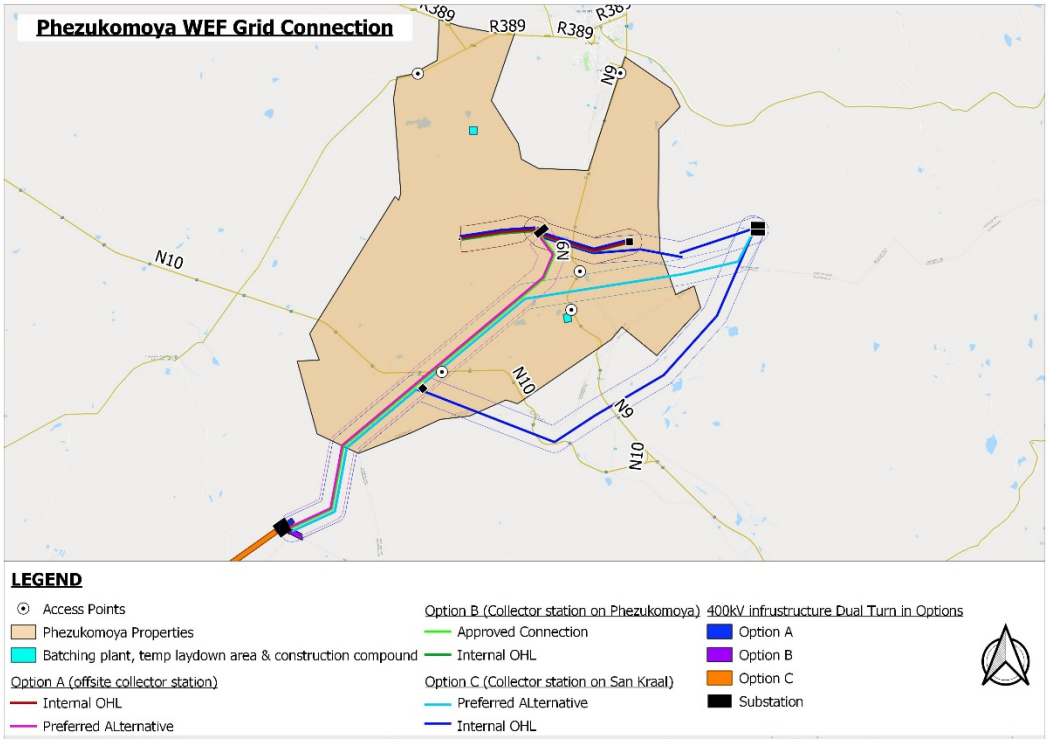


Figure 2-3: Phezukomoya Infrastructure

HARTEBEESTHOEK WEST WEF INFRASTRUCTURE

14. Hartebeesthoek (HBH) West switching station.
15. The proposed establishment of a 132 kV overhead power line (OHL) (located within the approved site) which will transfer electricity from the proposed HBH West switching sub-station to the San Kraal sub-station.
16. The proposed establishment of a 132 kV overhead power line (OHL) (located within the approved site) which will transfer electricity from the San Kraal sub-station to the approved Phezukomoya sub-station.
17. The proposed establishment of a 132 kV overhead power line (OHL) (HBH Corridor).

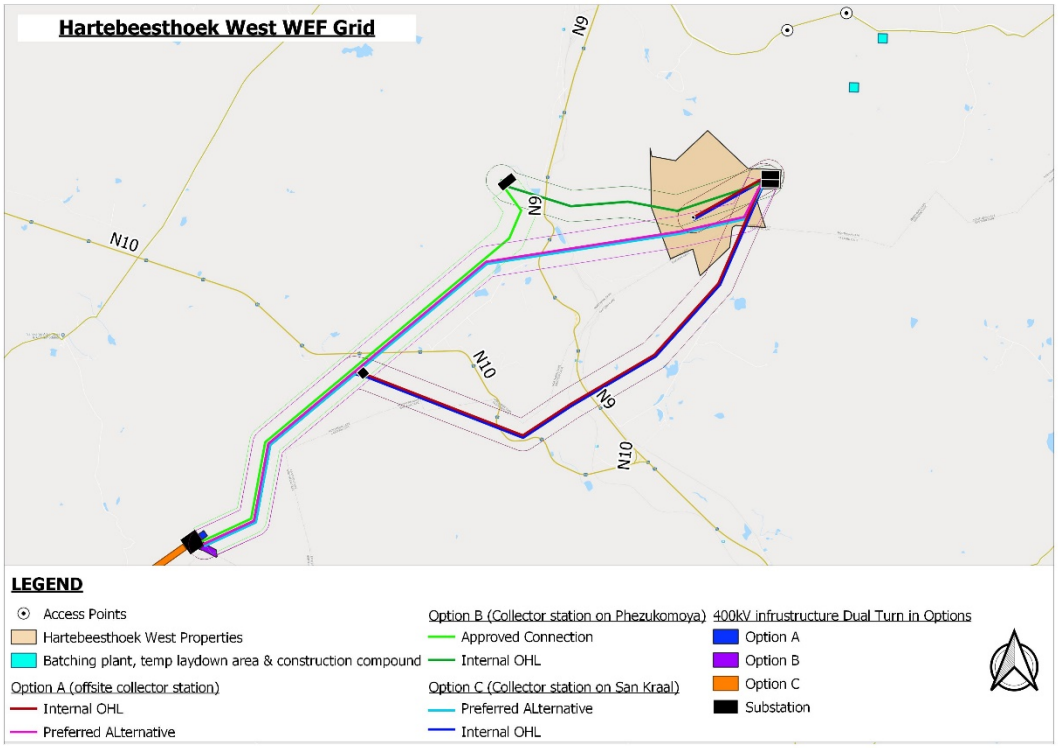


Figure 2-4: Hartebeesthoek West Infrastructure

ADDITIONAL INFRASTRUCTURE TO BE CONSIDERED

18. Access points A, B and C in red as shown in Figure 2-5.
19. A new proposed SK-PH collector sub-station.
20. A proposed expansion to the approved San Kraal sub-station.
21. 400 kV turn in options.

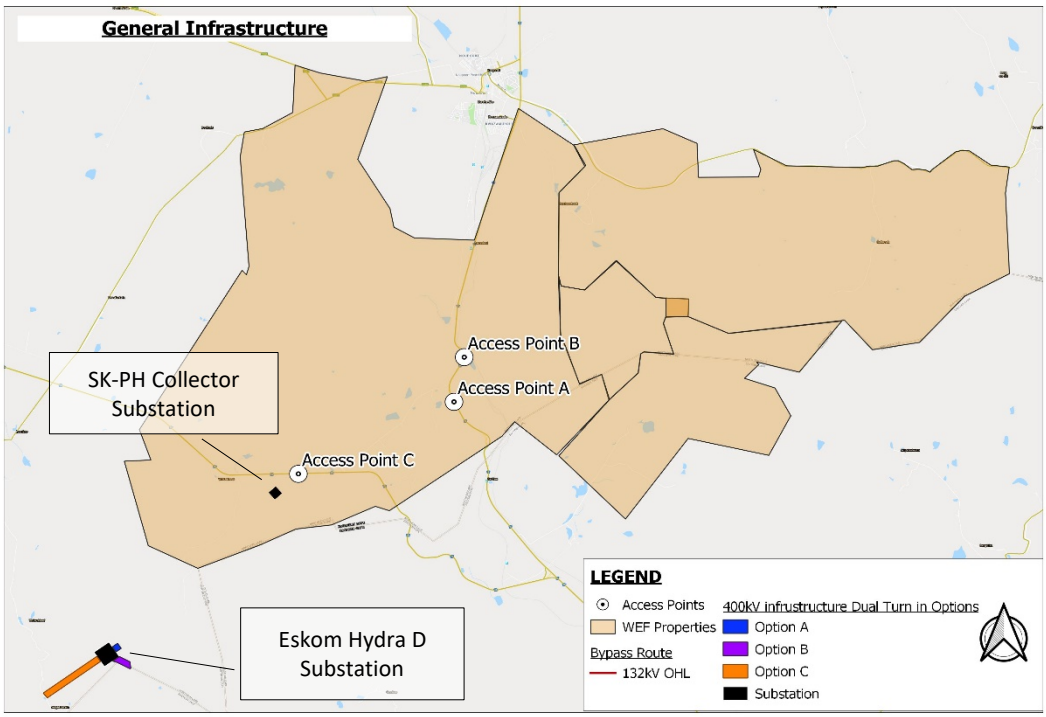


Figure 2-5: Additional Infrastructure to be considered

2.2 Assumptions and Limitations

The assessment study consisted of project information review, information collected during the site visit to the study area and a desktop study. The study also takes into consideration 2018 intersection count data and historical traffic volumes in order to better analyse traffic flows and traffic characteristics in the area.

The following aspects with regard to the project development were assumed while compiling this report:

- It is assumed that project lifecycle phases of the development of the grid connection will be in line and run parallel to the project lifecycle phases of the proposed four WEF's connected to the proposed grid, where construction activities will commence 2022 and decommissioning 2042;
- Based on the staffing requirements provided by the client for the construction of the WEFs, substations and overhead lines, it was assumed that approximately 300 will be on site. To determine trips generated for only the construction of the grid connection, a 50/50 split between the WEFs and grid connection construction was assumed;
- In the absence of historical data, the COTO, TMH17 Volume 1 Manual provides typical growth rates for traffic. A 3% per annum growth rate was assumed as Noupoort area was considered to be a low growth area. Taking into account the additional WEF being developed in the area;

- Limited trips will be generated by the proposed development in the pre-construction, operational and closing phases of the proposed development;
- The construction stage of the grid will generate the most trips out of all the phases and is estimated to be less than a year in duration;
- It was assumed that a 100% of the peak hour trips will be going in the site in the AM and out in the PM peak hours over a construction and component delivery period of 180 days, where a work month is equivalent to 20 days
- The decommissioning stage impacts are likely to have similar impacts if not less as the construction stages;
- Most of the components and other construction materials associated with the construction of the grid will be transported from Middleburg or Port Elizabeth via the N9 and N10 national roads connecting with the site access point options.

The following limitations were identified as part of the study:

- For link data only historical SANRAL link data, attached in Appendix B, was available which is older than 2 years. To ascertain traffic characteristics of the area, figures were grown to base year 2019 using a 3% growth rate.

3. IMPACT ASSESSMENT

3.1 Identification of Potential Traffic Impacts and Issues Identified

The construction of the proposed grid connection has the potential to result in an increase in traffic volumes, distributed to the surrounding road network. The trips will be generated during construction, operation and decommissioning phase activities of the grid connection.

The pre-construction, operation and closure phases are considered to generate relatively negligible traffic impact as compared to the construction and decommissioning phase.

The construction phase of the project (during construction and installation related activities on the site such as component, equipment and material deliveries) will generate the most trips (including abnormal vehicles) and hence is used to assess the traffic impacts of the development.

The decommissioning phase (when site withdrawal and site rehabilitation will take place) will likely to generate similar trips, if not less, than the construction phase and is therefore considered to have a similar traffic impact as construction phase traffic.

The following section details the traffic and transportation related impacts on the environment and possible mitigation measures that can be implemented to reduce risks associated with the impacts.

3.1.1 Impact 1: Traffic and Access

(a) Capacity Analysis

The development of the sub-station, overhead line and associated infrastructure will result in increased traffic volumes, especially during the construction phase.

A capacity analysis check, for the estimated additional trips generated by the construction of the grid connection was done to determine the traffic impact to the surrounding road network. The N9 and N10 roads are classified as Rural Class 1 principal arterials according to the TRH 26 South African Road Classification and Access Management Manual. Based on figures obtained from similar projects, the estimated number of trip generated by the construction of the grid is presented in Table 3-1.

During the construction phase, an estimated 84 Average Daily Trips (ADT) can be expected to deliver transformers; switching gear, sub-station and construction equipment and including transportation of staff. It is anticipated that 70% of the trips will be distributed on to the N9 and 30% will travel onto the N10.

Table 3-1: Trips generated

Activity	Components	Trips/Sub-station	Total 1 way Trips	Daily	Peak Hours Trips	PCU
Substation	Transformers	2	18	0	0	0
	Switching Gear and other Substation Equipment	120	1080	6	6	21
Site Work Activities	Construction Vehicles, Deliveries & Tankers	2	18	0	0	0
	Crane Transport	1	9	0	0	0
	Labour Transport (Passenger Vehicles)	30	5400	60	60	60
	Labour Transport (Bus)	9	1620	18	18	18
Total		**164**	**8145**	**84**	84	**100**

Existing background traffic flows vary during different times of the year (seasonal variation) therefore, Average Daily Trips (ADT) were used to assess the impact of increased traffic flows on the road network. The ADT for the N9 and N10 was determined for baseline scenario and projected for the 2022 and 2042 future daily traffic. The ADT was determined using count data and historical SANRAL data and is presented in Table 3-2.

The estimated average daily traffic on the N9 and N10 roads for baseline 2019 and future 2022 and 2042 traffic volume scenarios are presented in and Table 3-2.

Table 3-2: Average Daily Traffic Volumes

Count Station	Road	Average Daily Traffic (2019) Baseline	Future Average Daily Traffic (2022) Construction Phase	Future Average Daily Traffic (2042) Decommissioning Phase
2733 (Between Noupoort and Middleburg)	N9	1735	1895	3632
1477 (Between Middleburg and Hanover)	N10	521	569	1091

The TRH17: Geometric Design of Rural Roads manual defines service traffic volumes for LOS B as 4900 vehicles per day (vpd) for two-lane rural highways on flat terrain in both directions.

The impact of the trips generated during the construction and decommissioning phase is anticipated to increase the ADT between 2% and 4%. This is likely to have a low magnitude of impact on the exiting road network capacity, in addition to the fact that this limited impact will be for a short period of time. The additional trips also result in the overall LOS not changing from the existing LOS B and retaining less than 4900 vpd threshold for a rural Class 1 on the road network.

In terms of delay, traffic impact assessments were carried out for the 4 WEF's as part of the authorisation process. A capacity analysis was undertaken to assess the LOS of the surrounding road network using SIDRA intersection software. The analysed scenarios include: a base year 2019, and two horizon years, namely construction (2022) and decommissioning (2042).

The analysis took into account the trips generated by substation construction activities which include transportation of transformers, switching gear and other substation equipment. It was determined in the capacity analysis that all approaches of the analysed intersection operate at an acceptable LOS during AM and PM peak hours. The Results of the capacity analysis can be found in Appendix C.

(b) Site Access Points

Three site access options have been proposed to serve the east and west portions of the development site located on the N9 and N10 roadways. Their locations are shown in Figure 3-1.

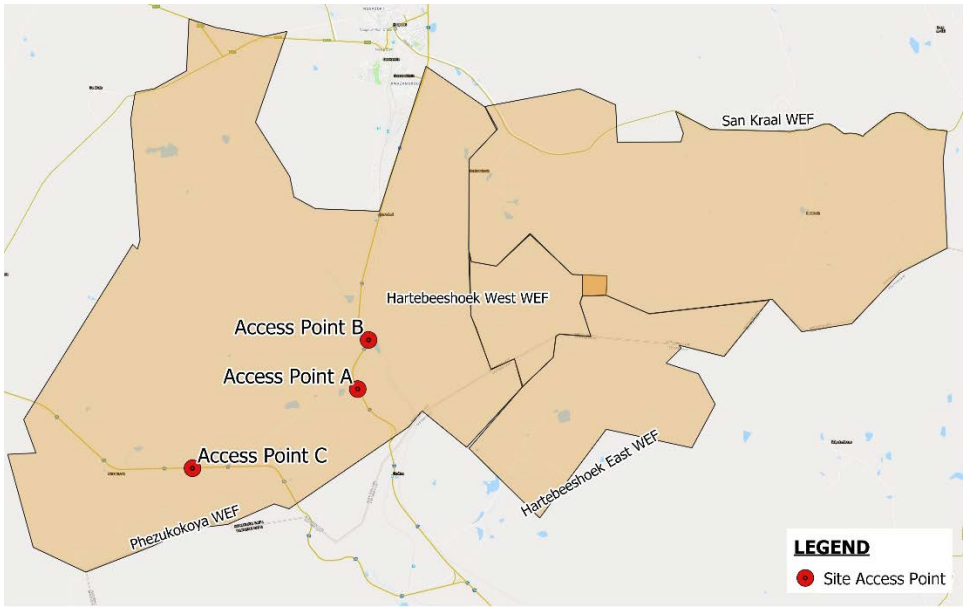


Figure 3-1: Site Access Point Options

Providing access from these roads will potentially impact the mobility of the road and cause speed differentials between high-speed traffic travelling along the national roads and vehicles turning into the development site. This has safety implications. A summary of the assessment of the site access options is presented in Table 3-3.

Access point A and C are suitable from visibility, accessibility and safety point of view.

Access point B raises safety concerns as it is located on a horizontal curve; which increases the propensity for collisions due to sight visibility considerations.

In order to facilitate uninterrupted through movement and safety and give priority to the through movement of vehicles travelling on the N9 and N10, it is recommended that the road must be widened to allow for provision of right-turning bays of adequate length, left turn deceleration tapers and 500 m acceleration auxiliary lanes to allow trucks turning left onto the N9/N10 to accelerate before entering the traffic stream and must be designed taking into consideration the turning circles of the expected vehicles accessing the site.

Traffic management control must be implemented to ensure the safe movement of vehicles. This includes clear warning and construction vehicles signage at access points. Should detours and temporary road closures occur, traffic must be accommodated properly as per the South African Road Traffic Signs Manual requirements, i.e. signage and flagmen.

Table 3-3: Site Access Assessment Summary

Access Point	Road	Site Distance	Intersection/Access Spacing Requirement	Existing Access/intersection?	Comments
A	Accessible from the N9	No sight distance issues – sight distance extends for at least 500m.	7 km from the closest existing intersection. Minimum requirement is 8 km.	Yes (Farm access)	• Surfaced road in good condition; • Dangerous vehicle speeds; • Warning signs will be required.
B	N9	The access is on a curve. Might create visibility issues. Vehicles approaching travel at high speeds on super-elevation.	8 km from the closest existing intersection. Meets minimum 8 km Requirement.	No	• Surfaced road in Good Condition; • Access at a curve compromises on safety and sight distance; • Dangerous vehicle speeds; • Road has been elevated on one side and guardrails installed. / No Access to B. Height difference from top of embankment to bottom +- 3m; • Warning signs will be required.
C	Accessible from the N10	No sight distance issues – sight distance extends for at least 500m.	10 km from the closest existing intersection. Meets minimum 8 km Requirement.	No	• Surfaced road in good condition.

3.1.2 Impact 2: Noise and Air Pollution

Intrusive noise and vibration from heavy vehicles breaking squeals, exhaust backfires, hooters and sirens can cause a nuisance to surrounding residential areas.

During the construction phase, the movement of vehicles on unpaved roads/gravel will also likely create dust on unsurfaced roads. Also, the presence of construction vehicles will result in an increase in greenhouse gas emissions into the atmosphere which might result in the change of local air quality.

3.2 Assessment of Impacts

For each predicted impact, criteria were applied to establish the significance of the impact based on likelihood and consequence, both without mitigation being applied and with the most effective mitigation measure(s) in place.

3.2.1 Impact 1: Traffic and Access

Impact Phase: Construction / Decommissioning							
Potential impact description: Increase traffic volumes and disruption on the route and access points to site.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Medium (M)	Regional to Local (L)	Short Term (L)	Negative (L)	Probable (H)	Low (L)	Sure (H)
With Mitigation	Low (L)	Regional to Local (L)	Short Term (L)	Neutral (L)	Probable (H)	Very Low (L)	Sure (H)
Can the impact be reversed?			Through proper coordination of arrivals and departures of construction related traffic to avoid high numbers of vehicles arriving at once. Provision of traffic management controls at access points to the site essential.				
Will impact cause irreplaceable loss or resources?			Road safety concerns may lead to higher risk and potential of fatal accidents.				
Can impact be avoided, managed or mitigated?			Implementation of a traffic management plan and road upgrades where necessary (intersection/access points/dedicated turning lanes) and may manage/mitigate safety concerns and minimise traffic disruptions.				
Mitigation measures to reduce residual risk or enhance opportunities: - Arrival and departure of abnormal and heavy vehicle traffic should be coordinated and distributed throughout the day. - The community must be informed before the start of site activities. - Additional traffic management control measures at site accesses must be implemented, which may include warning and construction vehicles signage and/or flagmen to assist during detours or temporary road closures. - Use of access point A and C is recommended subject to approval from SANRAL. Access points must be priority stop-controlled, with the national roads as priority. - Provision must be made for 500 m acceleration lanes, to allow trucks turning onto a road to accelerate before entering the traffic stream, and road widened to allow for dedicated right turn and left turn (auxiliary lanes) lanes off the main road and must consider the turning circles of the vehicles expected to need to access the site. - Routine maintenance works (repairs and reseals) on the roads to maintain road surface condition.							

Residual impact	- Yes, but acceptable

3.2.2 Impact 2: Noise and Air Pollution Rating

Impact Phase: Construction/Decommissioning							
Potential impact description: Air pollution from dust, greenhouse gas emissions from vehicles and increased noise levels from vehicle traffic.							
	Severity	**Extent**	**Duration**	**Status**	**Probability**	**Significance**	**Confidence**
Without Mitigation	Low (L)	Local (L)	Short Term (L)	Negative (L)	Probable (H)	Low (L)	Sure(H)
With Mitigation	Very low (L)	Local (L)	Short Term (L)	Negative (L)	Probable (H)	Low (L)	Sure(H)
Can the impact be reversed?			No				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Through noise and dust control techniques.				
Mitigation measures to reduce residual risk or enhance opportunities: - Unpaved road soils must be watered or covered with gravel to lessen dust generation. - Vehicles transporting materials that can be blown away and cause dust must be securely covered and adhere to speed limits. - The community must be informed before the start of site activities. - Emissions will have short-term impacts on the immediate surrounding areas.							
Residual impact	- Yes, but acceptable						

3.3 Cumulative Impacts

There are other renewable energy projects in the locality of the proposed grid connection at varying phases of their project lifecycle as shown in Figure 3-2. It is uncertain which project lifecycle phase these projects are in at this point in time. For projects in the process of evaluation for authorisation, it is unknown which of these projects will be authorised and of those, which would ultimately be built. It is anticipated that cumulative traffic impacts will only have a noticeable impact in the event that all projects are approved and all the construction phases coincides, which is unlikely to occur.

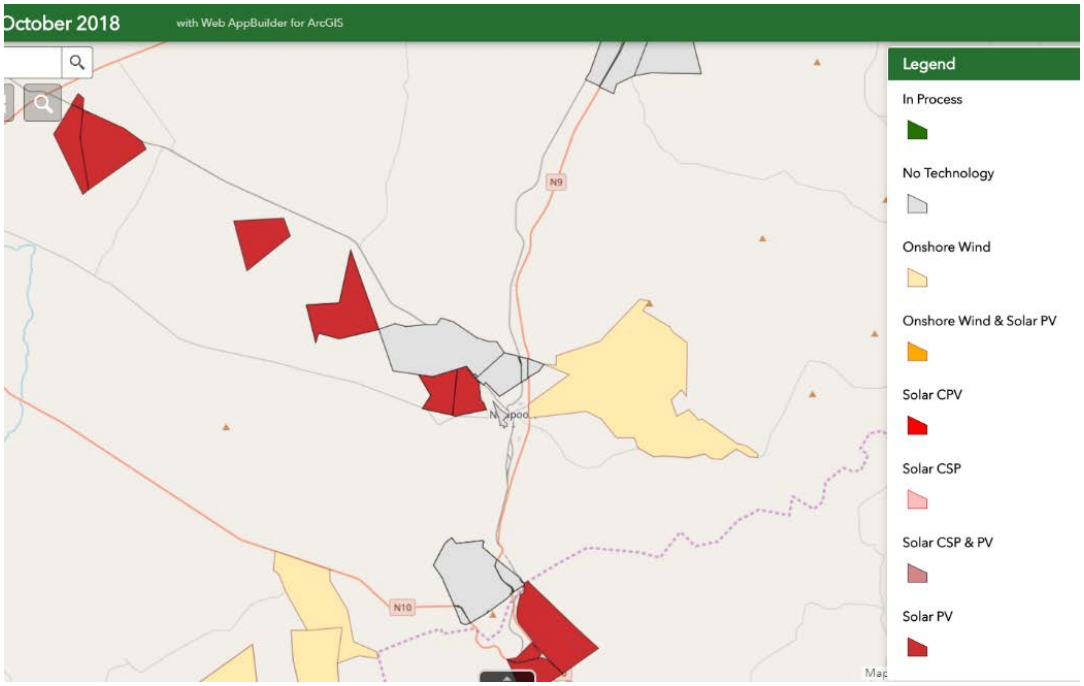


Figure 3-2: DEA-registered Renewable Energy Projects

In assuming that the grid construction and decommissioning phases will run parallel to that of the four WEF's, it is anticipated that the impact on the LOS on the N9 and N10 will maintain at acceptable levels.

3.4 Assessment of Alternatives

There are three grid connection options proposed, substations and overhead lines.

Each WEFs' substation will be connected via 3 options to the Eskom Hydra D Substation located 8 km west of the N10 west of the WEFs sites. There are 3 grid connection alternative options for each WEF to connect to the Eskom Hydra D Substation and are listed as follows:

(i) Option 1: Off-site Collector Station

Electricity is transferred from the proposed switching /on-site substation of the WEF to the San Kraal (SK) substation or Phezukomoya (PH) substation via a proposed OHL. From the substation the electricity is transferred by the approved 132kV OHL to the new SK-PH collector substation or via the proposed southerly 132kV OHL (HBH Corridor) to the SK-PH collector substation. From the SK-PH collector substation electricity, will be transferred to the Eskom Hydra D substation via a 132kV OHL.

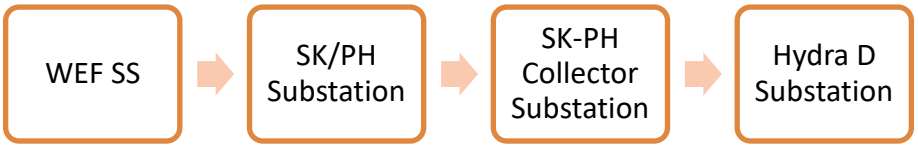


Figure 3-3: Option 1 Transmission

(ii) Option 2: Collector Station on Phezukomoya

Electricity is transferred from the proposed switching station/substation of the WEF to the SK or PH substation via a proposed OHL. From the substation the electricity is transferred to the approved Phezukomoya substation via a proposed OHL. From the approved Phezukomoya substation the electricity is transferred by the approved 132kV OHL to the Eskom Hydra D substation.

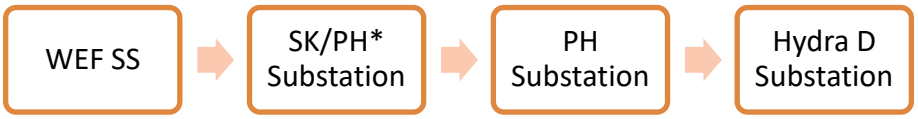


Figure 3-4: Option 2 Transmission

(iii) Option 3: Collector Station on San Kraal

Electricity is transferred from the proposed switching station/on-site substation of the WEF to the SK or PH substation via a proposed OHL. From the San Kraal substation, the electricity is transferred by the approved 132kV OHL to the Eskom Hydra D substation or via the proposed southerly 132kV OHL (HBH Corridor) to the Eskom Hydra D substation.

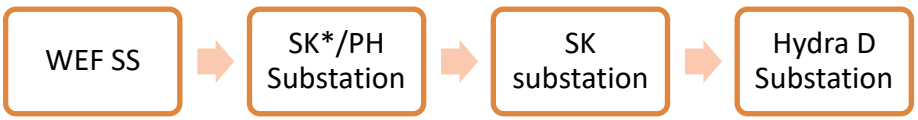


Figure 3-5: Option 3 Transmission

*[*In the case the marked substation is the second stage in the transmission, electricity will be transferred directly to the Eskom Hydra D Substation since the third stage refers to the exact same substation.]*

All the grid corridors / options transverse the N9 and N10 national roads. Option A has been identified as the preferred alternative. It is the shortest line compared to the other two corridors - however, it requires the construction of SK-PH collector substation while the other two options do not, as described above. The difference in traffic and transportation related impact does not differ significantly between the three options and therefore, all are considered acceptable, with mitigation from a traffic and transportation perspective.

It is important that pylon placement for the overhead line be configured to avoid obstruction with the road infrastructure, pavement, road signs or signal and existing overheads lines in order to maintain motorist visibility.

4. CONCLUSIONS & RECOMMENDATIONS

The proposed project will result in low traffic related impacts due to the transportation of components, equipment, materials and staff. The net effects of these impacts were deemed to be low after recommendations made for mitigation measures are considered and implemented.

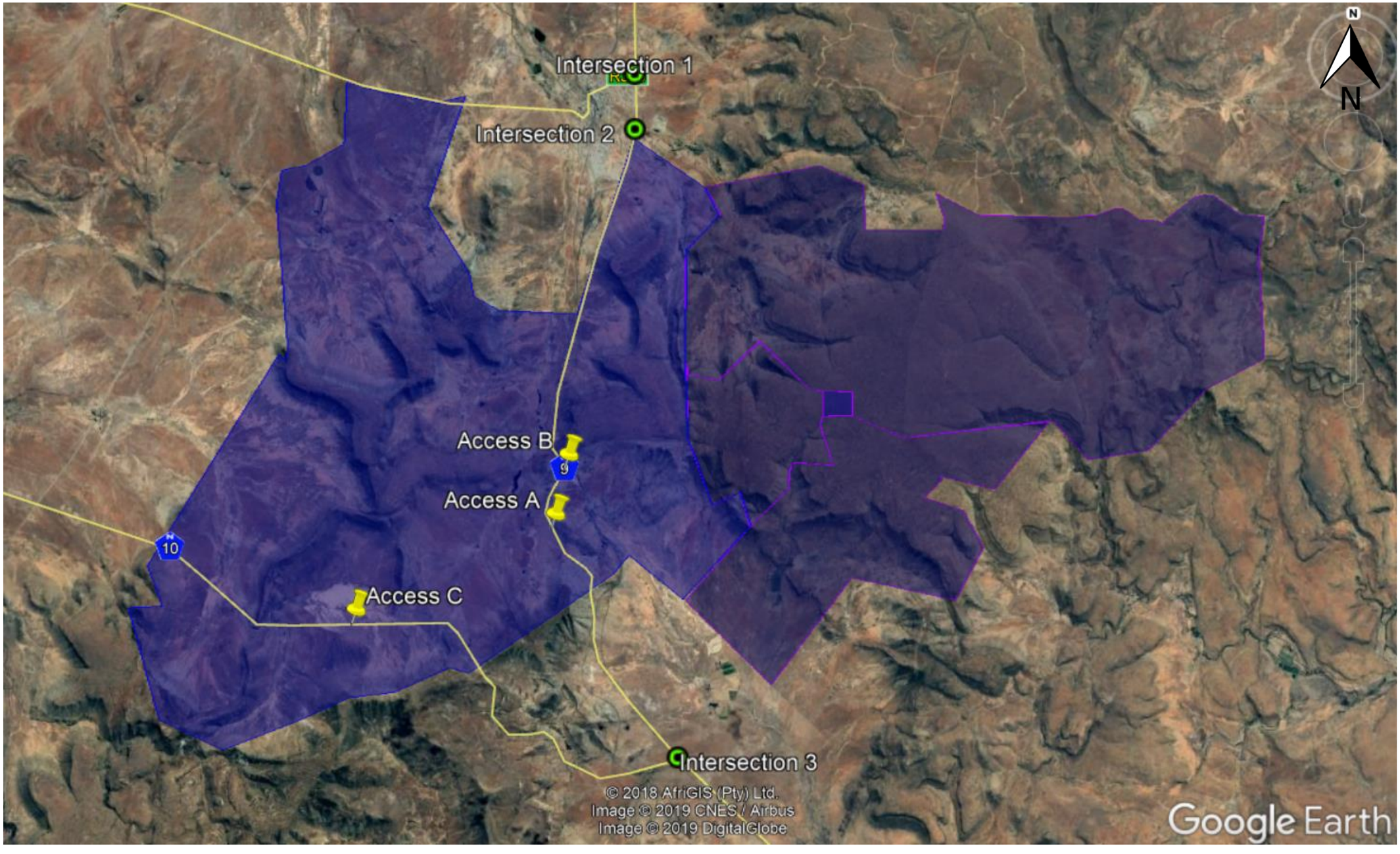
A 2% to 4% increase in traffic on the N9 and N10 national roads would not result in a significant negative impact. Traffic impact would be temporary during the construction and decommissioning phases of the development of the grid connection.

The following mitigation measures have been recommended:

- Site Access point A and C are suitable from visibility, accessibility and safety point of view;
- It is recommended that provision of right-turning bays of adequate length, left turn deceleration tapers and 500 m acceleration auxiliary lanes must be provided at the access points;
- Additional traffic management control measures at site accesses must be implemented. This may include warning and construction vehicles signage and/or flagmen to assist during construction and detours or temporary road closures;
- Use of access point A and B is recommended subject to approval from SANRAL. Access points must be priority stop-controlled, with the national roads as a priority;
- It is recommended that the road must be widened to allow for the provision of right-turning bays of adequate length, left turn deceleration tapers and 500 m acceleration auxiliary lanes taking into consideration the turning circles of the expected vehicles accessing the site;
- Traffic management control measures at access points and during detours or temporary road closures must be implemented, i.e. warning signs and flagmen;
- Arrival and departure of abnormal and heavy vehicle traffic should be coordinated and distributed throughout the day;
- Unpaved roads must be watered to lessen dust generation and routine maintenance on the road surface to maintain condition;
- Vehicles transporting materials that can be blown away and cause dust, must be securely covered and adhere to speed limits; and
- Community participation/stockholder involvement at every stage of the project is recommended to allow the community to be informed before the start of site activities.

LOCALITY MAP

Access Points from N9 and other roads



Intersection 1 on N9

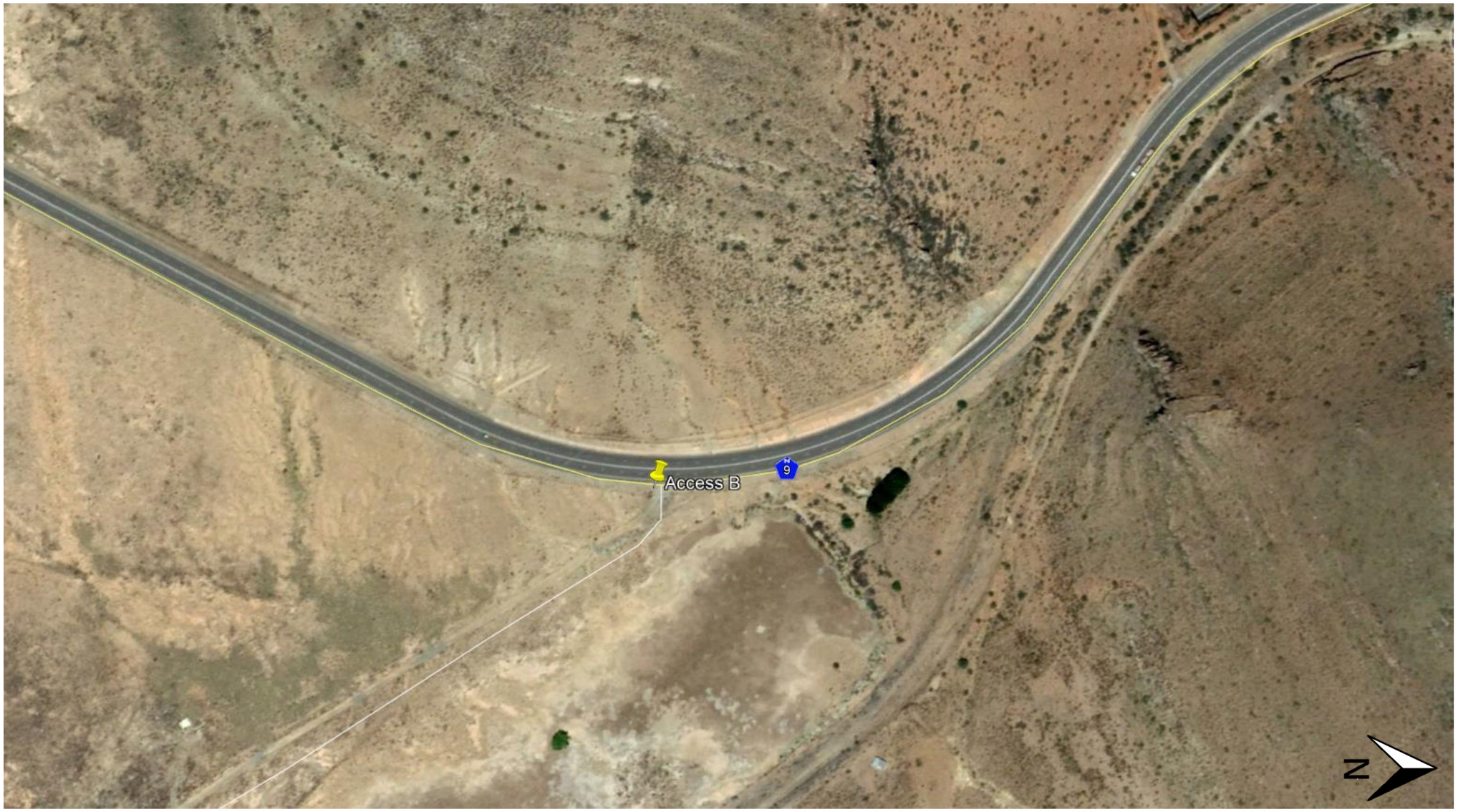
		
Left Approach	**Access Intersection**	**Right Approach**
No Sight distance issues – sight extends for at least 500m		No Sight distance issues – sight extends for at least 500m

Intersection 2 on N9

		
Left Approach	**Access Intersection**	**Right Approach**
No Sight distance issues – sight extends for at least 500m		No Sight distance issues – sight extends for at least 500m

ACCESS B

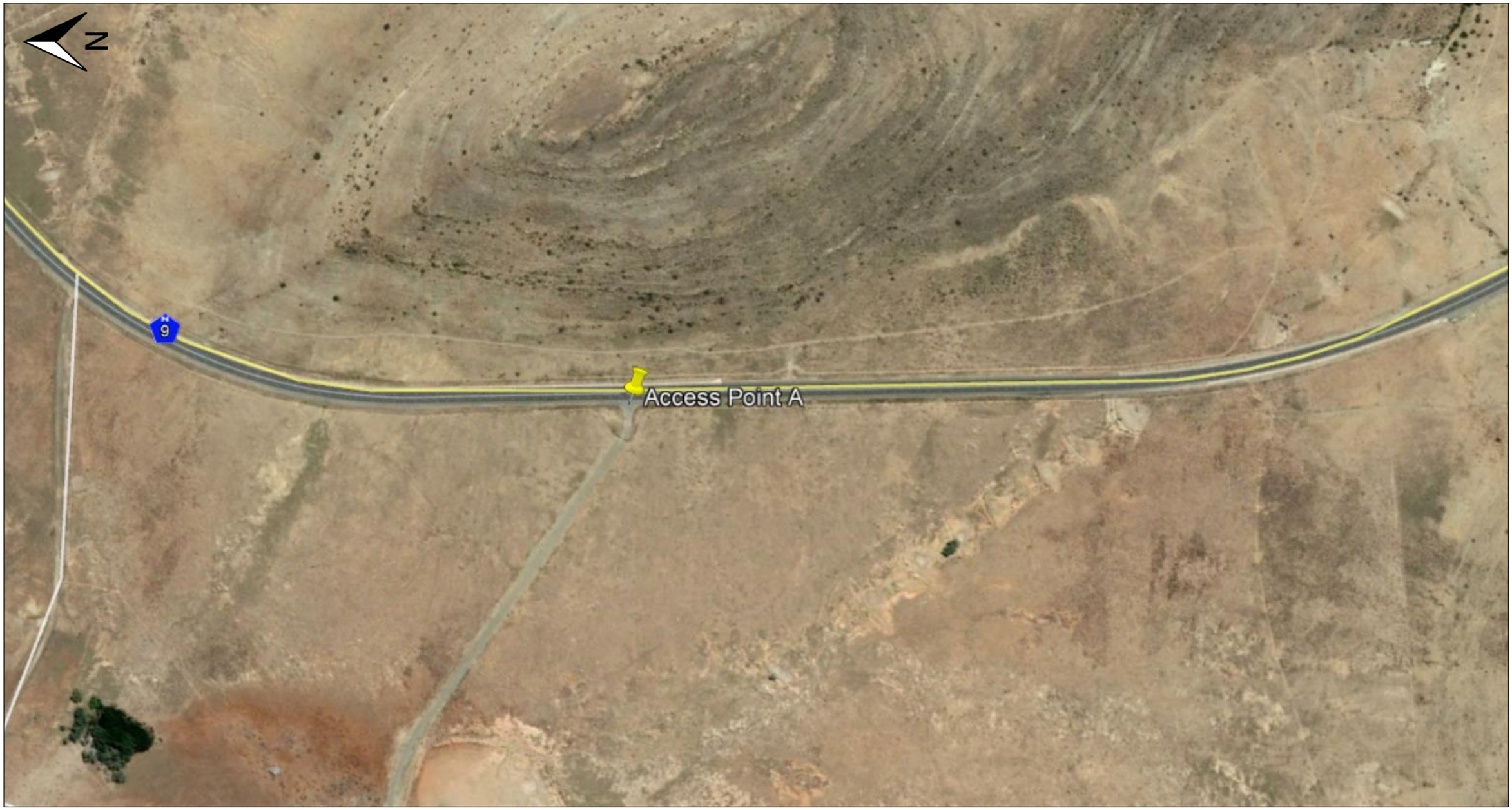
on N9



	
Left Approach	**Right Approach (vehicles approaching at high speed on super elevation)**
	
Road has been lifted / Guardrails / No Access to “road” shown on Google Earth **Height difference from top of embankment to bottom +- 3m**	**Right Approach**

ACCESS A

on N9



ACCESS A

Left Approach

Right Approach (vehicles approaching at high speed)

ACCESS C

on N10

ACCESS C

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Left Approach</td><td>Right Approach</td></tr>
<tr><td>No Sight distance issues – sight extends for at least 500m</td><td>No Sight distance issues – sight extends for at least 500m</td></tr>
<tr><td colspan="2"> 
</td></tr>
</table>

Charlotte Xhobiso

Graduate Engineer

Professional Overview

Charlotte is a Graduate Engineer in the Planning and Traffic Engineering Function, with a Bachelor in Engineering degree (Civil Engineering) from the University of Johannesburg (2016). She is currently working in the Planning and Traffic Engineering function in the Johannesburg office.

Charlotte has gained experience in conducting various Traffic Impact Studies which has involved microscopic and macroscopic Simulation Traffic Modelling using SIDRA and PTV Visum, GIS geospatial data management, analysis and visualisation, and conceptual drawings. Her experience also includes signal plans and designs.

Her experience also includes data management and analysis during the NEQ data collection project by handling and analysing Rea Vaya and SANRAL annual data.

She has been involved in Management Services projects where she has worked on and coordinated a small team to conduct water meter audits in Rustenburg and Bloemfontein and also been involved in site investigation, reporting and GIS analysis for Urban Design projects.

Relevant Project Experience

XL0038: Revision of Master Plans and Development of New Green Conceptual, Detailed City Development Plans for Six Cities of Rwanda
Date: 2019 (Ongoing)
Client: Surbana Jurong
Client Contact Details: Enrico Moriello; Project Manager; **E** enrico.morriello@surbanajurong.com

Description: The development of a Macro Demand Model to assess travel demand and re-routing of traffic as a result of the socio-economic development plan in the respective secondary cities in Rwanda using VISUM software. Update of the Transportation Masterplan for these cities.

Role: Transport and Traffic Modeller, GIS Specialist

Responsibilities: Transport modelling PTV VISUM, GIS digitising and mapping

PE270: Tswaing Mega City Development SATURN TIA
Date: 2017
Client: Makole Property Developers
Client Contact Details: Mokganyetsi Mashele

Description: SMEC SA has been appointed to conduct a Traffic Impact Study and Site Traffic Assessment for the proposed Tswaing Mega-City Development. The development site is on portion 1 of the farm Tswaing 149 – JR located north of Soshanguve, east of the Twaing Crater. The Tswaing Mega-City Traffic Impact Study evaluated the impact of the new development on the surrounding road network, by

Personal Info

- ID Nr.: 920913 0308 081
- Country of Birth: South Africa
- Nationality: South African
- Date joined the Firm: January 2017

Years of Industry Experience

2 years

Countries of Experience

- South Africa

Qualifications and Memberships

- Bachelor of Engineering, University of Johannesburg, 2016
- Candidate Engineer, The Engineering Council of South Africa (201751297)

Key Skills and Competencies

- Planning and Traffic Engineering
- Data Handling and Analysis
- Transport Modelling
- Traffic Impact Studies
- Software: PTV VISUM, SIDRA, QGIS
- AutoCAD & Microstation Power Draft
- Signal Plans & Design

means of a traffic model, and propose mitigation measures, if required, in order to maintain acceptable level of service at the intersections surrounding the development. The study also evaluated the adequacy of public transport and non-motorised transport (NMT) for the Tswaing Mega-City Development.

Role: Graduate Transport Modeller

Responsibilities: Conduct Site Traffic Assessment, SIDRA modelling, GIS mapping and report writing

JT0042: City of Johannesburg North Eastern Quadrant Data Collection and Profitability of Minibus Taxi Industry | R9.8m
Date: 2018
Client: City of Johannesburg
Client Contact Details: Daisy Dwango, Project Manager; **E** daisyd@joburg.org.za

Description: The collection, compilation and analysis of private and public transport data in the north-east quadrant area of Johannesburg. This project includes the collection of data on minibus taxis at taxi facilities and on-board surveys of buses.

Role: Transport and Traffic Modeller

Responsibilities: Data handling SANRAL and Rea Vaya annual profile compilation and stakeholder engagement.

JT0045: Vaalbult Colliery Traffic Impact Assessment | R97k
Date: 2018
Client: Vaalbult Mining Company
Client Contact Details: Jakes Van Biljon, Project Manager; **Ph** (+27)082 499 6582 **E** jakes@vcmining.co.za

Description: Development of Traffic Impact Assessment with a Traffic Management Plan for the Vaalbult Colliery in Mpumalanga. The aim was to analyse the impact of the mining activities on traffic in the surrounding road network and develop a Traffic Management Plan for midday roadblocks during blasting on a provincial road.

Role: Graduate Engineer

Responsibilities: Development of the traffic impact assessment including analysis and reporting.

JT0041: Gautrain Management Agency GRRIN Scenario Fare Testing| R2.6m
Date: 2018
Client: Gautrain Management Agency
Client Contact Details: Victor Shange, **Ph** +27 11 086 3533

Description: A multi-modal EMME model was developed in 2014 for the Gauteng Province to test the feasibility of the Gautrain Rapid Rail Integrated Network (GRRIN). For the Scenario Fare Testing project, this existing model was applied to test the impact of different fare structures on the expected patronage and revenue of the Gautrain, and the impact on the required infrastructure and operational costs.

Role: Graduate Engineer

Responsibilities: High Model Shift Assessment sensitivity analysis, public transport time and cost surveys, management and coordination of survey auditors and report writing.

JU0057: City of Ekurhuleni Sanitation Feasibility Study | R350k
Date: 2018
Client: Ekurhuleni Metropolitan Municipality

Description: SMEC South Africa was appointed to conduct a feasibility study to determine optimum solutions for the provision of water and sanitation services to informal settlements in the City of Ekurhuleni (CoE). The feasibility study includes an overview of current services provided in each settlement, operations and maintenance, and possible solution options, which are considered for the implementation of the programme. The feasibility study will provide a framework for the development of business cases for sustainable water and sanitation service provision.

Role: Graduate Engineer

Responsibilities: Site Investigation, problem/needs identification, high level planning and recommendation of solutions, GIS digitisation and report writing.

XL0036: Kigali Transport Master Plan Review and Update, Rwanda | R2.6m
Date: 2018
Client: Surbana Jurong on behalf of City of Kigali
Client Contact Details: Enrico Moriello; Project Manager; **E** enrico.morriello@surbanajurong.com

Description: A multi-modal PTV Visum model was developed in 2013 for the City of Kigali to develop the transport master plan for the City. The 2013 model was not calibrated to baseline data and simply forecasted the envisioned demand and assumed a mode split between private and public transport. For the review and update of the masterplan, this Visum model was updated by calibrating the private transport component to observed baseline data (household travel survey data) and developing a spreadsheet based public transport model based on observed baseline data.

Role: Graduate Engineer

Responsibilities: Kigali Network on coding PTV Visum

BCM45 - Enhancement of WDM Initiatives (South Africa) | R2m
Date: 2018
Client: Mangaung Metropolitan Municipality
Client Contact Details: Koki Mokhoabane, WDM Manger, **Ph** +2751 410 6679, **E** koki.mokhoabane@mangaung.co.za

Description: The project involved performing physical meter audits, logging large consumers and logging of the Discrete Metered Areas within the municipal area, and performing business process mapping of the meter replacement cycle.

Role: Graduate Engineer

Responsibilities: Water Meter Audit GIS and collection data managing

JD0019: Rustenburg Local Municipality AC Pipe Replacement | R7m
Date: 2018
Client: Rustenburg Local Municipality
Client Contact Details: Wanda Simelane, Project Manager, **Ph** +2782 555 5935, **E** wsimelane@rustenburg.gov.za

Description: Refurbishment and Replacement of AC Pipes and Upgrading of Water Meters and Aged Connections-Zinniaville and Karlienpark.

Role: Graduate Engineer

Responsibilities: On-site water meter verification survey, data digitising with Qfield. Data Mapping and management with QGIS.

DM0142: Arcus Wind Energy Facilities Traffic Impact Assessment| R170k
Date: 2018
Client: Arcus Consulting
Client Contact Details: Ashlin Bodasing, Project Manager; **E** ashlinb@arcusconsulting.co.za

Description: Arcus Consultancy Services appointed SMEC South Africa to provide specialist Traffic Engineering services on two proposed Wind Energy Facilities. The project included the development of a Traffic Impact Assessment to assess the impact of each proposed Wind Energy Facility on the surrounding road network, evaluation of transport permits required for abnormal vehicles and make recommendations on access locations and designs.

Role: Graduate Engineer

Responsibilities: Trip generation, trip assignment, trip distribution for the pre-construction, construction, operational, decommissioning phases of the project and report writings.

JT0035: Balfour Park Traffic Impact Study | R130k
Date: 2017
Client: Akweni Group (Pty) Ltd

Description: Development of a high level Traffic Impact Study for a student promenade along Athol Street as part of the urban development of the Balfour Park Precinct.
Eight selected intersections were assessed in terms of intersection capacity, access to surrounding properties and a high level parking assessment was conducted. Focus was placed on NMT accessibility, road safety and universal access in order to ensure that the student promenade was NMT friendly and safe for the use of learners and pedestrians.The deliverable was a Traffic Impact Study report which included an Access and Parking analysis, Public Transport and Non-Motorised Transport chapter.

Role: Graduate Engineer

Responsibilities: Analysis of intersections performance using SIDRA

JD0019: Imbunga City Walk Project | R2.8m
Date: 2017
Client: Kigali City

Description: The City of Kigali appointed SMEC South Africa to assist with traffic engineering solutions in the pedestrian station of KN4 Avenue in Kigali. The task was to assess the impact of the closure of KN4 Avenue to normal traffic and recommend solutions to minimise impact and improve circulation within the city.

Role: Traffic Technologist

Responsibilities: Traffic Signal Plan Designs, High-level construction plan

DM0142: Edendale TIA | R170k
Date: 2017
Client: Sivest

Description: Development of a high level Traffic Impact Assessment to assess the impact of the proposed mixed-use Edendale Town Centre on the surrounding road network. The deliverable was a Traffic Impact Assessment report, which included a Public Transport and Non-Motorised Transport chapter.

Role: Graduate Engineer

Responsibilities: Trip Generation, trip assignment, trip distribution. AutoCAD sticks drawings.

JT0031: Meyerton Sicelo Shiceka ext 5 TIA | R120k
Date: 2017
Client: ASA Group Consultancy

Description: Development of a Traffic Impact Assessment for the Sicelo Shiceka ext 5 residential development with 700 dwelling units. The aim was to test the impact of the residential development on the surrounding road network using SIDRA intersection analysis.

Role: Graduate Engineer

Responsibilities: Trip Generation, trip assignment, trip distribution. AutoCAD sticks drawings.

JT0028: Rustenburg CBD IRPTN TIA | R700k
Date: 2017
Client: LSO Consulting Engineers on behalf of Rustenburg Local Municipality
Client Contact Details: DJ Lourens, Director; **Ph** 012 803 0961

Description: Development of a Saturn Model to test the impact of the proposed Rustenburg Rapid Transit (RRT) on the Rustenburg CBD intersection capacity. The project aims to test and report on pre-determined geometric layouts and recommend adequate geometric upgrades where required through the introduction of the Rustenburg Rapid Transit corridor. This deliverables include a Traffic Impact Assessment Report, Traffic Signal Design, Access Study Report and a Parking Study report.

Role: Graduate Engineer

Responsibilities: Traffic Signal Plan Designs.

JT0017: Rosebank NMT Design and Implementation | R4m
Date: 2017
Client: Johannesburg Development Agency
Client Contact Details: Mr. Sithandile Xhanti, Project Director; **Ph** +27 (0)11 688 7800

Description: SMEC South Africa (PTY) Ltd was appointed as Civil Engineer for the Design and Implementation of the Rosebank Non-Motorised Transport and Cycle Lanes Phase1, Phase 2 & Phase 3

Role: Graduate Transport Planner

Responsibility: Generating of SIDRA intersection analysis and Signal Plan Designs.

JT0020: Western Cape Road Safety Strategy | R2.9m
Date: 2017
Client: Western Cape Government – Transport and Public Works

Description: In conjunction with the Universities of Cape Town and Stellenbosch, SMEC has to compile the Western Cape's Road Safety Strategy. The strategy will devise a framework for implementation of road safety principles within the Province.

Role: Graduate Engineer

Responsibility: Research and report writing of Tender Audit Policy, compiling of high level cost estimations and involvement in the Road Traffic Safety Interventions Toolkit.

JT0027: Vanderbijlpark CBD Traffic Flow, Parking and NMT Impact Study | R750k
Date: 2017
Client: Emfuleni Local Municipality
Client Contact Details: Mr. David Letsoalo, Consultant Engineer; **Ph** +27 (0)72 536 4875

Description: Key issues identified in the Vanderbijlpark CBD are parking capacity problems, traffic congestion, parking bay utilisation, safety, access and mobility. The project aims to upgrade the CBD to encourage efficient use of the road reserve, parking bays and sidewalks, thus relieving traffic congestion and improving traffic safety.

Role: Graduate Engineer

Responsibility: Compilation and report writing of Parking Plan Report

Professional History

January 2017- Current: SMEC South Africa (Pty) Ltd – Graduate Engineer

Courses & Conferences attended

July 2018: South African Transport Conference 2018: 4A Integrated Public Transport Networks: Mapping, Data and ICT
July 2018: South African Transport Conference 2018: Urban Transport
March 2018: Special Transport Forum SIG
March 2018: Internal Public Transport Workshop on BRT Infastructure
August 2017: Internal Rail and Public Transport Planning Lecture
July 2017: South African Transport Conference
March 2017: Internal SIDRA Training
January 2017: Internal EMME and Saturn Training

Publications & Papers presented

N/A

Language Skills

Mother Tongue: Zulu

Languages	**Speak**	**Read**	**Write**
English	Excellent	Excellent	Excellent
Zulu	Excellent	Fair	Fair
Sotho	Excellent	Fair	Fair
Xhosa	Good	Fair	Fair

Certification

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes my qualifications, my experience, and myself. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

_____ **Date:** _____

(Signature of staff member or authorised representative of the firm) *Day/Month/Year*

Full name of staff member: _____

Full name of authorised representative: _____

Gerna Van Jaarsveld

Professional Transport Planner

Professional Overview

I am a transport planner with 23 years post-graduate experience. I studied Town and Regional Planning at the University of Pretoria and graduated in 1996. Following my graduation, the South African Institute for Civil Engineering (SAICE) awarded me with a bursary towards my full-time study for a Master's Degree in Transport Planning at the Faculty of Civil Engineering at the University of Pretoria, which I completed in 1998. I am registered as a professional planner with the South African Council for Planners (SACPLAN) – registration number A/2406/2016.

I have gained work experience in South Africa and abroad in both the private and public sector. My private sector employers included Aurecon, WS Atkins, Arup and Hatch Goba. My public-sector employers included the Town Council of Centurion and the Dublin Transport Office. In 2017 I joined SMEC in their Johannesburg office.

I am currently Function Manager for Planning and Traffic Engineering. Some of the projects for which I have been responsible, or where I've had a major involvement, over the past 5 years include the Gauteng Freeway Improvement Project's (GFIP) toll model, other projects for toll concessionaires for example the Bakwena Platinum Corridor Concessionaire's toll model, the Maputo Bypass study for TRAC and the Lusaka to Ndola toll study for Group 5, transport master plans and models for example for large scale precinct development applications in Kwa-Zulu Natal and Mossel Bay, the Johannesburg Road's Agency's 10 year roads master plan and implementation plan, the Jabulani Transport Masterplan (Johannesburg), the Patterson Park Masterplan (Johannesburg, the M1, M2 and M70 Saturn meso-scopic transport model and masterplan for the Johannesburg Roads Agency, the Kigali City Transport Masterplan Review (Rwanda), modelling of public transport options for the City of Tshwane's Integrated Rapid Transport Network (IRPTN) using their multi-modal EMME model, decongestion study for the Maseru Bridge Border Post between South Africa and Lesotho, the development of a guideline document carrying out Transport Assessments for the City of Johannesburg, traffic studies for City of Tshwane, the City of Johannesburg's North-East Quadrant Data Collection for minibus-taxi compensation and Gautrain Management Agency's transport planning and feasibility studies through the application of their multi-modal EMME model, the Comprehensive Integrated Transport Plan (CITP) for Lephalale Local Municipality (South Africa), the development of a Parking Policy for City of Johannesburg,

In conclusion, my main field of expertise is Transport Planning, Transport Modelling and Traffic Engineering. I have conducted various Traffic Impact Studies and Transport Planning Studies that varied in scale and size. The focus of my career has to a large extent been on Transport Modelling projects of various scales, using different transport modelling software, of which I am most proficient in SATURN and to a lesser extent EMME, and currently expanding my filed of expertise to include PTV Visum. I also have a strong focus on research-type projects and project management.

Personal Info

- ID Nr.: 7405250035085
- Country of Birth: South Africa
- Nationality: South African
- Date joined the Firm: 2017

Years of Industry Experience

21 Years

Countries of Experience

- South Africa
- Republic of Ireland
- United Kingdom

Qualifications and Memberships

- B (TRP) (1996)
- MSc (1998
- Professional Planner (Pr Pln (SA) A/2406/2016)

Key Skills and Competencies

- Project Management
- Transport Planning
- Transport Modelling
- Demand Modelling
- Simulation Modelling
- Integrated Transport Master Planning
- Non-Motorised Transport Planning
- Toll Feasibility Studies
- Traffic Impact Studies
- Traffic Engineering
- Research

Relevant Project Experience

Herewith-additional information on most relevant projects over recent years (2009 – 2019):

Lephalale Comprehensive Integrated Transport Plan (CITP), | +/- R1 300 000
Date: 2019
Client: Department of Transport
Client Contact Details: [Julius Tefo, Project Manager; Ph (0) 82 413 4535]

Description: A Comprehensive Integrated Transport Plan (CITP) is a statutory document required by the National Land Transport Act No. 5 of 2009 (NLTA). The CITP was prepared according to the minimum requirements for the preparation of integrated transport plans, published in the Government Gazette (No. 40174) in 2016. ITPs are used as tools by planning authorities to provide, plan for, develop and manage all modes of transport within the area of jurisdiction. This CITP covers the area within the boundaries of the Lephalale Local Municipality in the Limpopo Province of South Africa. This CITP was prepared for the period 2020 – 2025.

Role: Project Director

Responsibilities: Gerna was the project director and responsible for the technical review as well as managing client relationships.

North-East Quadrant BRT Minibus-Taxi Compensation, Johannesburg, | +/- R9 500 000
Date: 2019
Client: City of Johannesburg
Client Contact Details: [Gugu Mbambo, Project Manager; Ph (0) 82 301 6826]

Description: This Project aimed to describe the current public (minibus-taxi and bus services) and private transport services and utilisation within the study area through the collection, compilation and analysis of relevant demand, supply and utilization data, which was collected through an array of surveys. Additionally, data was collated from various audited institutions and organisations that informed the direct and indirect operating costs. The fare revenue of informal minibus-taxi public transport services was determined to provide reliable estimates of the profitability of the services. The data was used to verify data provided by the minibus-taxi and bus industry and was utilised in the negotiations to compensate service providers upon the implementation of Bus Rapid Transit (BRT) services.

Role: Project Director

Responsibilities: Gerna was the project director and responsible for the technical review as well as managing client relationships.

Development of a Parking Policy, Johannesburg, | +/- R 270 000
Date: 2018
Client: City of Johannesburg
Client Contact Details: [Nobuntu Ciko Duze, Project Manager; Ph (0) 84 588 3508]

Description: I was responsible for investigating the status quo of parking about existing policies, strategies and plans. This entailed two tasks namely to conduct a desktop study of existing studies, policies, strategies; and to conduct interviews on existing strategies with representatives from the responsible units at and other core stakeholders. The project also presented a valuable opportunity to work alongside the international expert, Paul Barter, to draft a problem statement for the ultimate “Parking Policy/Framework/Strategy” for the City.

Role: Project Director

Responsibilities: Gerna was the project director and responsible for the technical review as well as managing client relationships.

Gautrain Scenario Fare Testing, Johannesburg, | +/- R2 600 000
Date: 2018

Client: Gautrain Management Agency
Client Contact Details: [Victor Shange, Project Manager; Ph (0) 60 995 3059

Description: A multi-modal EMME model was developed in 2014 for the Gauteng Province to test the feasibility of the Gautrain Rapid Rail Integrated Network (GRRIN). For the Scenario Fare Testing project, this existing model was applied to test the impact of different fare structures on the expected patronage and revenue of the Gautrain, and also the impact on the required infrastructure and operational costs.

Role: Project Director

Responsibilities: Gerna was the project director and responsible for the technical review as well as managing client relationships.

Kigali Transport Master Plan Review and Update, Rwanda, | +/- R1 300 000
Date: 2019
Client: City of Kigali
Client Contact Details: [Enrico Morriello, Project Manager; Ph +250 786 700 257]

Description: A multi-modal PTV Visum model was developed in 2013 for the City of Kigali to develop the transport master plan for the City. The 2013 model was not calibrated to baseline data and simply forecasted the envisioned demand and assumed a mode split between private and public transport. For the review and update of the masterplan, this Visum model was updated by calibrating the private transport component to observed baseline data (household travel survey data) and developing a spreadsheet based public transport model based on observed baseline data.

Role: Project Director

Responsibilities: Gerna was the project director and responsible for the technical review as well as managing client relationships.

M1, M2, M70 Road Masterplan and Simulation Model, Johannesburg, | +/- R 3 700 000
Date: 2017
Client: Johannesburg Roads Agency
Client Contact Details: [Alan Robinson; Project Manager; Ph (0) 62 519 0397]

Description: The development of a SATURN simulation model to test various proposed road infrastructure improvements and to determine the demand that has to be accommodated on the network. The process involved interaction with the City of Johannesburg's multi-modal demand model. The forecast demand flows were extracted from the SATURN model and used to develop the road master plan and provided to the design teams to inform the detailed geometric designs and micro-simulation where relevant.

Role: Project Manager

Responsibilities: Gerna was the project manager and responsible for the simulation model development, forecast modelling and the transport master plan reporting as well as managing client relationships.

EN 4 Maputo Bypass Toll Road Feasibility Study, Johannesburg, | +/- R500 000
Date: 2016
Client: TRAC / ANE
Client Contact Details: [Alan Robinson; Project Manager; Ph (0) 62 519 0397]

Description: When opened to traffic, the Maputo Bypass will provide an alternative route for traffic travelling between the EN4 in the west and the EN1 and the eastern and northern coastal areas of Maputo in the east. As a consequence of the above, there is likely to be an impact on the revenue stream of the Maputo Toll Plaza due to the opening of the Maputo Bypass by ANE. The Maputo Toll Plaza and the EN4/EN2 is operated by Trans African Concessions (TRAC). ANE is proposing to toll the Maputo Bypass in order to mitigate against the potential impact on the revenue stream of the Maputo Toll Plaza. In addition, there is also the possibility of large scale land use development taking place around the location of the future Maputo Bypass and the interchange with the existing EN4. These land use developments may also

have an impact on the revenue stream of the Maputo Toll Plaza. The objective of the traffic study was to determine the compensation to be paid by ANE to TRAC for any losses incurred as a result of the traffic diversion from the Maputo Toll Plaza to the Maputo Bypass. In addition, the impact of the possible tolling of the Maputo Bypass on TRAC and the impact of land use developments in the vicinity of the EN4 and the Maputo Bypass on TRAC had to be taken into account. Traffic survey data was processed and a base year traffic model (SATURN) was developed. The project was put on hold due to internal differences between TRAC and ANE.

Role: Transport Modeller

Responsibilities: Gerna was the transport modeller that formed part of the team responsible for the development of the toll and revenue models.

Transport Assessment Guideline / Manual, Johannesburg, | +/- R1 000 000
Date: 2016
Client: City of Johannesburg
Client Contact Details: [Nobuntu Ciko; Project Manager; Ph (0) 84 3508]

Description: Develop a transport assessment manual in light of the fact that current traffic impact assessment guidelines do not address the impact and proposed mitigation measures on public transport or non-motorised transport adequately. The project involved research into international and local best practice. The document focuses on the methodologies to determine the required mitigation measures considering the vehicle road network, public transport services and non-motorised transport. All services must be accommodated within the road reserve. The aim is to enforce the requirements for applicants to address all modes in the transport assessment.

Role: Project Manager

Responsibilities: Gerna was the project manager and responsible for the research, stakeholder consultation and document development as well as client relationships.

City of Tshwane Integrated Rapid Public Transport Network (IRPTN), Johannesburg, | +/- R1 500 000
Date: 2014
Client: City of Tshwane
Client Contact Details: [Imelda Matlawe; Project Manager; (0) 12 358 7755]

Description: The team responsible for the IRPTN outlined a number of rail and BRT options that could possibly address future travel demand. The City's existing multi-modal EMME model was obtained and reviewed. Various rail and BRT options were developed and tested. The criteria to determine an optimised solution was established to be the scenario that carries the highest demand. Outputs from the various scenarios were presented. A multi-criteria analyses was developed in which the demand extracted from the model was only viewed as one of the criterions used to determine an optimised solution. A report was submitted that outlined the recommendations from the modelling / demand point of view.

Role: Project Manager

Responsibilities: Gerna was the project manager and responsible for the demand modelling, forecast modelling and the model output reporting as well as client relationships.

Jabulani Transport Masterplan, Johannesburg, | +/- R1 000 000
Date: 2016
Client: Johannesburg Development Agency (JDA)
Client Contact Details: [Nthangeni Mulovhedzi; Project Manager; Ph (011) 688 7800]

Description: Jabulani is a centrally located area in Soweto supported by the Inhlanzane rail station and existing BRT and taxi services. Most of the vacant land in the area is owned by a private developer. Recent transport planning has indicated the possibility of increased rail services, the extension of Gautrain to the area and additional BRT service to the area (although not confirmed). The JDA is supporting transit-oriented development (TOD) and is therefore working with the private developer to maximise the development potential of the area. Due to the proposed additional mixed

use development for the area, a transport master plan was requested by the City of Johannesburg. The aim of the plan was to focus specifically on non-mortised transport and public transport strategies. The plan was supported by non-motorised transport surveys and a multi-modal spreadsheet model. Various options were considered, specifically related to the location of a public transport interchange as well as the accommodation of hawkers in the area. The project was subsequently put on hold due to uncertainty with regard to the cycle lane policy and the future of BRT services to the area.

Role: Project Manager

Responsibilities: Gerna was the project manager and responsible for the option development, the development of the spreadsheet model, as well as client relationships.

JRA 10-year Road Master Plan, Johannesburg, | +/- R1 700 000
Date: 2015
Client: Johannesburg Roads Agency (JRA)
Client Contact Details: [Esther Schmidt; Project Manager; Ph (0) 82 374 6247]

Description: The JRA appointed a team to develop an infrastructure master plan and implementation plan to guide their infrastructure expenditure over the next 10 years (2015 -2025). Gerna was responsible for the road infrastructure component of the appointment. The project involved the prioritization of new roads, new bridges and new interchange projects. This included the review of current road planning for the Johannesburg area of jurisdiction, including provincial and national road planning and high level cost estimates for prioritized projects. In the absence of an analytical tool such as a transport model or a demographic database, the project involved the development of a Multi-Criteria Analysis (MCA) Tool. The MCA analyses defined various criteria grouped under the main objectives of mobility, accessibility and sustainability. The total number of possible new road projects exceeded 1000 proposed by various authorities throughout Johannesburg. A desktop study and visual assessment of the scale and number of these projects resulted in a sub-set of 315 of these being identified for further evaluation. The various projects were scored using the MCA tool. All projects were then prioritized based on their score. During the prioritization process, budget considerations were put in the background in order to form a view on the real needs of the city as opposed to only those needs that can be satisfied based on affordability. As a supplementary exercise, an assessment of the road network was carried out using the online Google Traffic tool to determine if the existing planning and policy address localized capacity problems and also if strategic travel demand patterns are adequately addressed by current planning. A number of gaps were identified and recommendations made.

Role: Project Manager

Responsibilities: Gerna was the project manager and responsible for the development of the transport master plan and the delivery of the final report.

Bus Depot Operations Optimisation, Johannesburg, | +/- R800 000
Date: 2015
Client: City of Tshwane
Client Contact Details: [Imelda Matlawe; Project Manager; (0) 12 358 7755]

Description: The client required advice in terms of the future location, size and function of supporting bus facilities such as bus depots, bus layovers and bus waiting areas. The aim was to achieve significant savings in terms of operational costs for the City of Tshwane through the optimization of the required facilities. Furthermore, the advice, based on empirical study, resulted in recommendations regarding the size of land required and the facilities to be provided which achieved significant savings in terms of capital expenditure for the City of Tshwane. As a first port of call, demand modelling information was obtained from the city's most up to date EMME demand model. This information served as an input into a bus operations optimization spreadsheet model. The output from the spreadsheet model was fed back into the EMME demand model for a second iteration. More realistic demand numbers were subsequently output from the second iteration of the EMME demand model for the envisaged short, medium and long term BRT roll-out plan. These numbers were finally used as an input into the bus operations optimization spreadsheet model for a second iteration. The output from the spreadsheet model was used to recommend a particular location, size and functionality for supporting bus facilities for the short, medium and long term. In addition, the final advice was supported by a land use due diligence exercise that involved consultation with town planning specialists.

Role: Project Manager

Responsibilities: Gerna was supported by a team of technical specialists and responsible for delivering the final recommendations to the client.

Gauteng Freeway Improvement Project (GFIP) Toll Feasibility Study, Johannesburg, | +/- R5 000 000
Date: 2010
Client: SANRAL
Client Contact Details: [Alan Robinson; Project Manager; Ph (0) 62 519 0397]

Description: The development of a SATURN buffer model to test various toll levels and to provide outputs for incorporation into the revenue model. The model consisted of 4 time periods and 6 user classes to take account of the different values of time. The development of the revenue model to annualise the predicted revenue also formed part of the scope of works.

Role: Transport Modeller

Responsibilities: Gerna was a transport modeller that formed part of the team responsible for the development of the transport model and the revenue model.

N1 / N4 Bakwena Platinum Toll Road Feasibility Study, Johannesburg, | +/- R2 000 000
Date: 2011
Client: Bakwena
Client Contact Details: [Liam Clarke; Project Manager; Ph (0) 11 519 0400]

Description: The application of the existing toll and revenue models to determine the predicted revenue following various scenarios, including bypasses, different fare levels, various capacity upgrades and different toll strategies / different collection points.

Role: Transport Modeller

Responsibilities: Gerna was a transport modeller that formed part of the team responsible for the application of the existing models.

N1 / N2 Winelands Toll Road Feasibility Study, Johannesburg, | +/- R2 000 000
Date: 2011
Client: SANRAL
Client Contact Details: [Alan Robinson; Project Manager; Ph (0) 62 519 0397]

Description: The development of a SATURN buffer model to test various toll levels and to provide outputs for incorporation into the revenue model. The outputs supported a bid submitted by the concessionaire to design, build and operate the toll roads in the Western Cape.

Role: Transport Modeller

Responsibilities: Gerna was a transport modeller that formed part of the team responsible for the development of the toll and revenue models.

Eastern Region Toll Road Feasibility Study, Johannesburg, | +/- R800 000
Date: 2012
Client: SANRAL
Client Contact Details: [Alan Robinson; Project Manager; Ph (0) 62 519 0397]

Description: SANRAL investigated the possibility of taking ownership of various regional roads in Limpopo, Mpumalanga and Kwa-Zulu Natal Provinces. As part of this investigation, the possibility of tolling these roads as a means to fund the

maintenance and upgrade of these roads was considered. The project involved the development of a SATURN buffer model to test various toll levels and to provide outputs for incorporation into the revenue model.

Role: Transport Modeller

Responsibilities: Gerna was a transport modeller that formed part of the team responsible for the development of the toll and revenue models.

Mossel Bay Transport Master Plan, Johannesburg, | +/- R800 000
Date: 2012
Client: Western Cape Province Transport Department
Client Contact Details: [Alan Robinson; Project Manager; Ph (0) 62 519 0397]

Description: The N2 and alternative R102 was experiencing increased congestion due to the recent expansion of Mossel Bay as well as the envisaged land use developments in the area. The provincial authority requested a transport road master plan to address the future demand. A Saturn simulation model was developed, supported by extensive traffic count surveys, journey time surveys and origin-destination surveys (using numberplate recognition).

Role: Transport Modeller

Responsibilities: Gerna was a transport modeller that formed part of the team responsible for the development of the simulation model and providing outputs to inform the development of the road master plan.

Inyaninga Transport Master Plan, Johannesburg, | +/- R500 000
Date: 2013
Client: Tongaat Hulett
Client Contact Details: [Rory Wilkinson; Project Manager; (0) 31 560 1900]

Description: Inyaninga is a greenfield area close to the King Shaka airport in Kwa-Zulu Natal accessible via the R102 which runs parallel to the N2. The developer proposed a mixed-use development and the Ethekwini Transport Authority required a transport master plan for the area to be developed. A SATURN simulation model was developed for the area based on traffic count surveys and journey time surveys. The master plan recommended some road upgrades as well as a new bridge construction.

Role: Project Manager

Responsibilities: Gerna was the project manager and responsible for the simulation model development, forecast modelling and the transport master plan reporting as well as client relationships.

Westgate Transport Master Plan, Johannesburg, | +/- R750 000
Date: 2012
Client: Johannesburg Development Agency (JDA)
Client Contact Details: [Joy Jacobs, Project Manager; Ph (011) 688 7800]

Description: Westgate is an area located near the M2/Selby Road off-ramp in Johannesburg. The JDA appointed an urban designer to implement their land use and urban environment vision, including non-motorised transport initiatives. The area is earmarked as a major public transport interchange, including BRT and taxi activity. The urban design proposals (including reduction of road space, e.g. pedestrianisation, the widening of sidewalks) as well as the provision of dedicated BRT lanes were simulated in SATURN with a view to best accommodate traffic given the reduced road space.

Role: Project Manager

Responsibilities: Gerna was the project manager and responsible for the simulation model development, forecast modelling and the transport master plan reporting as well as client relationships.

Patterson Park Transport Masterplan, Johannesburg, | +/- R500 000

Date: 2016
Client: Johannesburg Development Agency (JDA)
Client Contact Details: [Joy Jacobs, Project Manager; Ph (011) 688 7800]

Description: Paterson Park is a centrally located area, just east of Louis Botha Road in Johannesburg, with existing BRT services providing access to the area. The park is owned by the Johannesburg Property Company and was earmarked for residential densification in support of the transit-oriented principles applicable to this area. Due to the intensification of the land use proposed, a transport master plan was requested by the City of Johannesburg. The aim of the plan was to focus specifically on non-motorised transport and public transport strategies.

Role: Project Manager

Responsibilities: Gerna was the project manager and responsible for client relationships. She was supported by a team and acted in a review capacity.

Professional History

2017 to date	SMEC	Function Manager Planning and Traffic Engineering
2014-2017	MPA Consulting Engineers	Section Head Transport Planning
2009-2014	Goba / Hatch Goba Consulting Engineers	Transport Engineer
2003-2009	Dublin Transport Office	Senior Executive Transport Planner
2001-2003	Arup Consulting Engineers	Project Engineer
1998-2001	Africon Consulting Engineers	Transport Planner
1997-1998	Centre for Transport Development, University of Pretoria	Research Assistant
1993-1996	Town Council of Centurion	Research Student

Courses & Conferences attended

10 July 2019	1-Day SOUTH AFRICAN TRANSPORT CONFERENCE	SATC, Pretoria, South Africa
15 – 18 October 2018	EMME Demand Modelling course presented by Inro	Adam Harmon, Johannesburg, South Africa
10 – 12 April 2018	Introduction to Macro-Scopic Network Modelling with PTV Visum	Evan Roux (PTV), Pretoria, South Africa
9 - 13 March 2015	5-Day course on DISCRETE CHOICE MODELLING AND STATED CHOICE SURVEY DESIGN	Mark Zuidgeest (UCT), Stephane Hess (ITS, Leeds), Cape Town, South Africa
6 February 2014	Half-Day Conference TRANSPORT FORUM – FREIGHT AND TRANSPORT MODELLING	Prof. JW Joubert, UP and Mr. Cobus Roussouw, Imperial Logistics, Pretoria, South Africa
4 October 2011	1-Day training session BUSINESS COMMUNICATIONS (WRITTEN & SPOKEN)	Marlene Ward, Johannesburg, South Africa
20 September 2011	1-Day training session MANAGEMENT AND LEADERSHIP DEVELOPMENT	Marlene Ward, Johannesburg, South Africa
14 June 2011	1-Day training session THE BASICS OF PROJECT MANAGEMENT	SQDC Business School, Johannesburg, South Africa
10 May 2011	1-Day training session on COMMUNICATION AND RELATIONSHIP MANAGEMENT	Marlene Ward, Johannesburg, South Africa

8 July 2010	1-Day SOUTH AFRICAN TRANSPORT CONFERENCE	SATC, Pretoria, South Africa
8 July 2009	1-Day SOUTH AFRICAN TRANSPORT CONFERENCE	SATC, Pretoria, South Africa
18 June 2008	1-Day TRANSPORT MODELLING conference	Mott MacDonald Consultants with Landor Conferences, Birmingham, UK
11 April 2008	1-Day seminar on Challenges for Today's Transport Modellers	Minnerva Consultants. London, UK
17 – 19 October 2007	3-Day EUROPEAN TRANSPORT CONFERENCE	Association for European Transport, Leiden, Netherlands
27 June 2006	1-Day TRANSPORT MODELLING conference	Mott MacDonald Consultants with Landor Conferences, Birmingham, UK
12 May 2005	1-Day course on MEETING SKILLS	Carr Communications, Dublin, Ireland
12 – 14 April 2005	3-Day beginner OMNITRANS course	Omnitrans Software Developers, Deventer, Netherlands
6 – 8 December 2004	3-Day course for manager and modellers on TRIPS	Citilabs Software Developers, Dublin, Ireland
16 – 18 September 2003	3-Day Introduction to SATURN	Prof Dirck Van Vliet, Institute for Transport Studies, University of Leeds, UK
15 – 17 October 2003	3-Day theoretical course on TRANSPORT MODELLING	Prof. Juan de Dios Ortuzar and Dr Luis Willumsen, Cambridge, UK
10 – 11 June 2002	2-Day basic TRANSYT Workshop	Barbara Chard Consultants, Bournemouth, UK
7 – 9 January 2002	3-Day introductory PARAMICS course	SIAS Consultants, Dunboyne, Ireland

Publications & Papers presented

Brislin A, De Abreu V, Serero G and Van Jaarsveld G. 2015. Feasibility Study on Traffic Decongestion Strategies at Maseru Bridge Border Post. South African Transport Conference. Pretoria

Language Skills

Mother Tongue: Afrikaans

Languages	**Speak**	**Read**	**Write**
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

Certification

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes my qualifications, my experience, and myself. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

_____ **Date:** _____

(Signature of staff member or authorised representative of the firm) *Day/Month/Year*

Full name of staff member: _____

Full name of authorised representative: _____

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

Basic Assessment Application for San Kraal and Phezukonoya Amendment WEFs

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	SMEC SOUTH AFRICA			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	1	Percentage Procurement recognition	135%
Specialist name:	GERNA VAN JAARSVELD			
Specialist Qualifications:	B(TOWN AND REGIONAL PLANNING), MSc (TRANSPORT PLANNING)			
Professional affiliation/registration:	PROFESSIONAL PLANNER (SA) (A/2406/2016)			
Physical address:	267 KENT AVENUE FERNDALE JOHANNESBURG 2194			
Postal address:	P O BOX 1462 PINEGOWRIE			
Postal code:	2123	Cell:		
Telephone:	(011) 369 0703	Fax:	(011) 886 4589	
E-mail:	GERNA.VAN JAARSVELD@SMEC.COM			

2. DECLARATION BY THE SPECIALIST

I, GERNA VAN JAARSVELD, 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.

GJ VAN JAARSVELD

Signature of the Specialist

SMEC SOUTH AFRICA

Name of Company:

08/08/2019

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, GERNA VAN JAARSVELD, 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

SMEC SOUTH AFRICA

Name of Company

08/08/2019

Date

Signature of the Commissioner of Oaths

08-08-2019

Date

LISA MARY SMIT
Commissioner of Oaths
Reference: RO-12/02/2019
267 Kent Avenue, Ferndale
Randburg, 2194