




FILLING STATION FEASIBILITY STUDY (TRAFFIC IMPACT STUDY WITH ASSUMPTIONS)

ERF 20, PRESIDENT PARK X6, ON MANDELA DRIVE, EMALAHLANI, MPUMALANGA

COORDINATES: LAT: 25°52'56.91"S, LONG: 29°15'25.48"E

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1 Introduction & Study Area

1.1 Introduction

EDL Engineers (Pty) Ltd have been appointed to investigate a site for the development of a new and modern filling station. An investigation was therefore undertaken to prepare a study for the opening and operation of a new filling station on the proposed site, which is situated on President Park X6, next to Mandela Drive, in Emalahleni (Witbank), at coordinates 25°52'56.91"S and 29°15'25.48"E, within the borders of the Emalahleni Local Municipality. The evaluation was for a filling station, with a canopy covered forecourt and several pump islands, that can sell petrol and diesel fuels. The site (Erf 20) is currently undeveloped, and measures 9 862m² in extent, of which **±4 200m²** will be utilised for the filling station.

The purpose of the study is to determine whether the site is feasible for the opening and operation of a medium sized modern filling station and to estimate the Litres of Fuel that will be sold monthly. The study considers the development viability by determining the monthly projected volume of fuel to be sold and possible impact on competitor filling stations.

This feasibility report takes certain physical characteristics into account based on information obtained by EDL Engineers (Pty) Ltd during a site inspection and a survey of the traffic volumes and then makes reasonable assumptions on various aspects affecting the feasibility of the proposed site, as well as the competitors within the affected radius, as required by the Department of Energy (DoE). The Proposed Access Layout, as per **Drawing No. 20023/AL/01** can be found at the back of this report.

Please note that the approval of the Accesses, the EIA approval, the licensing, land-use issues/conditions, building plan approvals etc. is outside the scope of this feasibility report and therefore these implementation issues cannot be guaranteed. The developer of the fuel facility must therefore still get all the required approvals for the filling station development on this site, including (but not limited to) the items listed above.

1.2 Study Area

The proposed site, as mentioned, is located on Erf 20 President Park X6, next to Mandela Drive, in Emalahleni, approx. 1.6km north west of where Mandela Drive crosses over the N4 Freeway. Surrounding this proposed development is an undeveloped farmland to the north, Nissan dealership and the residential area of Highland View Estate to the west and the large Highveld Mall to the east, to the south is the Portuguese club and the eastern part of the Del Judor suburb. The major transit route, Mandela Drive, is situated along the northern boundary of the site.

Mandela Drive functions as a Minor Arterial (Class 3) road and runs in an east-west direction. Mandela Drive is a surfaced dual carriageway road with two through lanes of approx. 3.7m wide per direction. This road links the N4 and Witbank Dam to the east with the northern suburbs of Witbank to the west. This road has a kerbed median for most of its length passing the site.

The location of the site is indicated on the locality map in **Figure 1**, after the Conclusions.

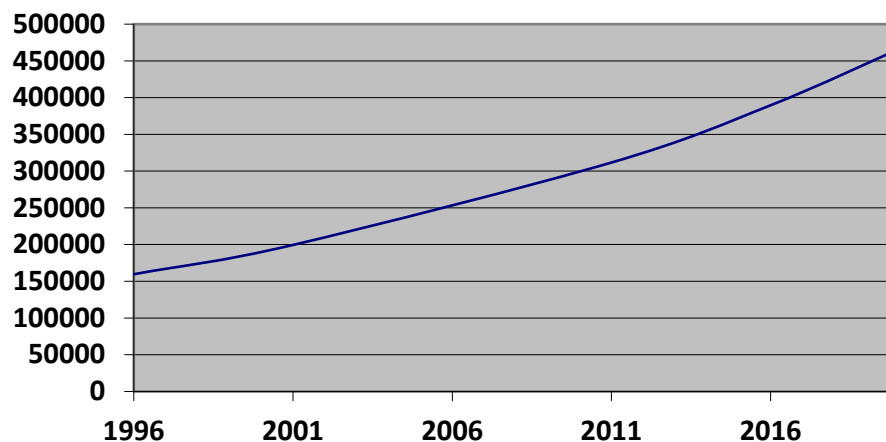
1.3 Increased Demand

Increased demand includes population growth (see Chapter 1.4), new developments (see Chapter 1.7), an increase in vehicle ownership and higher traffic volumes (see Chapter 1.5) that are present at this site location (with the new 12 000m² shopping centre).

Being on the southern side of Mandela Drive, this site mainly serves traffic travelling westbound, with the other nearby sites catering mainly for vehicles travelling eastbound on Mandela Drive. The demand in the area of this site is created by the factors mentioned above and the other sites (competitors) cannot cater for this increased demand, due to their locations (northern side of the road serving mainly eastbound traffic).

1.4 Population growth in the study area

As depicted by the Graph below, the population growth for the area of Witbank and Kwa-Guqa, has been positive every year since 2001 and has increased from 199 468 to about 311 657 people in 2011. This calculates to an average positive population growth rate of just over +4.5% per annum over 10 years. This is based on data from **Statistics South Africa**. Considering this average growth rate of just over +4.5%/annum, it is estimated that the population of the area in and around of Emalahleni (Witbank) should have an estimated population of just over 465 500 in the current year of 2020.



1.5 Traffic growth within the Study Area and Historic Data

As set out in Chapter 1.3 above, it is evident that an above average population growth is experienced in Emalahleni (Witbank) due to the expanding residential areas and numerous new coal mining operations in the surrounding areas. A traffic count conducted in **March of 2010 showed a total of 17 962 vehicles** passing the site, through the intersection of Mandela Drive and Nita Ave in 24-hrs, a new count conducted at the same intersection in **March of 2020 showed a total of 25 296 vehicles** passing the site location. The increase in daily traffic can be calculated as a **compounded growth of 3.46% per year** over 10 years. As there is still undeveloped land available opposite the site, next to Mandela Drive, the traffic growth can be expected to increase further within the foreseeable future. Therefore, considering the abovementioned, **an average annual traffic growth rate of +3.0% / annum** was adopted over the next 3 years for the study area of the site.

1.6 Future Roads

According to the knowledge of EDL Engineers (Pty) Ltd., there are no future roads near the study site nor any changes or upgrades that is proposed for Mandela Drive (other than for the access) near the site in the foreseeable future that might affect the proposed filling station on Erf 20, President Park X6.

1.7 Approved Adjacent Shopping Centre

The balance of Erf 20, Erf 21 and Erf 22 totals about 26 254m² which will be used to develop a 12 000m² (GLA) shopping centre directly adjacent to the filling station. The land use rights (President Park X6) for the 12 000m² shopping centre is already approved and the planning for the next phase (SDP Plans) is currently being undertaken by the appointed architects. This shopping centre (approved) will increase the traffic and the demand for fuel at the site significantly.

1.8 Evaluation of the Study Site

The subject site was investigated, and a qualitative assessment was made, and the site was ranked according to the following descriptions:

Very Poor	Poor	Average	Good	Very Good
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- **Visibility:** Being located next to a Class 3 route that connects several suburbs and places of interest as mentioned before, with no natural obstructions or topography that impairs the visibility, the site is easily visible to passing traffic from a good distance away. The visibility can thus be described as **VERY GOOD**.
- **Location:** The study site is located at an Intersections, next to Mandela Drive, a minor arterial (Class 3) road which feeds traffic to-and from Emalahleni and the N4 Freeway. It is also close to several commercial developments as well as a large shopping centre (Highveld Mall) situated about 500m to the east of where the filling station is proposed. Therefore, the location of the site is considered to be **VERY GOOD**.
- **Access:** A 'Left-in, Left-out' access is proposed from Mandela Drive and a Full access from Nita Avenue is proposed for the proposed filling station (with a right-turn lane for the full access and with a left-slip lane at the intersection of these mentioned roads). It can hence be concluded that seeing as this site will be able to serve both east and westbound traffic travelling on Mandela Drive and both directions of travel on Nita Ave, the access layout can be described as **GOOD**. The access on Nita Ave has been approved as part of the Retail (12,000m² shopping centre) development adjacent to the filling station.
- **Trading Market:** Considering that this filling station relies on daily commuters traveling to-and-from Emalahleni (Witbank) and the N4 Freeway as well as traffic to-and-from the nearby shopping centre, the Nissan dealership located opposite the site and local traffic on Nita Ave, during weekdays and weekends, the trading market is described as **VERY GOOD**. The approved 12 000m² shopping centre adjacent to the site also helps to increase its own local trading market.
- **Competitor Stations:** There are a few existing filling stations situated on Mandela Dr (but are located on the opposite side of Mandela Dr, serving mainly eastbound traffic) and several existing filling stations within Emalahleni, of which none are within 1km radius from the site. There is a total of 7 sites within a 1 - 3km radius. There are also 16 sites within a 3 - 5km radius, but these mainly serve different traffic streams and markets. The study site is thus rated **GOOD** in terms of competitors.
- **Traffic Volumes:** The survey indicated high traffic volumes (around 25 296vpd) passing the proposed site in all directions. The exposure to traffic can thus be described as **VERY GOOD**. Please note that this existing traffic excludes the expected additional 4 200 vpd (vehicles per day) for the approved shopping centre located adjacent.

Considering the criteria discussed above, it can be concluded that the study site has **VERY GOOD** trading potential. Please refer to **Photo 1** in **Annexure A** of this report for a photo of the study site.

1.9 Need for the site

Since 2007 the area surrounding the site has been developing at a steady rate and has seen a significant increase in traffic along Mandela Drive (see Chapter 1.5). Developments

in the area include the large Highveld mall (currently at 66 827m² GLA), Builders Warehouse, a Residential Estate of approx. 400 units (diagonally across the site), Corridor Hill commercial area and the Nissan Motor Dealership (directly opposite the site). The developments in the area attract a large amount of traffic and the potential for future development within the area creates a great need for a new filling station.

The existing nearby filling stations along Mandela Drive are situated on the northern side of the road and therefore aimed towards intercepting traffic traveling eastwards. There is a **kerbed median** in Mandela Drive, **which makes accessing sites on the opposite side of the road difficult and more dangerous**. The **need** for a filling station to intercept the large amount of **traffic travelling westwards** and also to-and-from the various large developments in the area of the site is **significant**, and creates an increasingly important need for a new filling station site on the southern side of Mandela Drive.

2 Impact on Existing Sites

2.1 Competitor Sites

To determine the impact on surrounding sites, it is typical to look at the filling stations sharing the same and adjacent local markets as well as filling stations located along the same routes. This guideline is used by various departments, major fuel companies and agencies. A radius of 3km and 5km is normally looked at in an urban environment, as more impact on the competitors is expected, the closer they are located to the proposed site. In the case where the site is located along a rural arterial or major arterial, it is typical to look further as the area of influence is stretched along a much longer distance due to transient (long distance) traffic traveling between towns and settlements.

According to the latest published draft guidelines (Jan 2020) by DoE, based on the Amended Petroleum Products Act of 1977, an urban site must evaluate the competitors within a **5km radius**.

As this site is located within a portion of a large town (urban area), twenty-three (23) existing sites within a 5km radius were deemed relevant for this study as per the requirement by DoE. **Figure 2** depicts these competitor filling stations in relation to the proposed site, as well as the applicable catchment markets.

2.2 Catchment Markets

Physical man-made barriers (such as freeways, railways, airports etc.) or natural barriers (such as mountains, rivers, or dams) create different markets (catchment areas) for a site. For this study, types of commuters (local vs transient) were also used to divide the study area into the following markets:

- A: The commuter and local market along Mandela Drive
- B: The commuter market between Emalahleni and the N4 highway
- C: The adjacent market of the large Highveld Mall
- D: The adjacent local market of the approved shopping centre (President Park X6)

2.3 Competitor Sites Investigation

The exact reasons on how drivers make their decisions at which filling station to fill up is not known, but it is influenced by the same factors determining the turn-in percentage (interception rate) to be discussed in **Section 3.4**. Other agencies, such as the Department of Energy, consider passing road users' access to petroleum products at existing filling stations and not all the factors influencing the interception rate. These factors will determine the moving market factor (i.e. when the study site gains customers from other existing stations).

Research indicates there are several factors that influence the moving market between competing filling stations. Different petrol brands play a very small role in consumer motivations. The price of the convenience store goods plays a limited role in re-patronage. Aesthetic factors impact on re-patronage and total customer experience (i.e. the interception rate factors mentioned previously) lead people to become more frequent patrons of a filling station. In the past few years rewards programs such as Clicks Clubcard Points, e-bucks and uCount rewards (among others) also became more important for customers and does influence the interception rate, when two filling stations are located near each other. In short, it is the filling station that delivers the best overall experience and service to customers that outperforms the competitors.

The assessment of the impact the proposed filling station will have on other filling stations in the area, was mainly based on the shared traffic streams, but all other factors discussed have also been considered. It is important to note that shared traffic only gives an indication of the daily traffic movement patterns between stations.

The following existing filling stations have been deemed relevant (within a 5km radius) for this study and the distances to the site have been measured along each road to the competitors:

(i) **TOTAL Route N4 Business Park** – 2.15km from Site (Travel Distance)

This filling station is situated on the corner of Mandela Dr and Corridor Crescent, east of the N4 highway. It can be reached by means of a 'Left-in' access on Mandela Dr and a 'Full' access on Corridor Crescent. This site offers four (4) pump islands, selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 28.9 litres per vehicle. This site offers a modern medium sized convenience store with a bakery and an ABSA ATM inside, as well as a coffee station. Nearby shops include a Kohler Auto (Opel and Isuzu dealership), Jimmy's Killer Prawns and a Prosperity Property sale. Please refer to **Photo 2 in Annexure A**.

(ii) **SHELL OR Tambo** – 2.05km from Site (Travel Distance)

This filling station is situated on the corner of Mandela Dr Service Road and OR Tambo Service Road, it can be reached by means of 3 full accesses on the service roads. This site offers four (4) pump islands selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 33.4 litres per vehicle. This site offers a modern OK Express. Nearby businesses include a BMG Bearings, Ford Dealership (Eastvaal Motors). Please refer to **Photo 3 in Annexure A**.

(iii) **SHELL Saveways** – 2.46km from Site (Travel Distance)

This filling station is situated at the Saveways Crescent Centre, it can be reached by means of a 'Full' access to the shopping centre and a 'Left-in and Left-out' access from Mandela Dr. This site offers four (4) pump islands selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 23.5 litres per vehicle. This site offers a modern medium sized convenience store with an internal FNB ATM, with an in-store bakery. Other amenities at the premises include a car wash. Nearby shops include large Saveways Shopping Centre. Please refer to **Photo 4** in **Annexure A**.

(iv) **TOTAL President** – 2.93km from Site (Travel Distance)

This filling station is situated on the corner of Mandela Dr and Nicol St, it can be reached by means of a 'Full' access on Nicol St and a 'Left-in and Left-out' access on Mandela Dr. This site offers four (4) pump islands selling petrol and diesel fuels. Average fills recorded at 18.4 litres per vehicle. This site offers a modern medium sized convenience store with an internal Cash Express ATM. Nearby shops include Solly's Car Sales, Haus of Cars and Porto Shop mini supermarket. Please refer to **Photo 5** in **Annexure A**.

(v) **ENGEN Del Judor** – 3.06km from Site (Travel Distance)

This filling station is situated on the corner of Geringer St and Louise St, it can be reached by means of a full access on each road. This site offers four (4) pump islands selling petrol and diesel fuels and one (1) island with canopy selling diesel fuel exclusively. Average fills recorded at 24.2 litres per vehicle. This site offers a modern medium to large sized convenience store with a Woolworths food and Corner bakery. Other amenities at the premises include a Nedbank ATM. Nearby shops include Barcelos Chicken. This filling station is opposite the police station. Please refer to **Photo 6** in **Annexure A**.

(vi) **TOTAL Plaza** – 6.40km from Site (Travel Distance)

This filling station is situated on the corner of Hans Strydom Ave and Gaselle Ave, it can be reached by means of a full access on each road, one of which is shared with the Reyno Ridge Shopping Centre. This site offers four (4) pump islands under a square canopy selling petrol and diesel fuels. Average fills could not be taken as the pumps were not in operation at the time of visit. This site offers a modern medium sized convenience store. Other amenities at the premises include an ABSA ATM and a car wash. Nearby shops include the Reyno Ridge Centre with a Powerbuild, Pick n Pay, Take 2 Pizza, Gogo's Burgers, Optometrist, Mr Video, Nedbank ATM and Post Office Boxes, etc. Please refer to **Photo 7** in **Annexure A**.

(vii) **ENGEN Kana Filling Station** – 5.74km from Site (Travel Distance)

This filling station is situated near the corner of Hans Strydom Ave and Theunis Janson Ave, it can be reached by means of two large 'Full' accesses on Theunis Janson Ave. This site offers four (4) pump islands under a square canopy selling petrol and diesel fuels. Average fills recorded at 21.1 litres per vehicle. This site offers an older small sized convenience store with a Standard Bank ATM inside. Nearby shops include a Midas, Wheel Wise, Willard Batteries, Cambridge Liquor, Bolt & Nut and Vukuzenzele Auto Electrical Parts & Repairs. Please refer to **Photo 8** in **Annexure A**.

(viii) **SASOL Watermeyer St** – 5.53km from Site (Travel Distance)

This filling station is situated on the corner of Watermeyer St and Hans Strydom Ave, it can be reached by means of a 'Left-in and Left-out' access on Hans Strydom Ave. This site offers four (4) pump islands selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 20.7 litres per vehicle. This site offers a modern medium sized convenience store with an ABSA ATM inside. Other amenities at the premises include a Chicken Licken Drive Thru. Nearby shops include an Autozone and Voltex electrical supplies. Please refer to **Photo 9** in **Annexure A**.

(ix) **CALTEX Motors** – 5.60km from Site (Travel Distance)

This filling station is situated on the corner of Hans Strydom Ave and John Bailie St, it can be reached by means of a full access on John Bailie St and a 'Left-in' on Hans Strydom Ave. This site offers four (4) pump islands selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 24.4 litres per vehicle. This site offers a modern medium to small sized convenience store. Nearby shops include Dunlop Tyre Centre, Canvas Shop and Nesta Foods. Please refer to **Photo 10** in **Annexure A**.

(x) **SASOL Klipfontein** – 5.10km from Site (Travel Distance)

This filling station is situated on the corner of Watermeyer St and Stevenson St, it can be reached by means of a full access on Stevenson St, also serving as access to the shopping mall. This site offers four (4) pump islands selling petrol and diesel fuels. Average fills recorded at 24.1 litres per vehicle. This site offers a modern medium sized convenience store with an internal ABSA ATM. Nearby shops include the Del Judor Mall. The taxi rank/ rest area is also close by. Please refer to **Photo 11** in **Annexure A**.

(xi) **TOTAL Stevenson St** – 5.17km from Site (Travel Distance)

This filling station is situated on the corner of Stevenson St and De Kock Ave, it can be reached by means of a full access on each road. This site offers four (4) pump islands selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 19.4 litres per vehicle. This site offers a modern medium sized convenience store with an ABSA ATM inside. Other amenities at the premises include a car wash. Nearby shops include a Pick n Pay Hyper, KFC, Mahindra Dealership and Coastal Hire. Please refer to **Photo 12** in **Annexure A**.

(xii) **CALTEX Nova Motors** – 4.47km from Site (Travel Distance)

This filling station is situated on the corner of Watermeyer St and Steenkamp St, it can be reached by means of a full access on Steenkamp St and a 'Left-in and Left-out' on Watermeyer St. This site offers five (5) pump islands selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 29.5 litres per vehicle. This site offers a modern large sized convenience store with a Bakery and Seattle Coffee Company. Other amenities at the premises include an ABSA ATM and a car wash. Nearby shops include Fair Deal Motors and Diner Fast Foods. Please refer to **Photo 13** in **Annexure A**.

(xiii) **ENGEN Watermeyer St** – 5.35km from Site (Travel Distance)

This filling station is situated near the intersection of Watermeyer St and Eybers St, it can be reached by means of a 'Left-in and Left-out on Watermeyer St. This site offers four (4) pump islands under a square canopy selling petrol and diesel fuels. Average fills recorded at 25.2 litres per vehicle. This site offers a modern medium sized convenience store with an ABSA ATM inside. Nearby shops include a Hi-Q Tyres, MT Vehicle Sales and a small retail centre. Please refer to **Photo 14** in **Annexure A**.

(xiv) **SASOL Gordon Rd** – 4.11km from Site (Travel Distance)

This filling station is situated on the corner of OR Tambo Rd and Gordon Rd, it can be reached by means of a 'Left-in and Left-out' access on OR Tambo Rd and a full access on Gordon road. This site offers four (4) pump islands selling petrol and diesel fuels. Average fills recorded at 19.3 litres per vehicle. This site offers a modern medium sized convenience store with an ABSA ATM inside. Other amenities at the premises include a car wash. Please refer to **Photo 15** in **Annexure A**.

(xv) **SASOL Voortrekker Rd** – 4.73km from Site (Travel Distance)

This filling station is situated on the corner of OR Tambo Rd and Voortrekker Rd, it can be reached by means of a full access on OR Tambo Rd and a 'Left-in and Left-out' accesses on Voortrekker Rd. This site offers four (4) pump islands under a square canopy selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 27.1 litres per vehicle. This site offers a modern medium sized convenience store with an ABSA ATM inside. Nearby shops include a KFC opposite the site and the Techno Park Business Park next to the site. Please refer to **Photo 16** in **Annexure A**.

(xvi) **SHELL Midwit Diesel** – 5.07km from Site (Travel Distance)

This filling station is situated on the corner of Voortrekker Rd and an access road, it can be reached by means of a large full access on the access road. This site offers four (4) pump islands under a square canopy selling diesel fuel exclusively. Average fills recorded at 117.7 litres per vehicle. This site offers a shop selling oil and lubricants. Nearby businesses include a Storage facility, large trucking depot (currently for sale), Gear industries, Bosnia Used Cars and Sterling Equipment Rental. All pumps are accessible to large trucks and trailers. Please refer to **Photo 17** in **Annexure A**.

(xvii) **ENGEN Joubert St** – 5.79km From Site (Travel Distance) - Closed

This filling station is situated near the intersection of Voortrekker Rd and 2nd Ave, it can be reached by means of a full access on each road. This site offers three (3) pump islands selling petrol and diesel fuels. Average fills were not recorded as the pumps were not operational. This site offers a modern medium sized convenience store (also closed currently) with an ABSA ATM inside. Nearby shops include a Fat Boys Liquor Store and Safari Supermarket and Take-Aways. Please refer to **Photo 18** in **Annexure A**.

(xviii) **SASOL Leyds Ave** – 5.97km from Site (Travel Distance)

This filling station is situated on the corner of Voortrekker Rd and Leyds Ave, it can be reached by means of a full access on each road. This site offers three (3) pump islands selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 32 litres per vehicle. This site offers a modern medium sized convenience store with a Coffee Machine and an ABSA ATM inside. Nearby shops include Dynamic Trade Academy, Photi Towing Services & Auto Repair, Pizza Perfect, Citroen Car Dealership and Ram Couriers. Please refer to **Photo 19** in **Annexure A**.

(xix) **CALTEX Park Motors** – 3.84km from Site (Travel Distance)

This filling station is situated on the corner of Mandela Dr and Smuts Ave, it can be reached by means of a full access on each road. This site offers six (6) pump islands under a square canopy selling petrol and diesel fuels. Average fills recorded at 11.9 litres per vehicle. This site offers a modern medium sized convenience store. Other amenities at the premises include a Cash Express ATM and a car wash. Please refer to **Photo 20** in **Annexure A**.

(xx) **CALTEX Elizabeth Ave** – 5.04km from Site (Travel Distance)

This filling station is situated on the corner of Voortrekker Rd and Elizabeth Ave, it can be reached by means of two full accesses on Voortrekker Rd. This site offers four (4) pump islands under a square canopy selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 33.2 litres per vehicle. Nearby shops include Autostar Supermarket, Witbank Panelbeaters and Danie Verwey Service Centre. Please refer to **Photo 21** in **Annexure A**.

(xxi) **SASOL CBD** – 5.59km from Site (Travel Distance)

This filling station is situated on the corner of Mandela St, Diedericks St and Langermann St, it can be reached by means of a full access on each road. This site offers four (4) pump islands selling petrol and diesel fuels and one (1) island selling diesel fuel exclusively. Average fills recorded at 19 litres per vehicle. Nearby shops include a Spar, Tops, BFS Loans, Samad Cash & Carry, DStv and 4 Way Motor Spares. Please refer to **Photo 22** in **Annexure A**.

(xxii) **SASOL Walter Sisulu** – 6.51km from Site (Travel Distance)

This filling station is situated on the corner of Walter Sisulu Dr and Colliery St, it can be reached by means of a full access on Walter Sisulu Dr. This site offers five (5) pump islands selling petrol and diesel fuels and two (2) islands with canopies selling diesel fuel exclusively. Average fills recorded at 28.3 litres per vehicle. This site offers a modern large sized convenience store, a Galitos Chicken and an ABSA ATM inside. Nearby shops include a large Spar. Please refer to **Photo 23** in **Annexure A**.

(xxiii) **ENGEN GC Gypsy** – 6.89km from Site (Travel Distance)

This filling station is situated on the corner of the N12 on/off ramp and Watermeyer St, it can be reached by means of a full access and a 'Left-out' on Watermeyer St, as well as a full access on Pioneer Ave. This site offers five (5) pump islands selling petrol and diesel fuels. Average fills recorded at 38.9 litres per vehicle. This site offers a modern medium sized convenience store with a Wimpy and Woolworths food inside. Other amenities at the premises include a Nedbank ATM. Nearby shops include a Sun 1 Hotel, Safari Centre and Gypsy Caravans. Please refer to **Photo 24** in **Annexure A**.

2.4 Impact on existing sites

An estimation of the shared traffic between the study site and the abovementioned existing competitor stations is summarised in **Table 1**. Shared traffic can be accurately calculated by conducting traffic counts at intersections closest to competitor stations and other intersections where traffic can be diverted. In lieu of such information, a percentage of shared traffic is calculated from previous counts and reasonable assumptions are made, based on EDL's experience with conducting feasibility studies and knowledge regarding the area and traffic movement in the study area.

Table 1: Expected Shared Traffic

SITE	FILLING STATION	POTENTIAL PASS-BY TRAFFIC (VEH/DAY)	POTENTIAL TRAFFIC SHARED WITH NEW FILLING STATION (VEH/DAY)	PERCENTAGE OF TOTAL TRAFFIC SHARED (%)
1	TOTAL Route N4 Business Park	15 000	3 750	25%
2	SHELL OR Tambo	21 000	4 200	20%
3	SHELL Saveways	17 500	2 975	17%
4	TOTAL President	16 500	2 475	15%
5	ENGEN Del Judor	18 000	1 800	10%
14	SASOL Gordon Rd	15 000	1 500	10%
15	SASOL Voortrekker Rd	22 000	1 650	7.5%
16	SHELL Midwit Diesel	16 000	1 200	7.5%
17	ENGEN Joubert St	16 000	Closed	-
19	CALTEX Park Motors	11 000	1 100	10%
	TOTAL Plaza, ENGEN Kana FS, SASOL Watermeyer St, CALTEX Motors, SASOL Klipfontein, TOTAL Stevenson St, CALTEX Nova Motors, ENGEN Watermeyer St, SASOL Leyds Ave, CALTEX Elizabeth Ave, SASOL CBD, SASOL Walter Sisulu, ENGEN CG Gypsy			<5%

Note that the traffic shared between existing stations and the study site does not imply the same or proportional percentage of lost fuel sales. Passing road users are more likely to purchase fuel or turn into a filling station based on the overall aesthetic perception of the facility and the quality of service offered. The station’s location, its accesses, available amenities, visibility, site layout and overall convenience offered influence the loss of fuel sales when competing against a new, modern competitor. A summary of the potential loss in fuel sales is indicated in **Table 2**.

Table 2: Impact on Surrounding Sites – Lost of Fuel Sales

SITE	FILLING STATION	MOVING MARKET FACTOR (%)
1	TOTAL Route N4 Business Park	10%
2	SHELL OR Tambo	8%
3	SHELL Saveways	7%
4	TOTAL President	6%
5	ENGEN Del Judor	5%
14	SASOL Gordon Rd	5%
19	CALTEX Park Motors	5%
	TOTAL Plaza, ENGEN Kana FS, SASOL Watermeyer St, CALTEX Motors, SASOL Klipfontein, TOTAL Stevenson St, CALTEX Nova Motors, ENGEN Watermeyer St, SASOL Voortrekker Rd, SHELL Midwit Diesel, ENGEN Joubert St, SASOL Leyds Ave, CALTEX Elizabeth Ave, SASOL CBD, SASOL Walter Sisulu, ENGEN CG Gypsy	<5%

The development and operation of the proposed filling station will have an initial impact on a number of filling stations in the study area, but considering the shared traffic and different markets catered for by each one of these competitor stations, this impact should not irreparably jeopardise these businesses as they have different markets and this development mainly caters for a different portion of the local market and westbound traffic along Mandela Drive.

2.5 Conclusions on Competitor Stations

From Table 2, it can be concluded that the impact of the competitors will be low, mainly due to the competitor sites serving different markets and located on the opposite side of the street. The existing TOTAL N4 Business Park is also located on the opposite side of Mandela Drive and will be the most affected (10% impact) but will be able to recover most of the lost sales within 3 to 4 years after the proposed filling station is constructed, due to the positive traffic growth in Emalahleni. The balance of the expected fuel sales in a month, that is not gained from the mentioned competitors will be gained from the commuter traffic, daily passing the site (mainly westbound on Mandela Drive), specifically vehicles that currently fill-up elsewhere (outside the study area).

All the other sites affected on Mandela Drive closer to the CBD are located on the opposite side of the road, and therefore mainly serve different traffic streams (including eastbound traffic on Mandela Drive).

3 Estimated Sales of Proposed Site

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

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

Liters per month (L) = [Vehicles per day passing the site (ADT)]
x
[Average fuel fill per vehicle (\bar{F})]
x
[Percentage vehicles of pass-by traffic turning into the site(p)]
x
[Average full normal trading days in a month (d)]

Each of the factors used in the calculation formula for fuel sales shown above, are discussed in the following subsections of this chapter.

3.1 2020 Traffic Demand Count

Traffic Counts were used to determine the traffic demand and traffic volumes for the study area. A classified count was conducted by EDL in March 2020, at the intersection of Mandela Dr and Nita Ave as indicated in **Figure 1**.

The detailed (classified) traffic count report is attached as **Annexure B**.

The Average Daily Traffic (ADT) currently travelling through this intersection is approximately **25 296 vehicles per day**, with heavy vehicles constituting approximately **1.7%** of the daily traffic and Taxi's about **6.2%** of the daily traffic.

The daily traffic flows were broken down in the different directions, as shown in the next Sub-chapter.

3.2 2020 Traffic Demand (ADT)

The 13-hour classified traffic count that was conducted by EDL on the **17th of March 2020** at the intersection of Mandela Dr and Nita Ave as indicated in **Figure 1**. These counts were converted to 24-hour counts and broken up into different traffic streams as shown below:

- **10 947 veh/day** westbound on Mandela Dr past the site.
- **9 960 veh/day** eastbound on Mandela Dr past the site (Not passing and Access).
- **2 921 veh/day** northbound on Nita Ave past the site (Negative)
- **1 468 veh/day** southbound on Nita Ave past the site.

From the traffic count (2020), the site is exposed (vehicles passing the site) to an ADT of approx. **25 296 veh/day** travelling in all directions along Mandela Dr and Nita Ave at the intersection where the filling station is proposed.

The existing Nissan, UD Trucks and Datsun dealerships opposite the site and the new approx. 400 unit Residential development on Nita Ave will contribute a large amount to the traffic passing the site and therefore increases the need for a new filling station in the area.

3.3 Future Traffic Demand

Nearby future developments include the addition of a shopping centre directly adjacent to the site, with approved rights for approximately 12 000m² GLA (Gross Leasable area). **This shopping centre will add approx. 4 200 vehicles per day**, as per Table 3.1 in the COTO TMH 17 Manual with an AADT trip rate of 35 vehicles/100m²/Day.

From the above, it is clear that the **future traffic demand will increase significantly**.

3.4 Average Fill (\bar{F})

The average fill at a site varies depending on the type of traffic it is exposed to, with higher fills generally encountered at sites exposed to more transient traffic and lower fills for local traffic. Lower fills can also be expected for sites situated in lower income areas, for older sites and higher fills in more affluent (high income) areas, and modern sites.

In order to get an indication of the average fill in die study area, a survey was conducted at the relevant sites (within the study area) where fill volumes were recorded, and the facilities provided at each station recorded. The survey indicated an average fill at nearby stations in higher income areas of approximately **12 - 39 litres per vehicle**. Due to the slightly lower local traffic in the area of the site and for the purpose of the study, an average fill of **22 litres per vehicle** was deemed appropriate and adopted for the calculations of the subject site.

3.5 Interception Rates (p)

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

- Convenience (clean new facility and easily accessible).
- Visibility (good/long time to decide whether to use the facility or not).
- The amount of passer-by traffic (as per traffic count).
- Type of traffic (transient, commuter or local; income level of the area also a factor).
- Other nearby filling stations (distances to competitor sites).
- Service provided to public (car wash, convenience shop, A.T.M. etc).
- Good accesses (proper deceleration and acceleration lanes).
- Location (homebound and work bound and surrounding area).
- Site layout (large enough to provide easy site circulation)
- Fuel Rewards Programs

From previous site surveys and experience with existing and new filling station developments, it has been determined that there is a relationship between the interception rate and the passing traffic volumes of a site. This relationship is illustrated by the graph in the next page. The expected interception rates for the different traffic streams of the proposed development are also indicated on the graph and tabulated in **Table 3** on the next page. The interception rates for traffic flow on the opposite side of the road from the filling station is lower as vehicles need to cross traffic to enter the filling station, and eastbound traffic on Mandela Dr is also low as the traffic does not have direct access.

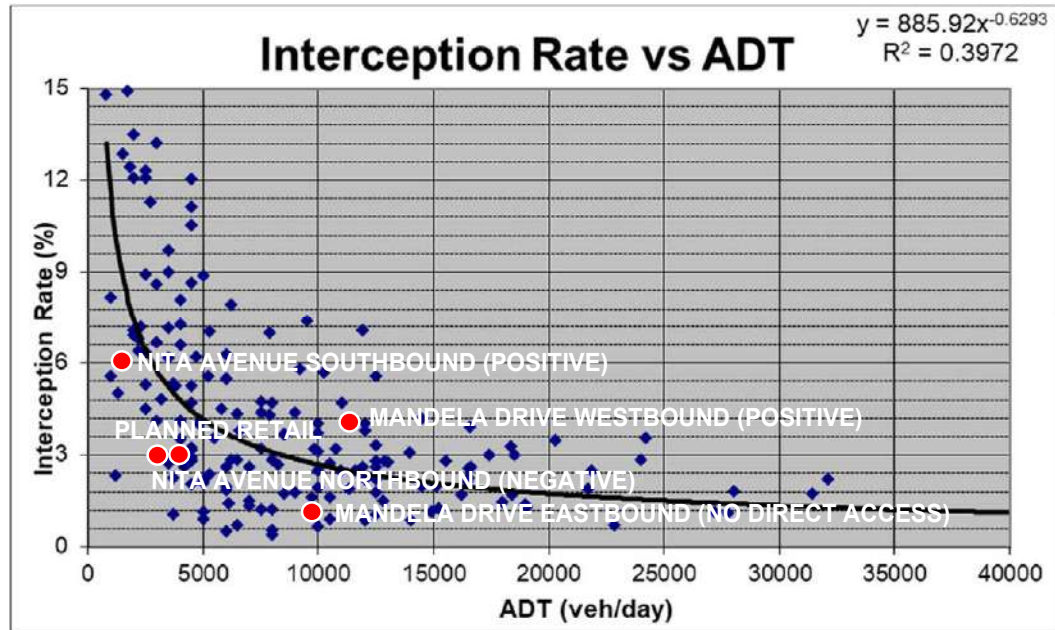


Table 3: Expected Interception Rates

ADT = 25 296 EXISTING VEH/DAY PASSING THE SITE		
ROAD AND DIRECTION	TRAFFIC VOLUME (VEH/DAY)	ADOPTED INTERCEPTION RATE
Westbound on Mandela Dr past the site (Positive Traffic)	10 947	4.0%
Eastbound on Mandela Drive past the site (No Direct Access)	9 960	1.0%
Northbound on Nita Ave past the site (Negative Traffic)	2 921	3.0%
Southbound on Nita Ave past the site (Positive Traffic)	1 468	6.0%
Planned (& Approved) Retail Development (±12,000m ²)	4 200	3.0%

As can be seen on the **Interception Rate vs ADT graph** above, the interception rates expected for the subject site varies on the Mandela Dr and Nita Ave. Lower interception rates are expected for the traffic travelling on the opposite side of the street, which will have to turn across oncoming traffic (negative traffic), and also on Mandela Dr eastbound traffic, which does not have direct access to the site, and have to use Nita Avenue to access the site.

3.6 Full trading days in a month

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 during a week with no school holidays or public holidays. If there was no variation in the traffic, there would have been 30.5 (365/12) full normal trading days in a month. If, for example, the weekend traffic demand is lower than during the week, the full normal trading days in a month becomes less. It is thus wrong to assume that a default value of 30.5 days should be used since a 24-hour facility will be operated each day of the month.

Traffic patterns in the study area largely determine the number of trading days per month. For filling stations situated in areas largely exposed to commuter traffic, 26 full trading days in a month can be expected. The 26 days is based on the fact that a Saturday and Sunday each only count for only half a trade day, resulting in only 6 full days of trading each week.

With the nearby mall and attractions generating higher traffic on Saturdays and Sundays. It is expected that **28 trading days** per month is appropriate and was therefore assumed for the proposed filling station.

3.7 Expected Monthly Sales

For new developments, a general guideline is used when estimating fuel sales for future years. It is commonly found that the full potential of a filling station's fuel sales is not reached during the first year of operation. Only during the third year the full (100%) potential is normally reached.

In-depth calculations for diesel sales were not conducted separately for this study. The average fills on diesel is more than that of petrol, but the profit per litre is lower. It was thus assumed that the typical profit on diesel transactions will be similar to the profit on petrol transactions. Diesel sales normally constitute only 5 – 20% of the total fuel sales, depending on the % Heavy Vehicles and there are usually other competitors that already cater for the diesel market, by offering reward programs and discounts as well as 30-day accounts.

For the purpose of this study and considering the surrounding area and the very low percentage of heavy vehicles passing the site, it was estimated that diesel transactions will account for approximately only 10% of the monthly fuel sales. A summary of the estimated fuel sales is presented in **Table 4** on the next page.

Table 4: Estimated Fuel Sales per month

President Park X6, Emalahleni (Mandela Dr & Nita Ave)

MONTHLY SALES POTENTIAL	ALL VEHICLES				
	Mandela Dr		Nita Ave		New Retail
	EAST	WEST	NORTH	SOUTH	
Traffic Flow (Vehicles per Day)	9 960	10 947	2 921	1 468	4 200
Average Fill (Litres per Day)	22,0	22,0	22,0	22,0	22,0
Trading Days (Days per Month)	28	28	28	28	28
Interception Rate (%)	1,00%	4,00%	3,00%	6,00%	3,00%
SUB-TOTAL	61 354	269 734	53 980	54 257	77 616
SALES POTENTIAL	331 088		108 237		77 616
					516 941

ANNUAL FORECAST - MONTHLY SALES POTENTIAL						
PERIOD		POTENTIAL GROWTH		ESTIMATED LITRES		TOTAL
YEAR		Percentage of Potential	Growth Rate	Petrol	Diesel	LITRES PER MONTH
1	2021	90%	3,00%	431 284	47 920	479 204
2	2022	95%	3,00%	468 901	52 100	521 002
3	2023	100%	3,00%	508 388	56 488	564 875

Major fuel companies generally regard a new urban site feasible if the fuel sales volume forecast indicates that more than 300 000 litres of fuel will be sold per month. Considering the expected fuel sales tabulated in **Table 4** to OVER 564 000 litres in the 3rd year of operations, it can be concluded that the proposed site will be feasible for the development of a filling station for all the larger fuel companies, (such as SASOL, TOTAL, ENGEN, BP, SHELL, etc.) at the intersection of Mandela Dr and Nita Ave. Please note that the feasibility will be dependent on obtaining direct access approval from both Mandela Dr and Nita Ave, similar to what we propose on enclosed **Drawing 20023/AL/01**.

4 Feasibility of Proposed Site

We have previously consulted with filling station developers and considered several new filling station development cases for minimum monthly fuel sales thresholds and for development costs. Table 4 below provides a summary of the typical costs associated with a new, modern (medium) filling station development located on a site roughly like the proposed filling station.

Table 5: Typical Costs of a New Filling Station

COST ITEM	COST	COST
1. ZONED PROPERTY		R 4 500 000.00
1.1 Rights, EIA, Licenses, etc.	R 900 000.00	
1.2 Land Cost	R 2 500 000.00	
1.3 Developer Profit	R 500 000.00	
1.4 Bulk Service Contribution	R 350 000.00	
2. CIVIL ENGINEERING CONTRACT		R 3 900 000.00
2.1 Access (External Roads)	R 1 500 000.00	
2.2 Internal Roads (incl. paving & kerbs)	R 1 500 000.00	
2.3 Earthworks	R 750 000.00	
2.4 Services	R 150 000.00	
3. BUILDER'S CONTRACT		R4 300 000.00
3.1 Building	R 1 350 000.00	
3.2 Canopy	R 1 000 000.00	
3.3 Signage	R 120 000.00	
3.4 Shop Fitting	R 350 000.00	
3.5 Computer & CCTV System	R 230 000.00	
3.6 Generator	R 250 000.00	
4. OTHER		R 1 450 000.00
4.1 Franchise Fee	R 250 000.00	
4.2 Professional Fees	R 950 000.00	
4.3 Gardens, Irrigation and Fencing	R 250 000.00	
TOTAL		R 14 150 000.00

The cost variation of a filling station development is largely influenced by the cost of the zoned property, the size of the site and the civil engineering works (mainly the cost of the earthworks and the accesses). Major fuel companies generally regard such an urban site feasible if the projected fuel sales are in the region of 300 000 liters per month, depending on several factors, but this is not cast in stone and various fuel companies have different views on the required minimum fuel sales thresholds.

Given the expected fuel sales in year 3, tabulated in **Table 4** ($\pm 564\ 000$ liters per month) and the estimated development cost in the table above ($\pm R14.15m$), it can be concluded that the proposed filling station will be feasible for the larger fuel companies as the projected fuel sales are way more than 300 00 litres per month.

5 Other Traffic Engineering Considerations

5.1 Impact on Traffic Flow past the site (Safety)

Road authorities have in the past identified the possible negative impact a filling station can have on the traffic flow past a site. After proper research and the input from various experienced traffic engineers, the BB2 design manual and Guidelines for Access to Filling Stations were compiled to ensure the construction of proper and safe accesses to filling stations.

A 'Left-in and Left-out' access is proposed on Mandela Dr at approx. 100m east of the intersection of Mandela Dr and Nita Ave.

A 'Full' access is proposed on Nita Ave at approx. 80m south of the intersection of Mandela Dr and Nita Ave. These accesses will have very little impact on passing traffic (due to new deceleration lanes), as we propose them on **Drawing 20023/AL/01**.

The impact of the proposed filling station on the existing traffic flow must be considered for the following two phases:

(i) During the Construction Phase

During the construction phase, construction vehicles or even abnormal vehicles or delivery vehicles could affect and/or disrupt current traffic flows. During this phase possible traffic congestion or increase in congestion, temporary obstructions in the roadway and the influence on adjacent developments must be considered.

(ii) During the Operational Phase

During the **operational** phase, the existing traffic flow patterns on the roadways adjacent to the proposed site are expected to vary and change over time. Filling stations are developments that intercept trips from the background traffic as opposed to other developments that generate additional trips. The interception of traffic could cause minor disruptions if not considered thoroughly.

The following issues should be considered to minimize the possible negative impacts that the proposed filling station might have on the passing traffic during the operational phase:

- The detail design of the proposed filling station should adhere to the prescribed specifications (and subsequent approvals) of the applicable road authorities.
- Care should be taken pertaining to the placing of signage in the proximity of access points to the proposed filling station.
- Issues pertaining to surface damage and poor condition of the roads in proximity of the site should be reported to the applicable authority and custodian of the respective roads; and
- Appropriate road signs and traffic markings should be implemented at the site to ensure safe and convenient access for passing traffic on both roads.

It can be concluded that the existing traffic passing the site will not be negatively affected by the proposed filling station's operations, as the issues mentioned above will be addressed by proper access design standards, turning and deceleration lanes (where applicable) as well as appropriate signage.

5.2 Delivery Vehicle Path

Like road safety, the path of the delivery vehicle is also evaluated by the road authority. The geometric standards adopted in the design manuals allow for a fuel delivery vehicle to enter and exit a site safely. Typically, the entrance lane width should be at least 5m wide, to accommodate a Single Unit + Trailer Heavy Vehicle. For light vehicles, a minimum width of only 3.5m is required. As can be seen on **Drawing 20023/AL/01**, with the turning circles of a fuel delivery truck shown.

It can be concluded that the proposed site will be able to accommodate such fuel delivery vehicles.

6 Conclusions

The following conclusions were made regarding the proposed filling station:

- The expected fuel sales for the proposed filling station development is summarized in **Table 4**. The estimated fuel sales for the proposed filling station's third year of operation is approximately **564 000 litres per month**.
- The proposed filling station is expected to take between 5% and 10% from seven (7) competitor sites (Table 2), with 16 sites expected to be impacted less than a 5%. The proposed site will have an initial negative impact (between 5% and 10%) on a number of existing filling stations in the study area, but considering the different markets and traffic streams catered for, by each of the existing filling stations as well as the distances away from the proposed filling station, the impact should not irreparably jeopardize these businesses and with the positive traffic growth in the area, will be able to recover within 3 – 4 years of the new Filling Station being implemented.

A 'Left-in and Left-out' access is proposed on Mandela Dr and a 'Full' access is also proposed on Nita Ave, details are shown on **Drawing 20023/AL/01**.

General Conclusions

Major fuel companies generally regard a new urban site feasible if the fuel sales are more than 300 000 litres sold per month. Regarding the proposed site, as the passing traffic is over 25 000 vehicles per day and the monthly volume as summarized in **Table 4** is estimated at ±564 000 litres per month by the 3rd year of operation, the proposed site will be feasible for all of the fuel companies.

Considering the expected fuel sales tabulated in **Table 4**, it can be concluded that the proposed site will indeed **be feasible** for the development of a filling station, subject to obtaining access approval from Mandela Drive.

Figures

Figure 1 Locality Plan

Figure 2 Competitor Sites

Figure 3 Existing 2020 (24 Hr) Traffic Volumes



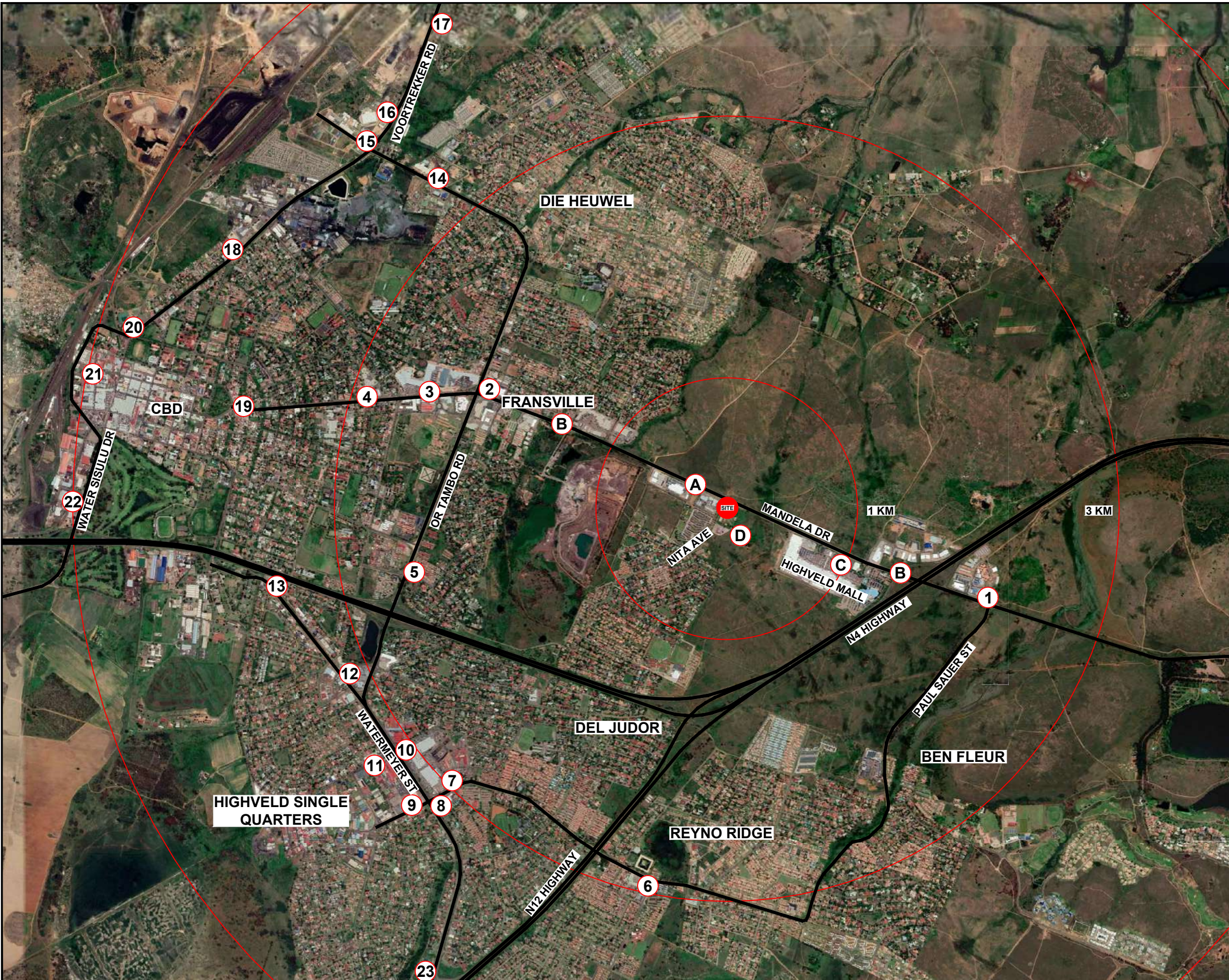
20023

● SITE LOCATION
○ KEY INTERSECTION

SITE:
PRESIDENT PARK X6

TITLE:
LOCALITY

FIG 1

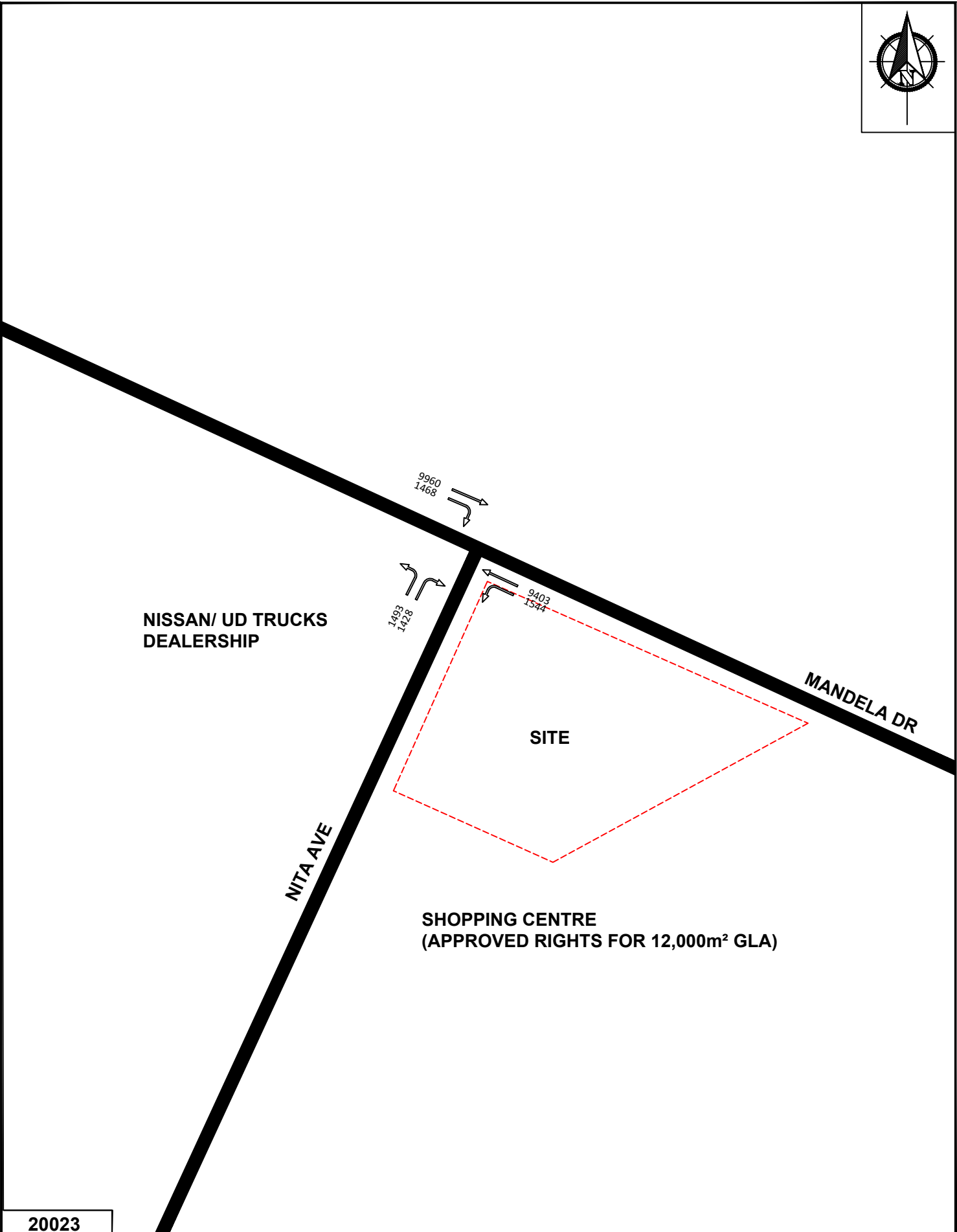


COMPETITOR SITES		
NO.	SITE	ROUTE DISTANCE
1	TOTAL ROUTE N4 BUSINESS PARK	2.15km
2	SHELL OR TAMBO	2.05km
3	SHELL SAVEWAYS	2.46km
4	TOTAL PRESIDENT	2.93km
5	ENGEN DEL JUDOR	3.06km
6	TOTAL PLAZA	6.40km
7	ENGEN KANA FILLING STATION	5.74km
8	SASOL WATERMEYER ST	5.53km
9	CALTEX MOTORS	5.60km
10	SASOL KLIPFONTEIN	5.10km
11	TOTAL STEVENSON ST	5.17km
12	CALTEX NOVA MOTORS	4.47km
13	ENGEN WATERMEYER ST	5.35km
14	SASOL GORDON RD	4.11km
15	SASOL VOORTREKKER RD	4.73km
16	SHELL MIDWIT DIESEL	5.07km
17	ENGEN JOUBERT ST	5.79km
18	SASOL LEYDS AVE	5.97km
19	CALTEX PARK MOTORS	3.84km
20	CALTEX ELIZABETH AVE	5.04km
21	SASOL CBD	5.59km
22	SASOL WATER SISULU	6.51km
23	ENGEN CG GYPSY	6.89km
A	LOCAL AND COMMUTER MARKET ALONG MANDELA DR	
B	COMMUTER MARKET BETWEEN RESIDENTIAL AREAS AND N4	
C	ADJECENT MARKET OF HIGHVELD MALL	
D	APPROVED SHOPPING CENTRE (LOCAL MARKET)	

SITE:	PRESIDENT PARK X6
TITLE:	MAIN ROUTES AND COMPETITOR SITES

FIGURE 2		20023	MAY 2020
DRAWING NO.		PROJECT NO.	DATE.
1 : 30 000	JMvR	E.D. KOTZE	0
SCALE AT A3.	DRAWN.	CHECKED.	REVISION.

EDL CONSULTING ENGINEERS
 1st Floor, Block D
 The Village Office Park
 C/O Glenwood Rd & Oberon Ave,
 Fearie Glen, 0043
 Tel: 087 897 5074/5/6
 eben@edlengineers.co.za
 www.edlengineers.co.za



20023

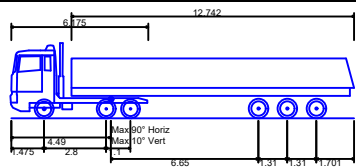
SITE:
PRESIDENT PARK X6

TITLE:
EXISTING 2020 (24 HOUR) TRAFFIC

FIG 3


Drawings

Drawing No: 20023/AL/01 Concept Access Layout



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



SITE: PRESIDENT PARK X6	DRAWING NO. 20023/AL/01		PROJECT NO. 20023	DATE. 27/05/2020	 EDL CONSULTING ENGINEERS 1st Floor, Block D The Village Office Park C/O Glenwood Rd & Oberon Ave, Fearie Glen, 0043 Tel: 087 897 5074/5/6 eben@edlengineers.co.za www.edlengineers.co.za
	TITLE: CONCEPT ACCESS LAYOUT	SCALE AT A3. 1 : 1 000	DRAWN. JMvR	CHECKED. ED KOTZE	

REV:	DESCRIPTION:	BY:	DATE:
AMENDMENTS:			

Annexures

Annexure A Competitor Filling Station Photos

Annexure B Traffic Count Report

Annexure A

Competitor Filling Station Photos

Photo 1: SITE



Photo 2: TOTAL ROUTE N4 BUSINESS PARK



Photo 3: SHELL OR TAMBO



Photo 4: SHELL SAVEWAYS



Photo 5: TOTAL PRESIDENT



Photo 6: ENGEN DEL JUDOR



Photo 7: TOTAL PLAZA



Photo 8: ENGEN KANA FILLING STATION



Photo 9: SASOL WATERMEYER ST



Photo 10: CALTEX MOTORS



Photo 11: SASOL KLIPFONTEIN



Photo 12: TOTAL STEVENSON ST



Photo 13: CALTEX NOVA MOTORS



Photo 14: ENGEN WATERMEYER ST



Photo 15: SASOL GORDON RD



Photo 16: SASOL VOORTREKKER RD



Photo 17: SHELL MIDWIT DIESEL



Photo 18: ENGEN JOUBERT ST



Photo 19: SASOL LEYDS AVE



Photo 20: CALTEX PARK MOTORS



Photo 21: CALTEX ELIZABETH AVE



Photo 22: SASOL CBD



Photo 23: SASOL WALTER SISULU



Photo 24: ENGEN GC GYPSY



Annexure B

Traffic Count Report



TRAFFIC COUNT REPORT

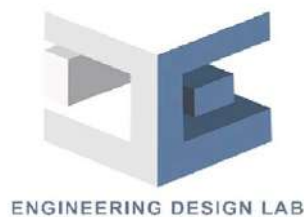
ONE DAY CLASSIFIED

1 LOCATION

MANDELA DRIVE & NITA AVENUE (WITBANK)

PREPARED FOR CLIENT :

COUNT DATE	TUESDAY 17 MARCH 2020
DATE APPROVED	27-May-20
PROJECT ENGINEERS	EBEN KOTZE PR. TECH JOHN VAN ROOYEN B. ENG
PROJECT NUMBER	20023



EDL
EDL Engineers (Pty) Ltd
1st Floor, Block D
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C/o Glenwood Rd & Oberon Ave,
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Cell: +27 (0)83 564 1563
Tel: +27 (0)87 897 5074/5/6
Email: eben@edlengineers.co.za
www.EDLengineers.co.za

Table of Contents

1. SITE LOCATION


3

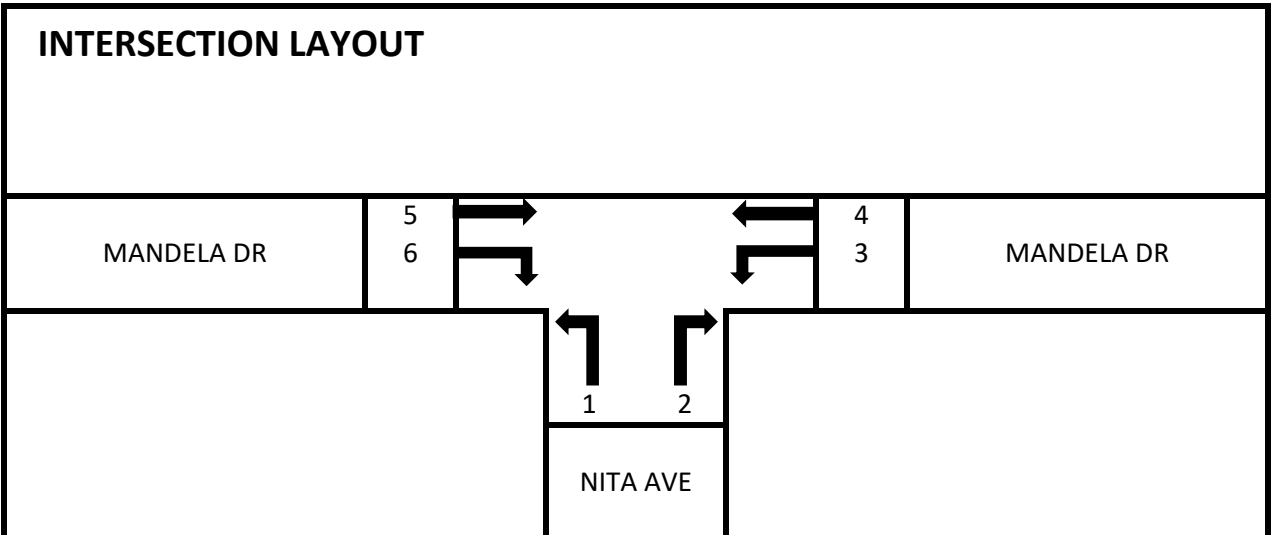
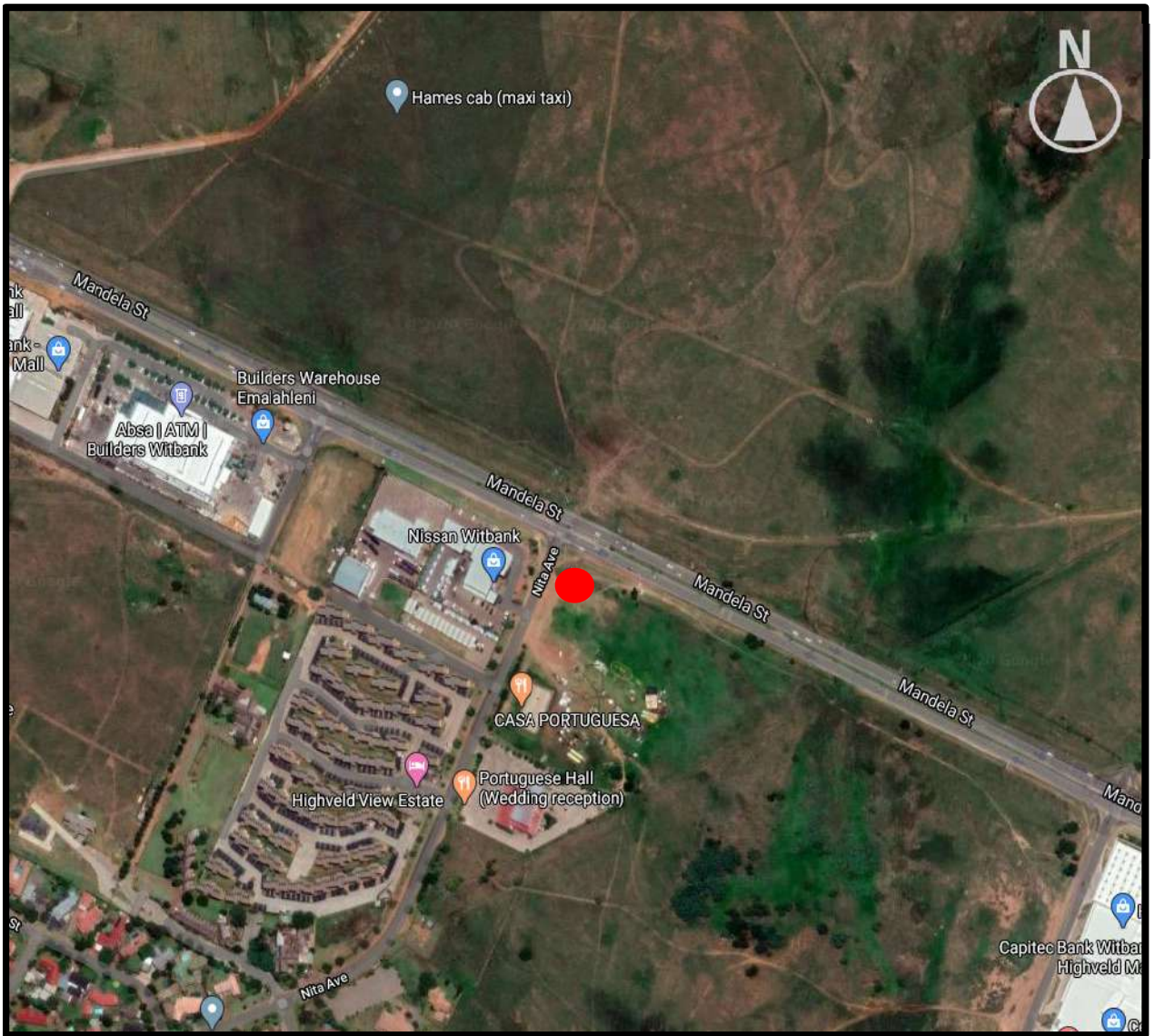
LOCALITY PLAN.....	3
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2. TRAFFIC COUNT : 1 LOCATION

R24 / D1691

Movement Summary All Vehicles.....	4
Movement Details All Vehicles.....	5
Movement Summary Light Vehicles.....	6
Movement Details Light Vehicles.....	7
Movement Summary Taxis.....	8
Movement Details Taxis.....	9
Movement Summary Busses.....	10
Movement Details Busses.....	11
Movement Summary Heavy Vehicles.....	12
Movement Details Heavy Vehicles.....	13
Movement Total Traffic.....	14
Movement Graphs Traffic Classes.....	15

Site Location:	MANDELA DR & NITA AVE			Coordinates:	-25.882328	29.257052
Date:	17/03/2020			 TDS Traffik Data Solutions		
Survey Times:	06:00	to	19:00			
LOCALITY MAP						



Site Location: MANDELA DR & NITA AVE Coordinates: -25.882328 29.257052

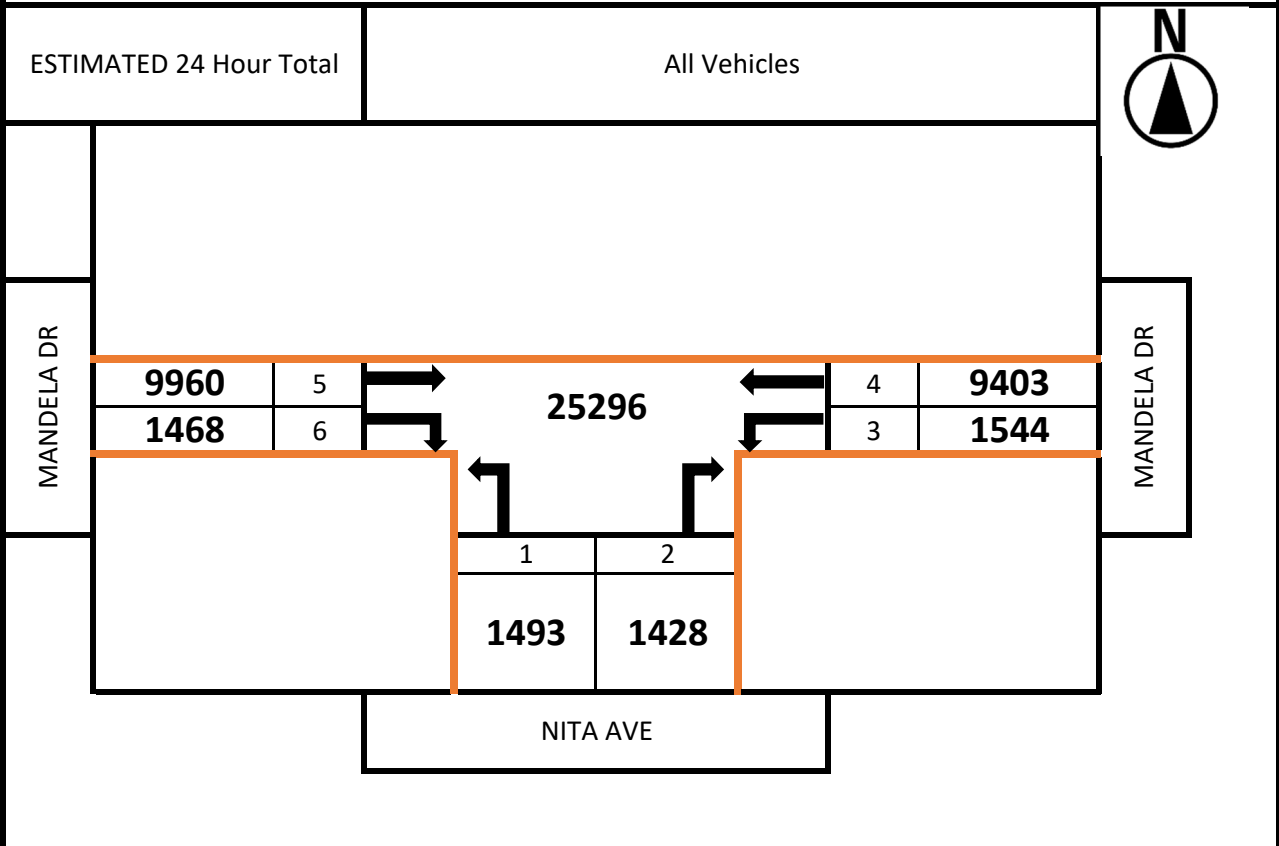
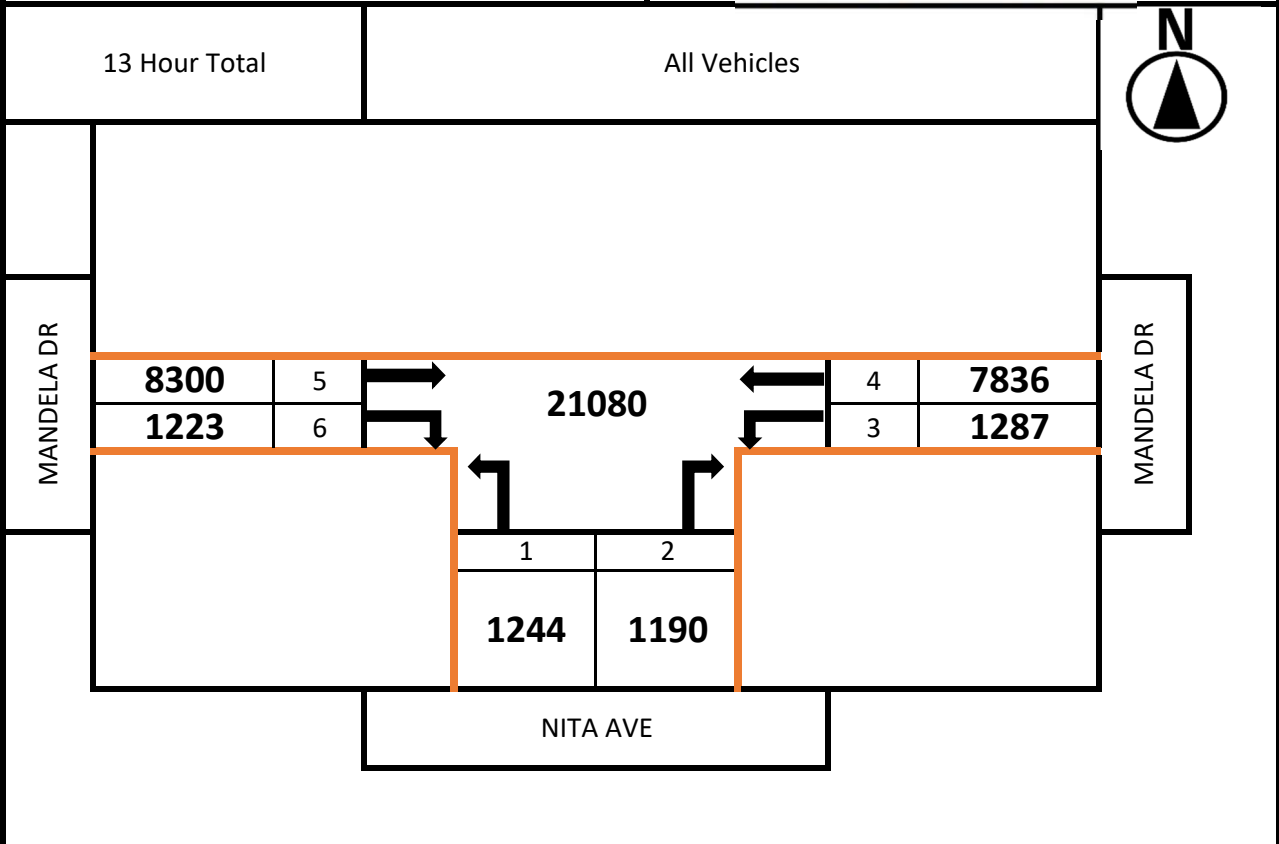
Date: 17/03/2020


Survey Times: 06:00 to 19:00



Traffik Data Solutions

MOVEMENT SUMMARY



Site Location:	MANDELA DR & NITA AVE			Coordinates:	-25.882328	29.257052
Date:	17/03/2020					
Survey Times:	06:00	to	19:00			
All Vehicles						

		Peak Hours				All Vehicles				
Street Names		NITA AVE		MANDELA DR		MANDELA DR				Total
Time Slot		Northbound		Westbound		Eastbound				
Start	Stop	L	R	L	S	S	R			
06:00	06:15	18	34	8	36	91	14			201
06:15	06:30	20	54	19	78	132	24			327
06:30	06:45	45	51	18	134	174	12			434
06:45	07:00	40	42	55	199	180	33			549
07:00	07:15	70	69	82	213	211	27			672
07:15	07:30	67	37	40	199	201	49			593
07:30	07:45	41	32	22	181	184	19			479
07:45	08:00	54	40	21	178	216	16			525
08:00	08:15	39	21	14	141	149	20			384
08:15	08:30	20	14	13	150	153	9			359
08:30	08:45	21	21	15	128	154	25			364
08:45	09:00	20	16	12	144	154	10			356
09:00	09:15	19	14	19	121	168	16			357
09:15	09:30	11	13	22	161	149	24			380
09:30	09:45	8	25	31	132	146	28			370
09:45	10:00	18	26	47	147	128	26			392
10:00	10:15	44	43	26	141	192	24			470
10:15	10:30	40	49	14	180	174	18			475
10:30	10:45	18	12	15	146	160	17			368
10:45	11:00	17	18	15	166	180	11			407
11:00	11:15	25	20	26	166	154	22			413
11:15	11:30	26	29	10	132	178	14			389
11:30	11:45	22	13	15	173	172	13			408
11:45	12:00	6	18	18	173	194	8			417
12:00	12:15	6	14	19	184	180	15			418
12:15	12:30	19	6	12	109	142	27			315
12:30	12:45	10	18	27	132	155	17			359
12:45	13:00	25	17	13	144	159	17			375
13:00	13:15	19	20	8	143	177	11			378
13:15	13:30	20	21	18	159	153	12			383
13:30	13:45	18	15	23	166	180	19			421
13:45	14:00	20	10	21	158	178	29			416
14:00	14:15	28	17	21	151	216	27			460
14:15	14:30	12	15	24	134	152	18			355
14:30	14:45	26	22	20	154	216	23			461
14:45	15:00	21	15	19	121	145	14			335
15:00	15:15	17	22	25	145	150	32			391
15:15	15:30	12	12	18	142	131	18			333
15:30	15:45	18	23	34	173	170	21			439
15:45	16:00	22	24	25	150	210	22			453
16:00	16:15	21	15	27	128	196	39			426
16:15	16:30	26	17	23	170	184	43			463
16:30	16:45	19	19	53	216	191	54			552
16:45	17:00	29	35	54	233	168	48			567
17:00	17:15	28	24	41	171	179	50			493
17:15	17:30	17	25	33	151	161	34			421
17:30	17:45	17	14	34	144	127	41			377
17:45	18:00	14	17	31	141	105	22			330
18:00	18:15	26	7	24	167	81	20			325
18:15	18:30	18	13	30	155	80	29			325
18:30	18:45	13	11	17	114	69	24			248
18:45	19:00	14	11	16	62	51	18			172

13 Hour Total	Movement							
		Northbound		Westbound		Eastbound		Total
Time Slot		L	R	L	S	S	R	
Start	Stop	1	2	3	4	5	6	
06:00	19:00	1244	1190	1287	7836	8300	1223	21080

24 Hour Total	Movement							
		Northbound		Westbound		Eastbound		Total
Time Slot		L	R	L	S	S	R	
Start	Stop	1	2	3	4	5	6	
06:00	06:00	1493	1428	1544	9403	9960	1468	25296

Site Location: MANDELA DR & NITA AVE Coordinates: -25.882328 29.257052

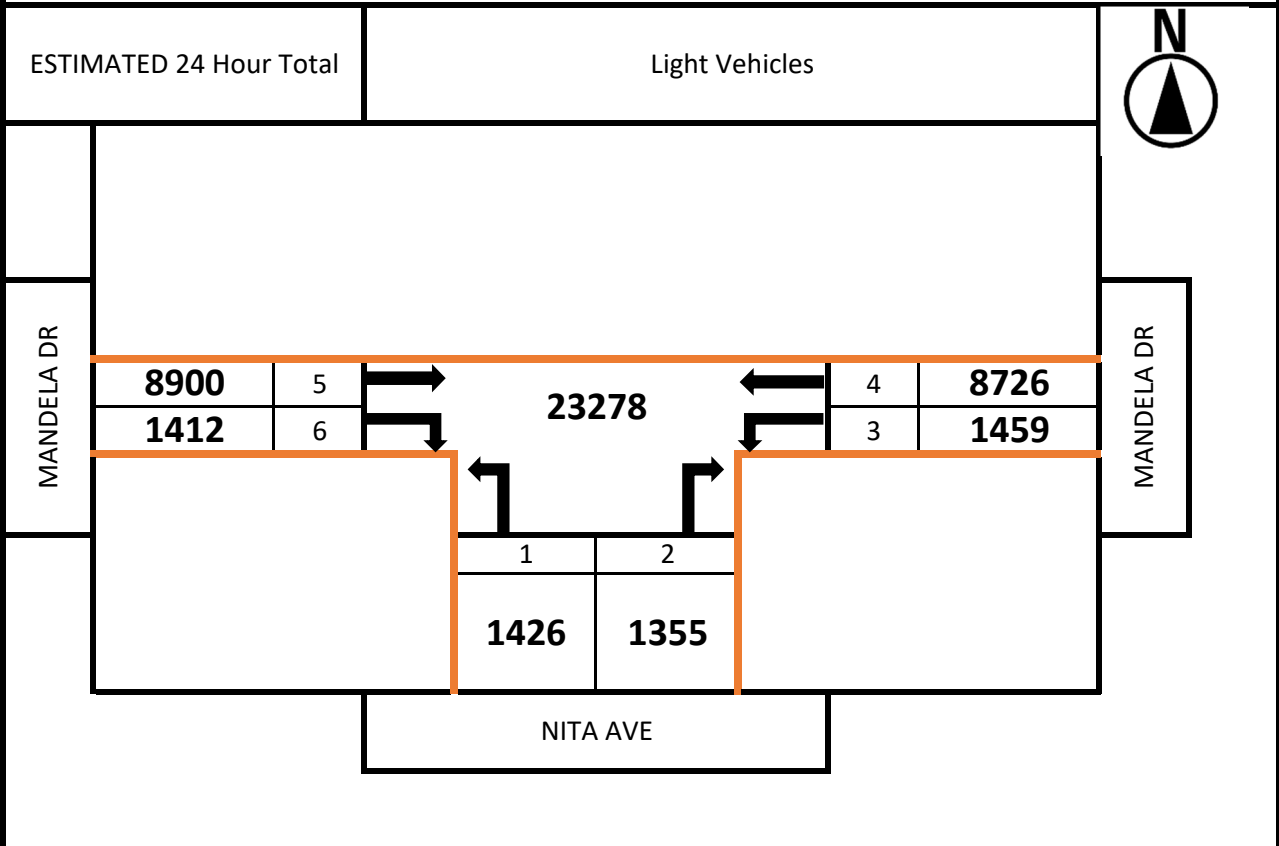
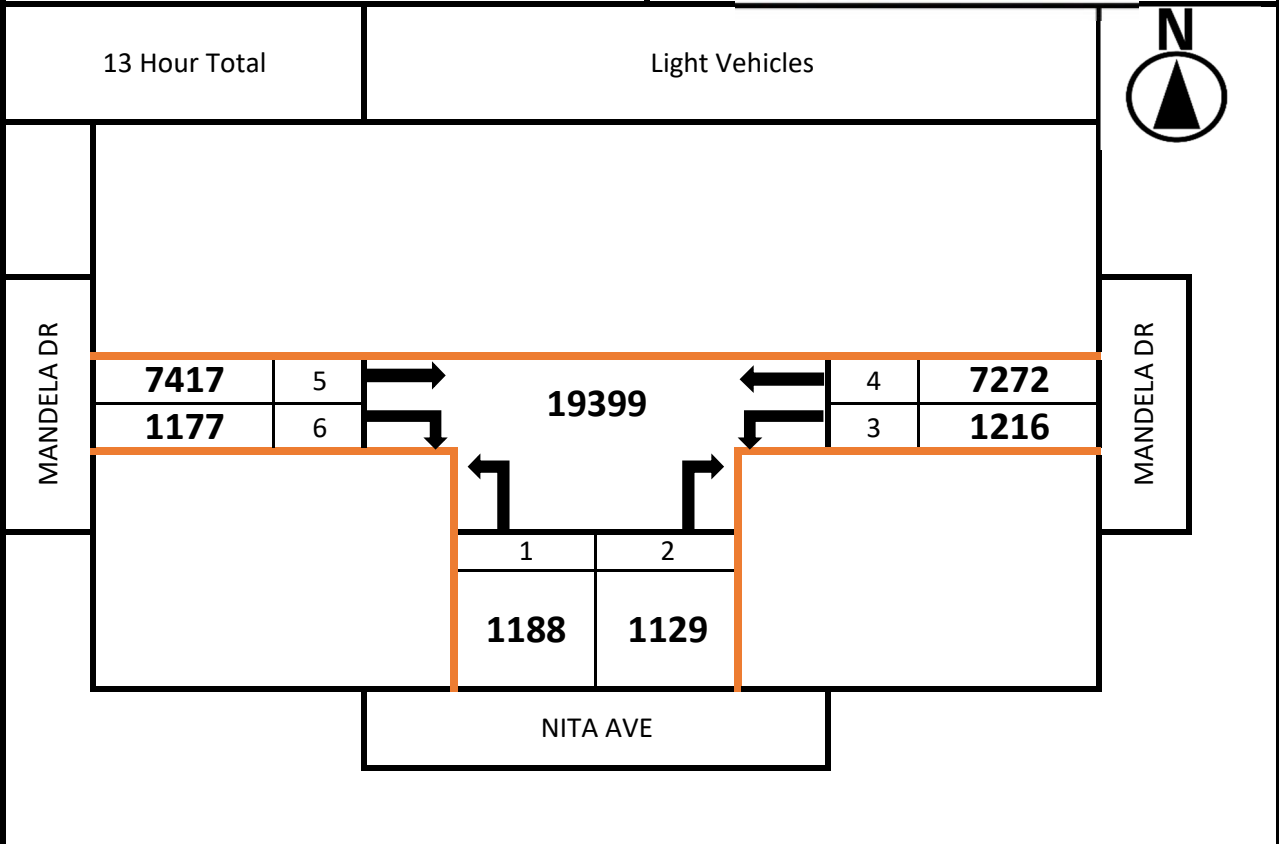
Date: 17/03/2020

Survey Times: 06:00 to 19:00



Traffik Data Solutions

MOVEMENT SUMMARY



Site Location:	MANDELA DR & NITA AVE			Coordinates:	-25.882328	29.257052
Date:	17/03/2020					
Survey Times:	06:00	to	19:00			
Light Vehicles						

		Peak Hours				Light Vehicles				
Street Names		NITA AVE		MANDELA DR		MANDELA DR				Total
Time Slot		Northbound		Westbound		Eastbound				
Start	Stop	L	R	L	S	S	R			
06:00	06:15	14	31	4	29	80	12	170		
06:15	06:30	17	50	18	71	119	20	295		
06:30	06:45	45	46	16	127	154	12	400		
06:45	07:00	38	40	53	194	162	32	519		
07:00	07:15	69	69	81	199	182	27	627		
07:15	07:30	64	35	40	186	185	49	559		
07:30	07:45	40	32	20	163	158	19	432		
07:45	08:00	53	37	21	153	182	15	461		
08:00	08:15	37	20	14	119	115	16	321		
08:15	08:30	18	13	12	132	128	7	310		
08:30	08:45	21	21	13	108	126	25	314		
08:45	09:00	18	16	12	132	136	10	324		
09:00	09:15	18	14	18	110	151	14	325		
09:15	09:30	11	13	22	148	131	23	348		
09:30	09:45	6	22	28	126	126	27	335		
09:45	10:00	18	24	45	138	109	25	359		
10:00	10:15	43	41	24	130	167	24	429		
10:15	10:30	39	47	14	169	157	15	441		
10:30	10:45	18	12	14	134	138	16	332		
10:45	11:00	17	18	15	151	158	11	370		
11:00	11:15	23	20	23	146	142	22	376		
11:15	11:30	26	28	10	124	160	14	362		
11:30	11:45	22	13	15	165	154	13	382		
11:45	12:00	6	17	18	162	177	8	388		
12:00	12:15	6	13	18	174	167	15	393		
12:15	12:30	19	6	12	97	129	26	289		
12:30	12:45	9	16	27	124	142	16	334		
12:45	13:00	23	17	11	130	147	15	343		
13:00	13:15	19	20	7	139	158	11	354		
13:15	13:30	19	21	18	154	139	12	363		
13:30	13:45	17	15	23	157	167	19	398		
13:45	14:00	19	10	18	154	156	27	384		
14:00	14:15	25	17	18	141	194	26	421		
14:15	14:30	12	13	23	121	139	17	325		
14:30	14:45	24	19	15	145	194	22	419		
14:45	15:00	20	14	15	119	132	14	314		
15:00	15:15	16	20	22	129	136	32	355		
15:15	15:30	12	10	17	130	119	18	306		
15:30	15:45	15	19	32	169	157	19	411		
15:45	16:00	21	24	22	143	187	20	417		
16:00	16:15	20	14	25	120	182	39	400		
16:15	16:30	26	17	21	159	172	42	437		
16:30	16:45	19	19	52	208	179	54	531		
16:45	17:00	29	32	51	218	148	47	525		
17:00	17:15	26	23	39	167	167	49	471		
17:15	17:30	16	23	31	136	151	32	389		
17:30	17:45	17	13	33	133	112	39	347		
17:45	18:00	10	16	29	132	91	21	299		
18:00	18:15	23	6	24	159	71	19	302		
18:15	18:30	18	12	30	140	76	29	305		
18:30	18:45	13	10	17	101	62	23	226		
18:45	19:00	14	11	16	57	46	18	162		

13 Hour Total	Movement							
		Northbound		Westbound		Eastbound		Total
Time Slot		L	R	L	S	S	R	
Start	Stop	1	2	3	4	5	6	
06:00	19:00	1188	1129	1216	7272	7417	1177	19399

24 Hour Total	Movement							
		Northbound		Westbound		Eastbound		Total
Time Slot		L	R	L	S	S	R	
Start	Stop	1	2	3	4	5	6	
06:00	06:00	1426	1355	1459	8726	8900	1412	23278

Site Location: MANDELA DR & NITA AVE Coordinates: -25.882328 29.257052

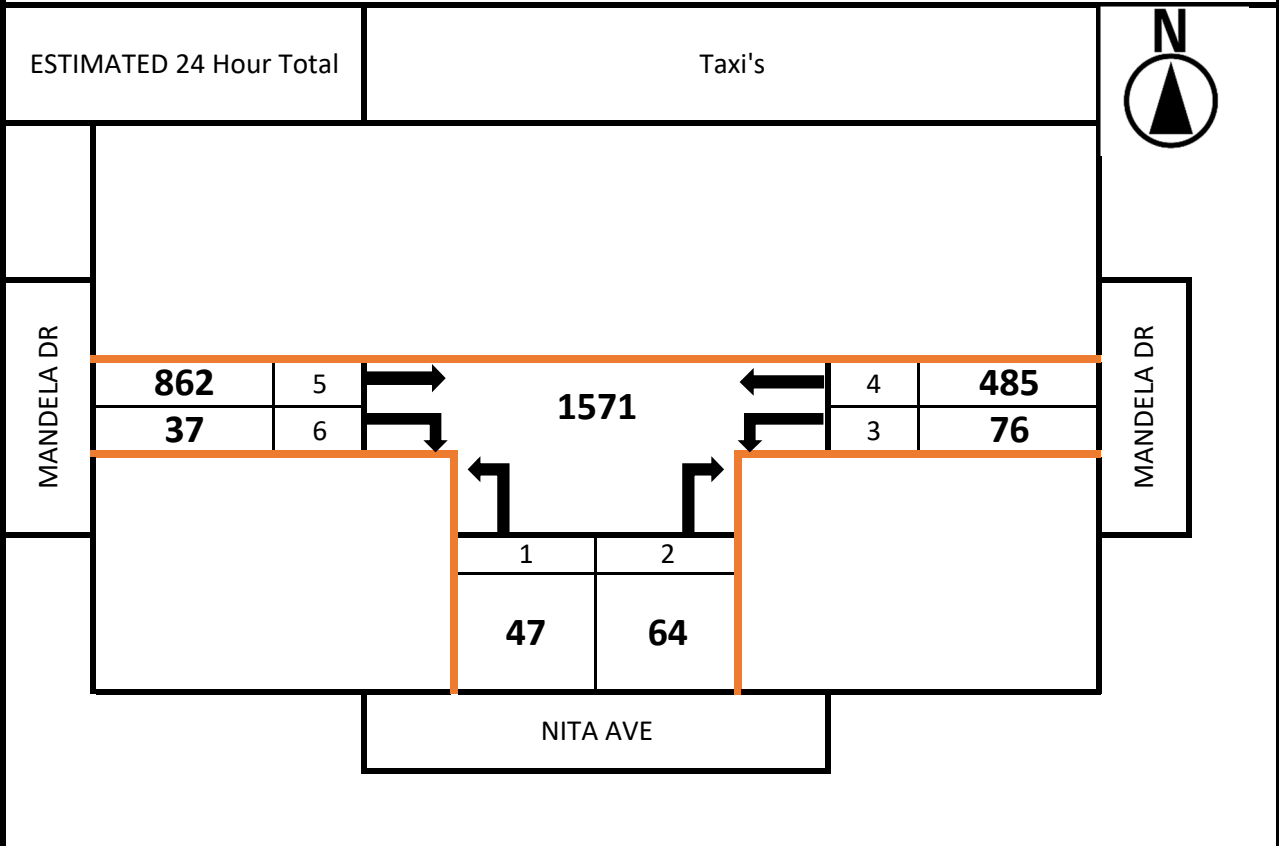
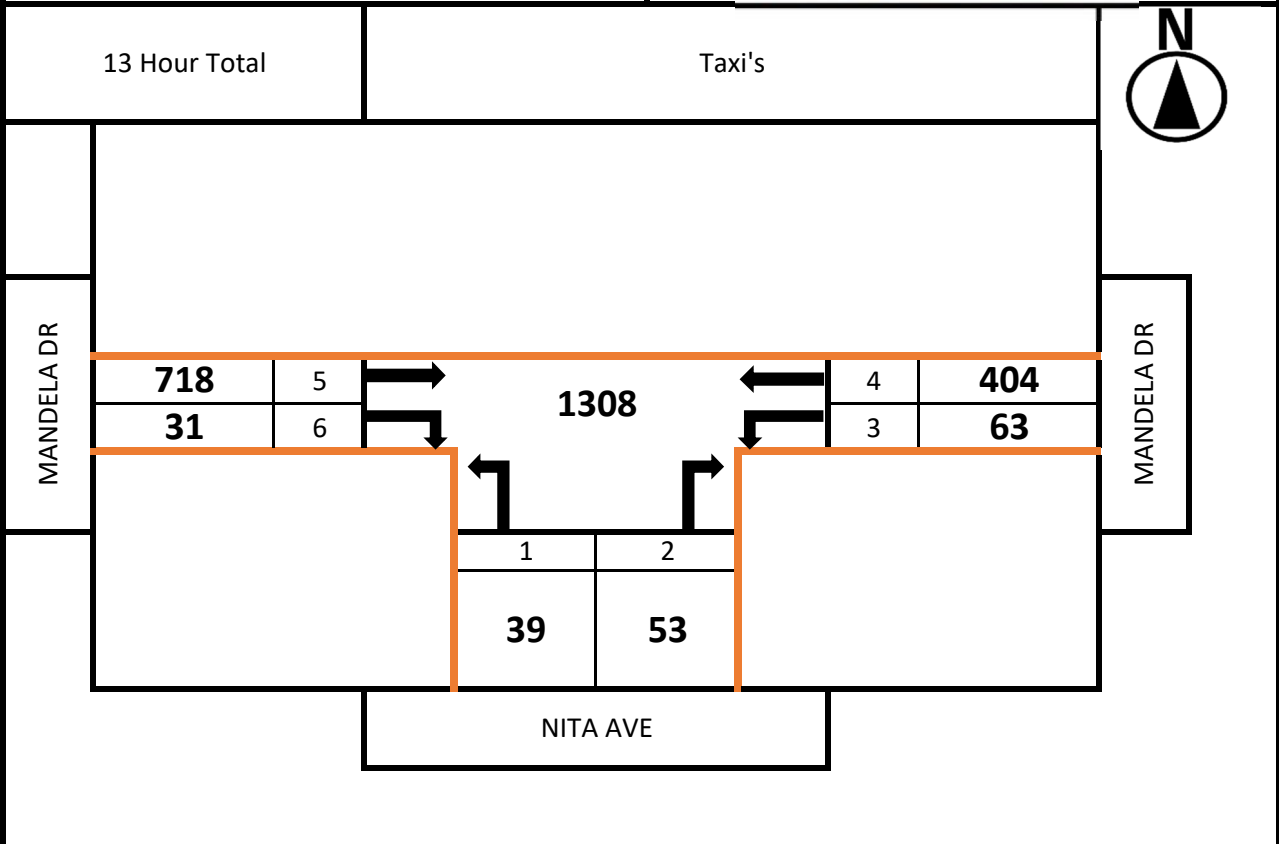
Date: 17/03/2020

Survey Times: 06:00 to 19:00



Traffik Data Solutions

MOVEMENT SUMMARY



Site Location:	MANDELA DR & NITA AVE			Coordinates:	-25.882328	29.257052
Date:	17/03/2020					
Survey Times:		06:00	to	19:00	 TDS Traffik Data Solutions	
Taxi's						

		Peak Hours				Taxis				
Street Names		NITA AVE		MANDELA DR		MANDELA DR				Total
Time Slot		Northbound		Westbound		Eastbound				
Start	Stop	L	R	L	S	S	R			
06:00	06:15	4	3	4	6	11	2			30
06:15	06:30	3	4	1	6	11	4			29
06:30	06:45	0	5	2	6	16	0			29
06:45	07:00	2	2	2	4	14	1			25
07:00	07:15	1	0	1	9	27	0			38
07:15	07:30	2	2	0	12	14	0			30
07:30	07:45	1	0	2	15	25	0			43
07:45	08:00	1	3	0	21	29	1			55
08:00	08:15	2	0	0	20	30	3			55
08:15	08:30	2	1	1	13	21	2			40
08:30	08:45	0	0	2	15	24	0			41
08:45	09:00	2	0	0	11	15	0			28
09:00	09:15	1	0	0	7	13	0			21
09:15	09:30	0	0	0	8	11	0			19
09:30	09:45	0	2	3	4	16	0			25
09:45	10:00	0	1	2	8	13	1			25
10:00	10:15	1	2	2	9	18	0			32
10:15	10:30	0	2	0	5	13	1			21
10:30	10:45	0	0	0	8	18	0			26
10:45	11:00	0	0	0	12	18	0			30
11:00	11:15	0	0	3	16	9	0			28
11:15	11:30	0	0	0	6	12	0			18
11:30	11:45	0	0	0	3	15	0			18
11:45	12:00	0	1	0	6	12	0			19
12:00	12:15	0	1	1	5	11	0			18
12:15	12:30	0	0	0	9	11	0			20
12:30	12:45	1	1	0	3	11	1			17
12:45	13:00	0	0	1	10	10	1			22
13:00	13:15	0	0	0	2	13	0			15
13:15	13:30	0	0	0	2	10	0			12
13:30	13:45	0	0	0	4	11	0			15
13:45	14:00	1	0	3	3	14	0			21
14:00	14:15	0	0	3	7	15	0			25
14:15	14:30	0	2	1	10	6	1			20
14:30	14:45	0	2	4	5	19	1			31
14:45	15:00	1	1	3	2	10	0			17
15:00	15:15	1	1	3	6	13	0			24
15:15	15:30	0	2	1	7	11	0			21
15:30	15:45	1	3	2	2	13	2			23
15:45	16:00	1	0	3	5	21	1			31
16:00	16:15	1	1	2	4	13	0			21
16:15	16:30	0	0	2	10	8	0			20
16:30	16:45	0	0	1	3	8	0			12
16:45	17:00	0	3	2	12	17	1			35
17:00	17:15	2	1	2	4	12	1			22
17:15	17:30	1	2	1	9	8	2			23
17:30	17:45	0	1	1	8	11	2			23
17:45	18:00	4	1	2	7	14	1			29
18:00	18:15	3	1	0	6	8	1			19
18:15	18:30	0	1	0	13	4	0			18
18:30	18:45	0	1	0	12	6	1			20
18:45	19:00	0	0	0	4	5	0			9

13 Hour Total	Movement							
		Northbound		Westbound		Eastbound		Total
Time Slot		L	R	L	S	S	R	
Start	Stop	1	2	3	4	5	6	
06:00	19:00	39	53	63	404	718	31	1308

24 Hour Total	Movement							
		Northbound		Westbound		Eastbound		Total
Time Slot		L	R	L	S	S	R	
Start	Stop	1	2	3	4	5	6	
06:00	06:00	47	64	76	485	862	37	1571

Site Location: MANDELA DR & NITA AVE Coordinates: -25.882328 29.257052

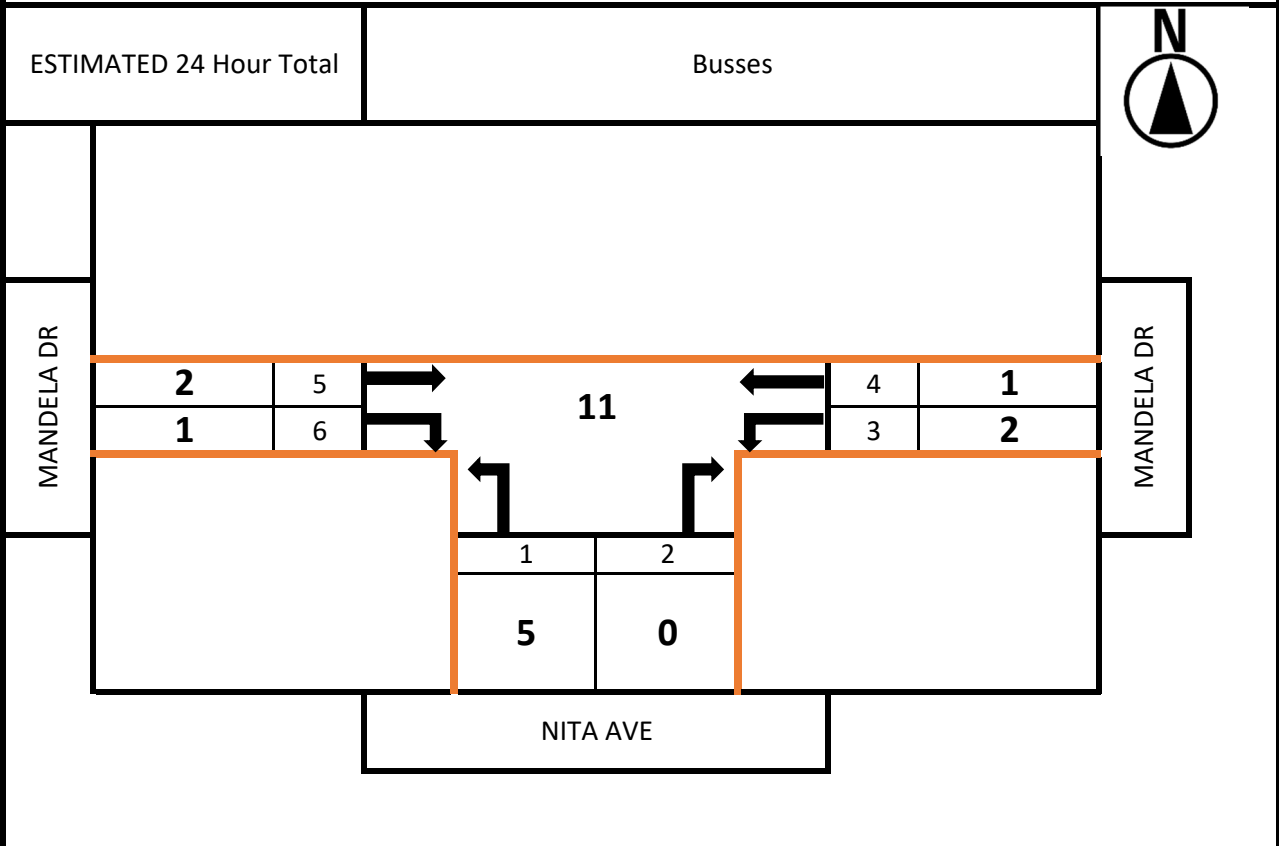
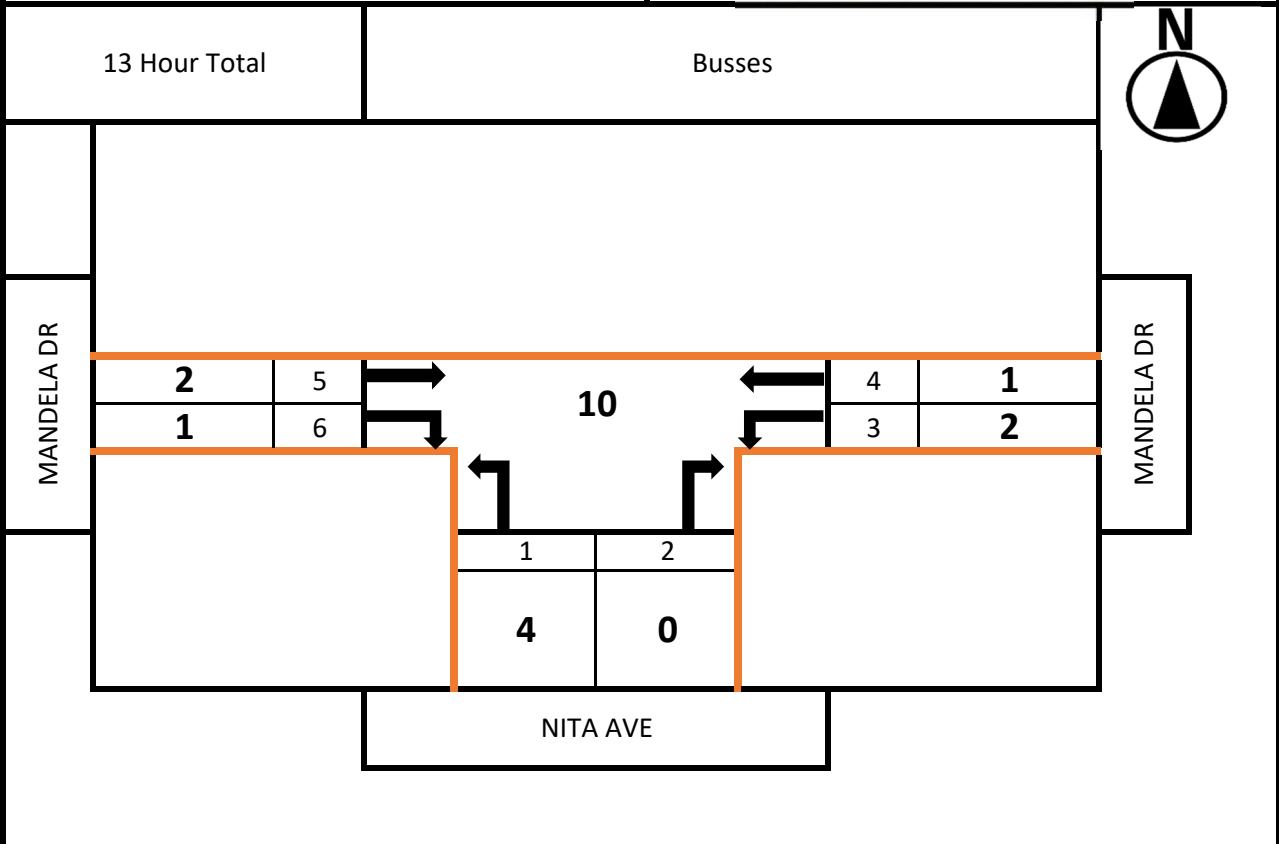
Date: 17/03/2020

Survey Times: 06:00 to 19:00



Traffik Data Solutions

MOVEMENT SUMMARY



Site Location:	MANDELA DR & NITA AVE			Coordinates:	-25.882328	29.257052
Date:	17/03/2020					
Survey Times:		06:00	to	19:00		
Busses				 TDS Traffik Data Solutions		

		Peak Hours				Busses				
Street Names		NITA AVE		MANDELA DR		MANDELA DR		Total		
		Northbound		Westbound		Eastbound				
Time Slot		L	R	L	S	S	R			
Start	Stop	1	2	3	4	5	6			
06:00	06:15	0	0	0	0	0	0	0		
06:15	06:30	0	0	0	0	0	0	0		
06:30	06:45	0	0	0	0	1	0	1		
06:45	07:00	0	0	0	0	0	0	0		
07:00	07:15	0	0	0	0	0	0	0		
07:15	07:30	0	0	0	0	0	0	0		
07:30	07:45	0	0	0	0	0	0	0		
07:45	08:00	0	0	0	1	0	0	1		
08:00	08:15	0	0	0	0	0	1	1		
08:15	08:30	0	0	0	0	0	0	0		
08:30	08:45	0	0	0	0	0	0	0		
08:45	09:00	0	0	0	0	0	0	0		
09:00	09:15	0	0	0	0	0	0	0		
09:15	09:30	0	0	0	0	0	0	0		
09:30	09:45	0	0	0	0	0	0	0		
09:45	10:00	0	0	0	0	0	0	0		
10:00	10:15	0	0	0	0	0	0	0		
10:15	10:30	0	0	0	0	0	0	0		
10:30	10:45	0	0	0	0	0	0	0		
10:45	11:00	0	0	0	0	0	0	0		
11:00	11:15	0	0	0	0	0	0	0		
11:15	11:30	0	0	0	0	0	0	0		
11:30	11:45	0	0	0	0	0	0	0		
11:45	12:00	0	0	0	0	0	0	0		
12:00	12:15	0	0	0	0	0	0	0		
12:15	12:30	0	0	0	0	0	0	0		
12:30	12:45	0	0	0	0	0	0	0		
12:45	13:00	1	0	0	0	0	0	1		
13:00	13:15	0	0	0	0	0	0	0		
13:15	13:30	0	0	0	0	0	0	0		
13:30	13:45	0	0	0	0	0	0	0		
13:45	14:00	0	0	0	0	0	0	0		
14:00	14:15	0	0	0	0	0	0	0		
14:15	14:30	0	0	0	0	0	0	0		
14:30	14:45	2	0	1	0	0	0	3		
14:45	15:00	0	0	0	0	0	0	0		
15:00	15:15	0	0	0	0	0	0	0		
15:15	15:30	0	0	0	0	0	0	0		
15:30	15:45	1	0	0	0	0	0	1		
15:45	16:00	0	0	0	0	0	0	0		
16:00	16:15	0	0	0	0	1	0	1		
16:15	16:30	0	0	0	0	0	0	0		
16:30	16:45	0	0	0	0	0	0	0		
16:45	17:00	0	0	0	0	0	0	0		
17:00	17:15	0	0	0	0	0	0	0		
17:15	17:30	0	0	1	0	0	0	1		
17:30	17:45	0	0	0	0	0	0	0		
17:45	18:00	0	0	0	0	0	0	0		
18:00	18:15	0	0	0	0	0	0	0		
18:15	18:30	0	0	0	0	0	0	0		
18:30	18:45	0	0	0	0	0	0	0		
18:45	19:00	0	0	0	0	0	0	0		

13 Hour Total	Movement							
	Northbound		Westbound		Eastbound			
Time Slot	L	R	L	S	S	R	Total	
Start	Stop	1	2	3	4	5	6	
06:00	19:00	4	0	2	1	2	1	10

24 Hour Total	Movement							
	Northbound		Westbound		Eastbound			
Time Slot	L	R	L	S	S	R	Total	
Start	Stop	1	2	3	4	5	6	
06:00	06:00	5	0	2	1	2	1	11

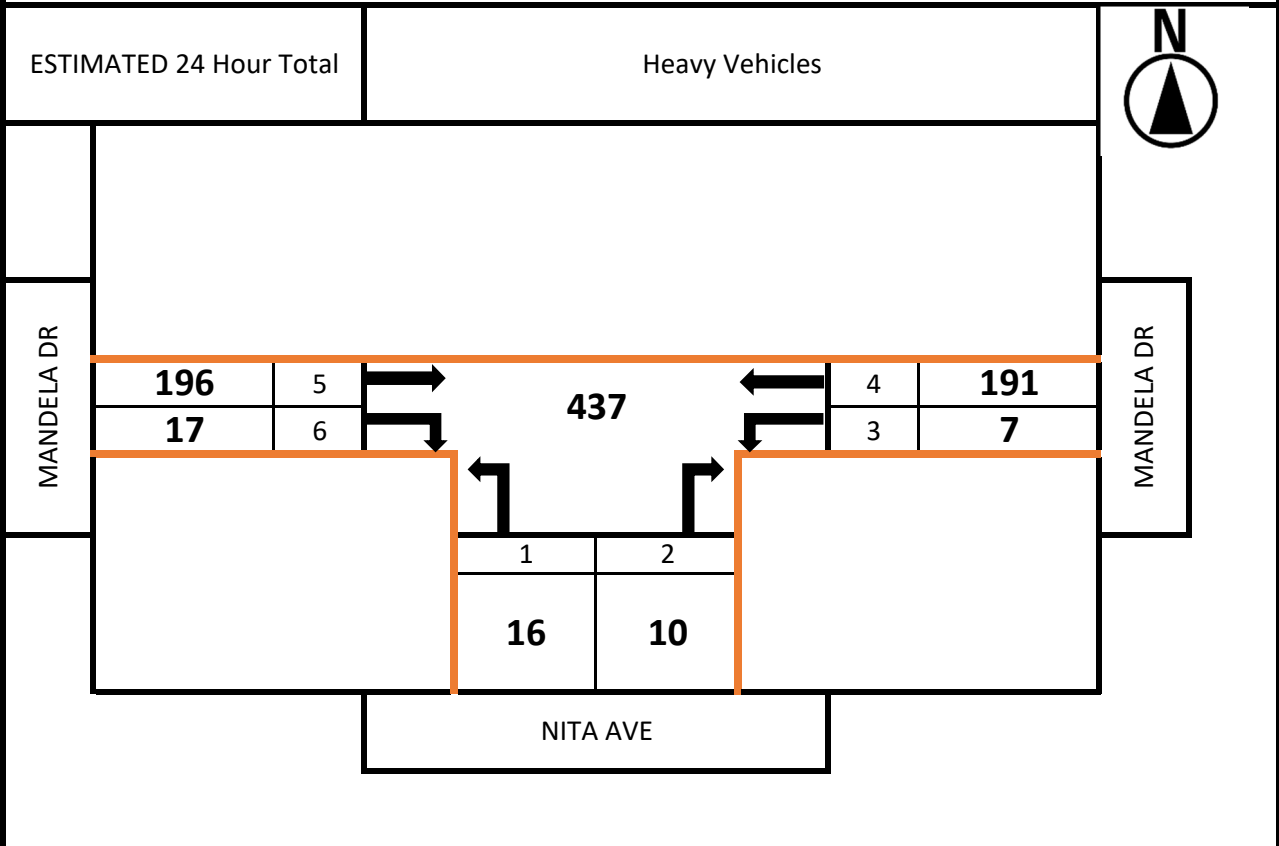
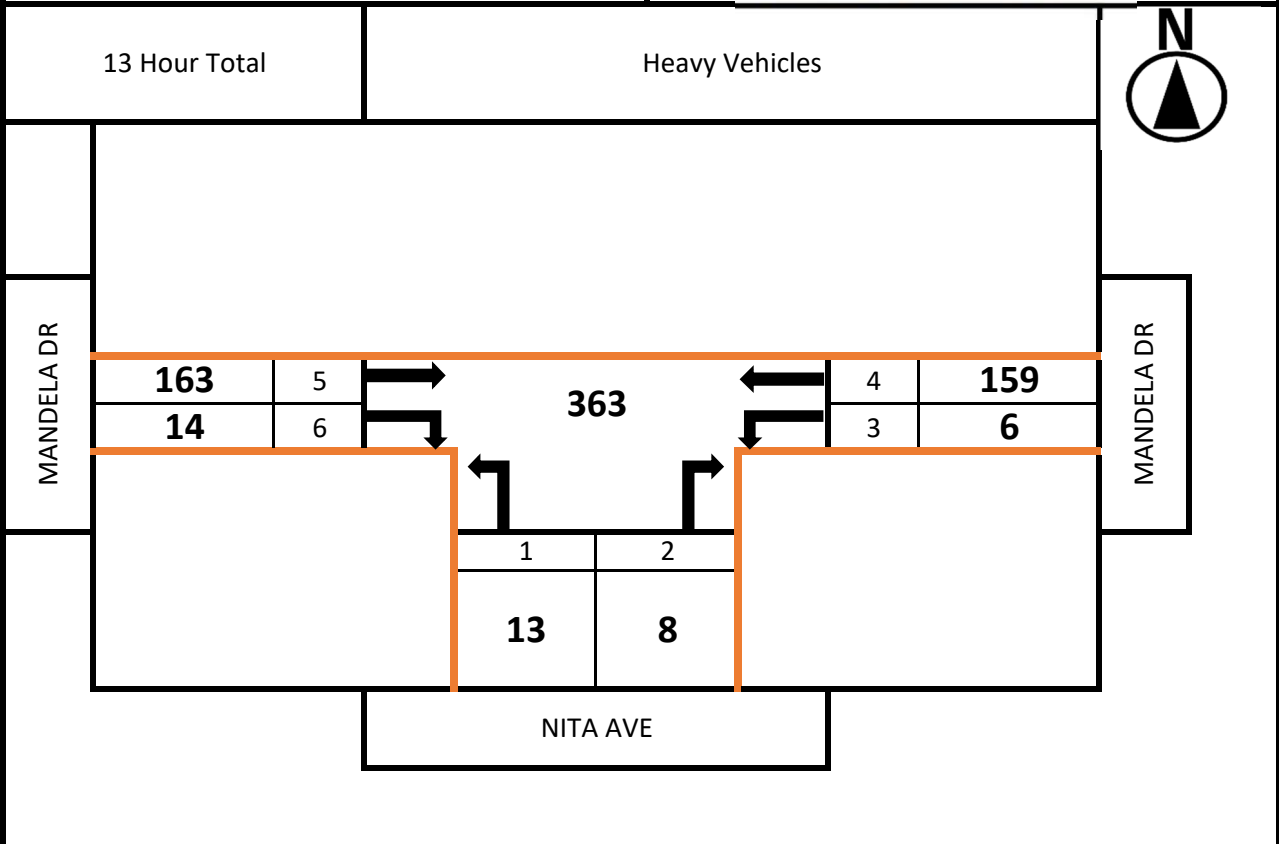
Site Location: MANDELA DR & NITA AVE Coordinates: -25.882328 29.257052

Date: 17/03/2020

Survey Times: 06:00 to 19:00



MOVEMENT SUMMARY



Site Location:	MANDELA DR & NITA AVE			Coordinates:	-25.882328	29.257052
Date:	17/03/2020					
Survey Times:	06:00	to	19:00			
Heavy Vehicles						

		Peak Hours				Heavy Vehicles				
Street Names		NITA AVE		MANDELA DR		MANDELA DR				Total
Time Slot		Northbound		Westbound		Eastbound				
Start	Stop	L	R	L	S	S	R			
06:00	06:15	0	0	0	1	0	0			1
06:15	06:30	0	0	0	1	2	0			3
06:30	06:45	0	0	0	1	3	0			4
06:45	07:00	0	0	0	1	4	0			5
07:00	07:15	0	0	0	5	2	0			7
07:15	07:30	1	0	0	1	2	0			4
07:30	07:45	0	0	0	3	1	0			4
07:45	08:00	0	0	0	3	5	0			8
08:00	08:15	0	1	0	2	4	0			7
08:15	08:30	0	0	0	5	4	0			9
08:30	08:45	0	0	0	5	4	0			9
08:45	09:00	0	0	0	1	3	0			4
09:00	09:15	0	0	1	4	4	2			11
09:15	09:30	0	0	0	5	7	1			13
09:30	09:45	2	1	0	2	4	1			10
09:45	10:00	0	1	0	1	6	0			8
10:00	10:15	0	0	0	2	7	0			9
10:15	10:30	1	0	0	6	4	2			13
10:30	10:45	0	0	1	4	4	1			10
10:45	11:00	0	0	0	3	4	0			7
11:00	11:15	2	0	0	4	3	0			9
11:15	11:30	0	1	0	2	6	0			9
11:30	11:45	0	0	0	5	3	0			8
11:45	12:00	0	0	0	5	5	0			10
12:00	12:15	0	0	0	5	2	0			7
12:15	12:30	0	0	0	3	2	1			6
12:30	12:45	0	1	0	5	2	0			8
12:45	13:00	1	0	1	4	2	1			9
13:00	13:15	0	0	1	2	6	0			9
13:15	13:30	1	0	0	3	4	0			8
13:30	13:45	1	0	0	5	2	0			8
13:45	14:00	0	0	0	1	8	2			11
14:00	14:15	3	0	0	3	7	1			14
14:15	14:30	0	0	0	3	7	0			10
14:30	14:45	0	1	0	4	3	0			8
14:45	15:00	0	0	1	0	3	0			4
15:00	15:15	0	1	0	10	1	0			12
15:15	15:30	0	0	0	5	1	0			6
15:30	15:45	1	1	0	2	0	0			4
15:45	16:00	0	0	0	2	2	1			5
16:00	16:15	0	0	0	4	0	0			4
16:15	16:30	0	0	0	1	4	1			6
16:30	16:45	0	0	0	5	4	0			9
16:45	17:00	0	0	1	3	3	0			7
17:00	17:15	0	0	0	0	0	0			0
17:15	17:30	0	0	0	6	2	0			8
17:30	17:45	0	0	0	3	4	0			7
17:45	18:00	0	0	0	2	0	0			2
18:00	18:15	0	0	0	2	2	0			4
18:15	18:30	0	0	0	2	0	0			2
18:30	18:45	0	0	0	1	1	0			2
18:45	19:00	0	0	0	1	0	0			1

13 Hour Total	Movement							
		Northbound		Westbound		Eastbound		Total
Time Slot		L	R	L	S	S	R	
Start	Stop	1	2	3	4	5	6	
06:00	19:00	13	8	6	159	163	14	363

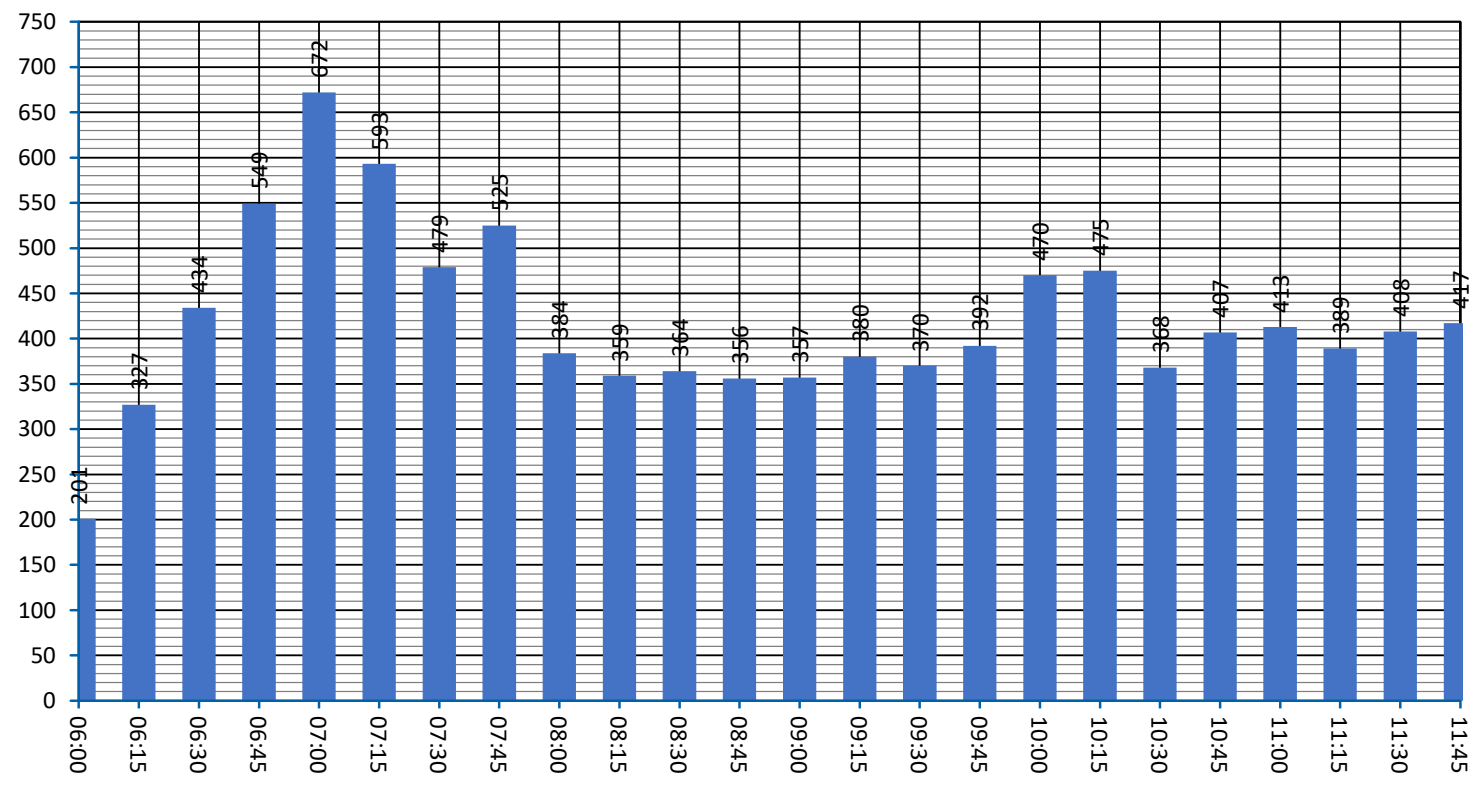
24 Hour Total	Movement							
		Northbound		Westbound		Eastbound		Total
Time Slot		L	R	L	S	S	R	
Start	Stop	1	2	3	4	5	6	
06:00	06:00	16	10	7	191	196	17	437

Site Location:	MANDELA DR & NITA AVE	Coordinates:	-25.882328	29.257052
Date:	17/03/2020			
Survey Times:	06:00 to 19:00			



VEHICLE INTERVAL GRAPH

TOTAL TRAFFIC



TRAFFIC PER 15 MINUTE PERIOD

Site Location:	MANDELA DR & NITA AVE	Coordinates:	-25.882328	29.257052
Date:	17/03/2020			
Survey Times:	06:00 to 19:00		VEHICLE INTERVAL GRAPH	

