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SMEC INTERNAL REF. C1917

Traffic Impact Assessment

Proposed Heather Park Development

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1 Introduction

SMEC South Africa (Pty) Ltd was appointed by Urban Front Developers to conduct a Traffic Impact Assessment for the proposed Heather Park residential development on Erf 19734, George. The site is bounded by Plantation Road to the east and Homewood Street to the south. A locality plan is shown in **Figure 1-1**.

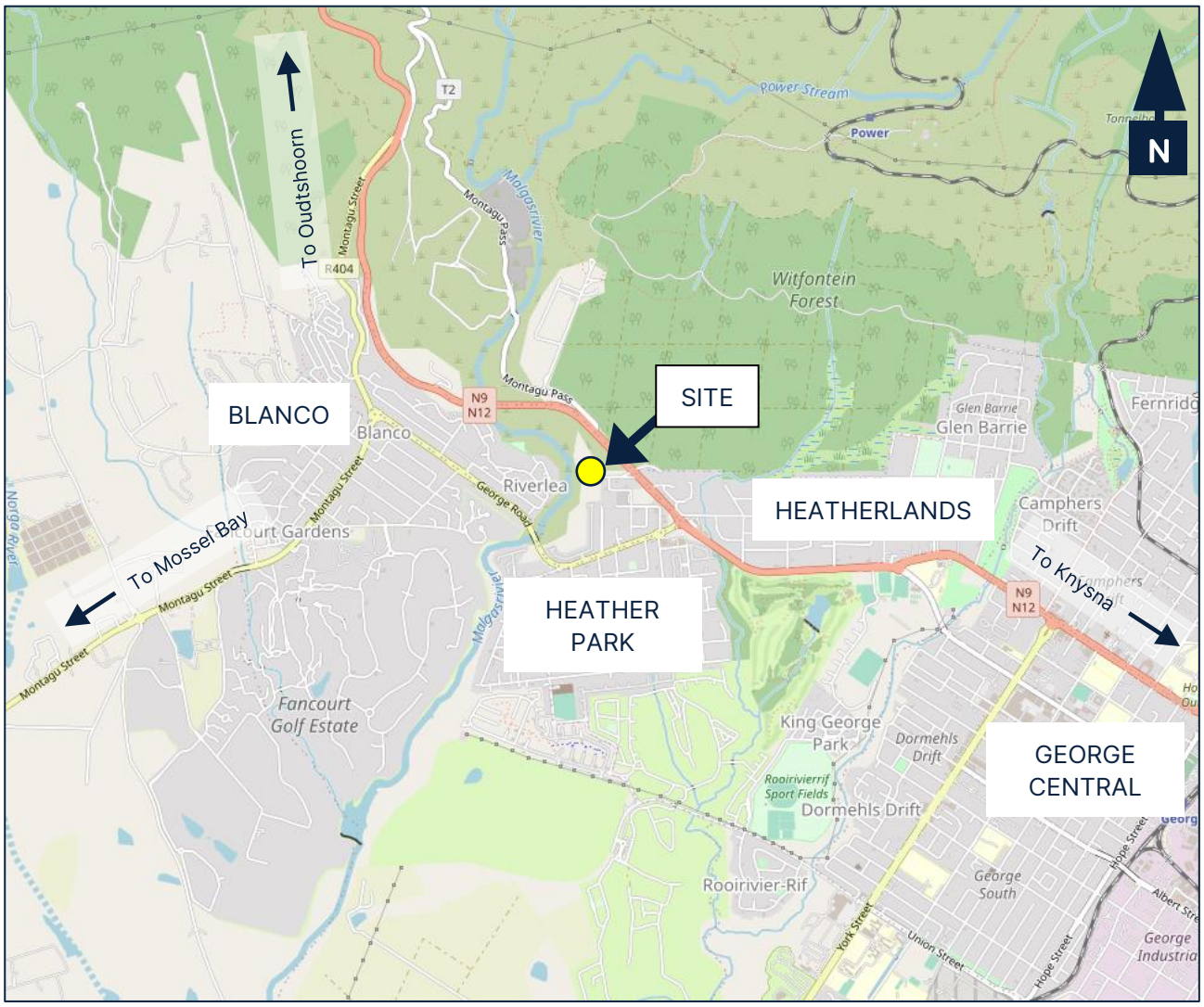


Figure 1-1: Locality Plan (Source: OpenStreetMap)

The site measures approximately 5,6 Hectares in extent and will comprise of 77 townhouses (simplexes and duplexes) and 40 Flats. An extract of the proposed Site Development Plan is shown in **Figure 1-2**. Refer to **Annexure A** for the full Site Development Plan.

The purpose of the Traffic Impact Assessment is to quantify the anticipated impact of the development traffic, and recommend remedial measures as required. The study was conducted in accordance with The Committee of Transport Officials South African Traffic Impact and Site Traffic Assessment Manual (COTO, TMH 16 Volume 1).

Figure 1-2: Site Development Plan (Source: Urban Front Developers – November 2022)

2 Background Information

2.1 Existing Roads

National Route 9 (C J Langenhoven Road) is classified as a Class 2 Major Arterial within the George Roads Masterplan. In the vicinity of the site, it comprises of one lane per direction. It experiences moderate traffic flows during peak hours.

Witfontein Road is classified as Class 3 Minor Arterial within the George Roads Masterplan. In the vicinity of the site, it comprises of one lane per direction. It experiences moderate traffic flows during peak hours.

Plantation Road is a Class 4 Collector Road, serving the surrounding residential area. The road comprises of one lane per direction in the vicinity of the subject site. It experiences low traffic flows during peak hours

Homewood Street is classified as a Class 5 Local Street, serving the surrounding residential area. The road comprises of one lane per direction, and experiences low traffic flows during peak hours.

Refer to **Figure 2-1.**

Figure 2-1: Existing Roads

2.2 Arterial Management Plan

An Arterial Management Plan (AMP) was undertaken for both the George/Witfontein Corridor and CJ Langenhoven Road by V3 Consulting Engineers (Pty) Ltd and published as follows:

- George/Witfontein Corridor Final Draft (November 2019).
- CJ Langenhoven Road Final Draft (Rev 1) (April 2020).

2.2.1 Road Classification

2.2.1.1 George/Witfontein Corridor

The AMP states that Witfontein Street has been classified as a Class 3 Minor Arterial within a Suburban Roadside Environment. Status Quo intersection spacings were reportedly non-compliant with a Suburban Roadside Environment and recommendations were made to better comply with the Western Cape Government Access Management Guidelines. Refer to **Figure 2-2.**

Figure 2-2: Proposed Road Upgrades to Witfontein Road

2.2.1.2 CJ Langenhoven Road

The AMP confirms that CJ Langenhoven Road is classified as a Class 2 Major Arterial in the vicinity of the site. Roadside development environment was defined as suburban in the vicinity of Plantation Road.

It was highlighted that the existing spacing (approx. 168 m) of Plantation Road intersection and Morning Glory Lane along C J Langenhoven is sub-standard. In accordance with WCG Access Management Guidelines (2020) the required spacing from an unsignalised full intersection to an unsignalised full intersection along a Class 2 road in a suburban roadside development environment is 270 m. No remedial measures, however, were proposed.

2.2.2 Land Use

2.2.2.1 George/Witfontein Corridor

The land use along Witfontein Road is mainly focused around low to medium density residential development, with a section of commercial and retail development within approximately 160m of CJ Langenhoven Street. The existing built fabric along Witfontein Road consists mainly of a range of building types, varying from single- to medium density residential dwellings, to retail and commercial developments.

No densification is proposed along the Witfontein Road yet the Municipal Spatial Development Framework identifies the commercial and retail development node as the Heather Park TOD node.

2.2.2.2 CJ Langenhoven Road

The land use along CJ Langenhoven in the vicinity of Plantation Road is predominantly residential in character and no significant increase of densification was reported.

2.3 Public Transport Facilities

Heather Park is served by the existing Go George service, with routes running along Witfontein Road onto George Road, linking the local workforce with employment opportunities. The existing GIPTN is shown in **Figure 2-3.**

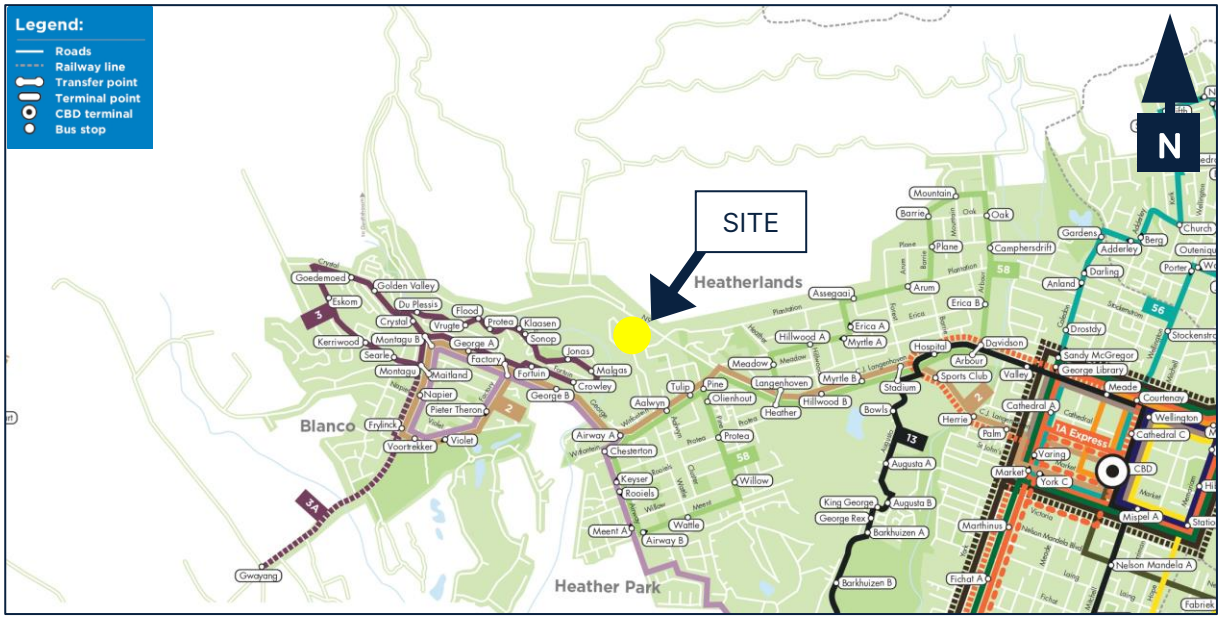


Figure 2-3: Existing GIPTN Routes (George LM)

2.4 Non-Motorized Transport Facilities

The George CITP (Iliso 2014/15) provides a snapshot of the existing NMT network within George. There are no formal pedestrian walkways along of Plantation Road in the vicinity of the proposed development, however, a formal pedestrian walkway is provided along the south edge of CJ Langenhoven Street in the vicinity of the development. The planned NMT Network is shown in **Figure 2-4.**

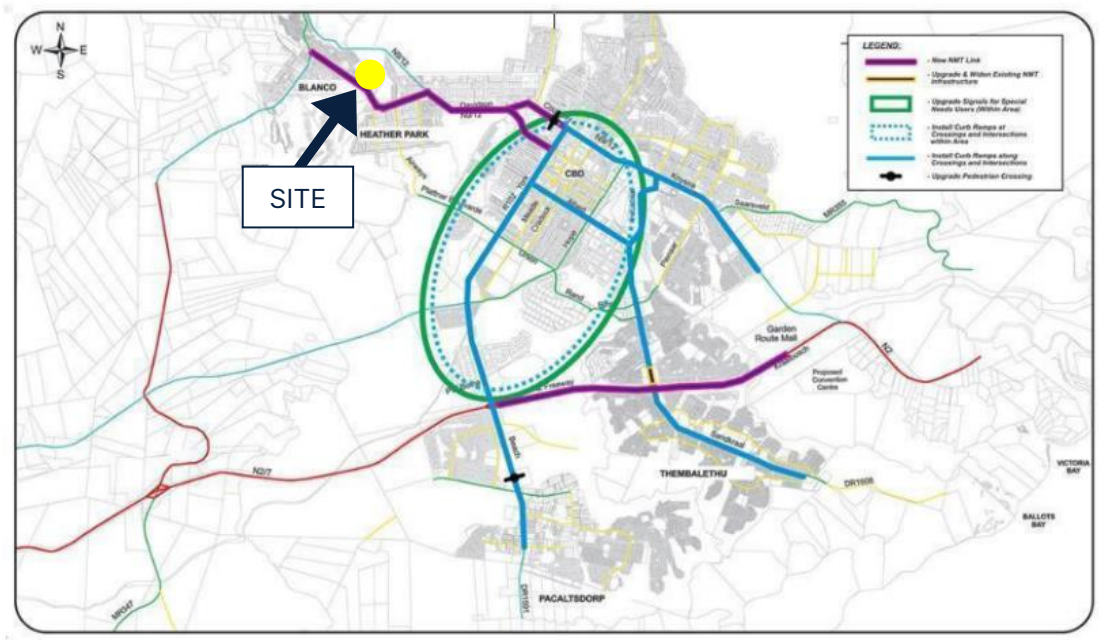


Figure 2-4: Planned NMT Infrastructure Projects (Iliso)

2.5 Site Access

The subject site is proposed to be served by one access at the end of Plantation Road. Refer to **Figure 2-5.**

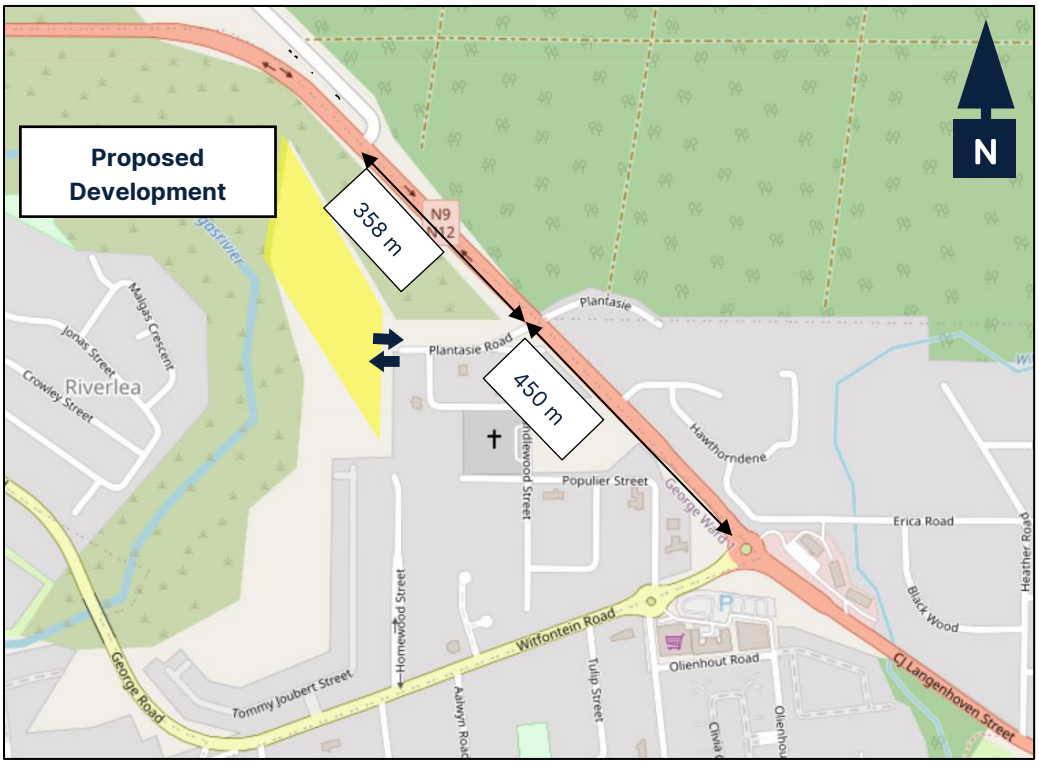


Figure 2-5: Proposed Site Access and Access Spacing

Consideration was given to providing site access via the northward extension of Homewood Street however this was later disregarded due to the following:

1. Opposition to additional vehicular trips along the street by local homeowners.
2. Existing sub-standard spacing along Witfontein Road.

2.6 Access Spacing Requirements

The access spacing requirements were derived from the Western Cape Government (WCG) Access Management Guidelines (2020).

The minimum spacing of an unsignalised full intersection along a Class 2 Road within a suburban roadside environment, upstream or downstream of an unsignalised full intersection is 270 metres.

It is confirmed that Plantation Road conforms to the WCG access spacing requirements to the north. However, as identified in the C J Langenhoven Road AMP, spacing to the southern intersection with Morning Glory Lane does not conform to the WCG access spacing requirements.

3 Other Planning Authorities

C J Langenhoven Road falls under the jurisdiction of the Western Cape Department of Transport. As such, they would need to be included in the approval process.

4 Traffic Demand Estimation

4.1 Assessment Years

A base year assessment was undertaken to identify shortcomings in the road-based capacity in the short term, if any. In addition thereto, it is required to grow traffic flows to an acceptable horizon year in order to ensure that the proposed road network would be able to operate satisfactorily once the development traffic is added to the surrounding road network.

TMH 16 Volume 1 Version 1.0, states that transportation improvements for developments must be designed for a horizon year of 5 years. Hence, a 2022 Base Year and a 2027 Design Year was used for this TIA.

4.2 Assessment Hours

The assessment has been undertaken considering the periods during which the combined effect of background and development traffic would result in the highest traffic demand. Hence, it was deemed suitable to assess the Weekday AM and PM Peak Hours.

4.3 Traffic Counts

Taking into consideration the location and extent of the proposed development with relation to the surrounding road network, the following traffic count surveys were undertaken as part of this project assignment:

- Counting Station 1: Intersection of the N9 (C J Langenhoven Road) and Plantation Road;
- Counting Station 2: Intersection of the N9 (C J Langenhoven Road) and Witfontein Road; and

Traffic count locations are shown in **Figure 4-1.**

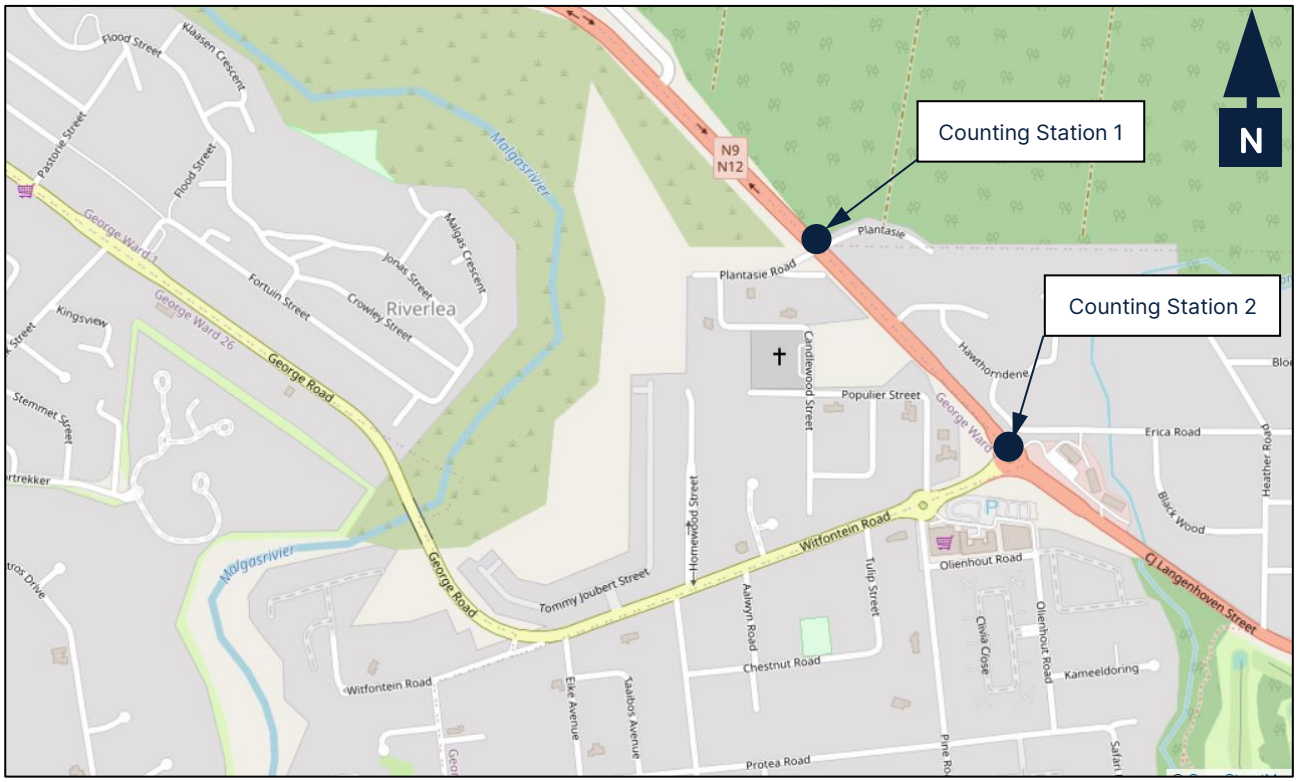


Figure 4-1: Traffic Count Locations

Details of the traffic survey are provided below:

- Date counted; 12 May 2022
- Day; Normal Weekday
- Congestion levels; Low
- Enumerator; SMEC South Africa (Pty) Ltd

The detailed traffic survey data is provided in **Annexure B.**

A common peak hour was identified for the intersections under discussion, as follows:

- Weekday AM Peak Hour 07h00 – 08h00
- Weekday AM Peak Hour 16h30 – 17h30

The 2022 Base Year traffic flows are shown in **Figure 4-2.**

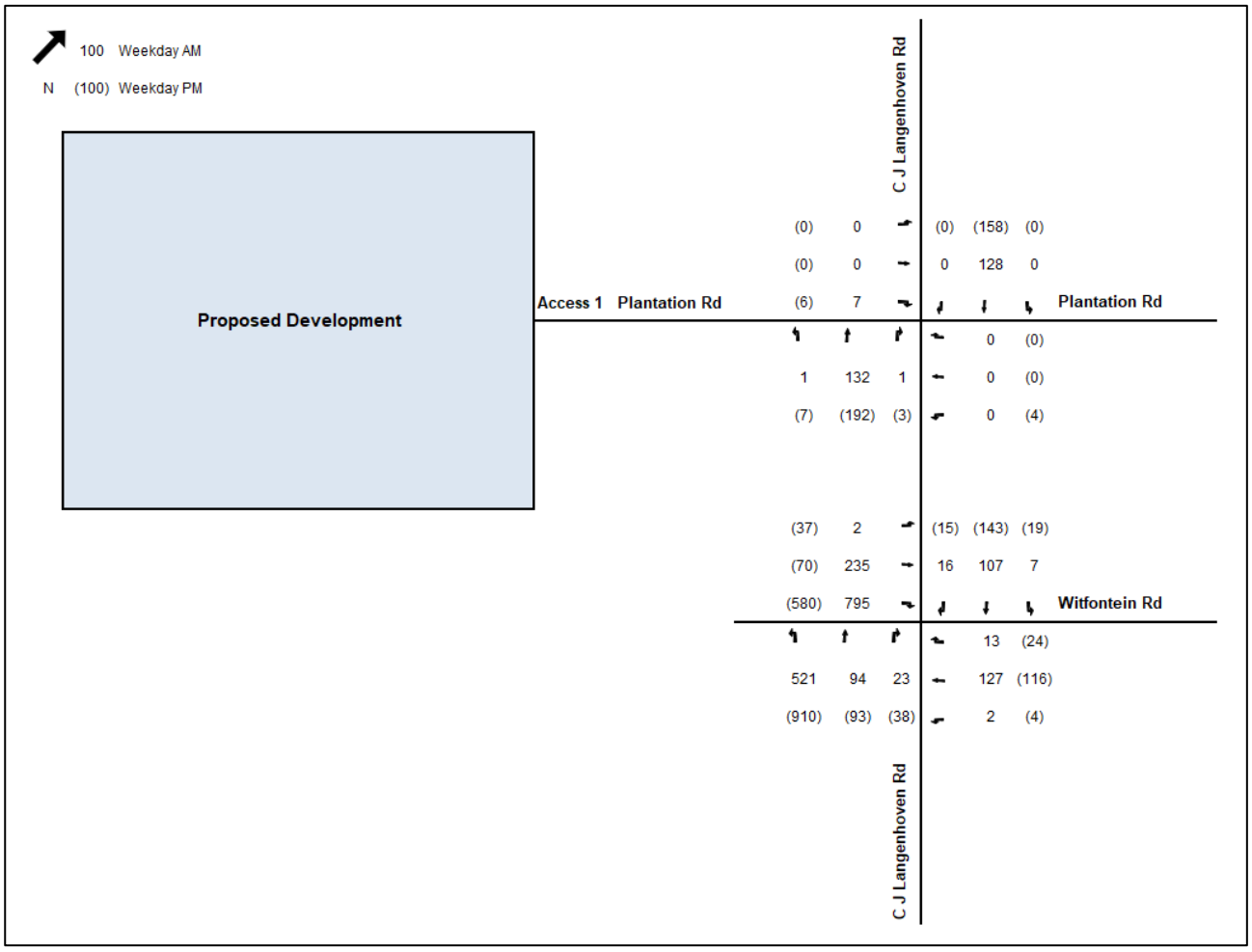


Figure 4-2: 2022 Base Year Traffic Flows

4.4 Traffic Growth Rates

A traffic growth rate is applied to background traffic in order to determine the anticipated growth in this traffic besides that relating to planned and new developments. The Committee of Transport Officials Trip Data Manual (COTO, TMH 17 Volume 1 Version 1.01) provides typical growth rates to be used for growth areas based on the existing/anticipated rate of growth. Refer to **Table 4-1**.

Table 4-1: Typical Growth Rates

Development Area	Growth Rate
Low Growth Areas	0% - 3%
Average Growth Areas	3% - 4%
Above Average Growth Areas	4% - 6%
Fast Growing Areas	6% - 8%
Exceptionally High Growth Areas	> 8%

Taking into consideration the nature and extent of development within this area, an annual compounded traffic growth rate of 3.0% was applied to the 2022 background through traffic along Witfontein Road and CJ Langehoven Road in order to derive the 2027 Design Year traffic flows.

The 2027 Forecast Year traffic flows are shown in **Figure 4-3.**

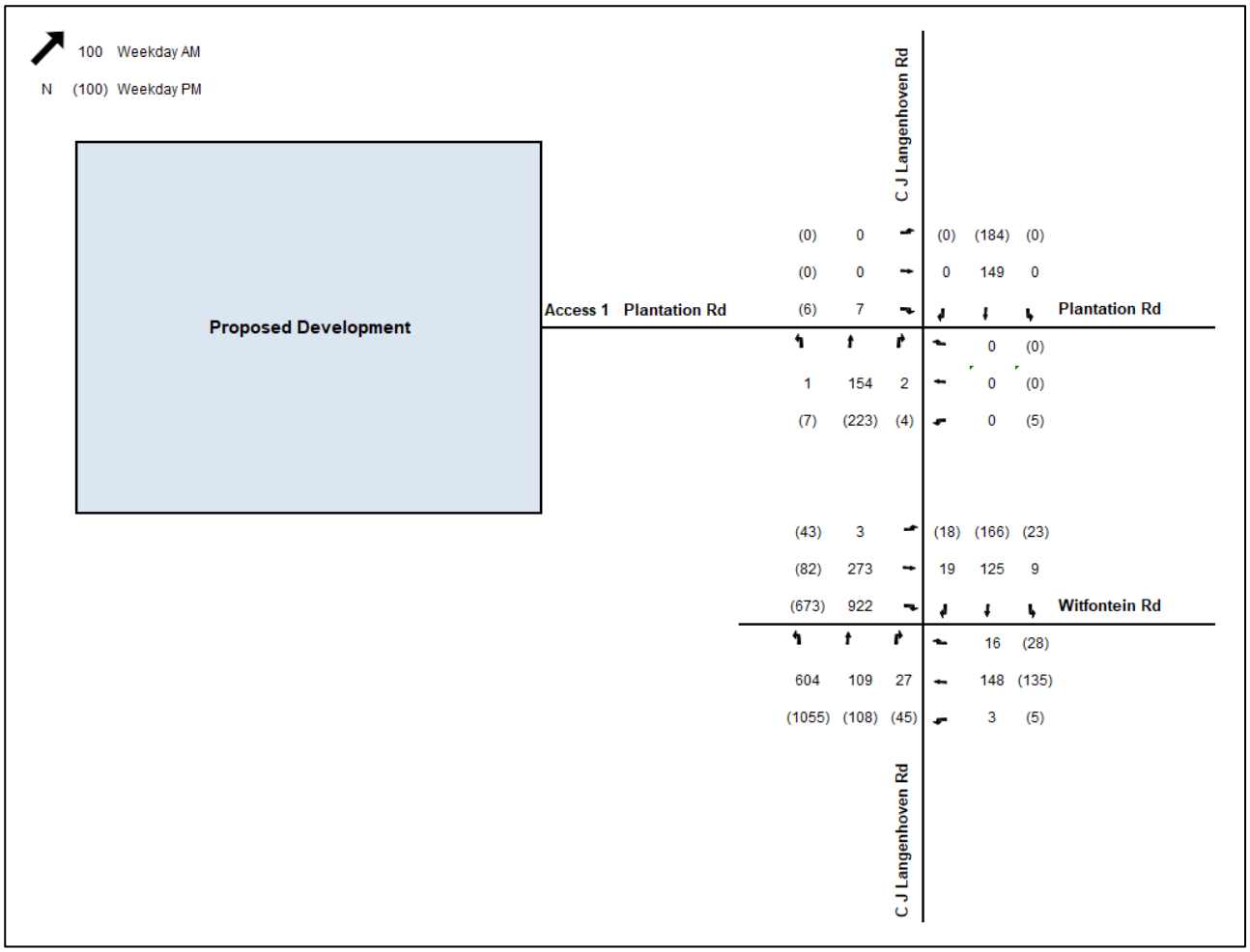


Figure 4-3: 2027 Forecast Year traffic flows

5 Trip Generation and Distribution

5.1 Trip Generation

The Trip Generation Rates for the land use types forming part of the development were obtained from the COTO TMH 17 South African Trip Data Manual dated September 2012.

The trip generation potential of the development is shown in **Table 5-1.**

Table 5-1: Trip Generation

Land Use	Units	Trip Generation Rates (per Unit)		Adjustment Factor	Traffic generation (vph)			
		Weekday			Weekday			
					AM		PM	
		AM	PM		IN	OUT	IN	OUT
Apartments and Flats	40	0.65	0.65	1.00	7	20	19	8
Townhouses (Simplexes and Duplexes)	77	0.85	0.85	1.00	17	50	46	20
Total New Trips					**24**	**70**	**65**	**28**
					94		**93**	

It is anticipated that the development would generate 94 and 93 new vehicular trips during the Weekday AM and PM Peak Hours respectively.

5.2 Trip Distribution

Trip distribution was estimated manually, based on existing traffic flows, the land use of the surrounding areas and the proposed access configuration. Refer to **Figure 5-1.**

5.3 Traffic Assignment

Traffic assignment involves determining the amount of traffic that will use specific routes in the network. The traffic assignment is made with consideration to logical routings, available roadway capacity, right-turn movements, travel times and other factors. Refer to **Figure 5-2.**

The 2027 Base + Development Trips are shown in **Figure 5-3.**

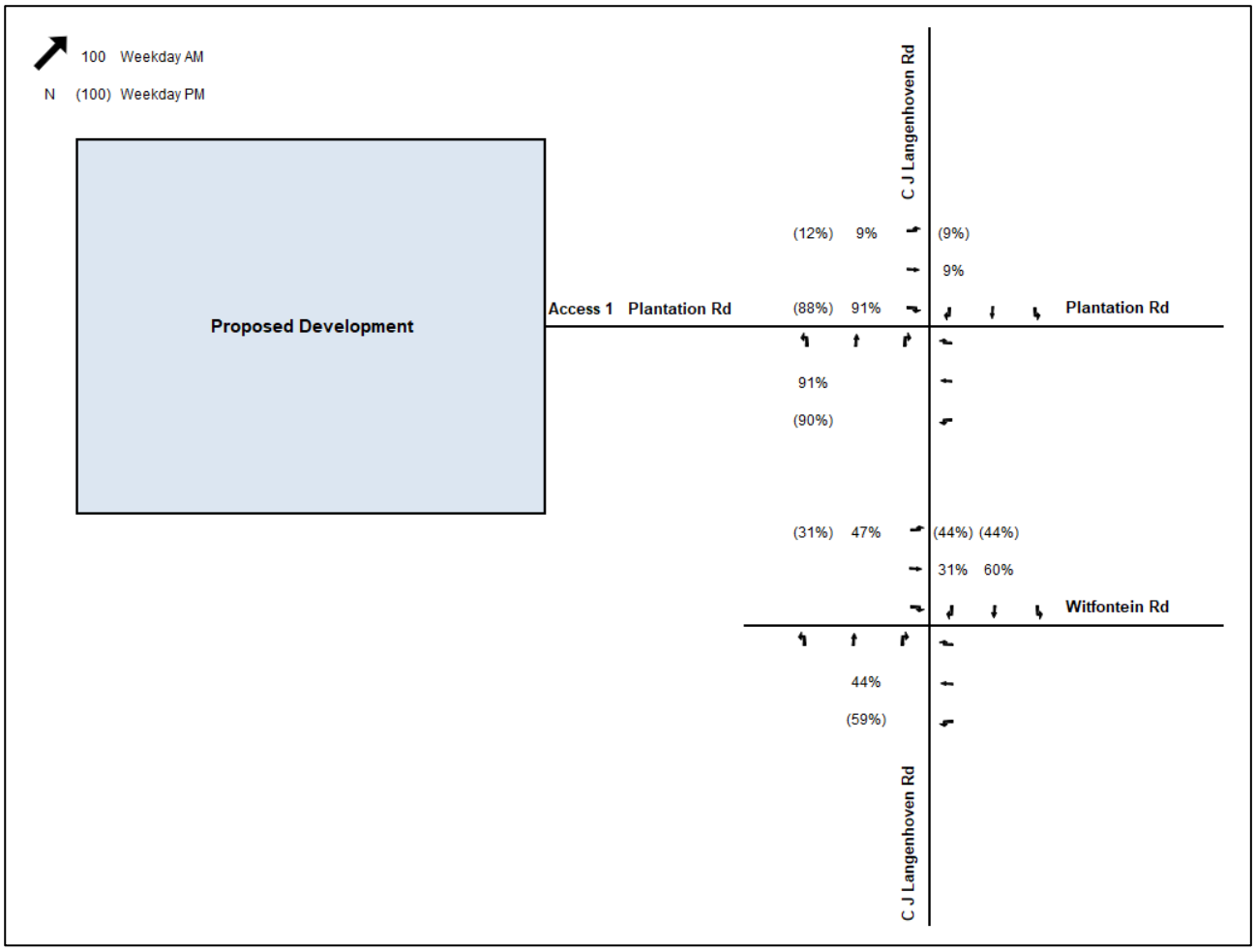


Figure 5-1: Trip Distribution (New Trips)

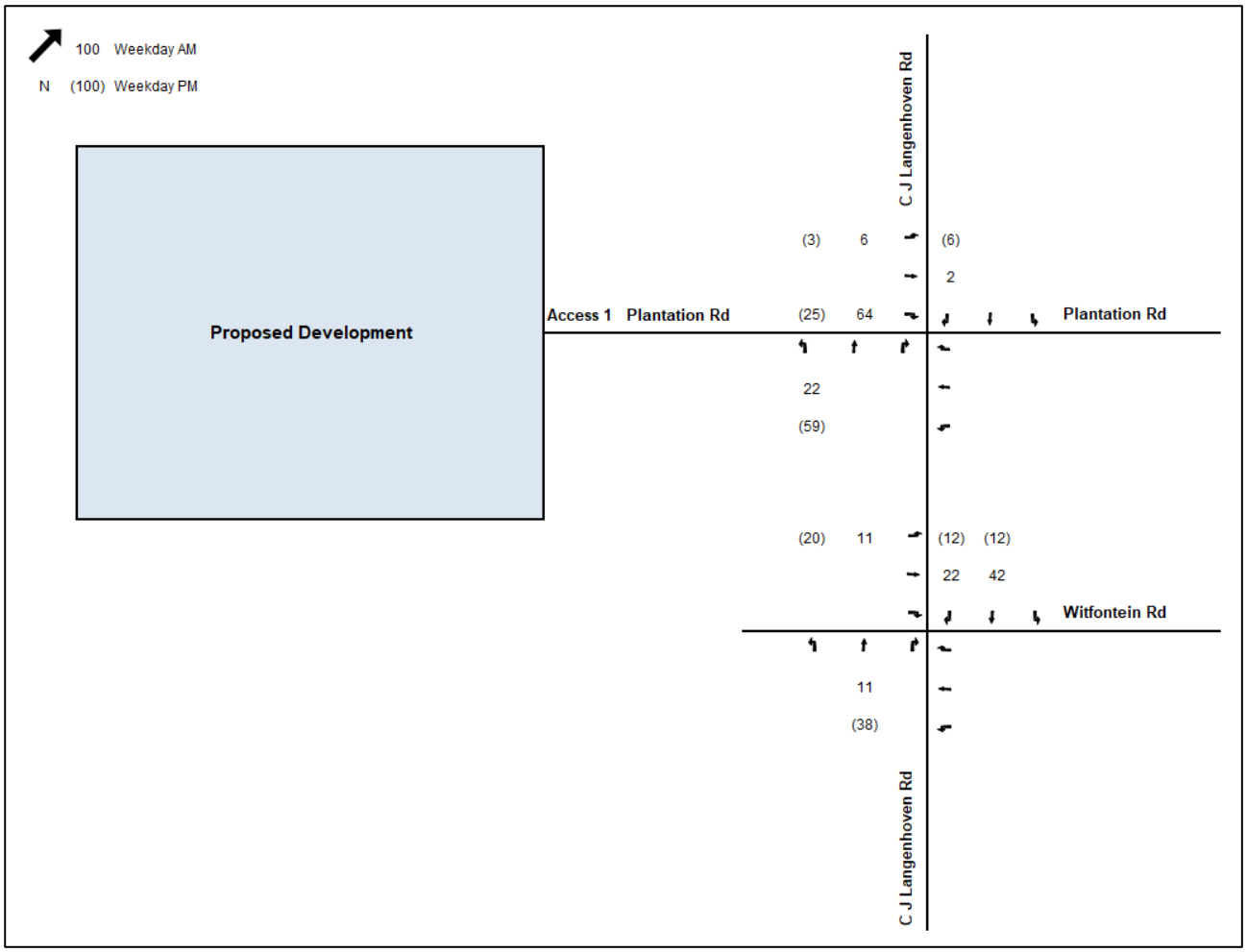


Figure 5-2: Traffic Assignment (New Trips)

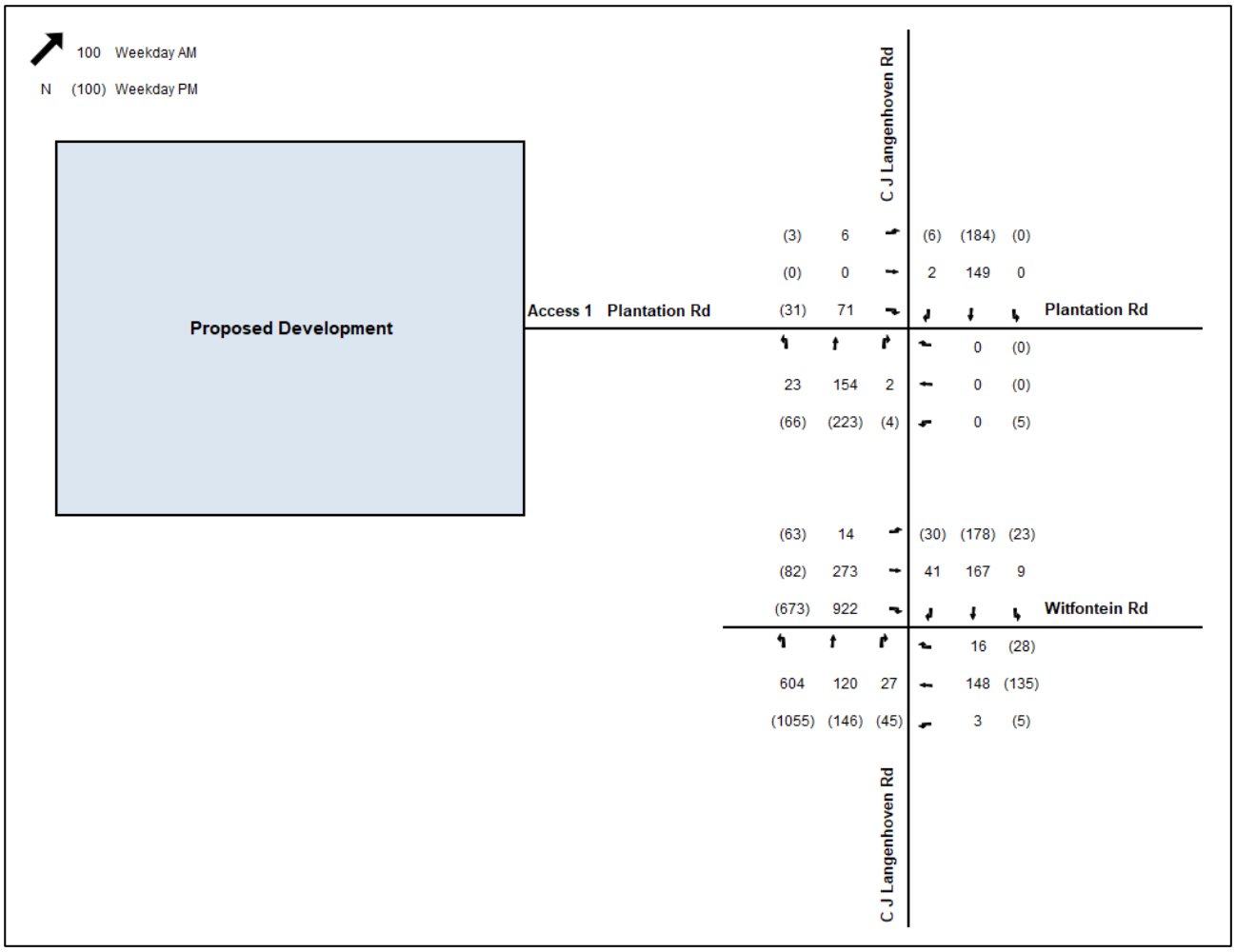


Figure 5-3: 2027 Base + Development Trips

6 Traffic Analysis

Intersection capacity analyses were undertaken to determine the anticipated operational performance of the site access and surrounding road network, taking into consideration the implementation of the development and associated development trips. The state-of-the-art traffic engineering software package, SIDRA Intersection 8.0 software, was used. The intersections analysed for the development are listed below:

- National Route 9 (C J Langenhoven Road) and Plantation Road;
- National Route 9 (C J Langenhoven Road) and Witfontein Road; and

The following scenarios were analysed as part of this project assignment:

- 2022 Background Traffic; and
- 2027 Background + Development Traffic.

The operational performance of an intersection is typically quantified in terms of Level of Service as defined by the SIDRA Intersection User Guide Ver. 8 (2018). These definitions relate average delays at intersections (for individual turning movements, for each approach and for the overall intersection) to a level of service ranging from A to F, as are shown in **Table 6-1**.

Table 6-1: Intersection-Based Level of Service Criteria

Level of Service	Control Delay per Vehicle in Seconds (d)			LOS for V/C Ratio
	Signals and	Roundabouts	Stop Signs and Yield Signs	V/C > 1
A	d ≤ 10	d ≤ 10	d ≤ 10	F
B	10 <d ≤ 20	10 < d ≤ 20	10 <d ≤ 15	F
C	20 < d ≤ 35	20 < d ≤ 35	15 < d ≤ 25	F
D	35 < d ≤ 55	35 < d ≤ 50	25 < d ≤ 35	F
E	55 < d ≤ 80	50 < d ≤ 70	35 < d ≤ 50	F
F	80 < d	70 < d	50 < d	F

Detailed SIDRA outputs are contained in **Annexure C**.

6.1 National Route 9 and Plantation Road

The existing intersection of National Route 9 (C J Langenhoven Road) and Plantation Road is a priority-controlled intersection with stop control along the east and west approaches. The north approach comprises of a shared through-and-left lane and a short right-turn lane. The east approach comprises a short left-turn lane and shared through-and-right-turn lane. The south approach comprises of a shared through-and-left lane and a short right-turn lane. The west approach comprises of a single lane serving all directions. Refer to **Figure 6-1.**

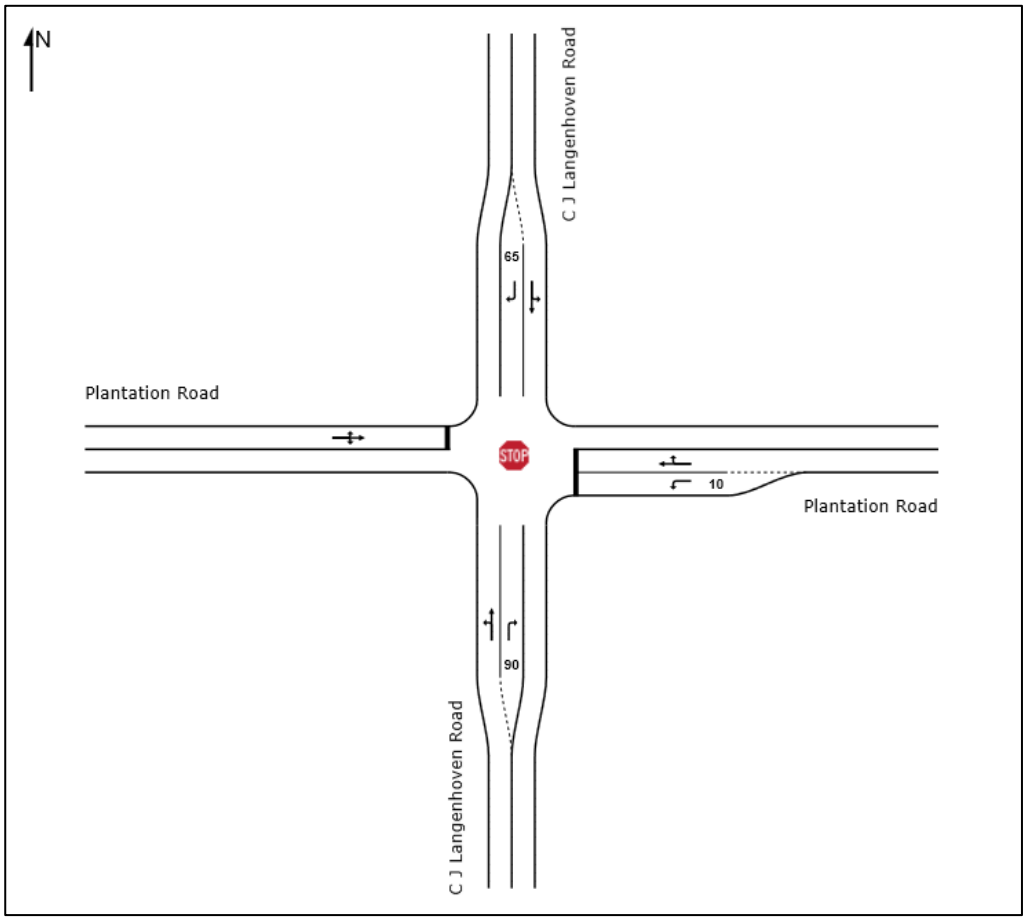


Figure 6-1: National Route 9 (C J Langenhoven Road) and Plantation Road: Existing Layout

2022 Background Traffic

Taking into consideration the 2022 Base Year traffic flows, the worst stop-control approach operates at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 9 seconds for both peak hours.

It is concluded that the existing intersection configuration is able to accommodate the 2022 Background Traffic at an acceptable Level of Service.

2027 Background + Development Traffic

Taking into consideration the 2027 Background Traffic plus the anticipated development traffic flows, the worst stop-control approach will operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 9 and 10 seconds respectively.

It is concluded that the existing intersection configuration would be able to accommodate the 2027 Background + Development Traffic at an acceptable Level of Service.

6.2 National Route 9 and Witfontein Road

The existing intersection of National Route 9 (C J Langenhoven Road) and Witfontein Road is a priority-controlled roundabout. The north approach comprises of a short shared through-and-left lane and a through and right-turn lane. The east approach comprises a short left-turn lane and shared through-and-right-turn lane. The south approach comprises of a short left-turn slip-lane and a single lane serving all directions. The west approach comprises of a right-turn lane and a single lane serving all directions. Refer to **Figure 6-2.**

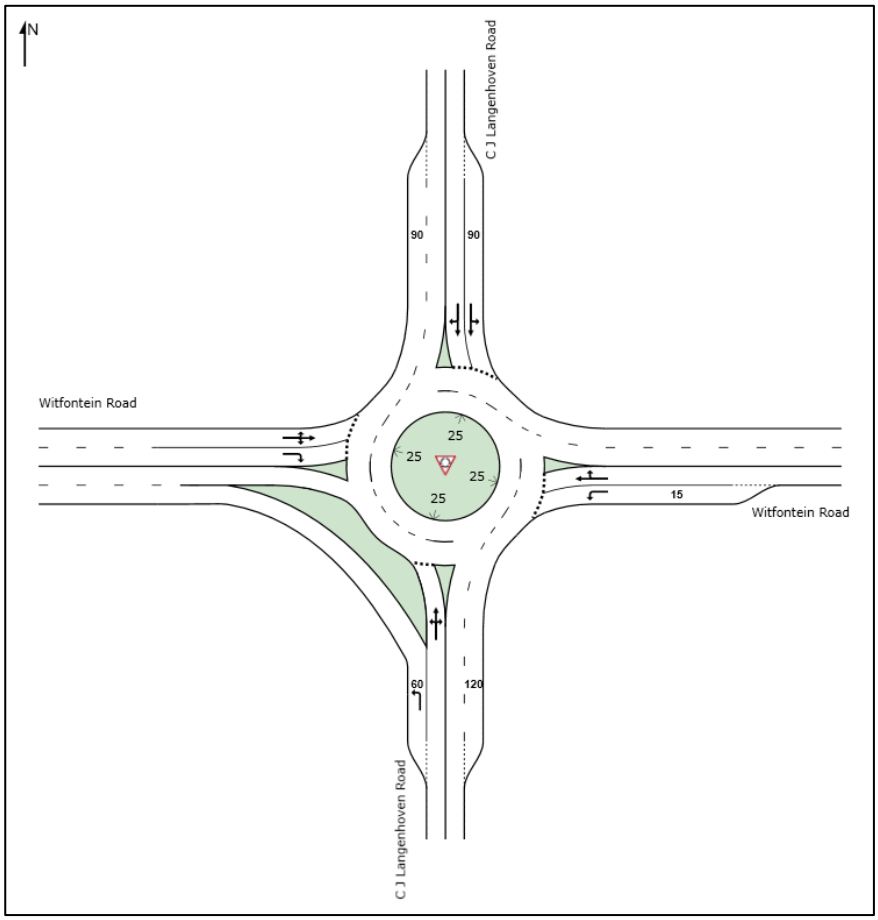


Figure 6-2: National Route 9 (C J Langenhoven Road) and Witfontein Road: Existing Layout

2022 Background Traffic

Taking into consideration the 2022 Base Year traffic flows, the intersection operates at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 7 and 6 seconds respectively.

It is concluded that the existing intersection configuration is able to accommodate the 2022 Background Traffic at an acceptable Level of Service.

2027 Background + Development Traffic

Taking into consideration the 2027 Background Traffic plus the anticipated development traffic flows, the intersection will operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 7 and 6 seconds respectively.

It is concluded that the existing intersection configuration would be able to accommodate the 2027 Background + Development Traffic at an acceptable Level of Service.

6.3 Analysis Summary

A summary of the analysis outputs is provided in **Table 6-2.**

Table 6-2: Analysis Summary

Intersection	2022 Base Year		2027 Background + Development	
	AM	PM	AM	PM
National Route 9 and Plantation Road	A	A	A	A
National Route 9 and Witfontein Road	A	A	A	A

7 Site Impact Assessment

7.1 Internal Operations

Provision should be made for an ease of circulation as part of the internal layout of the planned development.

7.2 Parking

Parking provision is an important consideration of any development and would ultimately ensure that vehicular traffic is accommodated on-site in its entirety. Insufficient parking provision would have dire consequences on the operational performance of the site and surrounding public roads, as well as on road safety.

The George Zoning Scheme By-Law (2016) was used to ascertain the parking standards to be adhered to, based on the site-specific land use rights for the development area.

A minimum of 2 parking bays per dwelling unit plus 0.25 parking bays per dwelling unit for visitors is required for Townhouses (Simplexes and Duplexes), thus totalling 174 parking bays.

A minimum of 1.75 parking bays per dwelling plus 0.25 parking bays per dwelling for visitors is required for flats, thus totalling 80 parking bays.

Therefore, the total development would need to accommodate 254 parking bays.

4 parking bays are to be accessible to the physically disabled.

7.3 Loading

Loading bays are not stipulated as a requirement for residential land uses in the George Zoning Scheme By-Law (2016). However, the Municipality may determine off-street loading requirements for uses not stipulated in the by-law on a case-by-case basis.

7.4 Throat Length

Adequate throat length provision is essential in ensuring sufficient operation of a development access and preventing possible spill-back onto the surrounding public road.

A throat length of 46 m (measured from the access control location to the development boundary) has been provided on the Site Development Plan.

It is our submission that the throat length provided would be sufficient to accommodate the anticipated traffic demand.

It is however recommended that visitors bays are not provided within the throat leading to the development access, as is currently shown on the Site Development Plan.

8 Proposed Capacity Improvements

No capacity improvements are proposed as part of the planned development.

9 Conclusion and Recommendations

SMEC South Africa (Pty) Ltd was appointed by Urban Front Developers to conduct a Traffic Impact Assessment for the proposed Heather Park residential development on Erf 19734, George. The site measures approximately 5,6 Hectares in extent and will comprise of 77 townhouses (simplexes and duplexes) and 40 flats.

The subject site is proposed to be served by a single access on Plantation Road.

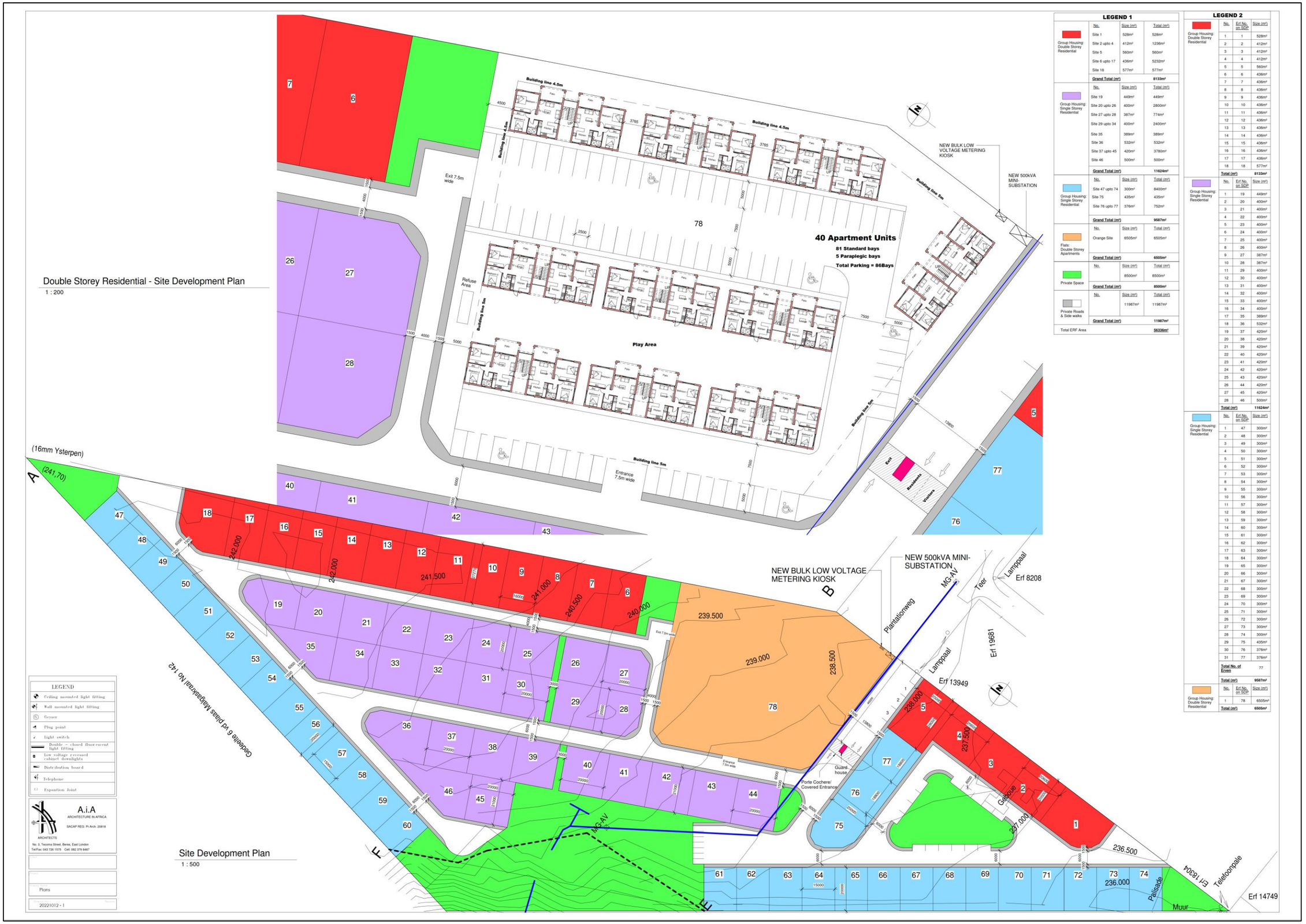
It is anticipated that the development would generate 94 and 93 new vehicular trips during the Weekday AM and PM Peak Hours, respectively.

Following our assessment, it is evident that no capacity improvements are required as part of the planned development. Existing intersection layouts are capable of serving the anticipated new development trips.

It is however recommended that visitors bays are not provided within the throat leading to the development access, as is currently shown on the Site Development Plan.

This development is supported from a traffic engineering perspective.

Annexure A Site Development Plan



LEGEND 1

	No.	Size (m²)	Total (m²)
Group Housing: Double Storey Residential	Site 1	528m²	528m²
	Site 2 upto 4	412m²	1236m²
	Site 5	560m²	560m²
	Site 6 upto 17	436m²	5232m²
	Site 18	577m²	577m²
	Grand Total (m²)		**8133m²**
Group Housing: Single Storey Residential	Site 19	449m²	449m²
	Site 20 upto 26	400m²	2800m²
	Site 27 upto 28	387m²	774m²
	Site 29 upto 34	400m²	2400m²
	Site 35	389m²	389m²
	Site 36	532m²	532m²
	Site 37 upto 45	420m²	3780m²
	Site 46	500m²	500m²
	Grand Total (m²)		**11624m²**
Group Housing: Single Storey Residential	Site 47 upto 74	300m²	8400m²
	Site 75	435m²	435m²
	Site 76 upto 77	376m²	752m²
	Grand Total (m²)		**9587m²**
Flats: Double Storey Apartments	Orange Site	6505m²	6505m²
	Grand Total (m²)		**6505m²**
Private Space		8500m²	8500m²
	Grand Total (m²)		**8500m²**
Private Roads & Side walks		11987m²	11987m²
	Grand Total (m²)		**11987m²**
Total ERF Area			**56336m²**

LEGEND 2

	No.	Erf No. on SDP	Size (m²)
Group Housing: Double Storey Residential	1	1	528m²
	2	2	412m²
	3	3	412m²
	4	4	412m²
	5	5	560m²
	6	6	436m²
	7	7	436m²
	8	8	436m²
	9	9	436m²
	10	10	436m²
	11	11	436m²
	12	12	436m²
	13	13	436m²
	14	14	436m²
	15	15	436m²
	16	16	436m²
	17	17	436m²
	18	18	577m²
	Total (m²)		**8133m²**
Group Housing: Single Storey Residential	1	19	449m²
	2	20	400m²
	3	21	400m²
	4	22	400m²
	5	23	400m²
	6	24	400m²
	7	25	400m²
	8	26	400m²
	9	27	387m²
	10	28	387m²
	11	29	400m²
	12	30	400m²
	13	31	400m²
	14	32	400m²
	15	33	400m²
	16	34	400m²
	17	35	389m²
	18	36	532m²
	19	37	420m²
	20	38	420m²
	21	39	420m²
	22	40	420m²
	23	41	420m²
	24	42	420m²
	25	43	420m²
	26	44	420m²
	27	45	420m²
	28	46	500m²
	Total (m²)		**11624m²**
Group Housing: Single Storey Residential	1	47	300m²
	2	48	300m²
	3	49	300m²
	4	50	300m²
	5	51	300m²
	6	52	300m²
	7	53	300m²
	8	54	300m²
	9	55	300m²
	10	56	300m²
	11	57	300m²
	12	58	300m²
	13	59	300m²
	14	60	300m²
	15	61	300m²
	16	62	300m²
	17	63	300m²
	18	64	300m²
	19	65	300m²
	20	66	300m²
	21	67	300m²
	22	68	300m²
	23	69	300m²
	24	70	300m²
	25	71	300m²
	26	72	300m²
	27	73	300m²
	28	74	300m²
	29	75	435m²
	30	76	376m²
	31	77	376m²
	Total No. of Erven		77
	Total (m²)		**9587m²**
Group Housing: Double Storey Residential	No.	Erf No. on SDP	Size (m²)
	1	78	6505m²
	Total (m²)		**6505m²**

Annexure B Traffic Survey Data

Counting Station 1: Intersection of the N9 and Plantation Road

SMEC

Verkeerstelling/Traffic Count

Projek Nr/Projek Name

Plek/Location: GEORGE : SLANGKOP : PLANTASIE / N12

Datum/Date: 12 MEI 2022

Teller/Counter: J. E. GIEWELAAR

N2 N2 N2

Tyd	1				2				3			
	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS
05:45 - 06:00												
06:00 - 06:15	0	0	0	0	3	0	1	0	0	0	0	0
06:15 - 06:30	0	0	0	0	17	6	2	0	0	0	0	0
06:30 - 06:45	1	0	0	0	37	8	3	0	1	0	0	0
06:45 - 07:00	1	0	0	0	59	10	3	0	1	0	0	0
07:00 - 07:15	2	0	0	0	80	15	3	0	1	0	0	0
07:15 - 07:30	2	0	0	0	109	19	6	0	2	0	0	0
07:30 - 07:45	2	0	0	0	133	21	8	0	2	0	0	0
07:45 - 08:00	2	0	0	0	169	27	8	0	2	0	0	0
08:00 - 08:15	3	0	0	0	206	33	8	0	2	0	0	0
08:15 - 08:30	4	0	0	0	247	38	8	0	2	0	0	0
08:30 - 08:45	4	0	0	0	302	47	8	0	2	0	0	0
08:45 - 09:00	4	0	0	0	345	52	8	0	2	0	0	0
09:00 - 09:15												
14:45 - 15:00												
15:00 - 15:15	1	0	0	0	3	6	1	0	1	0	0	0
15:15 - 15:30	2	0	0	0	83	13	1	0	1	0	0	0
15:30 - 15:45	4	0	0	0	103	15	2	0	1	0	0	0
15:45 - 16:00	9	0	0	0	131	16	2	0	3	0	0	0
16:00 - 16:15	11	0	0	0	176	19	4	0	3	0	0	0
16:15 - 16:30	15	0	0	0	216	23	4	0	3	0	0	0
16:30 - 16:45	17	0	0	0	251	24	6	0	4	0	0	0
16:45 - 17:00	20	0	0	0	296	24	7	0	5	0	0	0
17:00 - 17:15	21	0	0	0	343	28	7	0	5	0	0	0
17:15 - 17:30	22	0	0	0	394	33	8	0	6	0	0	0
17:30 - 17:45	24	0	0	0	423	36	8	0	7	0	0	0
17:45 - 18:00	25	0	0	0	445	38	9	0	8	0	0	0
18:00 - 18:15												

SMEC

Verkeerstelling/Traffic Count

Projek Nr/Projek Name: _____

Plek/Location: _____

Datum/Date: _____

Teller/Counter: _____

Tyd	4 PLANTASIE WEG				5 PLANTASIE WEG				6. PLANTASIE WEG			
	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS
05:45 - 06:00												
06:00 - 06:15	0	0	0	0	0	0	0	0	0	0	0	0
06:15 - 06:30	0	0	0	0	0	0	0	0	0	0	0	0
06:30 - 06:45	0	0	0	0	0	0	0	0	0	0	0	0
06:45 - 07:00	0	0	0	0	0	0	0	0	0	0	0	0
07:00 - 07:15	0	0	0	0	0	0	0	0	0	0	0	0
07:15 - 07:30	0	0	0	0	0	0	0	0	0	0	0	0
07:30 - 07:45	0	0	0	0	0	0	0	0	0	0	0	0
07:45 - 08:00	0	0	0	0	0	0	0	0	0	0	0	0
08:00 - 08:15	0	0	0	0	0	0	0	0	0	0	0	0
08:15 - 08:30	0	0	0	0	0	0	0	0	0	0	0	0
08:30 - 08:45	0	0	0	0	0	0	0	0	0	0	0	0
08:45 - 09:00	2	0	0	0	0	0	0	0	0	0	0	0
09:00 - 09:15												
14:45 - 15:00												
15:00 - 15:15	3	0	0	0	0	0	0	0	0	0	0	0
15:15 - 15:30	3	0	0	0	0	0	0	0	0	0	0	0
15:30 - 15:45	3	0	0	0	0	0	0	0	0	0	0	0
15:45 - 16:00	3	0	0	0	0	0	0	0	0	0	0	0
16:00 - 16:15	3	0	0	0	0	0	0	0	0	0	0	0
16:15 - 16:30	3	0	0	0	0	0	0	0	0	0	0	0
16:30 - 16:45	3	0	0	0	0	0	0	0	0	0	0	0
16:45 - 17:00	5	0	0	0	0	0	0	0	0	0	0	0
17:00 - 17:15	7	0	0	0	0	0	0	0	0	0	0	0
17:15 - 17:30	7	0	0	0	0	0	0	0	0	0	0	0
17:30 - 17:45	7	0	0	0	0	0	0	0	1	0	0	0
17:45 - 18:00	9	0	0	0	0	0	0	0	2	0	0	0
18:00 - 18:15												

SMEC

Verkeerstelling/Traffic Count

Projek Nr/Projek Name: _____

Plek/Location: N12 _____ N12 _____ N12

Datum/Date: _____

Teller/Counter: _____

Tyd	7				8				9			
	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS
05:45 - 06:00												
06:00 - 06:15	0	0	0	0	3	0	3	0	0	0	0	0
06:15 - 06:30	0	0	0	0	16	1	5	1	0	0	0	0
06:30 - 06:45	0	0	0	0	44	2	7	1	0	0	0	0
06:45 - 07:00	0	0	0	0	82	2	8	1	0	0	0	0
07:00 - 07:15	0	0	0	0	128	3	8	1	0	0	0	0
07:15 - 07:30	0	0	0	0	163	5	8	1	0	0	0	0
07:30 - 07:45	0	0	0	0	178	7	8	1	0	0	0	0
07:45 - 08:00	0	0	0	0	204	8	8	1	0	0	0	0
08:00 - 08:15	0	0	0	0	229	9	8	1	0	0	0	0
08:15 - 08:30	0	0	0	0	262	10	8	1	0	0	0	0
08:30 - 08:45	0	0	0	0	283	11	9	2	0	0	0	0
08:45 - 09:00	0	0	0	0	314	15	9	3	0	0	0	0
09:00 - 09:15												
14:45 - 15:00												
15:00 - 15:15	0	0	0	0	40	1	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	72	7	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	100	15	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	149	17	0	0	0	0	0	0
16:00 - 16:15	0	0	0	0	188	23	0	0	0	0	0	0
16:15 - 16:30	0	0	0	0	239	28	0	0	0	0	0	0
16:30 - 16:45	0	0	0	0	272	32	0	0	0	0	0	0
16:45 - 17:00	0	0	0	0	309	35	0	0	0	0	0	0
17:00 - 17:15	0	0	0	0	348	39	0	1	0	0	0	0
17:15 - 17:30	0	0	0	0	381	42	1	1	0	0	0	0
17:30 - 17:45	0	0	0	0	415	42	1	1	0	0	0	0
17:45 - 18:00	0	0	0	0	442	48	6	1	0	0	0	0
18:00 - 18:15												

SMEC

Verkeerstelling/Traffic Count

Projek Nr/Projek Name _____

Plek/Location: PLANTASIE WEG PLANTASIE WEG PLANTASIE WEG

Datum/Date: _____

Teller/Counter: _____

Tyd	10				11				12			
	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS
05:45 - 06:00												
06:00 - 06:15	0	0	0	0	0	0	0	0	0	0	0	0
06:15 - 06:30	0	0	0	0	0	0	0	0	1	0	0	0
06:30 - 06:45	0	0	0	0	0	0	0	0	3	0	0	0
06:45 - 07:00	0	0	0	0	0	0	0	0	7	0	0	0
07:00 - 07:15	0	0	0	0	0	0	0	0	10	0	0	0
07:15 - 07:30	0	0	0	0	0	0	0	0	11	0	0	0
07:30 - 07:45	0	0	0	0	0	0	0	0	13	0	0	0
07:45 - 08:00	0	0	0	0	0	0	0	0	14	0	0	0
08:00 - 08:15	0	0	0	0	0	0	0	0	15	0	0	0
08:15 - 08:30	0	0	0	0	0	0	0	0	16	0	0	0
08:30 - 08:45	0	0	0	0	0	0	0	0	16	0	0	0
08:45 - 09:00	0	0	0	0	0	0	0	0	17	0	0	0
09:00 - 09:15												
14:45 - 15:00												
15:00 - 15:15	0	0	0	0	0	0	0	0	7	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	7	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	8	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	9	0	0	0
16:00 - 16:15	0	0	0	0	0	0	0	0	11	0	0	0
16:15 - 16:30	0	0	0	0	0	0	0	0	12	0	0	0
16:30 - 16:45	0	0	0	0	0	0	0	0	14	0	0	0
16:45 - 17:00	0	0	0	0	0	0	0	0	16	0	0	0
17:00 - 17:15	0	0	0	0	0	0	0	0	18	0	0	0
17:15 - 17:30	0	0	0	0	0	0	0	0	18	0	0	0
17:30 - 17:45	0	0	0	0	0	0	0	0	20	0	0	0
17:45 - 18:00	0	0	0	0	0	0	0	0	20	0	0	0
18:00 - 18:15												

Counting Station 2: Intersection of the N9 and Witfontein Road

SMEC

Verkeerstelling/Traffic Count

Projek Nr/Projek Name

Plek/Location: GEORGE: (BLANCO) - SIRKEL (ENGEN/HEATHERPARK)

Datum/Date: 12:05:2022

Teller/Counter: J.E. GIEWELAAR

N12 N12 N12

Tyd	1				2				3			
	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS
05:45 - 06:00												
06:00 - 06:15	22	0	0	1	11	1	0	0	2	0	0	0
06:15 - 06:30	47	0	0	2	23	5	0	1	11	0	0	0
06:30 - 06:45	85	0	1	4	39	6	0	1	17	0	0	0
06:45 - 07:00	146	2	1	5	55	8	0	1	25	0	0	0
07:00 - 07:15	238	3	2	7	70	13	0	1	29	0	0	0
07:15 - 07:30	372	3	2	8	86	17	4	1	33	0	0	0
07:30 - 07:45	504	4	6	10	105	18	6	1	40	0	0	0
07:45 - 08:00	646	7	7	15	129	22	6	1	48	0	0	0
08:00 - 08:15	764	9	10	16	155	25	6	1	52	0	0	0
08:15 - 08:30	850	13	11	17	182	28	6	1	61	1	0	0
08:30 - 08:45	930	13	11	18	217	30	6	1	68	1	0	0
08:45 - 09:00	1014	16	11	19	240	33	6	1	78	1	0	0
09:00 - 09:15												
14:45 - 15:00												
15:00 - 15:15	128	1	0	4	20	2	0	0	10	0	0	0
15:15 - 15:30	250	4	4	6	50	5	0	0	20	0	0	0
15:30 - 15:45	400	9	5	8	65	7	0	0	28	0	0	0
15:45 - 16:00	554	12	6	10	84	8	0	0	38	0	0	0
16:00 - 16:15	712	13	6	11	107	12	0	0	45	0	0	0
16:15 - 16:30	888	17	7	12	135	15	0	0	52	0	1	0
16:30 - 16:45	1082	18	7	14	150	15	0	0	60	0	1	0
16:45 - 17:00	1344	19	7	14	171	15	0	0	75	0	1	0
17:00 - 17:15	1565	19	7	16	198	19	0	2	84	0	1	0
17:15 - 17:30	1787	21	9	18	219	24	0	2	90	0	1	0
17:30 - 17:45	1962	21	10	19	228	28	0	2	96	0	1	0
17:45 - 18:00	2096	23	11	20	233	28	0	2	99	0	1	0
18:00 - 18:15												

SMEC

Verkeerstelling/Traffic Count

Projek Nr/Projek Name _____

Plek/Location: _____

Datum/Date: _____

Teller/Counter: _____

WITFONTEIN RD WITFONTEIN RD WITFONTEIN RD

Tyd	4				5				6			
	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS
05:45 - 06:00												
06:00 - 06:15	0	0	0	0	3	0	0	0	2	0	0	0
06:15 - 06:30	0	0	0	0	7	0	0	0	4	0	0	0
06:30 - 06:45	1	0	0	0	13	0	0	0	9	0	0	0
06:45 - 07:00	3	0	0	0	24	0	0	0	11	0	0	0
07:00 - 07:15	3	0	0	0	54	1	0	0	17	0	0	0
07:15 - 07:30	3	0	0	0	86	1	0	0	18	0	0	0
07:30 - 07:45	3	0	0	0	123	1	0	0	19	0	0	0
07:45 - 08:00	5	0	0	0	150	1	0	0	24	0	0	0
08:00 - 08:15	6	0	0	0	170	1	0	0	28	0	0	0
08:15 - 08:30	8	0	0	0	182	1	0	0	29	0	0	0
08:30 - 08:45	8	0	0	0	191	1	0	0	33	0	0	0
08:45 - 09:00	9	0	0	0	212	1	0	0	36	1	0	0
09:00 - 09:15												
14:45 - 15:00												
15:00 - 15:15	0	0	0	0	19	0	0	0	6	1	0	0
15:15 - 15:30	1	0	0	0	35	0	0	0	12	1	0	0
15:30 - 15:45	1	0	1	0	48	0	0	0	15	1	0	0
15:45 - 16:00	2	0	1	0	74	0	0	0	21	1	0	0
16:00 - 16:15	3	0	1	0	102	0	0	0	25	1	0	0
16:15 - 16:30	3	0	1	0	125	0	0	0	32	1	0	0
16:30 - 16:45	3	0	1	0	145	0	0	0	38	1	1	0
16:45 - 17:00	6	0	1	0	171	0	0	0	45	1	1	0
17:00 - 17:15	6	0	1	0	208	0	0	0	51	1	1	0
17:15 - 17:30	7	0	1	0	241	0	0	0	55	1	1	0
17:30 - 17:45	8	0	1	0	271	0	0	0	65	1	1	0
17:45 - 18:00	8	0	1	0	286	0	0	0	70	1	1	0
18:00 - 18:15												

SMEC

Verkeerstelling/Traffic Count

Projek Nr/Projek Name: _____

Piek/Location: N12 _____ N12 _____ N12

Datum/Date: _____

Teller/Counter: _____

Tyd	7				8				9			
	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS
05:45 - 06:00												
06:00 - 06:15	1	0	0	0	8	0	0	0	0	0	0	0
06:15 - 06:30	1	0	0	0	22	1	2	0	1	0	0	0
06:30 - 06:45	3	0	1	0	50	3	2	0	2	0	0	0
06:45 - 07:00	6	0	1	0	80	3	2	0	4	0	0	0
07:00 - 07:15	7	0	2	0	111	4	2	0	10	0	0	0
07:15 - 07:30	8	0	2	0	134	6	2	0	14	0	0	0
07:30 - 07:45	10	0	2	0	147	6	2	0	15	0	0	0
07:45 - 08:00	12	0	2	0	181	9	2	0	20	0	0	0
08:00 - 08:15	19	0	2	0	202	10	2	0	24	0	0	0
08:15 - 08:30	21	0	2	0	235	11	2	0	25	0	0	0
08:30 - 08:45	21	0	2	0	256	11	2	1	27	0	0	0
08:45 - 09:00	21	0	2	0	292	15	2	2	32	0	0	0
09:00 - 09:15												
14:45 - 15:00												
15:00 - 15:15	0	0	0	0	42	1	0	0	11	1	0	0
15:15 - 15:30	2	0	0	0	76	6	0	0	16	1	0	0
15:30 - 15:45	3	0	0	0	106	12	0	0	21	1	0	0
15:45 - 16:00	6	0	0	0	152	14	0	0	27	1	0	0
16:00 - 16:15	8	0	0	0	183	18	0	0	34	1	0	0
16:15 - 16:30	11	0	0	0	242	22	0	0	40	1	0	0
16:30 - 16:45	13	0	0	0	273	25	0	0	43	1	0	0
16:45 - 17:00	17	1	0	0	311	26	0	0	44	1	0	0
17:00 - 17:15	27	1	0	0	346	28	0	1	49	1	0	0
17:15 - 17:30	29	1	0	0	375	31	0	1	54	2	0	0
17:30 - 17:45	30	1	0	0	411	32	0	2	57	2	1	0
17:45 - 18:00	31	1	0	0	441	36	3	2	59	2	1	0
18:00 - 18:15												

SMEC

Verkeerstelling/Traffic Count

Projek Nr/Projek Name _____

Plek/Location: _____

Datum/Date: _____

Teller/Counter: _____

WITFONTEIN RD WITFONTEIN RD WITFONTEIN RD

Tyd	10				11				12			
	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS	LIGHT	HEAVY	MBT	BUS
05:45 - 06:00												
06:00 - 06:15	0	0	1	0	5	0	0	0	23	0	2	2
06:15 - 06:30	0	0	1	0	9	0	0	0	69	0	4	5
06:30 - 06:45	3	0	1	0	28	0	0	0	199	1	6	6
06:45 - 07:00	5	0	1	0	96	0	0	0	469	1	8	9
07:00 - 07:15	7	0	1	0	200	0	0	0	665	2	9	10
07:15 - 07:30	7	0	1	0	261	0	0	0	831	4	11	13
07:30 - 07:45	7	0	1	0	295	0	0	0	1041	5	12	18
07:45 - 08:00	7	0	1	0	329	2	0	0	1241	6	16	19
08:00 - 08:15	10	0	1	0	345	2	0	0	1375	7	18	22
08:15 - 08:30	13	0	1	0	353	2	0	0	1487	7	23	24
08:30 - 08:45	23	0	1	0	368	2	0	0	1587	10	25	24
08:45 - 09:00	30	0	1	0	387	2	0	0	1723	11	26	25
09:00 - 09:15												
14:45 - 15:00												
15:00 - 15:15	7	1	0	0	8	0	0	0	141	2	0	0
15:15 - 15:30	12	1	0	0	16	0	0	0	248	3	3	3
15:30 - 15:45	14	1	0	0	37	0	1	0	375	4	6	3
15:45 - 16:00	19	1	0	0	60	0	1	0	508	6	11	5
16:00 - 16:15	24	1	0	0	70	0	1	0	647	10	14	5
16:15 - 16:30	25	1	0	0	81	0	1	0	784	13	17	6
16:30 - 16:45	30	1	1	0	102	0	1	0	935	13	20	7
16:45 - 17:00	41	1	1	0	119	0	1	0	1082	15	21	9
17:00 - 17:15	55	1	1	0	140	0	1	0	1213	15	21	9
17:15 - 17:30	61	1	1	0	151	0	1	0	1348	19	22	11
17:30 - 17:45	69	1	1	0	164	0	1	0	1384	23	26	13
17:45 - 18:00	72	2	2	0	175	0	1	0	1487	23	29	14
18:00 - 18:15												

Annexure C Detailed SIDRA Outputs

National Route 9 and Plantation Road

2022 AM Peak Hour

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: C J Langenhoven Road												
1	L2	1	3,0	0,069	5,6	LOS A	0,0	0,0	0,00	0,00	0,00	57,1
2	T1	139	3,0	0,069	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	59,9
3	R2	1	3,0	0,001	5,9	LOS A	0,0	0,0	0,25	0,50	0,25	49,8
Approach		141	3,0	0,069	0,1	NA	0,0	0,0	0,00	0,01	0,00	59,9
East: Plantation Road												
4	L2	1	3,0	0,001	8,6	LOS A	0,0	0,0	0,24	0,83	0,24	48,8
5	T1	1	3,0	0,002	8,9	LOS A	0,0	0,1	0,36	0,80	0,36	41,0
6	R2	1	3,0	0,002	8,9	LOS A	0,0	0,1	0,36	0,80	0,36	48,5
Approach		3	3,0	0,002	8,8	LOS A	0,0	0,1	0,32	0,81	0,32	46,9
North: C J Langenhoven Road												
7	L2	1	3,0	0,067	5,6	LOS A	0,0	0,0	0,00	0,00	0,00	57,2
8	T1	135	3,0	0,067	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	59,9
9	R2	1	3,0	0,001	5,8	LOS A	0,0	0,0	0,25	0,51	0,25	49,0
Approach		137	3,0	0,067	0,1	NA	0,0	0,0	0,00	0,01	0,00	59,9
West: Plantation Road												
10	L2	1	3,0	0,008	8,6	LOS A	0,0	0,2	0,34	0,83	0,34	48,0
11	T1	1	3,0	0,008	8,9	LOS A	0,0	0,2	0,34	0,83	0,34	40,8
12	R2	7	3,0	0,008	9,0	LOS A	0,0	0,2	0,34	0,83	0,34	47,8
Approach		9	3,0	0,008	8,9	LOS A	0,0	0,2	0,34	0,83	0,34	47,3
All Vehicles		291	3,0	0,069	0,5	NA	0,0	0,2	0,02	0,04	0,02	59,4

2022 PM Peak Hour

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: C J Langenhoven Road												
1	L2	7	3,0	0,103	5,6	LOS A	0,0	0,0	0,00	0,02	0,00	56,9
2	T1	202	3,0	0,103	0,0	LOS A	0,0	0,0	0,00	0,02	0,00	59,8
3	R2	3	3,0	0,002	6,0	LOS A	0,0	0,1	0,28	0,51	0,28	49,7
Approach		213	3,0	0,103	0,3	NA	0,0	0,1	0,00	0,03	0,00	59,6
East: Plantation Road												
4	L2	4	3,0	0,003	8,7	LOS A	0,0	0,1	0,28	0,83	0,28	48,8
5	T1	1	3,0	0,002	9,3	LOS A	0,0	0,1	0,43	0,78	0,43	40,6
6	R2	1	3,0	0,002	9,4	LOS A	0,0	0,1	0,43	0,78	0,43	48,3
Approach		6	3,0	0,003	8,9	LOS A	0,0	0,1	0,33	0,82	0,33	47,8
North: C J Langenhoven Road												
7	L2	1	3,0	0,082	5,6	LOS A	0,0	0,0	0,00	0,00	0,00	57,2
8	T1	166	3,0	0,082	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
9	R2	1	3,0	0,001	6,0	LOS A	0,0	0,0	0,32	0,51	0,32	48,7
Approach		168	3,0	0,082	0,1	NA	0,0	0,0	0,00	0,01	0,00	59,9
West: Plantation Road												
10	L2	1	3,0	0,007	8,8	LOS A	0,0	0,2	0,41	0,82	0,41	47,7
11	T1	1	3,0	0,007	9,4	LOS A	0,0	0,2	0,41	0,82	0,41	40,4
12	R2	6	3,0	0,007	9,4	LOS A	0,0	0,2	0,41	0,82	0,41	47,5
Approach		8	3,0	0,007	9,3	LOS A	0,0	0,2	0,41	0,82	0,41	46,9
All Vehicles		396	3,0	0,103	0,5	NA	0,0	0,2	0,02	0,05	0,02	59,3

2027 AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: C J Langenhoven Road												
1	L2	24	3,0	0,092	5,6	LOS A	0,0	0,0	0,00	0,08	0,00	56,2
2	T1	162	3,0	0,092	0,0	LOS A	0,0	0,0	0,00	0,08	0,00	59,3
3	R2	2	3,0	0,001	5,9	LOS A	0,0	0,0	0,27	0,51	0,27	49,7
Approach		188	3,0	0,092	0,8	NA	0,0	0,0	0,00	0,08	0,00	58,9
East: Plantation Road												
4	L2	1	3,0	0,001	8,6	LOS A	0,0	0,0	0,27	0,82	0,27	48,8
5	T1	1	3,0	0,002	9,2	LOS A	0,0	0,1	0,40	0,79	0,40	40,8
6	R2	1	3,0	0,002	9,2	LOS A	0,0	0,1	0,40	0,79	0,40	48,4
Approach		3	3,0	0,002	9,0	LOS A	0,0	0,1	0,36	0,80	0,36	46,8
North: C J Langenhoven Road												
7	L2	1	3,0	0,078	5,6	LOS A	0,0	0,0	0,00	0,00	0,00	57,2
8	T1	157	3,0	0,078	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
9	R2	2	3,0	0,001	6,0	LOS A	0,0	0,0	0,30	0,52	0,30	48,8
Approach		160	3,0	0,078	0,1	NA	0,0	0,0	0,00	0,01	0,00	59,8
West: Plantation Road												
10	L2	6	3,0	0,070	8,7	LOS A	0,3	2,2	0,40	0,87	0,40	47,7
11	T1	1	3,0	0,070	9,3	LOS A	0,3	2,2	0,40	0,87	0,40	40,4
12	R2	75	3,0	0,070	9,3	LOS A	0,3	2,2	0,40	0,87	0,40	47,5
Approach		82	3,0	0,070	9,3	LOS A	0,3	2,2	0,40	0,87	0,40	47,5
All Vehicles		434	3,0	0,092	2,2	NA	0,3	2,2	0,08	0,21	0,08	57,3

2027 PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: C J Langenhoven Road												
1	L2	69	3,0	0,152	5,6	LOS A	0,0	0,0	0,00	0,14	0,00	55,5
2	T1	235	3,0	0,152	0,0	LOS A	0,0	0,0	0,00	0,14	0,00	58,8
3	R2	4	3,0	0,002	6,1	LOS A	0,0	0,1	0,31	0,51	0,31	49,6
Approach		308	3,0	0,152	1,4	NA	0,0	0,1	0,00	0,14	0,00	58,1
East: Plantation Road												
4	L2	5	3,0	0,004	8,8	LOS A	0,0	0,1	0,30	0,83	0,30	48,8
5	T1	1	3,0	0,002	10,0	LOS B	0,0	0,1	0,48	0,78	0,48	40,1
6	R2	1	3,0	0,002	9,7	LOS A	0,0	0,1	0,48	0,78	0,48	47,9
Approach		7	3,0	0,004	9,1	LOS A	0,0	0,1	0,35	0,81	0,35	47,8
North: C J Langenhoven Road												
7	L2	1	3,0	0,096	5,6	LOS A	0,0	0,0	0,00	0,00	0,00	57,2
8	T1	194	3,0	0,096	0,0	LOS A	0,0	0,0	0,00	0,00	0,00	60,0
9	R2	6	3,0	0,004	6,4	LOS A	0,0	0,1	0,40	0,54	0,40	48,4
Approach		201	3,0	0,096	0,2	NA	0,0	0,1	0,01	0,02	0,01	59,6
West: Plantation Road												
10	L2	3	3,0	0,037	9,0	LOS A	0,2	1,1	0,47	0,86	0,47	47,3
11	T1	1	3,0	0,037	10,0	LOS A	0,2	1,1	0,47	0,86	0,47	39,8
12	R2	33	3,0	0,037	10,0	LOS B	0,2	1,1	0,47	0,86	0,47	47,1
Approach		37	3,0	0,037	9,9	LOS A	0,2	1,1	0,47	0,86	0,47	47,0
All Vehicles		554	3,0	0,152	1,6	NA	0,2	1,1	0,04	0,15	0,04	57,9

National Route 9 and Witfontein Road

2022 AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: C J Langenhoven Road												
1	L2	548	3,0	0,215	3,5	LOS A	1,1	7,7	0,09	0,44	0,09	54,0
2	T1	99	3,0	0,215	4,5	LOS A	1,1	7,7	0,33	0,48	0,33	54,7
3	R2	24	3,0	0,215	9,6	LOS A	1,1	7,7	0,33	0,48	0,33	49,2
Approach		672	3,0	0,215	3,9	LOS A	1,1	7,7	0,13	0,45	0,13	53,9
East: Witfontein Road												
4	L2	2	3,0	0,004	6,8	LOS A	0,0	0,1	0,60	0,60	0,60	49,4
5	T1	134	3,0	0,162	5,7	LOS A	0,7	5,4	0,62	0,72	0,62	43,3
6	R2	14	3,0	0,162	10,6	LOS B	0,7	5,4	0,62	0,72	0,62	48,0
Approach		149	3,0	0,162	6,2	LOS A	0,7	5,4	0,62	0,72	0,62	44,0
North: C J Langenhoven Road												
7	L2	7	3,0	0,076	7,3	LOS A	0,3	2,2	0,62	0,72	0,62	29,0
8	T1	113	3,0	0,097	6,7	LOS A	0,4	3,0	0,61	0,69	0,61	52,6
9	R2	17	3,0	0,097	11,6	LOS B	0,4	3,0	0,61	0,67	0,61	30,8
Approach		137	3,0	0,097	7,3	LOS A	0,4	3,0	0,61	0,69	0,61	49,1
West: Witfontein Road												
10	L2	2	3,0	0,411	4,6	LOS A	2,3	16,4	0,35	0,56	0,35	44,3
11	T1	247	3,0	0,411	4,6	LOS A	2,3	16,4	0,35	0,56	0,35	25,7
12	R2	837	3,0	0,449	9,7	LOS A	2,6	19,0	0,35	0,61	0,35	49,8
Approach		1086	3,0	0,449	8,5	LOS A	2,6	19,0	0,35	0,60	0,35	45,9
All Vehicles		2044	3,0	0,449	6,7	LOS A	2,6	19,0	0,31	0,56	0,31	48,7

2022 PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: RoadName												
1	L2	958	3,0	0,346	3,6	LOS A	1,9	13,9	0,12	0,45	0,12	53,8
2	T1	98	3,0	0,346	4,5	LOS A	1,9	13,9	0,36	0,50	0,36	54,7
3	R2	40	3,0	0,346	9,7	LOS A	1,9	13,9	0,36	0,50	0,36	49,2
Approach		1096	3,0	0,346	3,9	LOS A	1,9	13,9	0,15	0,45	0,15	53,7
East: RoadName												
4	L2	4	3,0	0,007	6,1	LOS A	0,0	0,2	0,55	0,60	0,55	50,2
5	T1	122	3,0	0,147	5,0	LOS A	0,6	4,5	0,54	0,66	0,54	43,6
6	R2	25	3,0	0,147	9,9	LOS A	0,6	4,5	0,54	0,66	0,54	48,2
Approach		152	3,0	0,147	5,9	LOS A	0,6	4,5	0,54	0,65	0,54	45,0
North: RoadName												
7	L2	20	3,0	0,089	6,2	LOS A	0,3	2,5	0,53	0,62	0,53	29,4
8	T1	151	3,0	0,113	5,8	LOS A	0,5	3,3	0,52	0,60	0,52	53,3
9	R2	16	3,0	0,113	10,8	LOS B	0,5	3,3	0,52	0,59	0,52	31,3
Approach		186	3,0	0,113	6,3	LOS A	0,5	3,3	0,52	0,60	0,52	49,5
West: RoadName												
10	L2	39	3,0	0,283	4,6	LOS A	1,4	9,9	0,34	0,60	0,34	43,5
11	T1	74	3,0	0,283	4,6	LOS A	1,4	9,9	0,34	0,60	0,34	25,2
12	R2	611	3,0	0,310	9,7	LOS A	1,6	11,3	0,33	0,62	0,33	49,8
Approach		723	3,0	0,310	8,9	LOS A	1,6	11,3	0,33	0,62	0,33	47,8
All Vehicles		2157	3,0	0,346	5,9	LOS A	1,9	13,9	0,27	0,54	0,27	50,9

2027 AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: RoadName												
1	L2	636	3,0	0,257	3,6	LOS A	1,3	9,6	0,09	0,44	0,09	53,9
2	T1	126	3,0	0,257	4,7	LOS A	1,3	9,6	0,39	0,51	0,39	54,3
3	R2	28	3,0	0,257	9,9	LOS A	1,3	9,6	0,39	0,51	0,39	48,8
Approach		791	3,0	0,257	4,0	LOS A	1,3	9,6	0,15	0,46	0,15	53,8
East: RoadName												
4	L2	3	3,0	0,006	7,8	LOS A	0,0	0,2	0,66	0,65	0,66	48,3
5	T1	156	3,0	0,215	6,7	LOS A	1,1	7,8	0,71	0,81	0,71	42,0
6	R2	17	3,0	0,215	11,5	LOS B	1,1	7,8	0,71	0,81	0,71	47,1
Approach		176	3,0	0,215	7,2	LOS A	1,1	7,8	0,71	0,81	0,71	42,9
North: RoadName												
7	L2	9	3,0	0,143	8,1	LOS A	0,6	4,4	0,69	0,80	0,69	28,7
8	T1	176	3,0	0,180	7,5	LOS A	0,9	6,1	0,69	0,77	0,69	51,9
9	R2	43	3,0	0,180	12,2	LOS B	0,9	6,1	0,69	0,76	0,69	30,3
Approach		228	3,0	0,180	8,4	LOS A	0,9	6,1	0,69	0,77	0,69	47,3
West: RoadName												
10	L2	15	3,0	0,495	4,9	LOS A	3,1	21,9	0,43	0,58	0,43	43,9
11	T1	287	3,0	0,495	4,9	LOS A	3,1	21,9	0,43	0,58	0,43	25,4
12	R2	971	3,0	0,541	10,0	LOS A	3,6	25,9	0,43	0,63	0,43	49,4
Approach		1273	3,0	0,541	8,8	LOS A	3,6	25,9	0,43	0,61	0,43	45,5
All Vehicles		2467	3,0	0,541	7,1	LOS A	3,6	25,9	0,39	0,59	0,39	48,3

2027 PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: RoadName												
1	L2	1111	3,0	0,420	3,6	LOS A	2,5	18,2	0,13	0,45	0,13	53,7
2	T1	154	3,0	0,420	4,8	LOS A	2,5	18,2	0,43	0,52	0,43	54,2
3	R2	47	3,0	0,420	10,0	LOS A	2,5	18,2	0,43	0,52	0,43	48,7
Approach		1312	3,0	0,420	4,0	LOS A	2,5	18,2	0,17	0,46	0,17	53,6
East: RoadName												
4	L2	5	3,0	0,009	6,7	LOS A	0,0	0,3	0,59	0,64	0,59	49,6
5	T1	142	3,0	0,184	5,5	LOS A	0,9	6,1	0,61	0,71	0,61	42,7
6	R2	29	3,0	0,184	10,4	LOS B	0,9	6,1	0,61	0,71	0,61	47,6
Approach		177	3,0	0,184	6,4	LOS A	0,9	6,1	0,61	0,71	0,61	44,1
North: RoadName												
7	L2	24	3,0	0,124	6,7	LOS A	0,5	3,7	0,59	0,67	0,59	29,1
8	T1	187	3,0	0,157	6,2	LOS A	0,7	5,0	0,59	0,65	0,59	52,8
9	R2	32	3,0	0,157	11,2	LOS B	0,7	5,0	0,58	0,64	0,58	30,9
Approach		243	3,0	0,157	6,9	LOS A	0,7	5,0	0,59	0,65	0,59	48,2
West: RoadName												
10	L2	66	3,0	0,356	5,0	LOS A	1,9	13,7	0,43	0,63	0,43	43,2
11	T1	86	3,0	0,356	5,0	LOS A	1,9	13,7	0,43	0,63	0,43	24,9
12	R2	708	3,0	0,389	10,1	LOS B	2,2	15,7	0,43	0,65	0,43	49,4
Approach		861	3,0	0,389	9,2	LOS A	2,2	15,7	0,43	0,65	0,43	47,3
All Vehicles		2593	3,0	0,420	6,2	LOS A	2,5	18,2	0,33	0,56	0,33	50,5