

Feasibility Report

**Proposed Filling Station on ERF 3726, 3727 & 3728, Mahikeng,
North West Province.**

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FEASIBILITY REPORT FOR A PROPOSED FILLING STATION ON ERF 3726, 3727 & 3728, MAHIKENG, NORTH WEST PROVINCE.

Prepared for:

Engen Petroleum Ltd
PO BOX 35
Cape Town
8000



Contact Person:

Hennie van Rensburg
e-mail: Hennie.vanRensburg@engenoil.com



Prepared by:



Designed Engineering Solutions (Pty) Ltd
PO Box 90760
Garsfontein
0042

Contact Person:

Edward Krause Pr Tech Eng
e-mail: eddie.krause@designedes.co.za
Mobile: 082 306 9830

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Signature			
Checked and Authorised by	Eddie Krause, <i>Pr. Tech. Eng.</i> Director		
Signature			
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1 INTRODUCTION

1.1 Project Brief and Objective

DES was commissioned to investigate a site for the possible development and operation of a filling station on Erf 3726, 3727 & 3728, Mahikeng, North West Province.

It is planned that a filling station with a canopy-covered forecourt will be developed on the property and that the facility will have a modern convenience store and full petrol and diesel fuelling facilities.

The brief was to provide a considered estimation of the projected fuel and shop sales based on the trade area demographics and the current traffic count with the scope of work being to undertake a market assessment and demand study for the proposed filling station.

This study will take into account the traffic that can have access to the property and the impact that opposition stations in the area will have on the proposed development. The study will assume that the facility will be efficiently operated and will provide all the normal facilities available at a modern contemporary service station.

The following chapters provide an insight into the background of the project, the site description, volume calculations and the assumed parameters used in the calculations.

2 DEVELOPMENT PARTICULARS

2.1 Study Area

Mahikeng, commonly known as Mafikeng, is the capital city of the North West Province. It is situated roughly 240km west of the City of Johannesburg and 25km south of the border of Botswana and South Africa. Mahikeng rural/urban area with approximately 24.57km² of total coverage and a population of 15 117 (2011 census).

The site is located at the intersection of the Nelson Mandela Drive (R503) and an unnamed road which will be referred to as 'Road A' in this report. The R503 is the main road running through the town of Mahikeng, it eventually becomes the N18 and runs north up to the border of Botswana. Road A connects the residential areas south east of the site to the R503.

Mahikeng consists of low to middle-income groups. It consists of many densely populated residential areas and a small industrial area. The population of the Mahikeng Municipality has been fast growing over the last two decades and this growth is most likely to continue into the future.

2.2 Traffic Growth within the Study Area

It is typical to consider a 5 to 7-year period for potential growth within a study area but precise traffic growth patterns were not analysed nor calculated in-depth for this report, a full investigation of such would require a separate study.

When there is insufficient historic data or data quality is poor and adequate information to calculate expected traffic growth in a study is not available, typical growth rates may be obtained from recommendations by the Committee of Transport Officials (COTO). However, it can be expected that traffic growth in this area will at least keep pace with the National Average as the proposed development will be aimed at the lower to middle-income motorists in the trade area. The lower-income population sector is currently enjoying an increasing disposable income and a desire to acquire their own transport, so is showing the best growth in vehicle ownership. While the average growth rate has declined over recent years from around 7% pa to as low as 3% to 4%, it is expected that this sector will at least retain this rate going into the future.

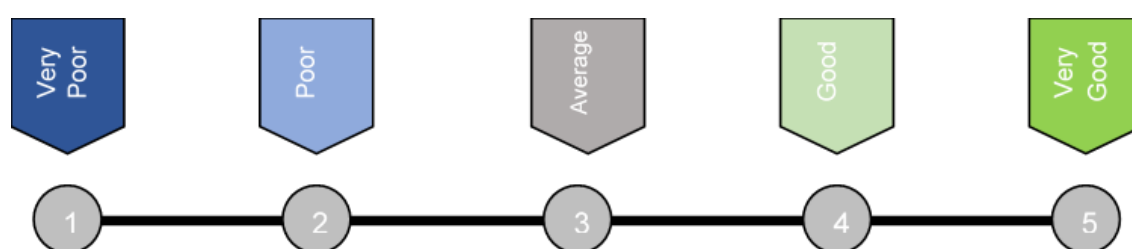
Due to the impact of Covid-19 on the economy its growth will be impaired and no increase in growth can be expected for the near future until everything has fully recovered from the effects of the pandemic. A **3.0% pa** traffic growth rate will be used to remain conservative during these conditions for the first five operational years (i.e., 2021 – 2026). The initial 3-Year annual forecast, the potential growth and estimated monthly sales for the proposed station are set out in **Table 5** of this report.

2.3 Future Roads

There are no planned road upgrades around the site for the foreseeable future. The most recent road upgrade was the construction of a traffic circle at the intersection adjacent to the site.

3 EVALUATION OF THE STUDY SITE

A desktop study was conducted for the target property with a qualitative assessment of the most important filling station attributes being assessed on a scale of from **VERY POOR** (1) to **VERY GOOD** (5) as follows:



3.1 Visibility (5)

VERY GOOD. The proposed site is located adjacent to the R503 which is a straight road that allows good vision from oncoming vehicles in both directions. The area around the site is mostly clear open land with little visual obstructions which could reduce a driver's vision of the site.

3.2 Proposed Access (4)

GOOD. The proposed site will have a Left-In-Left-Out (LILO) access off the R503 which will allow direct access for north-westbound, towards border, transient traffic. There will be a Full Access from Road A which will allow direct access for traffic travelling in both directions along that road.

3.3 Trading Market (4)

GOOD. The proposed site is located along a main road which will give it access to transient traffic travelling into the town, towards the border. There are residential areas south and east of the site that could supply the site with residential traffic. The site will mainly be targeting transient traffic travelling into the town, since there are not many alternatives before this site it may encourage drivers to spend more money on fills and the onsite convenience store. The area consists of low to middle-income residents with a growing population which has good potential for future sales.

3.4 Traffic Volumes (5)

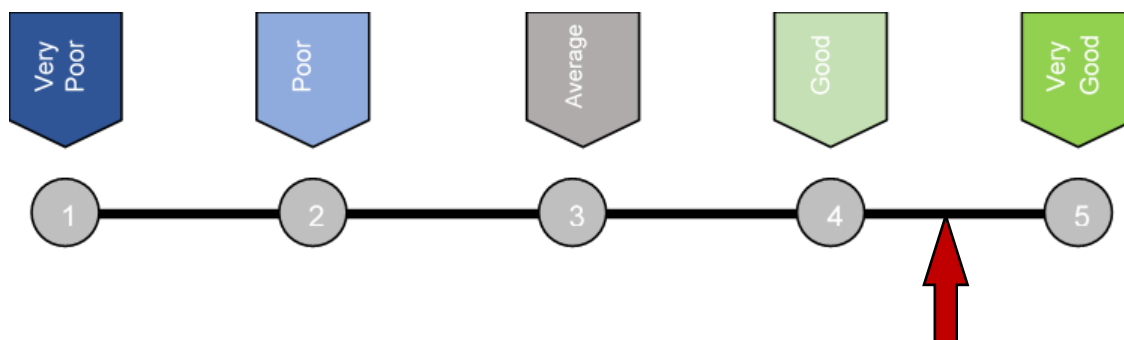
VERY GOOD. The traffic counts conducted on Thursday the 25th February 2021 at the intersection of the R503 and Road A showed an Average Daily Traffic (ADT) of 19 330 vehicles for a 24-hour count which is a great number of vehicles. These numbers will be likely to increase once the impact of the Covid-19 regulations phase out.

3.5 Competitor Investigation (4)

GOOD. There are seven other filling stations within the 3km radius of influence. Only two of these stations will have a meaningful impact on the proposed site since these two stations are the only stations located on the same side of Nelson Mandela Drive (R503) as the proposed site. The other competitor sites are not situated along the same road as the proposed site or are situated on the opposite side of the shared road, therefore they will not share transient traffic with the site. The closest station before the proposed site heading towards the town is located over 14 km down the R503. Refer to **Section 6** for more details regarding the competitor sites.

3.6 Overall Rating of Site (4.4)

Every aspect of the site location is considered above average. The site has great visibility and traffic volumes which raises the general rating of the site. The overall rating of all the categories is **4.4**.



4 VOLUME CALCULATION METHODOLOGY

In this section the methodology is discussed on how a fuel volume calculation is done to determine the expected first year of fuel volume.

The following formula is used by the fuel industry to calculate the expected average litres of fuel to be sold in a month:

$$L = ADT \times \bar{F} \times p \times d$$

Litres per month (L) = (ADT) Vehicles passing the site per day

(\bar{F}) Average fuel fill per vehicle

(p) Percentage vehicles of pass-by traffic turning into the site

(d) Trading days in a calendar month

4.1 Vehicles Passing the Site per Day

The number of vehicles passing any proposed filling station is critical when determining the projected volumes, the station is expected to pump and therefore critical in determining its feasibility.

A traffic count was completed on **Thursday 25th February 2021** which showed an ADT of **19 330** vehicles passing the proposed site. Refer to **Section 13.2** Traffic Count Report for details.

The proposed filling stations' access diagram attached in **Section 11** of this report shows that the filling station will have an opportunity to intercept eastbound traffic on the R503, via a Left-In-Left-Out access, and traffic travelling in both directions along Road A, via a Full-Access.

4.2 The 'Average Fill'

The average fill at a site is dependent on the type of traffic that the site is exposed to with transient traffic generally giving a higher average fill, lower fills from sites exposed to residential traffic and still lower fills from sites in low-income areas. The average fills for low-income motorists was normally assumed at 12 litres per fill, but with an increasing disposable income and the use of credit cards, this average is increasing, and can these days be taken at approx. 14 – 15 litres. The proposed station will serve an almost entirely low to middle-income local clientele, **Table 4-1** shows an average fill of **14 litres** is adopted in the volume calculations below for light vehicles and **100 litres** for heavy vehicles.

Table 4-1 Average Fill

VEHICLE TYPE	AVERAGE FILL (Litres)
Light	14
Heavy	100

4.3 Percentage of Pass-By Traffic (Interception Rate)

The turn-in percentages (interception rates) are determined by several factors, the most important of which is the convenience of the station to passing motorists. Unless for a special reason, no motorist will make a specific trip to buy fuel but will rather buy when undertaking a trip for another reason, such as to do the monthly shopping or to travel to or from work. Service stations are thus 'traffic interceptors' rather than 'traffic generators'

The most important factor determining the interception rate is, therefore 'convenience' and is determined by the following factors

- Convenience (easily accessible),
- Visibility (adequate time to decide whether to use the facility or not),
- Type of traffic (transient, commuter or residential),
- Other nearby filling stations (competitor threat),
- Service provided to the public (car wash, convenience shop, ATM. etc),
- Good accesses (proper deceleration and acceleration lanes),
- Location (homebound or work bound), and
- Site layout (large enough to enable ease of movement on the forecourt)

It should be noted that if the average fill at a site is lower than usual because of a lower-income clientele, it stands to reason that the interception rate should marginally increase as motorists will still need to travel to their home or workplace destinations and, with fewer litres in the tank, they will need to fill more often.

The normal interception rate for positive and negative traffic in lower-income areas in past times was 12% and 10% respectively, but with the ever-increasing disposable income, average fills are increasing, leading to a decreasing need to fill and therefore a lower interception rate, now found to be around 10% and 8% respectively. The traffic exposed to the proposed filling station will be almost entirely low-income so the interception rate will likely be close to the interception rates discussed above.

An interception rate of **4%** and **0.5%** for positive and negative traffic flow along the R503 respectively, is therefore assumed for light vehicles and taxis. An interception rate of **6%** for traffic flow in both directions along Road A due to the Full Access. The interception rate for truck and busses is **1.5%** for positive and negative traffic flow.

Table 4-2 below indicates the interception rate for the positive and negative traffic flows for the site.

Table 4-2: Expected Interception Rate

ADT = ± 19 330 <u>TOTAL</u> VEH/DAY PAST THE SITE	
VEHICLE TYPE AND DIRECTION	EXPECTED INTERCEPTION RATE
R503 - Positive Vehicles	4%
R503 - Negative Vehicles	0.5%
Road A - All Vehicles	6%
All Heavy Vehicles	1.5%

4.4 Number Trading Days

The definition of full normal trading days in a month is the number of typical weekday sales in a month. A typical weekday is a Tuesday, Wednesday or a Thursday with no public holidays. If there was no variation in the traffic there would be 365/12 or 30.5 full normal trading days in a month, but if the weekend traffic demand is lower than during the week, the full normal trading days in a month would be less. It is thus wrong to assume a default value of 30.5 days just because a 24-hour facility will be operated each day of the month. Traffic patterns have an impact on the number of trading days per month.

As the trade area is essentially low to middle-income residential, the residents can be expected to travel more during weekdays than over weekends, such as to get to and from their places of employment, so a **30-day month** is assumed for light vehicles and taxis, but **25 days** for heavy vehicles as there will be less travelling over weekends.

5 CALCULATION OF ESTIMATED FUEL AND SHOP SALES

5.1 Expected Monthly Fuel Sales

Table 5-1 below indicates the expected fuel volume for the first year of operations. Note that the factors used in the table is derived from the previous sections. Refer to **Section 4** for the table factors used.

Table 5-1: Theoretical Fuel Volume in First Year of Sales

MONTHLY SALES POTENTIAL	R503		ROAD A	ALL ROADS
	PETROL		PETROL	DIESEL
	EASTBOUND TRAFFIC (POSITIVE)	WESTBOUND TRAFFIC (NEGATIVE)	NORTH+ SOUTHBOUND TRAFFIC	ALL TRAFFIC
Traffic Flow (Veh/day)	3 385	3 460	11 600	884
Average Fill (Litres/Veh)	14	14	14	100
Trading Days (Days/Month)	30	30	25	25
Interception Rate (%)	4	0,50	6,00	1,50
Monthly Sales Potential (LPM)	56 868	7 266	243 600	33 150
Total Estimated Monthly Sales Potential (1 Year)				340 884

It is generally found that service stations only reach 80% and then 95% of their projected volume during the first two years and only achieve full mature volume at the end of year three. To represent more realistic fuel sales, the **391 604 litres** calculated in the first year in **Table 5-1**, is reduced for the first 3 years and a growth rate, discussed in **Section 2.2**, is applied to represent the growth in sales after the station becomes operational.

Table 5-2 below indicates the calculated volumes for Year-1 at 80% of expected fuel volume and Year-3 at 100% of expected fuel volume sales.

Table 5-2: Realistic/Expected Fuel Sales Year 1-3

PERIOD		POTENTIAL GROWTH		ESTIMATED LITRES		TOTAL
YEAR		PERCENTAGE OF POTENTIAL	GROWTH RATE	PETROL	DIESEL	LITRES PER MONTH
1	2021	85%	3.00%	269 421	29 023	298 444
2	2022	95%	3.00%	310 151	33 410	343 562
3	2023	100%	3.00%	336 269	36 224	372 493

The calculations above show that **298 444 litres** of fuel can be expected at the end of **Year-1** with **Table 3** showing the estimated monthly fuel sales at maturity (Year 3) will be **372 493 litres** per month.

5.2 Expected Monthly Shop Sales

The ratio of fuel sold to Rands generated in the convenience store is a function of the type of traffic which the site attracts and the area within which it is located. It is assumed that the site will have a branded convenience store with a minimum of an in-store food offer, and it will lie in a low to middle - income essentially local trade area. It is proposed that the convenience store would generate about **R1.20** for every litre of fuel sold.

The estimated Shop Sales in **Year-3** is therefore: $372\,493 \times 1.2 = \pm \mathbf{R446\,992}$ per month

6 IMPACT ON EXISTING FUEL MARKET

To determine the impact on surrounding sites in an urban environment it is typical to look at all local sites within a **3 km radius**. This guideline is used by various departments and agencies. However, a filling station outside of the 3km radius and on the same road and on the same side of the road, should also be considered as these filling stations would also be impacted by the proposed new filling station.

Figure 6-1 and **Figure 6-2** below illustrate the competitor site locations.

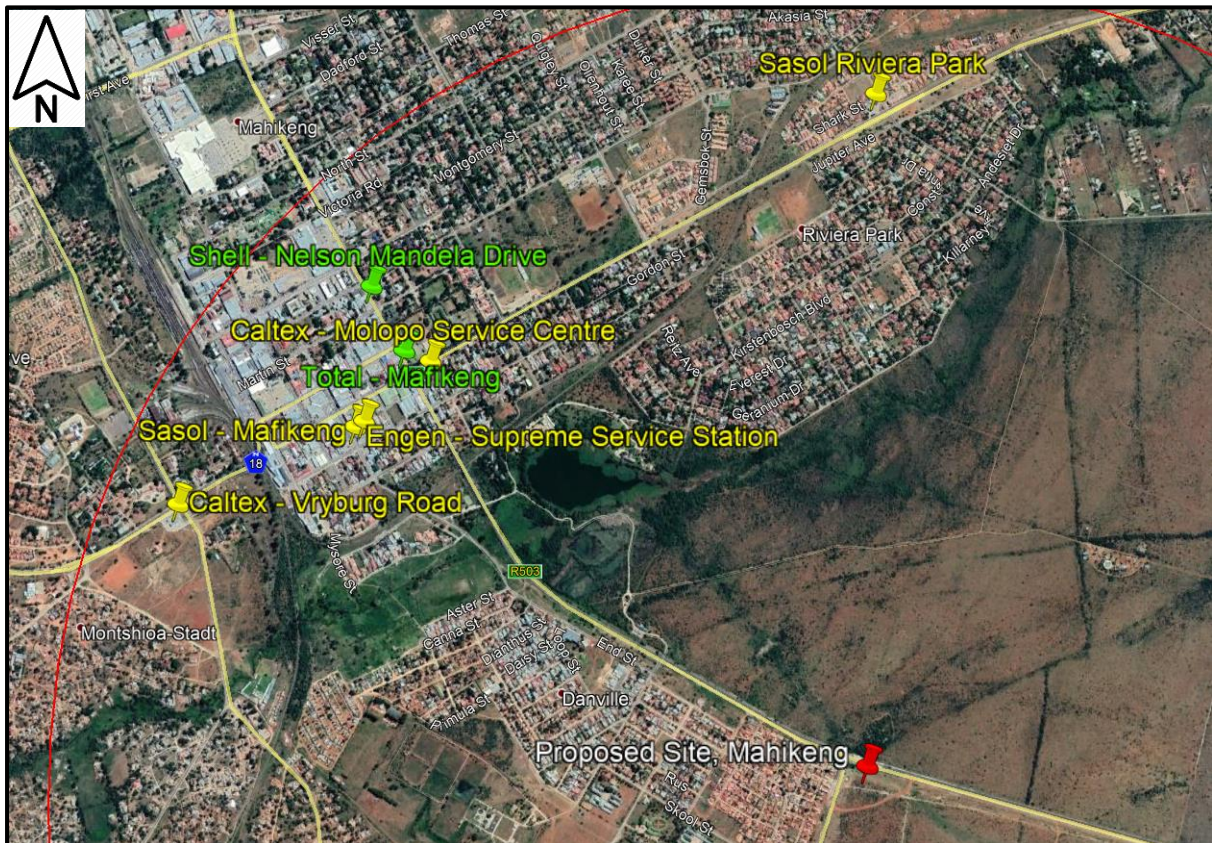


Figure 6-1 Competitor Sites

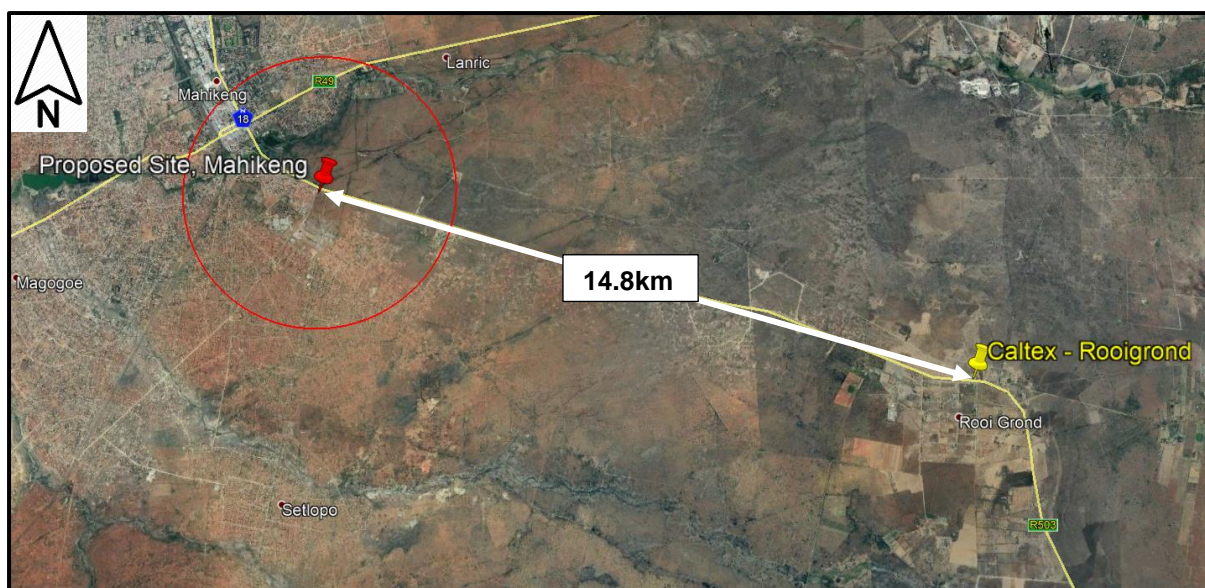


Figure 6-2 Closest Station East Along R503

6.1 Total - Mafikeng:

This station, at S25°51'51.30" and E25°38'47.04", is located 2.27 km from the proposed site and will most likely be its biggest competitor. This station will share transient traffic with the proposed site since it is located on the same side of the R503. The proposed site will have first opportunity to intercept north-westbound traffic traveling into the town.

6.2 Shell – Nelson Mandela Drive:

This station, at S25°51'43.55" and E25°38'42.60", is located 2.53 km from the proposed site. This station will share transient traffic with the proposed site since it is located on the same side of the R503. The proposed site will have first opportunity to intercept north-westbound traffic traveling into the town.

6.3 Other Stations:

These stations are all situated within the 3km radius of influence but will not have a meaningful impact on the site and therefore will only be mentioned in this section and will not be considered in further calculations.

6.3.1 Caltex – Molopo Service Centre:

This station, at S25°51'52.58" and E25°38'50.56", is located 2.19 km from the proposed site. This station will not share transient traffic with the proposed site since it is located on the opposite side of the R503 and north-westbound traffic will not be able to legally turn into this station due to a solid line preventing right turn movements.

6.3.2 Sasol – Mafikeng:

This station, at S25°51'59.78" and E25°38'41.78", is located 2.24 km from the proposed site. This station will not share transient traffic with the proposed site since it is not located along the R503.

6.3.3 Engen – Supreme Service Station:

This station, at S25°51'59.78" and E25°38'41.78", is located 2.26 km from the proposed site. This station will not share transient traffic with the proposed site since it is not located along the R503.

6.3.4 Caltex – Vryburg Road:

This station, at S25°52'9.75" and E25°38'17.06", is located 2.72 km from the proposed site. This station will not share transient traffic with the proposed site since it is not located along the R503.

6.3.5 Sasol - Riviera Park:

This station, at S25°51'20.25" and E25°39'50.13", is located 2.48 km from the proposed site. This station will not share transient traffic with the proposed site since it is not located along the R503.

6.3.6 Caltex - Rooigrond:

This station, at S25°54'52.06" and E25°48'19.03", is located 14.78 km from the proposed site. This station may share transient traffic with the proposed site since it is located along the R503 but due to the distance between the two sites the shared traffic will be reduced. This site is on the opposite side of the road to the proposed site and even though it is accessible for north-westbound traffic it is still not as convenient as a direct access that the proposed site has.

6.4 Conclusions on Competitor Stations

There are seven competitor sites within the 3km radius, most of the sites will have little to no impact on the proposed site due to market barriers and different target markets. There are only two competitor stations which will share a significant amount of traffic with the proposed site.

7 CALCULATION OF FUEL VOLUME LOSS FOR EXISTING FILLING STATIONS IN FUEL MARKET

In this section, the methodology is discussed on how to calculate the fuel volume loss for the existing filling stations when the proposed filling station is developed.

$$L_s = SADT \times \bar{F} \times p \times d$$

Litres per month lost (L_s) = ($SADT$) Shared Traffic Volume

(\bar{F}) Average fuel fill per vehicle for the affected site

(p) Interception Rate (% vehicles turning into the site)

(d) Trading days in a calendar month

7.1 Shared Traffic Volumes

To assess the impact the proposed new filling station will have on other existing filling stations, the shared traffic must be determined. The process starts by estimating the number of vehicles passing the affected filling station per day. Then an estimation is made on what will be the percentage of vehicles shared between the existing filling station and the new filling station. By multiplying the potential pass-by traffic with the percentage of total traffic shared, the shared traffic vehicles can be determined. The volumes are summarised in **Table 7-1**. Please note that a qualitative assessment was done to determine the shared traffic volumes.

Table 7-1: Shared Traffic for Affected Filling Station and Proposed Filling Station

SITE	FILLING STATION	POTENTIAL PASS-BY TRAFFIC (VEH/DAY)	PERCENTAGE OF TOTAL TRAFFIC SHARED (%)	TRAFFIC SHARED WITH NEW FILLING STATION (VEH/DAY)	GENERAL COMMENT
1	Total - Mafikeng	20 000*	20**	4000	Same transient traffic
2	Shell – Nelson Mandela Drive	20 000*	20**	4000	Same transient traffic

* The potential pass-by traffic is the best estimate of the author for filling stations of similar nature.

** The % shared traffic is based on the author's experience of filling stations within a similar environment.

7.2 Average Fill for Affected Filling Station

In **Table 7-1** above, the shared traffic was calculated. The figures in red indicates the shared vehicles per day between the affected filling stations and the proposed new filling station. To calculate the fuel volume loss of each affected filling station the author had to determine the average fill. **Table 7-2** below indicates the average fill for each of the affected filling stations. Please note that a qualitative assessment was done to determine the average fill.

Table 7-2: Competitor Average Fill

SITE	FILLING STATION	AVERAGE FILL (ℓ)
1	Total - Mafikeng	14
2	Shell – Nelson Mandela Drive	14

7.3 Interception Rate of Existing Filling Stations

The turn-in percentages (interception rates) are determined by the following factors:

- Convenience (easily accessible);
- Visibility (adequate time to decide whether to use the facility or not);
- The amount of passing traffic (as per the traffic count);
- Type of traffic (transient or local; income level of the area also a factor);
- Proximity or absence of other filling stations (competitor sites);
- Service provided to the public (car wash, convenience shop, ATM etc);
- Good accesses (proper deceleration and acceleration lanes);
- Location (homebound or work bound);
- Site layout (large enough to provide proper site circulation and turning circles)

From previous studies at similar filling station developments, the author has determined the relationship between the interception rate and the passing traffic volumes of a site subject site.

The expected interception rates for the affected filling station will vary from **3%** to **4%** depending on the location of the site and the specific fuel market area. The interception rate for the existing filling stations are assumed to be lower than the proposed filling station because they are not in such a prime location and newer filling stations generally attract more traffic than older ones. The mentioned interception rates are the same as for the fuel volume calculation. **Table 7-3** below indicates the interception rate for the affected filling station.

Table 7-3: Affected Filling Station Interception Rate

SITE	FILLING STATION	INTERCEPTION RATE (%)
1	Total - Mafikeng	3
2	Shell – Nelson Mandela Drive	3

7.4 Fuel Volume Loss of the Competitor Sites

To calculate the fuel volume loss; the shared traffic of each filling station must be multiplied by the average fill of the same filling station and the interception rate. This answer must then be multiplied by 30 trading days. **Table 7-4** below indicates the fuel volume loss in what can be considered as the fuel market of the proposed site.

Table 7-4: Impact on Surrounding Sites

SITE	FILLING STATION	AVERAGE FILL (ℓ)	SHARED TRAFFIC VOLUME	TRADING DAYS	INTERCEPTION RATE (%)	FUEL VOLUME LOST (ℓ)
1	Total - Mafikeng	14	4000	30	3	50 400
2	Shell – Nelson Mandela Drive	14	4000	30	3	50 400
TOTAL						100 800

To determine the recovery period of the fuel volume lost by the affected filling station, a growth rate of 3% is assumed over a 5-year period. This recovery period is also indicated in **Table 7-5** below.

Table 7-5: Fuel Volume Loss Recovery

SITE	FILLING STATION	PRESENT ESTIMATED FUEL SALE VOLUME (LPM)	FUEL VOLUME LOST (ℓ)	(PRESENT FUEL SALES) – (LOST FUEL) (LPM)	5 YEAR FUTURE SALES FROM LOST FUEL SALES (LPM)
1	Total - Mafikeng	252 000	50 400	201 600	233 710
2	Shell – Nelson Mandela Drive	252 000	50 400	201 600	233 710

The development and operation of the proposed filling station will have an initial impact on all filling stations in the study area, including those outside the critical radius of influence. All affected filling stations will recover most of the lost sales within 3 to 5 years.

The proposed new filling station will obtain **100 800 litres** from the fuel market as indicated in **Table 7.4** above. Furthermore, the new filling station will generate **340 884 litres** in its first year of operation, thus **240 084 litres** will be generated outside of the fuel market.

8 ENGINEERING CONSIDERATIONS

The engineering requirements for the development of the station will not pose a problem. The traffic flow passing the property, both during and after construction, will be accommodated by the carefully designed entrance and exit roads adhering to the BB2, Guidelines for Access to Filling Stations, 2003. The delivery tanker will be routed through the property to maximise ease of delivery but minimise inconvenience to customers.

Proper signage before and on the property, itself will ensure that all engineering considerations will be adequately catered for.

9 FINDINGS

Following the property evaluation, the following findings were arrived at:

- While South Africa has many similar characteristics to developed international markets in terms of political institutions and economic openness, its demographics are more similar to African markets. The total population is growing at a rapid rate and while it is getting older, it is still young compared with developed markets and is much more on par with African countries where young adults will represent the largest sector over the period 2015-2050. The trade area surrounding the proposed station is one such area, presenting a growing market and potential for good future growth in residential and vehicle ownership.
- The trade area comprises of a low to middle - income local residential market with a presently low per capita vehicle ownership, but this is changing with time as this sector of the population is experiencing a rapidly growing disposable income and an urge to acquire own-transport. Because of this, the area has an exciting potential.
- The proposed filling station is situated adjacent to the R503 and Road A. The R503 is the main east- west roads running through the area also connecting the town to other areas. Road A is a north-south running road connecting many residential areas to the R503.
- There are only two (2) meaningful opposition stations in the area, with five (5) other less meaningful stations within the 3km radius of influence.
- The station will have a Left-In-Left-Out (LILO) access from the R503 and a Full-Access from Road A.
- The expected fuel sales (petrol and diesel) for the proposed stations' third year of operation is estimated at **372 493 litres** per month.
- Expected shop sales will be approximately **R446 992** monthly.
- If developed, the proposed station will take approximately **100 800 litres** of fuel per month from the surveyed competitor stations.

10 CONCLUSION

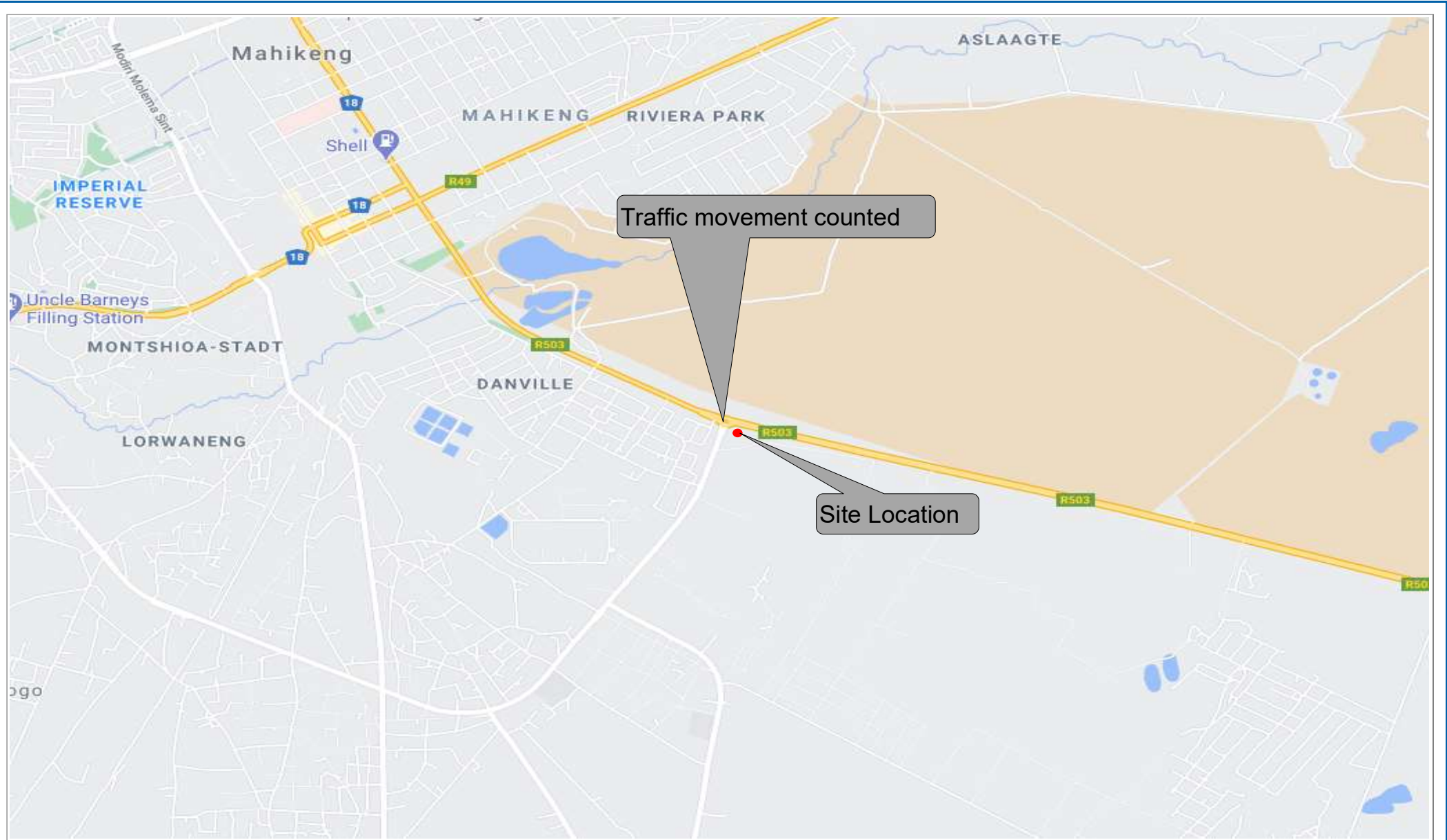
The general observation around the proposed site can be summarised as follows:

- The **298 444 litres** of fuel sales in the stations' 1st year of operation, rising to approximately **372 493 litres** in its 3rd year, is above the normally assumed benchmark of 300'000 litres per month, and indeed above 350'000 litres monthly.
- Estimated 3rd year monthly shop sales of approx. **R446 992** which is also a good shop turnover.

It is concluded that the proposed filling station will be **FEASIBLE** to develop.

11 FIGURES

- 11.1 Locality Plan
- 11.2 Competitor Sites



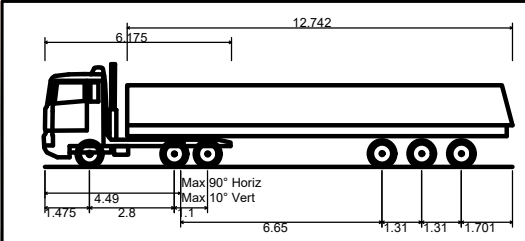
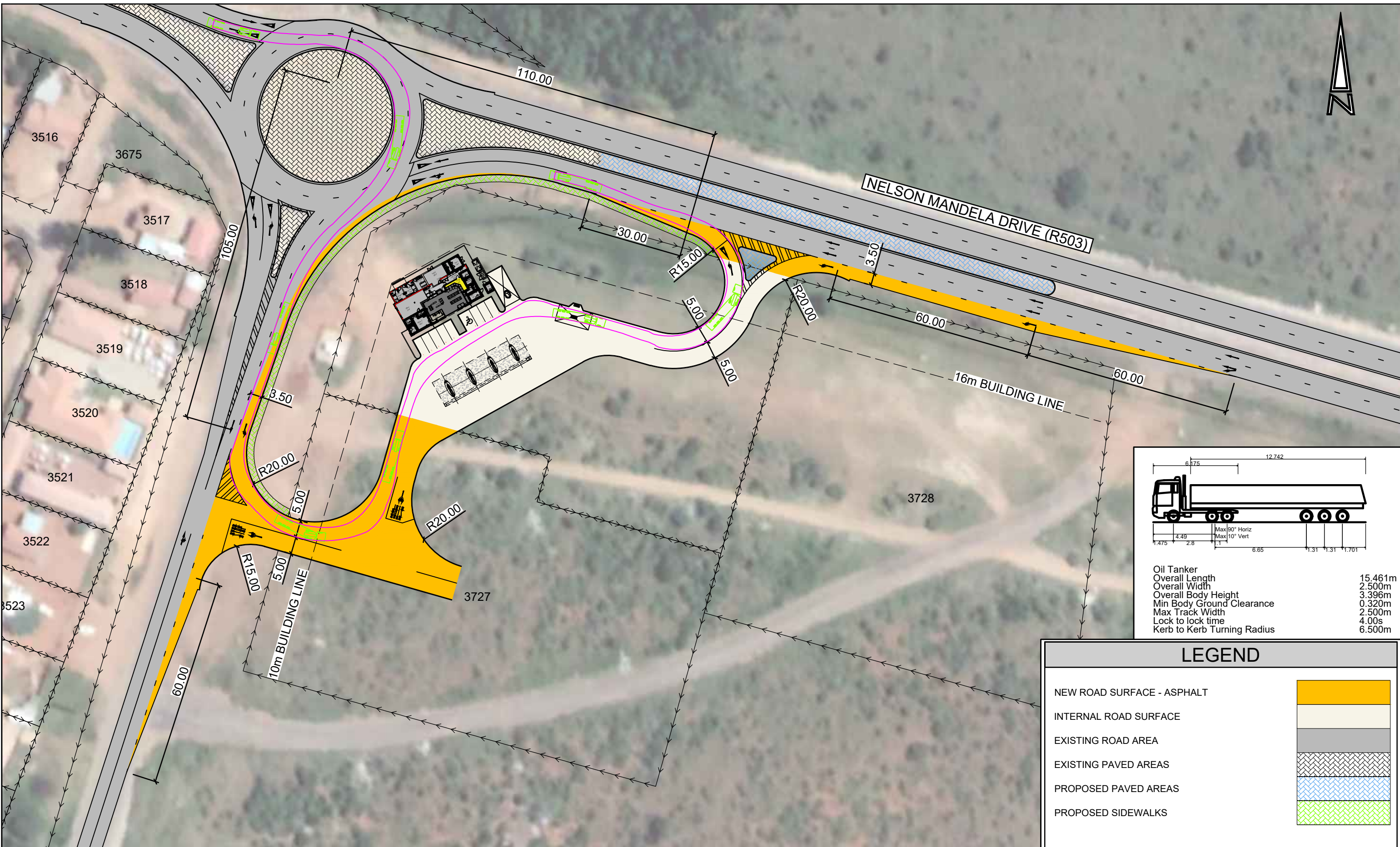
PROJECT NO.	PROJECT NAME	FIGURE DESCRIPTION
DES_0215	ENGEN - MAHIKENG	SITE LOCATION PLAN



PROJECT NO.	PROJECT NAME	FIGURE DESCRIPTION
DES_0215	ENGEN - MAHIKENG	COMPETITOR SITES

12 DRAWINGS

12.1 Access Layout



Oil Tanker	15.461m
Overall Length	2.500m
Overall Width	3.396m
Overall Body Height	0.320m
Min Body Ground Clearance	2.500m
Max Track Width	4.00s
Lock to lock time	6.500m
Kerb to Kerb Turning Radius	

LEGEND

NEW ROAD SURFACE - ASPHALT	
INTERNAL ROAD SURFACE	
EXISTING ROAD AREA	
EXISTING PAVED AREAS	
PROPOSED PAVED AREAS	
PROPOSED SIDEWALKS	

REV	DATE	BY	DESCRIPTION	APD
A	2020/11/06	TJ	INFORMATION	EK

CLIENT:

DESIGNED BY

Designed Engineering Solutions

152 Dallas Road, Menlyn Maine
Corobay Corner, Block A Ground Floor
Tel: +27 82 306 9830 www.designedes.co.za

PROJECT:

MAHIKENG FILLING STATION

TITLE:

PROPOSED ACCESS LAYOUT

SCALE:	1:1000	CHECKED:	E. KRAUSE	APPROVED:	E. KRAUSE
DESIGN:	T. JOUBERT	DRAWN:	T. JOUBERT	DATE:	2020-11-06
PROJECT No:	DES - 215	DRAWING No:	DRW001	REV:	A

DRAWING STATUS: FOR INFORMATION

13 APPENDICES

- 13.1 Photos
- 13.2 Traffic Count Report



PROJECT NO.	PROJECT NAME	FIGURE DESCRIPTION	PHOTO NO.
DES_0215	ENGEN - MAHIKENG	SURROUNDING FILLING STATIONS - TOTAL MAFIKENG	1



PROJECT NO.	PROJECT NAME	FIGURE DESCRIPTION	PHOTO NO.
DES_0215	ENGEN - MAHIKENG	SURROUNDING FILLING STATIONS - SHELL NELSON MANDELA DRIVE	2

Traffic Count R503

Mahikeng

3 Way Circle: R503 and Road A



Consultant:
Designed Engineering Solutions [Pty] Ltd
152 Dallas Road
Menlyn Maine
0081

Client:
Engen Petroleum Limited

Engineer:
Edward Krause Pr Tech Eng
Mobile: 082 306 9830



TRAFFIC COUNT R503 MAHIKENG

Client:

Engen Petroleum Limited
Hennie van Rensburg

Engineer:

Edward Krause Pr Tech Eng
Mobile: 082 306 9830

ISSUE 1

CONFIDENTIAL

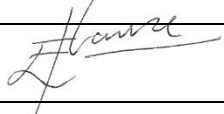
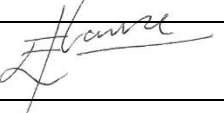
PROJECT NO: DES-0215
DATE: MARCH 2021

Designed Engineering Solutions [Pty] Ltd

152 Dallas Road
Corobay Corner Ground Floor Block A
Menlyn Maine

WWW.DESIGNEDES.CO.ZA


QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks				
Date	March 2021			
Prepared by	Lilly Jankowitz			
Checked by	Edward Krause Pr Tech Eng			
Signature				
Authorised by	Edward Krause Pr Tech Eng			
Signature				
Project number	DES-0215			
Report number	1			
File reference				

SIGNATURES

PREPARED BY

Lilly Jankowitz Project and Office Administrator



REVIEWED BY

Edward Krause Pr Tech Eng



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Contact Person

Name : Edward Krause
Address: PO Box 90760, Garsfontein 0042
Mobile: 082 306 9830
Email : eddie.krause@designedes.co.za

PRODUCTION TEAM

DESIGNED ENGINEERING SOLUTIONS [PTY] LTD

Function	Name
Project and Office administrator	Lilly Jankowitz
Function	Name
Director	Eddie Krause Pr Tech Eng

PROPOSED SITE LOCATION



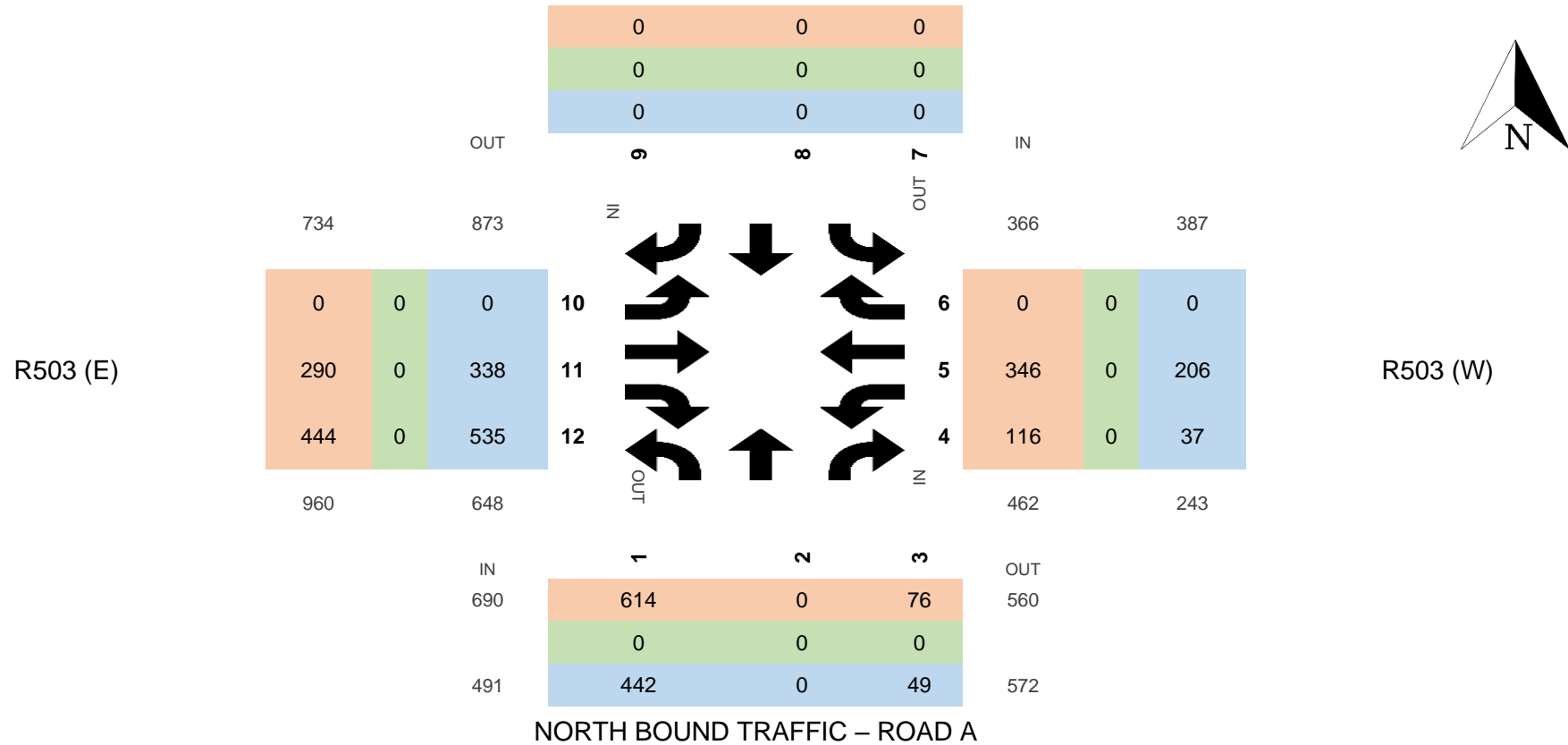
PROJECT NO.	PROJECT NAME	FIGURE DESCRIPTION	PHOTO NO.
DES_215	R503 Mahikeng Traffic Count	Site Location	1

INTERSECTION PHOTOS



PROJECT NO.	PROJECT NAME	FIGURE DESCRIPTION	PHOTO NO.
DES_0215	R503 Mahikeng Traffic Count	Intersection Photos	2

Figure 1 TRAFFIC MOVEMENT



Traffic Count: R503 MAHIKENG
 Intersection: R503 and Road A
 Peak Hour Period: 12 Hour
 Date: 25 February 2021

ALL VEHICLES

Time	South			East			North			West			Hourly
	1	2	3	4	5	6	7	8	9	10	11	12	
AM PEAK	614		76	116	346						290	444	1886
PM PEAK	442		49	37	206						338	535	1607
TOTAL	4655		501	511	2597						3115	4729	16108
24 HOUR	5586		601	613	3116						3738	5675	19330
06:00	37		11	4	20						25	132	
06:15	43		13	8	21						31	32	
06:30	74		9	16	45						34	47	
06:45	131		19	23	71						41	81	
07:00	203		17	32	118						73	107	
07:15	163		19	32	83						94	123	
07:30	117		21	29	74						82	133	
07:45	119		12	16	81						63	119	
08:00	102		12	13	40						49	91	
08:15	107		14	18	43						70	89	
08:30	109		16	8	43						58	65	
08:45	95		5	9	50						39	54	
09:00	85		5	6	54						50	75	
09:15	86		2	6	47						38	43	
09:30	88		8	10	55						60	57	
09:45	73		7	13	53						48	59	
10:00	104		11	12	50						55	72	
10:15	91		8	5	49						56	73	
10:30	97		7	11	50						58	64	
10:45	96		16	8	45						46	65	
11:00	89		6	9	54						56	63	
11:15	84		4	6	44						50	44	
11:30	77		8	6	44						53	88	
11:45	77		14	5	66						47	81	
12:00	79		7	6	65						55	84	
12:15	73		7	5	48						53	70	
12:30	83		7	5	52						55	64	
12:45	111		4	12	70						66	84	
13:00	118		7	9	49						63	89	
13:15	90		3	7	52						70	83	
13:30	96		9	14	60						78	93	
13:45	105		7	16	60						57	94	
14:00	89		7	7	61						49	105	
14:15	91		13	6	44						70	130	
14:30	104		20	8	46						96	107	
14:45	116		17	3	52						71	128	
15:00	110		13	14	65						78	115	
15:15	114		11	9	58						85	147	
15:30	82		14	3	65						71	115	
15:45	107		8	7	54						79	109	
16:00	133		11	11	47						101	133	
16:15	105		16	13	58						71	144	
16:30	97		14	6	47						87	149	
16:45	103		5	12	49						86	186	
17:00	78		11	11	61						114	163	
17:15	83		7	11	52						102	183	
17:30	68		9	6	39						82	151	
17:45	73		10	5	43						100	146	
18:00													
18:15													
18:30													
18:45													
19:00													
19:15													
19:30													
19:45													
20:00													
20:15													
20:30													
20:45													

Traffic Count: R503 MAHIKENG
 Intersection: R503 and Road A
 Peak Hour Period: 12 Hour
 Date: 25 February 2021

CARS

Time	South			East			North			West			Hourly
	1	2	3	4	5	6	7	8	9	10	11	12	
AM PEAK	507		69	92	322						256	364	1610
PM PEAK	374		47	33	175						310	471	1410
TOTAL	3856		442	433	2260						2776	4033	13800
24 HOUR	4627		530	520	2712						3331	4840	16560
06:00	29		10	4	12						21	124	
06:15	28		12	7	17						27	19	
06:30	54		8	15	43						31	32	
06:45	98		17	16	65						37	66	
07:00	177		15	24	112						64	83	
07:15	140		17	28	78						85	103	
07:30	92		20	24	67						70	112	
07:45	94		10	16	77						54	97	
08:00	87		9	11	33						42	60	
08:15	84		11	18	34						61	67	
08:30	89		15	7	38						51	51	
08:45	75		5	7	45						39	38	
09:00	69		5	5	50						47	60	
09:15	70		2	6	40						27	32	
09:30	75		8	9	51						52	47	
09:45	59		7	10	46						42	42	
10:00	83		10	9	43						48	63	
10:15	74		6	4	40						50	53	
10:30	82		4	10	43						47	53	
10:45	74		15	7	38						42	58	
11:00	71		4	6	50						53	54	
11:15	70		3	4	37						43	35	
11:30	64		5	4	41						48	72	
11:45	64		13	4	57						44	76	
12:00	60		6	4	62						52	74	
12:15	57		4	4	44						47	60	
12:30	71		7	5	47						48	50	
12:45	99		3	8	60						58	80	
13:00	105		7	8	44						53	74	
13:15	79		2	6	45						61	72	
13:30	76		7	13	48						67	80	
13:45	92		6	15	41						51	84	
14:00	77		7	6	52						42	87	
14:15	80		11	6	37						62	112	
14:30	90		16	7	35						83	86	
14:45	104		17	2	42						65	113	
15:00	96		11	12	60						64	102	
15:15	93		8	8	53						76	132	
15:30	63		13	3	55						62	103	
15:45	89		7	6	48						73	95	
16:00	112		11	11	36						90	117	
16:15	92		15	11	51						67	126	
16:30	81		14	5	40						80	133	
16:45	86		5	11	41						82	167	
17:00	63		10	8	48						107	149	
17:15	69		7	9	43						93	163	
17:30	58		8	6	33						76	143	
17:45	62		9	4	38						92	134	
18:00													
18:15													
18:30													
18:45													
19:00													
19:15													
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19:45													
20:00													
20:15													
20:30													
20:45													

Traffic Count: R503 MAHIKENG
 Intersection: R503 and Road A
 Peak Hour Period: 12 Hour
 Date: 25 February 2021

MINIBUS TAXIS

Time	South			East			North			West		Hourly	
	1	2	3	4	5	6	7	8	9	10	11		12
AM PEAK	96		6	17	8						18	73	218
PM PEAK	59		1	2	11						8	57	138
TOTAL	693		23	39	89						107	620	1571
24 HOUR	832		28	47	107						128	744	1885
06:00	7		1								1	7	
06:15	14		1	1	1						2	10	
06:30	20		1	1	1						1	15	
06:45	32		2	6	3						2	13	
07:00	24		2	7	2						6	23	
07:15	20		2	2	1						5	16	
07:30	20			2	2						5	21	
07:45	24				1						6	19	
08:00	14		1		1						4	25	
08:15	17		1		3						1	21	
08:30	20			1	1						3	14	
08:45	17			2	1							12	
09:00	16			1	1						1	13	
09:15	15				2						3	10	
09:30	13			1							2	9	
09:45	12				2						2	14	
10:00	18			1	1						1	8	
10:15	17			1	4						2	17	
10:30	12				1						2	10	
10:45	20				2						1	5	
11:00	17			1	1						1	8	
11:15	12			1	1						2	9	
11:30	11		1								1	15	
11:45	12				3						1	5	
12:00	14											7	
12:15	13				3						1	9	
12:30	9										3	13	
12:45	9		1	3	2						4	4	
13:00	12			1	1						3	12	
13:15	9		1		1						2	11	
13:30	12				6						3	10	
13:45	12				3						1	10	
14:00	9				2							15	
14:15	10										4	17	
14:30	12		2		1						1	19	
14:45	7				2						2	12	
15:00	13		1		1						4	13	
15:15	16		2	1	2						1	13	
15:30	13		1		4						3	12	
15:45	16		1									13	
16:00	19				5						4	13	
16:15	10			1	4						1	18	
16:30	14			1	2						3	13	
16:45	16										1	17	
17:00	14		1	2	6						3	11	
17:15	11			1	4						4	19	
17:30	9				2						2	8	
17:45	10		1	1	3						2	12	
18:00													
18:15													
18:30													
18:45													
19:00													
19:15													
19:30													
19:45													
20:00													
20:15													
20:30													
20:45													

Traffic Count: R503 MAHIKENG
 Intersection: R503 and Road A
 Peak Hour Period: 12 Hour
 Date: 25 February 2021

BUSES

Time	South			East			North			West			Hourly
	1	2	3	4	5	6	7	8	9	10	11	12	
AM PEAK	6			1	2						1	2	12
PM PEAK	3											2	5
TOTAL	20		1	1	5						6	15	48
24 HOUR	24		1	1	6						7	18	58
06:00												1	
06:15	1											2	
06:30													
06:45	1											1	
07:00	1				2						1		
07:15	1											1	
07:30	3			1									
07:45	1											1	
08:00													
08:15													
08:30													
08:45													
09:00													
09:15													
09:30												1	
09:45											1		
10:00					2								
10:15													
10:30			1								1		
10:45													
11:00													
11:15	1												
11:30	1												
11:45													
12:00													
12:15													
12:30													
12:45													
13:00												2	
13:15	1										1		
13:30	2												
13:45													
14:00													
14:15													1
14:30													
14:45													
15:00											1		
15:15	1											1	
15:30													
15:45													
16:00												1	
16:15	2												
16:30	1											1	
16:45											1		
17:00	1				1							2	
17:15	1												
17:30													
17:45	1												
18:00													
18:15													
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18:45													
19:00													
19:15													
19:30													
19:45													
20:00													
20:15													
20:30													
20:45													

Traffic Count: R503 MAHIKENG
 Intersection: R503 and Road A
 Peak Hour Period: 12 Hour
 Date: 25 February 2021

TRUCKS

Time	South			East			North			West			Hourly
	1	2	3	4	5	6	7	8	9	10	11	12	
AM PEAK	5		1	6	14						15	5	46
PM PEAK	6		1	2	20						20	5	54
TOTAL	86		35	38	243						226	61	689
24 HOUR	103		42	46	292						271	73	827
06:00	1				8						3		
06:15					3						2	1	
06:30					1						2		
06:45				1	3						2	1	
07:00	1			1	2						2	1	
07:15	2			2	4						4	3	
07:30	2		1	2	5						7		
07:45			2		3						3	2	
08:00	1		2	2	6						3	6	
08:15	6		2		6						8	1	
08:30			1		4						4		
08:45	3				4							4	
09:00					3						2	2	
09:15	1				5						8	1	
09:30					4						6		
09:45	2			3	5						3	3	
10:00	3		1	2	4						6	1	
10:15			2		5						4	3	
10:30	3		2	1	6						8	1	
10:45	2		1	1	5						3	2	
11:00	1		2	2	3						2	1	
11:15	1		1	1	6						5		
11:30	1		2	2	3						4	1	
11:45	1		1	1	6						2		
12:00	5		1	2	3						3	3	
12:15	3		3	1	1						5	1	
12:30	3				5						4	1	
12:45	3			1	8						4		
13:00	1				4						7	1	
13:15	1			1	6						6		
13:30	6		2	1	6						8	3	
13:45	1		1	1	16						5		
14:00	3			1	7						7	3	
14:15	1		2		7						4		
14:30	2		2	1	10						12	2	
14:45	5			1	8						4	3	
15:00	1		1	2	4						9		
15:15	4		1		3						8	1	
15:30	6				6						6		
15:45	2			1	6						6	1	
16:00	2				6						7	2	
16:15	1		1	1	3						3		
16:30	1				5						4	2	
16:45	1			1	8						2	2	
17:00				1	6						4	1	
17:15	2			1	5						5	1	
17:30	1		1		4						4		
17:45					2						6		
18:00													
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18:30													
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19:00													
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19:45													
20:00													
20:15													
20:30													
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R503 MAHIKENG TRAFFIC COUNT

