CITY OF TSHWANE METROPOLITAN MUNICIPALITY

NEW RESIDENTIAL DEVELOPMENT

ON ERF 1211

PIERRE VAN RYNEVELD EXTENSION 2

(REVISION 1)

TRAFFIC IMPACT ASSESSMENT
APRIL 2018

PREPARED FOR:

PJJ Van Vuuren Beleggings
P.O. Box 555
WAPADRAND
0050

Tel: 082 337 9567
Email: rinalab@mweb.co.za

PREPARED BY:

Mariteng Consulting Engineers
P.O. Box 8864
VERWOERD PARK
1453

Tel: 082 854 7358
Fax: (086) 547 8882

EXECUTIVE SUMMARY

This report contains a Traffic Impact Assessment undertaken for the following:

- New residential development on Erf 1211 Pierre van Ryneveld Extension 2.
- The site is situated at 21 Klopper Road in Pierre van Ryneveld and is situated in the area of jurisdiction of the City of Tshwane Metropolitan Municipality.

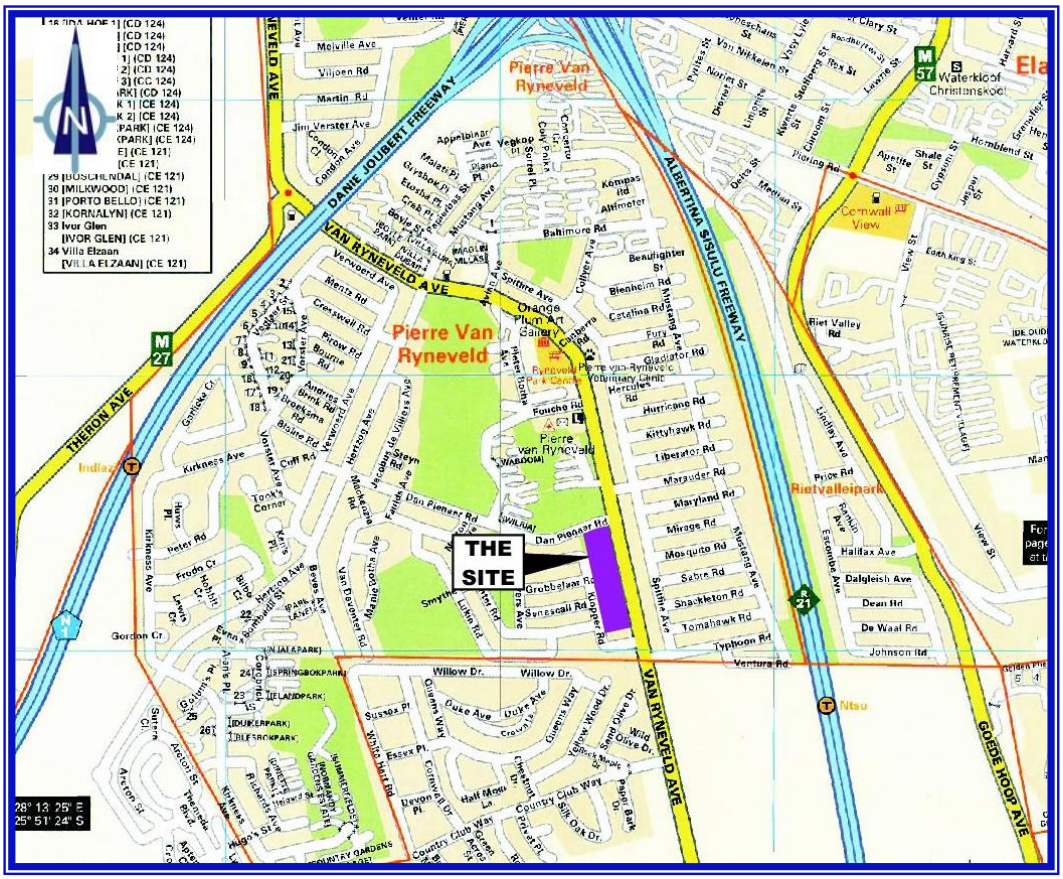
The development controls are summarised as follows:

- Zoning : "Res 3"
- Height restriction : 3 storeys
- Density : 49 units/ha (maximum 165 dwelling units)

A concept site development plan has been prepared for the applicant site.

The proposed development will generate approximately 140 trips, during the weekday morning and weekday afternoon peak hour respectively.

Access is from Klopper Road.



MARITENG INFORMATION PAGE

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PREPARED BY:

Mariteng Consulting Engineers (Pty) Ltd
P.O. Box 8864
VERWOERD PARK
1453
Tel : (082) 854 7358
Fax : (086) 547 8882
E-mail: louis@mariteng.co.za

	Name	Signature	Date
AUTHOR/S OF REPORT	: L J du Toit	.....	01-12-2017
TECHNICAL SUPPORT	: Me. E Muller		
	: Me. L du Toit		
	: Me. M.E. Nkonde		

Revision No.	Date	Comments
1	17 April 2018	Add additional intersections for assessment as per Tshwane requirement.

TRAFFIC IMPACT ASSESSMENT:

NEW RESIDENTIAL DEVELOPMENT ON

ERF 1211PIERRE VAN RYNEVELD EXTENSION 2

(REVISION 1)

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1. INTRODUCTION

This report contains a Traffic Impact Assessment undertaken for the following development:

- New residential development on Erf 1211 Pierre van Ryneveld Extension 2.
- The site is situated at 21 Klopper Road in Pierre van Ryneveld and is situated in the area of jurisdiction of the City of Tshwane Metropolitan Municipality.

The details of the developer involved with the development are:

- PJJ van Vuuren Beleggings

  P.O. Box 555

  WAPADRAND

  0050

  Contact Person: Mr. R Van Vuuren

  Tel No.: 082 337 9567

  Email: rinalab@mweb.co.za

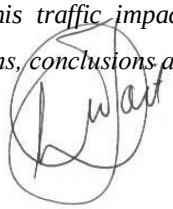
This study was undertaken by traffic engineer:

Mr. Louis du Toit, P.O. Box 8864, Verwoerd Park, 1453

The traffic engineer has the following qualifications for undertaking Traffic Impact Studies:

- Registered as a professional engineering technologist (Registration No. 200270072);
- Baccalaureus Technologiae – Engineering Civil (Transportation) (1997); and
- Experienced in the field of evaluating the traffic impact of developments.

"I Louis du Toit, author if this traffic impact study, hereby certify that I am a professional traffic engineer (ECSA Registration No.: 200270072) and that I have the required experience and training in the field of traffic and transportation engineering, as required by the Engineering Council of South Africa (ECSA), to compile this traffic impact study/statement and I take full responsibility for the content, including all calculations, conclusions and recommendations made therein".



Signature:.....

2. STUDY METHODOLOGY

The traffic impact assessment was executed in accordance with the following guideline documents:

- Committee of Transportation Officials (COTO), TMH 16, August 2012, **South African Traffic Impact and Site Traffic Assessment Manual (Volume 1)**.
- Department of Transport, 1995, **Manual for Traffic Impact Studies**.
- Committee of Transportation Officials (COTO), TMH 17, September 2012, **South African Trip Data Manual (Draft)**.

The proposed development will generate more than 50 peak hour trips and the following procedure was followed in the execution of the study:

- The extent of the study was determined by identifying the intersections in the vicinity of the development on which the traffic generated by the development may have a significant impact. The target years and peak scenarios to be analysed were also determined, based on the land-use and extent of the development.
- The existing traffic flow patterns were surveyed, where after the functioning of the intersections was analysed. Recommendations were made on the need for road upgrades, without the development.
- In the study, future traffic flow conditions were also taken into consideration, namely one target year, i.e. 5 years beyond the base year. Given the existing traffic, volumes and assuming a growth rate, the expected target year were determined, where after the intersections were again analysed and recommendations were made on the future road upgrades required.
- In addition to the proposed development, the study also took into consideration the impact of other developments (latent rights) already approved or submitted to the local road authority for approval. For ease of reference, these developments will jointly be referred to as the **other development or latent rights scenario**.
- The study also assessed the applicant site in terms of the Gauteng Transport Infrastructure Act.
- Given the extent of the development and using the applicable trip generation rates, the expected number of trips that will be generated was determined.
- The trip distribution of the traffic that will be generated by the proposed development was derived from the existing traffic flow patterns, the location as well as the potential market area of the development in relation to the road network. For ease of reference the proposed development will be referred to as **with or proposed development scenario**.

- Given the trip distribution, the generated traffic was assigned to the road network together with the existing and estimated target year traffic volumes. The functioning of the intersections were again analysed and recommendations were made on the need for additional road upgrading necessary, due to the proposed development.

- As part of the study, the existing public transport infrastructure was also evaluated and where required upgrading to the existing infrastructure was recommended.

The following documentations were also used as part of this study:

- Institute of Transportation, 2nd Edition, **Transportation and Traffic Engineering Handbook**.

- Akcelik and Associates (Pty) Ltd, 2011, **Sidra Version 7.0**.

- Transport Research Board, 1994, **Highway Capacity Manual**.

- Dr J Sampson, November 2015, **AutoJ**.

- Committee of Transportation Officials (COTO), October 2005, **National Guidelines for Road Access Management in South Africa (RAM) (Draft)**.

- Committee of Transportation Officials (COTO), July 2011, **South African Road Classification and Access Management Manual (Version 0.0)**.

- City of Tshwane, July 2015, **Road Master Plan**.

- City of Tshwane, Road and Stormwater Division, July 2015, **Standard Construction Details and Design Standards for Roads and Stormwater Drainage Infrastructure**.

3. PROPOSED DEVELOPMENT

3.1 DESCRIPTION OF PROPOSED DEVELOPMENT

This traffic impact assessment was undertaken for the new residential development on Erf 1211 Pierre van Ryneveld Extension 2.

The location of the proposed development is shown in **Figure 1**.

3.2 EXISTING ZONING AND LAND USE RIGHTS

The site is currently zoned “Res 3" in terms of the Tshwane Land Use Management By-Law, 2016. Refer to details appended in **Annexure A**.

3.3 APPLICATION

The development controls for the applicant site is summarised as follows (also refer to **Annexure A**):

- Zoning : "Res 3"
- Height restriction : 3 storeys
- Density : 49 units/ha (maximum 165 dwelling units)

A site development plan is appended in **Annexure B**.

3.4 TIME FRAME OF DEVELOPMENT

The development will be undertaken in a single phase, and it is anticipated that the full development will be completed within the next 5 years.

4. STUDY AREA

4.1 EXTENT OF STUDY AREA

The study area for this application is shown in **Figures 1** and **2**, and is surrounded by the following streets:

- To the north the site abuts Pienaar Road.
- To the east the site abuts Van Ryneveld Avenue.
- To the south and west the site abuts Klopper Road.

4.2 LATENT LAND-USES AND DEVELOPMENTS IN STUDY AREA

Given the low impact the development traffic will have on the adjacent road network, no latent rights were identified that could affect the outcome of this report.

4.3 EXISTING ROAD AND STREET NETWORK

The existing surrounding road network is briefly discussed hereafter (also refer to **Figure 1 and 2**). Also refer to an extract of the Tshwane Road Master Plan appended in **Annexure C**.

- Klopper Road is a single lane residential road. The road is a Class 5 and falls under the jurisdiction of the City of Tshwane Metropolitan Municipality.
- Dan Pienaar Road is a single lane road running in an east-west direction. The road is a Class U4(b)_Collector (typical road reserve width = 20m) and falls under the jurisdiction of the City of Tshwane Metropolitan Municipality. The City to confirm whether any road reserve widening is required along the northern boundary of the applicant site.

- Van Ryneveld Avenue is a single lane road running in a north-south direction. The road is a Class U3_District distributor (typical road reserve width between 32 and 40m) and falls under the jurisdiction of the City of Tshwane Metropolitan Municipality. The City to confirm whether any road reserve widening is required along the eastern boundary of the applicant site.

- Canberra Road is a lane residential road and serves residential and a crèche to the east of Van Ryneveld Avenue and a shopping centre to the west of Van Ryneveld Avenue. The road is a Class 5 and falls under the jurisdiction of the City of Tshwane Metropolitan Municipality.

- Theron Street is a single lane road and is a main feeder route, between Van Ryneveld Avenue and Centurion. The road falls under the jurisdiction of the City of Tshwane Metropolitan Municipality.

4.4 INTERSECTIONS EVALUATED

For the purposes of this study, the following intersections were analyzed (also refer to **Figure 1**):

- Intersection 1: Dan Pienaar Road & Beyers Avenue - Stop controlled with priority on Dan Pienaar Road.

- Intersection 2: Van Ryneveld Avenue & Klopper Road - Stop controlled with priority on Van Ryneveld Avenue.

- Intersection 3: Van Ryneveld Avenue & Dan Pienaar Road - Stop controlled with priority on Van Ryneveld Avenue.

- Intersection 4: Van Ryneveld Avenue & Canberra Road - 4-way stop control.

- Intersection 5: Van Ryneveld Avenue & Theron Street - Traffic light controlled intersection.

The above intersections were selected as it provides the main access to the study area and the additional development traffic will have the highest impact on these intersections. In addition to the above intersections, the following new intersection is also evaluated as part of the study:

- Intersection 6: Klopper Road & Grobbelaar Road/Site Access - Stop controlled with priority on Klopper Road.

5. SCENARIOS

It is expected, that the development will generate more than 50 peak hour trips and the following traffic assessment scenarios were analyzed:

- Scenario 1: Base year AM peak background traffic;
- Scenario 2: Base year AM peak with development traffic;
- Scenario 3: Target year AM peak background traffic;
- Scenario 4: Target year AM peak with development traffic;
- Scenario 5: Base year PM peak background traffic;
- Scenario 6: Base year PM peak with development traffic;
- Scenario 7: Target year PM peak background traffic; and
- Scenario 8: Target year PM peak with development traffic.

6. DESIGN PEAK HOURS AND PEAK-HOUR FACTORS

6.1 DESIGN PEAK HOURS

Given the trip generation characteristics of the proposed development, the peak demand is during the weekday morning and weekday afternoon peak hours of the adjacent road network. The peak hours selected for this application is as follows:

- Weekday morning peak hour (use critical demand for each intersection).
- Weekday afternoon peak hour (use critical demand for each intersection).

6.2 PEAK HOUR FACTORS

The following peak hour factors (PHF) were used in the capacity analysis and level-of-service (LOS) calculations:

- Base year – peak hour factors obtained from the existing traffic counts.
- For the future horizon, a PHF of 0.95 or LOS E was considered for a signalized controlled intersection. For unsignalized intersections a PHF of 0.85 was used.

7. GAUTENG TRANSPORT INFRASTRUCTURE ACT EVALUATION

The application was also evaluated in terms of the Gauteng Transport Infrastructure Act of 2001. Based on the provincial Gauteng Strategic Road Master Plan (refer to **Figure 3**) the applicant site is not affected by any existing or future provincial roads.

8. BACKGROUND TRAFFIC DEMAND

8.1 BASE YEAR BACKGROUND TRAFFIC DEMAND

Detailed traffic counts were carried out on Wednesday the 8th of November 2017. Additional traffic counts were also carried out on the Monday the 16th of April 2018 at the following intersections:

- Intersection 3: Van Ryneveld Avenue & Dan Pienaar Road
- Intersection 4: Van Ryneveld Avenue & Canberra Road
- Intersection 5: Van Ryneveld Avenue & Theron Street

The peak hour background traffic volumes are shown in **Figure 4**.

8.2 IMPACT OF CHANGES TO ROAD NETWORK PLANNED BY THE ROAD AUTHORITIES

No roads are currently under construction that could affect the findings of this report.

8.3 FUTURE YEAR BACKGROUND TRAFFIC DUE TO TRAFFIC GROWTH

For the purpose of this study, an annual growth rate of 3.0% was considered reasonable for the study area. The growth rate was used to determine the expected future target year through traffic volumes from the base year volumes. Therefore, the annual growth rate compounded over 5 years yield an expected increase of 15.9% in the traffic volumes between base year and target year.

Given the existing weekday morning peak hour traffic volumes, refer to **Figure 4** and the projected growth rate, the expected future target year peak hour traffic volumes were calculated – refer to **Figure 5**.

8.4 FUTURE TRAFFIC VOLUMES DEMAND DUE TO LATENT LAND USES

No latent rights traffic assigned to the road network.

9. PROPOSED DEVELOPMENT TRAFFIC

9.1 INTRODUCTION

Erf 1211 Pierre van Ryneveld Extension 2 is earmarked for 165 dwelling units (maximum 3 storey buildings).

9.2 TRIP GENERATION BY PROPOSED DEVELOPMENT

The trip generation rates for the land uses were obtained from the guideline document of the Department of Transport entitled ***"South African Trip Data Manual"***, and can be summarised as follows:

- Weekday morning peak hour: 0.85 trips/unit, with a directional split of 25:75 (in:out)
- Weekday afternoon peak hour: 0.85 trips/unit, with a directional split of 70:30 (in:out)

In terms of the "***guideline document"*** the certain trip generation adjustment factors can be applied, provided the site meet the necessary requirements. The factors are summarised as follows:

- Mixed-use development : 15%
- Low vehicle ownership : 30%
- Very low vehicle ownership : 50%
- Transit nodes or corridors : 15%

The proposed development is planned in an area where private vehicle use is the main mode of transport. In light of this no trip reduction factor was applied.

9.3 SUMMARY OF TRIP GENERATION BY PROPOSED DEVELOPMENT

Based on the above, the total trip generation for the development is summarised in **Table 1.** The detailed calculation is appended in **Annexure D**.

Table 1: Total Number of Development Trips

DESCRIPTION	EXTENT OF LAND USE	MORNING PEAK HOUR			AFTERNOON PEAK HOUR		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Res 3	165 units	35	105	140	98	42	140

NOTE: Trip calculations roundup for purpose of this study.

It can be concluded that the proposed development will generate 140 trips, during the weekday morning and weekday afternoon peak hours respectively.

10. TRIP DISTRIBUTION AND ASSIGNMENT – PROPOSED DEVELOPMENT

10.1 TRIP DISTRIBUTION

The most likely direction from which the generated traffic will approach and leave the study area was determined by taking the following in consideration:

- The location of the development in relation to main central business districts/residential areas; and
- The existing traffic flows on the adjacent road network during the respective peak hours.

For the purpose of this application, the following distribution was accepted, (refer to **Figure 6** for details):

a) AM Peak

- Dan Pienaar Road - West: Inbound = 33% and Outbound = 28%
- Dan Pienaar Road - East: Inbound = 11% and Outbound = 8%
- Van Ryneveld Avenue - North: Inbound = 17% and Outbound = 11%
- Van Ryneveld Avenue - South: Inbound = 39% and Outbound = 53%

b) PM Peak

- Dan Pienaar Road - West: Inbound = 19% and Outbound = 38%
- Dan Pienaar Road - East: Inbound = 13% and Outbound = 14%
- Van Ryneveld Avenue - North: Inbound = 24% and Outbound = 17%
- Van Ryneveld Avenue - South: Inbound = 44% and Outbound = 31%

10.2 TRIP ASSIGNMENT

Given the trip distributions, the expected traffic volumes that will be generated by the proposed development traffic were assigned to the road network. The details are shown in **Figure 7**.

11. TOTAL TRAFFIC DEMAND

The total traffic volumes were determined by adding the development traffic (refer to **Figure 7**) to the base year and target year background traffic. The total traffic demand is shown in **Figures 8** and **9**.

12. CAPACITY ANALYSIS OF INTERSECTIONS

12.1 INTRODUCTION

The following methodology was adopted in evaluating the intersections included as part of this study:

- Analyse the existing and future background traffic demand, using the existing intersection layout.
- Determine the road upgrades required to accommodate the background traffic scenarios.
- Analyse the expected base year scenario, taking the additional traffic that will be generated by the approved latent rights applicant site into consideration.
- Determine the road upgrades required to accommodate the background traffic and the development trips. It was assumed, as part of this application, that the upgrades required to accommodate the background traffic will be implemented.
- Analyse the expected base year and future year scenarios, taking the traffic that will be generated by the latent rights plus proposed development into consideration.
- In order to determine the required road upgrading, a level-of-service E or worse on any approach at an intersection was accepted at the stage when road upgrading will be implemented.

12.2 MEASURE OF EFFECTIVENESS

The capacity analysis was done according the method as contained in the ***Highway Capacity Manual*** (4-way stop scenario) and ***SIDRA*** intersection software program. The operation of an intersection is defined in terms of levels-of-service (LOS).

The LOS for a traffic light controlled intersection is defined in terms of average total vehicle delay (not average stop delay), where delay is a measure of driver discomfort, frustration, fuel consumption and lost travel time. However, for an unsignalized intersection the average delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation.

The LOS for an approach values are based on the worst delay for any vehicle movements. The average intersection delay is not a good LOS measure for two-way control intersection, as the major through movements normally have a zero delay. The average intersection LOS is therefore recorded as “NOT APPLICABLE”.

The thresholds for signalized intersection and stop-controlled intersection can be summarised as follows:

Signalized intersections

LOS A describes operations with very low delays, up to 10 sec/vehicle. The LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all.

LOS B describes operations with delays greater than 10 sec and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths or both. More vehicles stop than with LOS A, causing higher levels of average delay.

LOS C describes operations with delays greater than 20 sec and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many vehicles still pass through the intersection without stopping.

LOS D describes operations with delays greater than 35 sec and up to 55 sec per vehicle. This level, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume over capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping decline considerable. Individual cycle failures are noticeable.

LOS E describes operations with delays greater than 55 sec and up to 80 sec per vehicle. This level is considered by many road agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, or high volume over capacity ratios. Individual cycle failures are frequent occurrences.

LOS F describes operations with delays in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection.

Unsignalised intersections

LOS A describes operations with very low delays, up to 10 sec per vehicle.

LOS B describes operations with delays greater than 10 sec and up to 15 sec per vehicle.

LOS C describes operations with delays greater than 15 sec and up to 25 sec per vehicle.

LOS D describes operations with delays greater than 25 sec and up to 35 sec per vehicle.

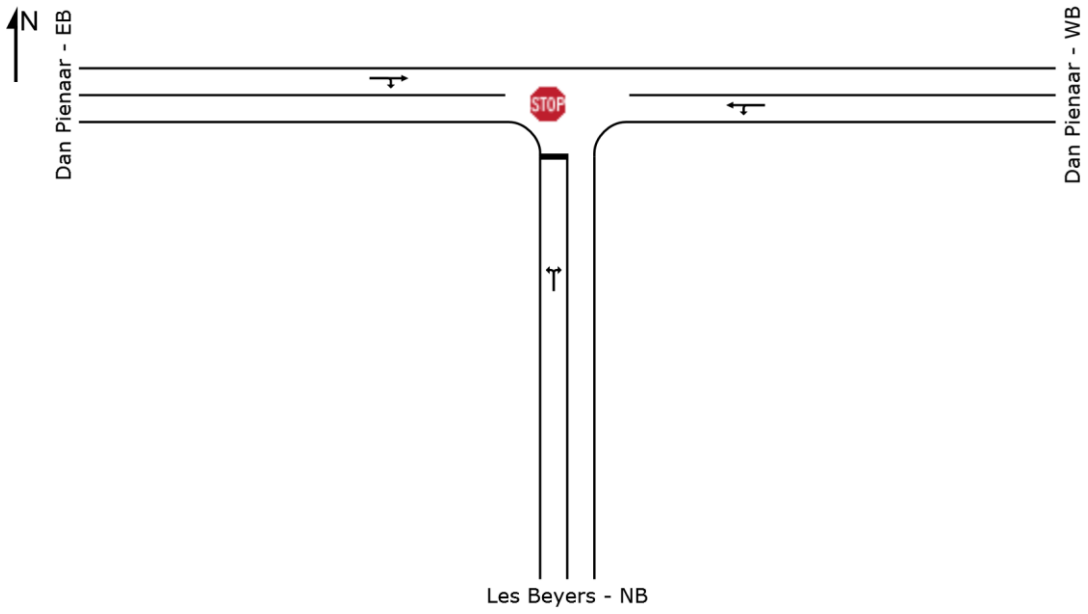
LOS E describes operations with delays greater than 35 sec and up to 50 sec per vehicle.

LOS F describes operations with delays in excess of 50 sec per vehicle.

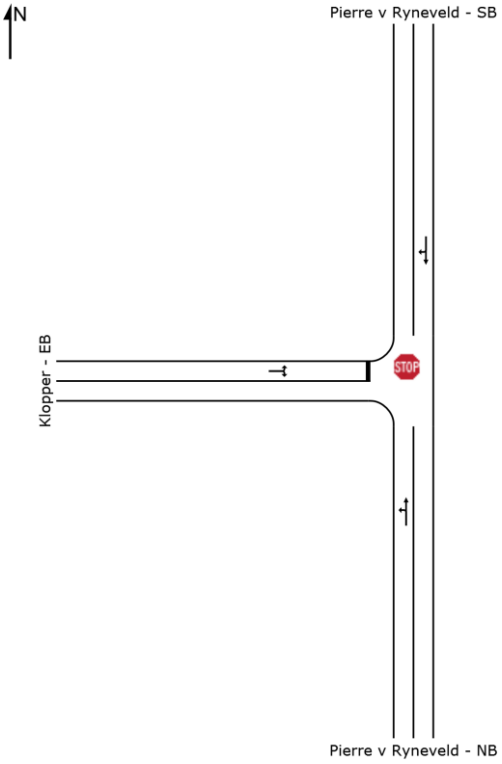
12.3 EXISTING INTERSECTION CONFIGURATIONS

Sidra 7.0 and **AUTOJ** were as used to assess the capacity for each intersection. The conceptual intersection layout for each intersection evaluated as part of this application is illustrated below:

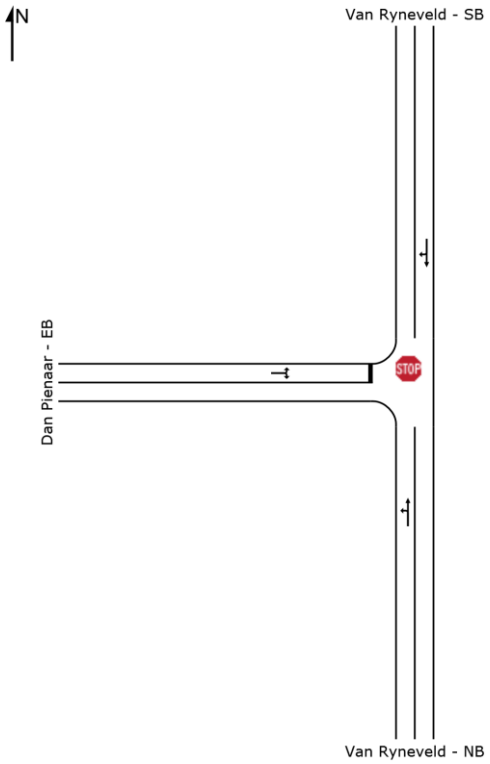
a) Intersection 1 – Dan Pienaar Road & Les Beyers Avenue



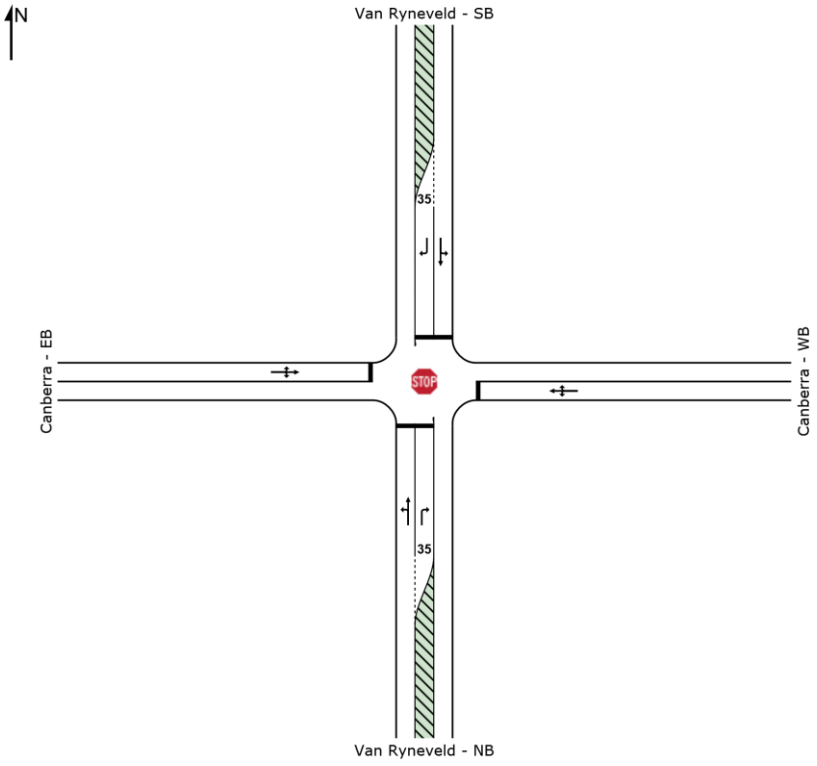
b) Intersection 2 – Van Ryneveld Avenue & Klopper Road



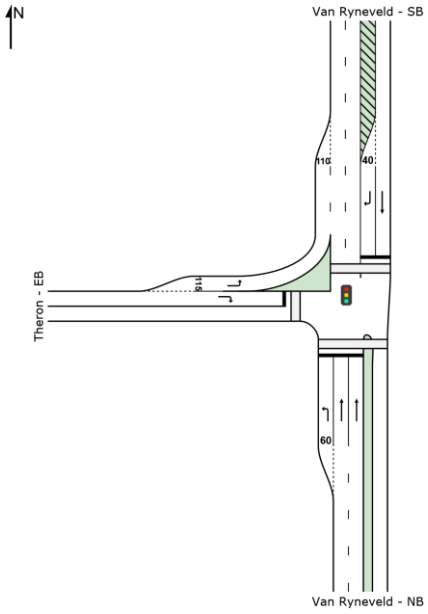
c) Intersection 3 – Van Ryneveld Avenue & Dan Pienaar Road



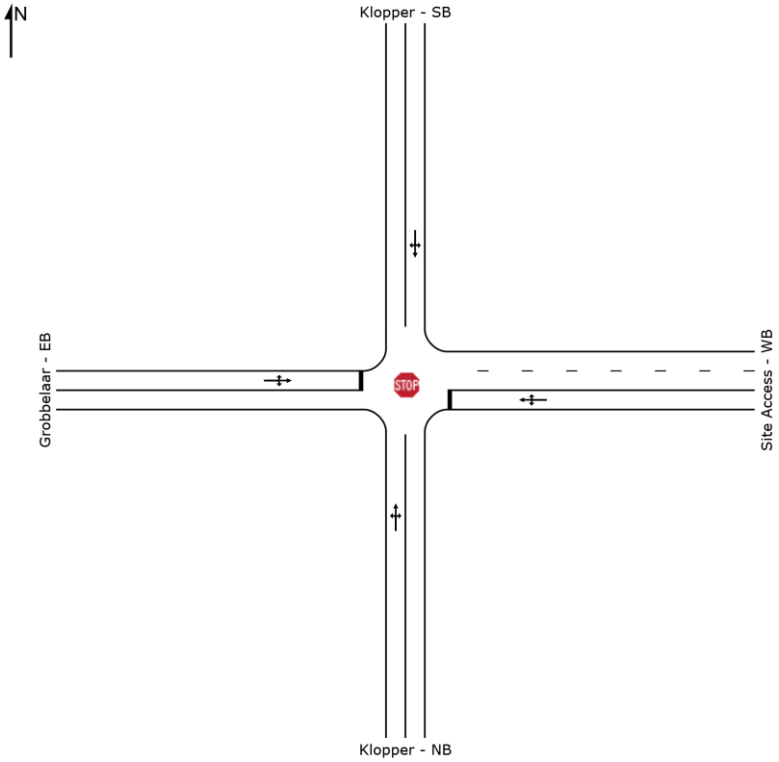
d) Intersection 4 – Van Ryneveld Avenue & Canberra Road



e) Intersection 5 – Van Ryneveld Avenue & Theron Street



f) Intersection 6 – Klopper Road & Grobbelaar Road/Site Access



12.4 DISPLAY OF CAPACITY ANALYSIS

The following figures should be read in conjunction with the capacity analysis:

- Figure 4: Existing Weekday Peak Hour Traffic Volumes - Background Traffic
- Figure 5: Estimated (2022) Weekday Peak Hour Traffic Volumes - Background Traffic
- Figure 8: Estimated (2018) Weekday Peak Hour Traffic Volumes - With Development Traffic
- Figure 9: Estimated (2022) Weekday Peak Hour Traffic Volumes - With Development Traffic

SIDRA results are summarised hereafter, with detailed results appended in **Annexure E**.

a) Intersection 1 – Dan Pienaar Road & Les Beyers Avenue

Table 2: Level of Service Results: Intersection 1 – Dan Pienaar Road & Les Beyers Avenue

PEAK	SCENARIO	TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS)														
		NORTHBOUND APPROACH			WESTBOUND APPROACH			SOUTHBOUND APPROACH			EASTBOUND APPROACH			INTERSECTION		
		S	D	L	S	D	L	S	D	L	S	D	L	S	D	L
AM	SC1	0.03	8.3	A	0.02	0.3	A	-	-	-	0.11	0.2	A	0.11	1.1	A
	SC2	0.06	8.3	A	0.03	0.8	A	-	-	-	0.12	0.5	A	0.12	2.2	A
	SC3	0.04	8.4	A	0.03	0.6	A	-	-	-	0.13	0.3	A	0.13	1.3	A
	SC4	0.07	8.5	A	0.03	0.9	A	-	-	-	0.14	0.5	A	0.14	2.2	A
PM	SC5	0.01	8.6	A	0.08	0.3	A	-	-	-	0.05	1.0	A	0.08	1.0	A
	SC6	0.04	8.6	A	0.09	0.7	A	-	-	-	0.06	2.1	A	0.09	2.2	A
	SC7	0.02	8.7	A	0.10	0.3	A	-	-	-	0.05	1.1	A	0.10	1.2	A
	SC8	0.04	8.8	A	0.10	0.7	A	-	-	-	0.07	2.1	A	0.10	2.2	A

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS)

Based on the results it can be concluded that the intersection operate at acceptable LOS during all traffic flow scenarios.

b) Intersection 2 - Van Ryneveld Avenue & Klopper Road

Table 3: Level of Service Results: Intersection 2 – Van Ryneveld Avenue & Klopper Road

PEAK	SCENARIO	TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS)														
		NORTHBOUND APPROACH			WESTBOUND APPROACH			SOUTHBOUND APPROACH			EASTBOUND APPROACH			INTERSECTION		
		S	D	L	S	D	L	S	D	L	S	D	L	S	D	L
AM	SC1	0.11	0.2	A	-	-	-	0.27	0.1	A	0.10	12.3	B	0.27	0.9	A
	SC2	0.12	0.6	A	-	-	-	0.28	0.2	A	0.26	13.4	B	0.28	2.2	A
	SC3	0.13	0.3	A	-	-	-	0.32	0.1	A	0.15	14.0	B	0.32	1.1	A
	SC4	0.14	06	A	-	-	-	0.33	0.2	A	0.34	16.0	C	0.34	2.5	A
PM	SC5	0.18	0.5	A	-	-	-	0.21	0.4	A	0.02	11.2	B	0.21	0.6	A
	SC6	0.21	1.0	A	-	-	-	0.23	1.0	A	0.06	11.8	B	0.23	1.5	A
	SC7	0.21	0.5	A	-	-	-	0.24	0.5	A	0.04	11.8	B	0.24	0.8	A
	SC8	0.24	1.0	A	-	-	-	0.27	1.1	A	0.08	12.7	B	0.27	1.6	A

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS)

Based on the results it can be concluded that the intersection operate at acceptable LOS during all traffic flow scenarios.

c) Intersection 3 - Van Ryneveld Avenue & Dan Pienaar Road

Table 4: Level of Service Results: Intersection 3 – Van Ryneveld Avenue & Dan Pienaar Road

PEAK	SCENARIO	TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS)														
		NORTHBOUND APPROACH			WESTBOUND APPROACH			SOUTHBOUND APPROACH			EASTBOUND APPROACH			INTERSECTION		
		S	D	L	S	D	L	S	D	L	S	D	L	S	D	L
AM	SC1	0.20	0.9	A	-	-	-	0.11	0.1	A	0.34	12.0	B	0.34	3.6	A
	SC2	0.20	0.8	A	-	-	-	0.12	0.3	A	0.36	12.4	B	0.36	3.8	A
	SC3	0.23	0.8	A	-	-	-	0.14	0.2	A	0.5	14.1	B	0.45	4.2	A
	SC4	0.23	0.8	A	-	-	-	0.14	0.4	A	0.47	14.5	B	0.47	4.4	A
PM	SC5	0.37	1.0	A	-	-	-	0.15	1.4	A	0.10	14.2	B	0.37	1.7	A
	SC6	0.37	1.0	A	-	-	-	0.19	2.1	A	0.12	14.4	B	0.37	2.0	A
	SC7	0.43	1.1	A	-	-	-	0.19	2.1	A	0.17	17.0	C	0.43	2.1	A
	SC8	0.43	1.1	A	-	-	-	0.23	3.0	A	0.20	17.6	C	0.43	2.5	A

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS)

Based on the results it can be concluded that the intersection operate at acceptable LOS during all traffic flow scenarios.

d) Intersection 4 - Van Ryneveld Avenue & Canberra Road

Table 5: Level of Service Results: Intersection 4 – Van Ryneveld Avenue & Canberra Road

PEAK	SCENARIO	TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS)														
		NORTHBOUND APPROACH			WESTBOUND APPROACH			SOUTHBOUND APPROACH			EASTBOUND APPROACH			INTERSECTION		
		S	D	L	S	D	L	S	D	L	S	D	L	S	D	L
AM	SC1	0.98	>50	F	0.411	20.7	C	0.57	21.4	C	0.83	>50	F	0.98	>50	F
	SC2	0.38	6.6	A	0.18	9.1	A	0.20	5.5	A	0.12	9.1	A	0.38	6.9	A
	SC3	0.44	7.1	A	0.22	9.4	A	0.23	5.6	A	0.15	9.8	A	0.44	7.3	A
	SC4	0.46	7.1	A	0.22	9.5	A	0.24	5.6	A	0.15	10.0	A	0.46	7.4	A
PM	SC5	0.84	44.6	E	0.28	24.6	C	0.86	36.2	E	0.97	>50	F	0.97	>50	F
	SC6	0.41	7.3	A	0.12	10.6	B	0.57	7.2	A	0.28	8.4	A	0.57	7.6	A
	SC7	0.49	8.0	A	0.16	11.6	B	0.66	7.9	A	0.35	9.0	A	0.66	8.3	A
	SC8	0.51	8.0	A	0.17	12.1	B	0.69	7.9	A	0.36	9.1	A	0.69	8.4	A

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS)

It can be concluded the intersection will operate at LOS E or worst or a V/C exceeding 1.0 for certain traffic flow scenarios. The road network upgrades required to improve the LOS is discussed in **Table 6**.

Table 6: Proposed Road Network Improvements: Intersection 4 – Van Ryneveld Avenue & Canberra Road

Description	Road Improvement Summary	Responsibility	Comments
Scenarios 1 & 5	Convert the 4-stop controlled intersection to a single lane traffic circle. Minimum inner diameter of 10m and a circulation lane of 5.0m.	Road authority	Sufficient road reserve available to accommodate upgrade.

The proposed road upgrade is illustrated below and the LOS for the respective traffic flow scenarios is shown in **Table 7**.

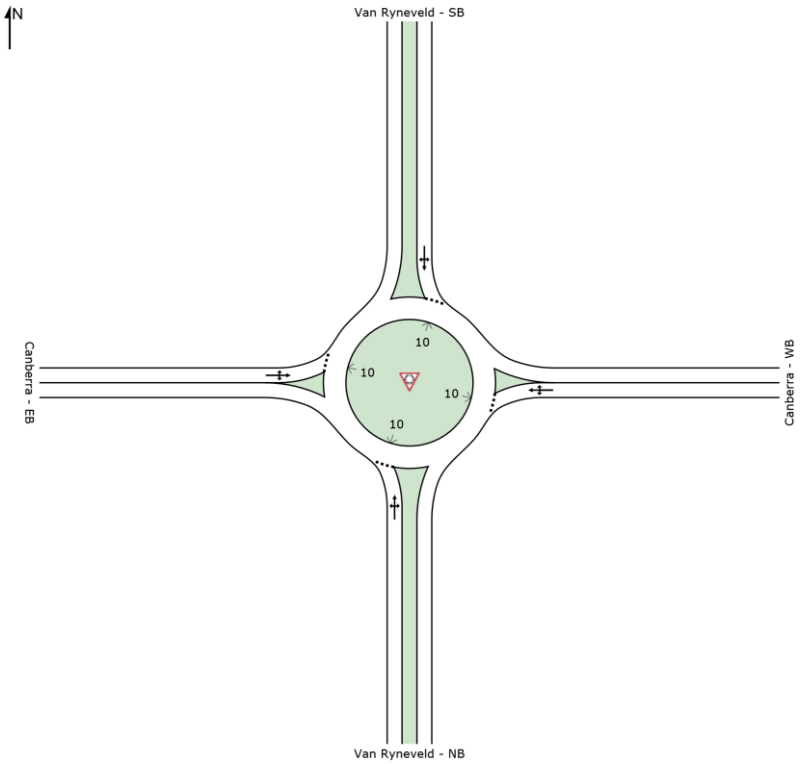


Table 7: Level of Service Results With Road Improvements: Intersection 4 – Van Ryneveld Avenue & Canberra Road

PEAK	SCENARIO	TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS)														
		NORTHBOUND APPROACH			WESTBOUND APPROACH			SOUTHBOUND APPROACH			EASTBOUND APPROACH			INTERSECTION		
		S	D	L	S	D	L	S	D	L	S	D	L	S	D	L
AM	SC1	0.36	6.5	A	0.17	9.0	A	0.19	5.5	A	0.11	9.0	A	0.36	6.9	A
PM	SC5	0.40	7.3	A	0.11	10.2	B	0.54	7.2	A	0.27	8.3	A	0.54	7.6	A

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS)

Based on the results it can be concluded that the intersection will operate at acceptable LOS with the implementation of the road upgrades.

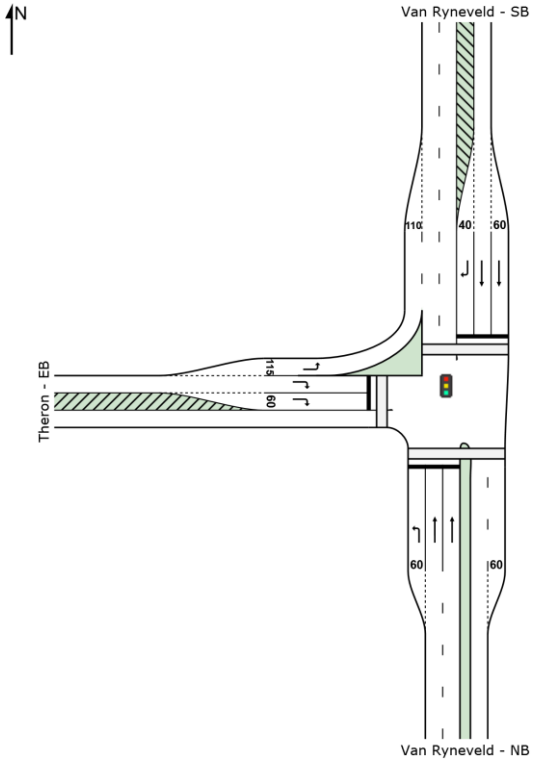
e) Intersection 5 - Van Ryneveld Avenue & Theron Street

Table 8: Level of Service Results: Intersection 5 – Van Ryneveld Avenue & Theron Street

PEAK	SCENARIO	TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS)														
		NORTHBOUND APPROACH			WESTBOUND APPROACH			SOUTHBOUND APPROACH			EASTBOUND APPROACH			INTERSECTION		
		S	D	L	S	D	L	S	D	L	S	D	L	S	D	L
AM	SC1	0.52	9.6	A	-	-	-	>1.0	>80	F	0.49	21.4	C	>1.0	54.5	D
	SC2	0.61	14.7	B	-	-	-	0.79	16.8	B	0.37	20.9	C	0.79	15.9	B
	SC3	0.92	24.6	C	-	-	-	0.94	31.2	C	0.48	22.1	C	0.94	25.9	C
	SC4	0.93	28.4	C	-	-	-	0.95	31.0	C	0.46	21.7	C	0.95	28.2	C
PM	SC5	0.22	9.8	A	-	-	-	>1.0	>80	F	>1.0	>80	F	>1.0	>80	F
	SC6	0.34	16.2	B	-	-	-	0.96	41.4	D	0.93	29.4	C	0.96	30.7	C
	SC7	0.40	17.2	B	-	-	-	>1.0	>80	F	>1.0	68.2	E	>1.0	72.7	E
	SC8	0.45	18.2	B	-	-	-	0.95	34.0	C	0.96	31.5	C	0.96	29.4	C

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS)

It can be concluded the intersection will operate at LOS E or worst or a V/C exceeding 1.0 for certain traffic flow scenarios. The road network upgrades required to improve the LOS is discussed in **Table 8**.



NOTE: Concept signal phasing diagrams appended in **Annexure F**.

Table 9: Proposed Road Network Improvements: Intersection 5 – Van Ryneveld Avenue & Theron Street

Description	Road Improvement Summary	Responsibility	Comments
Scenarios 1, 3, 5 & 7	Provide a 2nd exclusive right-turn lane (storage length = 60m) on the eastbound approach of Theron Street	Road authority	Sufficient road reserve available to accommodate upgrade.
	Provide a 2nd through lane (storage length = 60) on the southbound approach of Van Ryneveld Avenue.		
	Provide an exit lane (storage length = 60m) on the southern leg of Van Ryneveld Avenue.		
	Optimise signal settings.		

The proposed road upgrade is illustrated below and the LOS for the respective traffic flow scenarios is shown in **Table 10**.

Table 10: Level of Service Results With Road Improvements: Intersection 5 – Van Ryneveld Avenue & Theron Street

PEAK	SCENARIO	TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS)														
		NORTHBOUND APPROACH			WESTBOUND APPROACH			SOUTHBOUND APPROACH			EASTBOUND APPROACH			INTERSECTION		
		S	D	L	S	D	L	S	D	L	S	D	L	S	D	L
AM	SC1	0.61	15.4	B	-	-	-	0.75	15.4	B	0.36	20.7	C	0.75	16.0	B
	SC3	0.92	24.6	C	-	-	-	0.94	31.0	C	0.48	22.1	C	0.94	25.9	C
PM	SC5	0.33	16.2	B	-	-	-	0.94	35.3	D	0.91	26.9	C	0.94	27.5	C
	SC7	0.44	18.2	B	-	-	-	0.95	32.2	C	0.93	27.5	C	0.95	27.1	C

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS)

Based on the results it can be concluded that the intersection will operate at acceptable LOS with the implementation of the road upgrades.

f) Intersection 6 – Klopper Road & Grobbelaar Road/Site Access

Table 11: Level of Service Results: Intersection 6 – Klopper Road & Grobbelaar Road/Site Access

PEAK	SCENARIO	TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS)														
		NORTHBOUND APPROACH			WESTBOUND APPROACH			SOUTHBOUND APPROACH			EASTBOUND APPROACH			INTERSECTION		
		S	D	L	S	D	L	S	D	L	S	D	L	S	D	L
AM	SC4	0.02	4.6	A	0.10	4.9	A	0.01	2.6	A	0.02	8.1	A	0.10	4.8	A
PM	SC8	0.06	4.6	A	0.04	5.1	A	0.02	3.5	A	0.03	8.2	A	0.06	5.0	A

Note: S = Degree of Saturation (v/c); D = Delay (sec/veh); L = Level of service (LOS)

Based on the results it can be concluded that the intersection operate at acceptable LOS during all traffic flow scenarios.

13. ACCESS REQUIREMENTS

13.1 INTRODUCTION

The proposed SDP prepared by the architect was superimposed in **Mariteng Plan No.: 185-86-01**, appended in **Annexure G**, as well as per Tshwane access standards (refer to extract appended in **Annexure H**) the access arrangements are summarised as follows:

- Access from Klopper Park, directly opposite Grobbelaar Road.
- Provide two inbound lanes, one with a paved width of 3.0m and the second lane with a paved width of 3.5m.
- One outbound lane with a paved width of 3.5m and a clearance of 4.5m.
- A throat length of 24m - distance measured from edge of road to centre of access control boom/gate.
- 3.0m x 3.0m splays at access on Klopper Road.
- Bellmouth radius on Klopper Road to be a minimum of 5.0m.
- No vertical structures are currently proposed at the site access. However, should the need arise later in the design phase provision should be made for a minimum vertical clearance of 5.2m.

13.2 EVALUATION OF THE SITE ACCESS CONTROL SYSTEM

The queue theory as described in the ***"Transportation and Engineering Handbook"*** was used to determine the queuing of vehicles at the access point. The analysis are based on a 90th percentile probability that the operation at the access control point will have no negative impact on the traffic movements on the adjacent

road system. The operational characteristics for the access arrangements, discussed in **Section 13.1,** are summarised in **Table 12**, with detailed results appended in **Annexure I**.

Table 12: Operational Characteristics of the proposed Access Security Control System

DESCRIPTION	ANALYSIS RESULTS
Average arrival rate inbound (vph)	98
Average service rate (sec/veh)	14.00
Average service rate (services/hour)	250
Number of lane (gates)	2
Traffic intensity per lane	0.20
90^{th} percentile queue length	0.04
Average number of vehicles in system	0.0
Average delay (sec)	0.9
Average number of vehicles per gate	0.0

It can be concluded that the access arrangements assumed for the development will have sufficient capacity to accommodate the development traffic.

14. PUBLIC TRANSPORT & NON-MOTORIZED TRANSPORT REQUIREMENTS

14.1 INTRODUCTION

In terms of the National Land Transport Transition Act, Act 5 of 2009 (Section 38), it is also necessary to carry out a public transport assessment for all new developments. The assessment need to address aspects such as the additional transport trips that will be generated, the expected traveling pattern of these users, as well as the impact it may have on the existing public transport network.

14.2 ESTIMATED NUMBER OF PUBLIC TRANSPORT USERS

The propose site is earmarked for approximately 165 “Residential 3” dwelling units. It can therefore be assumed that the development will provide employment opportunities for domestic workers. The expected domestic worker trips were calculated, assuming the following. 50% of all households will employ a part-time domestic worker for an average of one (1) weekday per week. This equates to an estimated 17 domestic workers (i.e. 165*0.50*0.2) per weekday. It was also assumed that the development would employ 2 persons for gardening and general maintenance of the property as a whole. The total expected workforce equates to 19 workers per any weekday.

14.3 EXISTING PUBLIC TRANSPORT INFRASTRUCTURE

The following public transport services are provided in the study area:

- Taxi operates along Van Ryneveld Avenue, approximately 350m south-east from the proposed access on Klopper Road. No formal lay-bys are provided and taxis make unscheduled stops as and when required.

14.4 PROPOSED PUBLIC TRANSPORT INFRASTRUCTURE

The proposed development will generate some public transport trips. The existing public transport network has sufficient capacity to accommodate the expected increase in demand.

14.5 EXISTING NON-MOTORIZED TRANSPORT INFRASTRUCTURE

No paved walkways are provided in the study area.

14.6 PROPOSED NON-MOTORIZED TRANSPORT FACILITIES

The proposed development is located along a Class 5 road and no paved walkways are proposed as part of the approval of this application.

15. EVALUATION OF THE SITE DEVELOPMENT PLAN

15.1 PARKING REQUIREMENTS

All parking is provided on the property, as shown in the SDP appended in **Annexure B**. The parking bay dimensions are 5.0m x 2.5m with an aisle width of 7.5m.

15.2 INTERNAL CIRCULATION

The design allows for a circulation route with a width of 7.5m serving the applicant site. From a traffic engineering view point the design is supported and will accommodate the normal traffic circulation on the site.

The final design and layout is subject to the approval by the Fire Department.

15.3 REFUSE COLLECTION

A refuse collection point is provided at the site access and will be accessible from Klopper Road.

16. CONCLUSIONS AND RECOMMENDATIONS

16.1 CONCLUSIONS

The following conclusion can be reached from the study:

i. The applicant site is earmarked for 165 "Res 3" dwelling units.

ii. **Latent rights:** No latent rights were identified in the study area.

iii. The intersections listed in **Section 4.4**, forms part of the study area.

iv. **Gauteng Infrastructure Act:** The applicant site is not affected by any existing or future provincial roads.

v. The proposed development will generate an additional 140 peak hour trips.

vi. **Proposed road network upgrade – background traffic**: No external road upgrade required.

vii. **Proposed road network upgrade – new developments**: No external road upgrade required.

viii. **Access arrangements:** The access requirements are discussed under the ***"Recommendations"***.

ix. **Public transport assessments:** The area is well served by frequent public transport throughout the day. No additional facilities are recommended to serve the applicant site.

x. **Non-motorized public transport assessments:** No additional facilities are recommended to serve the applicant site.

16.2 RECOMMENDATIONS

Based on the traffic impact study, it is recommended that the new residential development on Erf 1211 Pierre van Ryneveld Extension 2, be approved for:

- Zoning : "Res 3"
- Height restriction : 3 storeys
- Density : 49 units/ha (maximum 165 dwelling units)

A concept site development plan has been prepared for the applicant site.

The approval is subject to the following:

i. The City to confirm whether any road reserve widening is required:

- Along Van Ryneveld Avenue.

- Along Dan Pienaar Road.

ii. Construct the following access arrangements (also refer to **Mariteng Plan No.: 185-86-01**):

- Access from Klopper Park, directly opposite Grobbelaar Road.
- Provide two inbound lanes, one with a paved width of 3.0m and the second lane with a paved width of 3.5m.
- One outbound lane with a paved width of 3.5m and a clearance of 4.5m.
- A throat length of 24m - distance measured from edge of road to centre of access control boom/gate.
- 3.0m x 3.0m splays at access on Klopper Road.
- Bellmouth radius on Klopper Road to be a minimum of 5.0m.
- No vertical structures are currently proposed at the site access. However, should the need arise later in the design phase provision should be made for a minimum vertical clearance of 5.2m.

iii. All parking provided on site, with a 5.0m x 2.5m dimension.

iv. The internal layout and access arrangements are supported from a traffic engineering view point, but will also require the approval from the Fire Department.

v. Refuse collection area to be provided on Klopper Road, at the entrance to the development

FIGURES

ANNEXURE A:

SUMMARY OF DEVELOPMENT CONTROL FOR APPLICANT SITE

COT: F/21 FORMAT OF THE DRAFT ANNEXURE AND DRAFT AMENDMENT SCHEME MAP READ WITH SECTION 12(2) OF THE CITY OF TSHWANE LAND USE MANAGEMENT BY-LAW, 2016		
PROPERTY DESCRIPTION: ERF 1211, PIERRE VAN RYNEVELD UITBREIDING 2		
1	Use Zone	**3: Residential 3**
2	Uses permitted	Duplex dwellings and Dwelling Units
3	Uses with consent	Use Zone 3: Column 4
4	Uses not permitted	All other uses
5	Definitions	Clause 5
6	Density	49 dwelling units per hectare (maximum of 165 dwelling units)
7	Coverage	50%
8	Height	3 storeys
9	Floor area ratio	0,5
10	Site development plan and landscape development plan	(1) A site development plan and a landscape development plan, unless otherwise determined by the City of Tshwane Metropolitan Municipality, compiled by a person suitably qualified to the satisfaction of the Municipality, shall be submitted to the Municipality for approval prior to the submission of building plans. (2) The landscaping, in terms of the landscape development plan, shall be completed by completion of the development or any phase thereof. The continued maintenance of the landscape development shall be to the satisfaction of the Municipality.
11	Street building lines	2,0m
12	Building restriction areas	Clause 12
13	Parking requirements	Demarcated parking spaces, together with the necessary paved manoeuvring space, shall be provided on the erf to the satisfaction of Municipality, in accordance with Table G
14	Paving of traffic areas	All parts of the erf upon which motor vehicles may move or park shall be provided with a permanent dust-free surface, which surface shall be paved, drained and maintained to the satisfaction of the Municipality
15	Access to the erf	Entrances to and exits from the erf shall be sited, constructed and maintained to the satisfaction of the Municipality.
16	Loading and off-loading activities	All loading and off-loading activities shall take place on the erf.
17	Turning facilities	Turning facilities shall be provided on the Erf to the satisfaction of the Municipality.
18	Physical barriers	A non- removable physical barrier, preventing any vehicle and pedestrian movement, must be implemented on all erf boundaries, the approved access excluded.
19	Health measures	(1) Any requirements for air pollution-, noise abatement- or health measures set by City of Tshwane Metropolitan Municipality shall be complied with to the satisfaction of the Municipality without any costs to the Municipality. (2) Air-conditioning units or compressors shall not be mounted to the exterior walls of buildings without the prior consent of the City of Tshwane Metropolitan Municipality.

20	Outdoor advertising	Advertisements and/or signboards shall not be erected or displayed on the erf without the written consent of the Municipality first being obtained in terms of municipal by-laws for outdoor advertising.
21	Detrimental soil conditions	No structures shall be erected on this erf prior to the appointment of a professional Structural or Geo-technical engineer, who shall design, specify and supervise structural measures to be implemented according to the structure type to the satisfaction of the City of Tshwane Metropolitan Municipality.
22	Open space	Not applicable
23	General: In addition to the above conditions the erf and buildings thereon are further subject to the general provisions of the Tshwane Town Planning Scheme, 2008 (revised in 2014).	

CITY OF
TSHWANE

City Planning & Development Department

Room 1-010 I Isivuno Building I 143 Lilian Ngoyi (Van der Walt) Street I Pretoria I 0002
PO Box 3242 I Pretoria I 0001
Tel: 012 358 7987/8
Email: geoinfoservices@tshwane.gov.za I www.tshwane.gov.za.| www.facebook.com/CityOf Tshwane

Contact Person: GeoWeb

TO WHOM IT MAY CONCERN

Date 2014/10/15

ZONING SUMMARY IN TERMS OF TSHWANE TOWN-PLANNING SCHEME, 2008

PROPERTY KEY: 012701211
PROPERTY DESCRIPTION: 1211 PIERRE VAN RYNEVELD X02 (21 KLOPPER ROAD)

1. **USE ZONE 20:** PUBLIC OPEN SPACE

2. **PURPOSES FOR WHICH BUILDINGS MAY BE ERECTED AND USED IN TERMS OF TABLE B (COLUMN 3):**

   Public Open Space
   Sports Ground

3. **PURPOSES FOR WHICH BUILDINGS MAY BE ERECTED AND USED ONLY WITH THE CONSENT OF THE MUNICIPALITY IN TERMS OF TABLE B (COLUMN 4):**

   Agriculture
   Market Garden
   Picnic Place
   Place of Refreshment
   Recreation Resort
   Special Use
   Sport and Recreation Club
   Telecommunication Mast

4. **PURPOSES FOR WHICH BUILDINGS MAY NOT BE ERECTED OR USED IN TERMS OF TABLE B (COLUMN 5):**

   Uses not in Columns 3 and 4, that is uses not specified in the above-mentioned Paragraphs 2 and 3.

5. **TEMPORARY USES MAY BE PERMITTED IN TERMS OF CLAUSE 14(8).**

6. **DENSITY:**

7. **HEIGHT:** Table D, Site Development Plan, subject to Clause 26

8. **FLOOR AREA RATIO:** Table C, Site Development Plan, subject to Clause 25.

9. **COVERAGE:** Table E, Site Development Plan, subject to Clause 27

/2

10. BUILDING LINES:

Streets : Subject Clause 9(a),(b),(d) and (e)
Other : Subject to Clause 12

11. CONSENT USES: N/A

Disclaimer: Please note that the validity of the Consent Use cannot be verified as the rights may have elapsed in terms of the conditions of the Consent Use approval. The validity will have to be proven by the owner of the property.

12. ATTACHED DOCUMENTS:

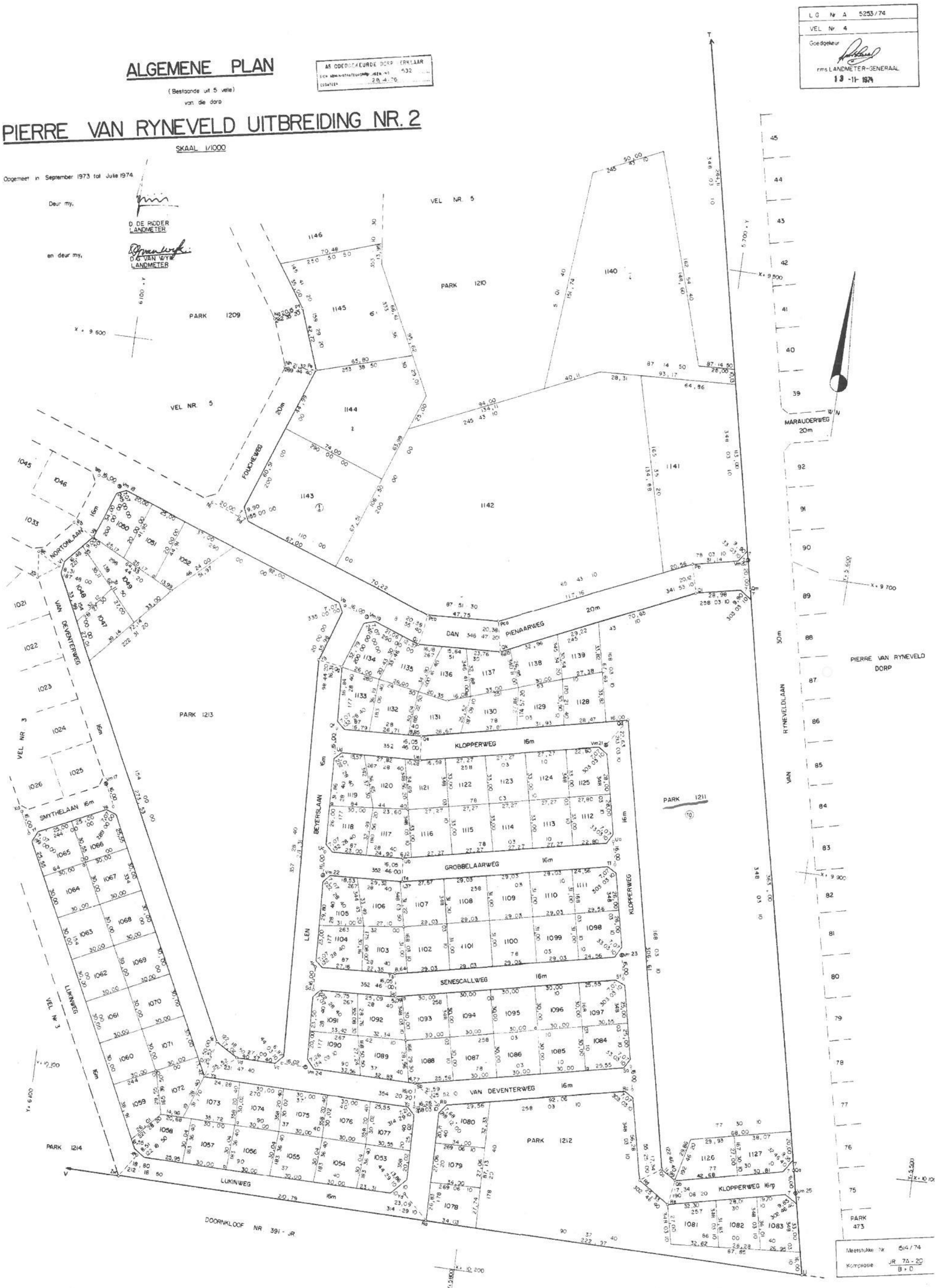
NOTE:

The above zoning information must be read in conjunction with the relevant Annexure T, if any, and the rest of the Clauses of the Tshwane Town-Planning Scheme 2008. Where an Annexure T does not specify or stipulate a land use or development control (for e.g. Height, F.A.R. etc.) the stipulations of the said Scheme clauses and the above Zoning Certificate shall prevail.

Kind regards

MA Makgata

f: STRATEGIC EXECUTIVE DIRECTOR: CITY PLANNING & DEVELOPMENT

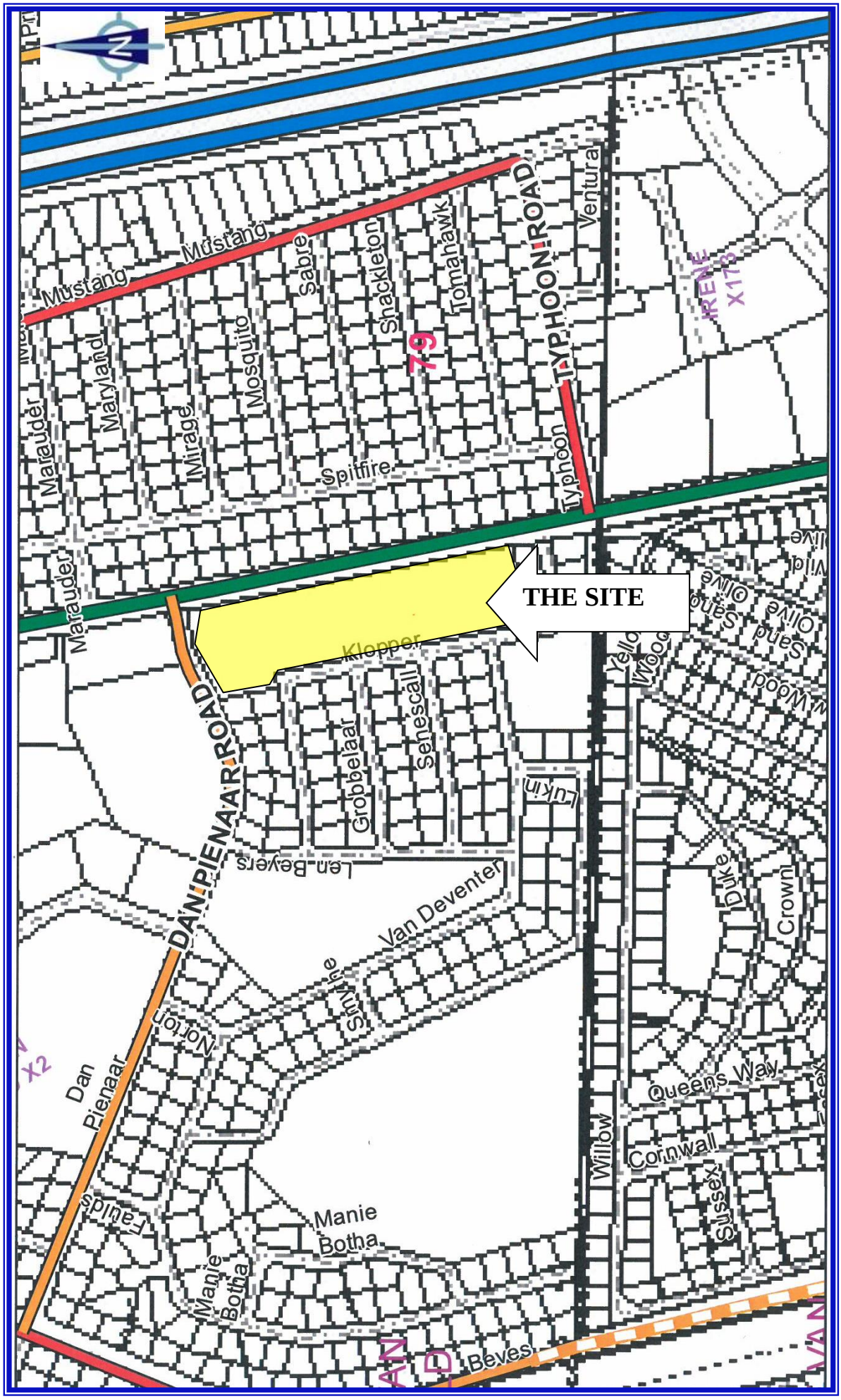

ALGEMENE PLAN
(Bestaande uit 5 velle)
van die dorp
PIERRE VAN RYNEVELD UITBREIDING NR. 2
SKAAL 1/1000
Opgemeet in September 1973 tot Julie 1974
Deur my,
D. DE RIDDER
LANDMETER
en deur my,
D.G. VAN WYK
LANDMETER
LG Nr A 5253/74
VEL Nr 4
Goedgekeur
nms. LANDMETER-GENERAAL
13 -11- 1974
VEL NR. 5
PARK 1209
PARK 1210
FOUCHEWEG
NORTONLAAN
VAN DEVENTERWEG
VEL NR 3
PARK 1213
SMYTHELAAN 16m
LUKINWEG
PIENAARWEG
KLOPPERWEG 16m
BEYERSLAAN
GROBBELAARWEG 16m
SENESCALLWEG
VAN DEVENTERWEG 16m
PARK 1211
PARK 1212
PARK 1214
MARAUDERWEG 20m
VAN RYNEVELDLAAN 30m
PIERRE VAN RYNEVELD DORP
PARK 473
DOORNKLOOF NR 391 - JR

ANNEXURE B:

CONCEPT SITE DEVELOPMENT PLAN

ANNEXURE C:

EXTRACT FROM TSHWANE ROAD MASTER PLAN


THE SITE
DAN PIENAAR ROAD
TYPHOON ROAD
79
Mustang
Mustang
Sabre
Shackleton
Tomahawk
Ventura
Marauder
Maryland
Mosquito
Mirage
Spitfire
Typhoon
Marauder
Klopper
Grobbelaar
Senescall
Len Beyers
Van Deventer
Smuts
Dan Pienaar
Manie Botha
Manie Botha
Willow
Queens Way
Cornwall
Sussex
Crown
Duke
Beves
IRENE
X173
X2

ANNEXURE D:

TRIP GENERATION CHARACTERISTICS – PROPOSED DEVELOPMENT

Residential Development - Erf 1211 Pierre van Ryneveld X2

Mariteng Project: 185/86

Trip Generation Calculations

Date: 1 December 2017

Description	No. of Res Erven	Dev Area (m^2)	Zoning	Density (No. of units/ha)	Height Restriction (No. Storeys)	Dwelling Units	Trip Rate/ Unit	No. of Trips	Trip Reduction. (No. of trips)	Final No. of Trips	Directional Split			
											AM		PM	
											IN	OUT	IN	OUT
											25%	75%	70%	30%
Applicant site	-	-	Res 3	-	3	165	0.85	140	0	140	35	105	98	42
Total	-	-	-	-		165	-	140	0	140	35	105	98	42
												140		140

Trip reduction factor	Factors (%)	Factors Use for Pc
Mixed use development (Pm)	15%	0%
Low vehicle ownership (Pv)	30%	0%
Very low vehicle ownership (Pv)	50%	0%
Transit nodes or Corridors (Pt)	15%	0%
Total reduction factor	-	**0.00%**

Combined reduction factor

Combined factor: Pc = 1- (1-Pm)*(1-Pv)*(1-Pt)

ANNEXURE E:

CAPACITY ANALYSIS RESULTS

Intersection 1: Dan Pienaar & Les Beyers

MOVEMENT SUMMARY

Site: 101 [SC1 2017 AM Background]

Erf 1211 Pierre van Ryneveld X2
Dan Pienaar & Les Beyers
SC1 - 2017 AM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Les Beyers - NB											
1	L2	24	0.0	0.025	8.2	LOS A	0.1	0.7	0.11	0.93	51.7
3	R2	7	0.0	0.025	8.7	LOS A	0.1	0.7	0.11	0.93	51.3
Approach		31	0.0	0.025	8.3	LOS A	0.1	0.7	0.11	0.93	51.6
East: Dan Pienaar - WB											
4	L2	2	0.0	0.023	5.5	LOS A	0.0	0.0	0.00	0.03	58.1
5	T1	43	0.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.03	59.7
Approach		45	0.0	0.023	0.3	NA	0.0	0.0	0.00	0.03	59.6
West: Dan Pienaar - EB											
11	T1	212	0.0	0.112	0.0	LOS A	0.0	0.3	0.01	0.02	59.8
12	R2	7	0.0	0.112	5.6	LOS A	0.0	0.3	0.01	0.02	57.6
Approach		219	0.0	0.112	0.2	NA	0.0	0.3	0.01	0.02	59.7
All Vehicles		295	0.0	0.112	1.1	NA	0.1	0.7	0.02	0.12	58.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [SC2 2017 AM With dev]

Erf 1211 Pierre van Ryneveld X2
Dan Pienaar & Les Beyers
SC2 - 2017 AM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Les Beyers - NB											
1	L2	60	0.0	0.062	8.2	LOS A	0.2	1.7	0.11	0.93	51.7
3	R2	17	0.0	0.062	8.9	LOS A	0.2	1.7	0.11	0.93	51.3
Approach		76	0.0	0.062	8.3	LOS A	0.2	1.7	0.11	0.93	51.6
East: Dan Pienaar - WB											
4	L2	7	0.0	0.026	5.5	LOS A	0.0	0.0	0.00	0.09	57.6
5	T1	43	0.0	0.026	0.0	LOS A	0.0	0.0	0.00	0.09	59.2
Approach		50	0.0	0.026	0.8	NA	0.0	0.0	0.00	0.09	59.0
West: Dan Pienaar - EB											
11	T1	212	0.0	0.120	0.0	LOS A	0.1	0.9	0.03	0.05	59.4
12	R2	20	0.0	0.120	5.6	LOS A	0.1	0.9	0.03	0.05	57.3
Approach		232	0.0	0.120	0.5	NA	0.1	0.9	0.03	0.05	59.2
All Vehicles		358	0.0	0.120	2.2	NA	0.2	1.7	0.04	0.24	57.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [SC3 2022 AM Background]

Erf 1211 Pierre van Ryneveld X2
Dan Pienaar & Les Beyers
SC3 - 2022 AM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Les Beyers - NB											
1	L2	30	0.0	0.036	8.2	LOS A	0.1	0.9	0.13	0.92	51.6
3	R2	12	0.0	0.036	9.1	LOS A	0.1	0.9	0.13	0.92	51.2
Approach		42	0.0	0.036	8.4	LOS A	0.1	0.9	0.13	0.92	51.5
East: Dan Pienaar - WB											
4	L2	6	0.0	0.030	5.5	LOS A	0.0	0.0	0.00	0.06	57.8
5	T1	54	0.0	0.030	0.0	LOS A	0.0	0.0	0.00	0.06	59.5
Approach		60	0.0	0.030	0.6	NA	0.0	0.0	0.00	0.06	59.3
West: Dan Pienaar - EB											
11	T1	250	0.0	0.134	0.0	LOS A	0.1	0.6	0.02	0.03	59.7
12	R2	12	0.0	0.134	5.7	LOS A	0.1	0.6	0.02	0.03	57.5
Approach		262	0.0	0.134	0.3	NA	0.1	0.6	0.02	0.03	59.6
All Vehicles		363	0.0	0.134	1.3	NA	0.1	0.9	0.03	0.14	58.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [SC4 2022 AM With dev]

Erf 1211 Pierre van Ryneveld X2
Dan Pienaar & Les Beyers
SC4 - 2022 AM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Les Beyers - NB											
1	L2	65	0.0	0.074	8.2	LOS A	0.3	2.0	0.13	0.93	51.6
3	R2	21	0.0	0.074	9.2	LOS A	0.3	2.0	0.13	0.93	51.2
Approach		87	0.0	0.074	8.5	LOS A	0.3	2.0	0.13	0.93	51.5
East: Dan Pienaar - WB											
4	L2	11	0.0	0.033	5.5	LOS A	0.0	0.0	0.00	0.10	57.5
5	T1	54	0.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.10	59.1
Approach		64	0.0	0.033	0.9	NA	0.0	0.0	0.00	0.10	58.8
West: Dan Pienaar - EB											
11	T1	250	0.0	0.142	0.0	LOS A	0.2	1.2	0.04	0.05	59.4
12	R2	25	0.0	0.142	5.7	LOS A	0.2	1.2	0.04	0.05	57.2
Approach		275	0.0	0.142	0.5	NA	0.2	1.2	0.04	0.05	59.2
All Vehicles		426	0.0	0.142	2.2	NA	0.3	2.0	0.05	0.24	57.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [SC5 2017 PM Background]

Erf 1211 Pierre van Ryneveld X2
Dan Pienaar & Les Beyers
SC5 - 2017 PM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Les Beyers - NB											
1	L2	12	0.0	0.014	8.6	LOS A	0.1	0.4	0.26	0.86	51.7
3	R2	4	0.0	0.014	8.6	LOS A	0.1	0.4	0.26	0.86	51.3
Approach		16	0.0	0.014	8.6	LOS A	0.1	0.4	0.26	0.86	51.6
East: Dan Pienaar - WB											
4	L2	9	0.0	0.083	5.5	LOS A	0.0	0.0	0.00	0.03	58.1
5	T1	154	0.0	0.083	0.0	LOS A	0.0	0.0	0.00	0.03	59.7
Approach		163	0.0	0.083	0.3	NA	0.0	0.0	0.00	0.03	59.6
West: Dan Pienaar - EB											
11	T1	71	0.0	0.045	0.1	LOS A	0.1	0.6	0.10	0.09	58.8
12	R2	13	0.0	0.045	5.9	LOS A	0.1	0.6	0.10	0.09	56.7
Approach		84	0.0	0.045	1.0	NA	0.1	0.6	0.10	0.09	58.4
All Vehicles		263	0.0	0.083	1.0	NA	0.1	0.6	0.05	0.10	58.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [SC6 2017 PM With dev]

Erf 1211 Pierre van Ryneveld X2
Dan Pienaar & Les Beyers
SC6 - 2017 PM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Les Beyers - NB											
1	L2	29	0.0	0.036	8.6	LOS A	0.1	0.9	0.27	0.87	51.7
3	R2	11	0.0	0.036	8.8	LOS A	0.1	0.9	0.27	0.87	51.3
Approach		40	0.0	0.036	8.6	LOS A	0.1	0.9	0.27	0.87	51.6
East: Dan Pienaar - WB											
4	L2	23	0.0	0.091	5.5	LOS A	0.0	0.0	0.00	0.08	57.7
5	T1	154	0.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.08	59.3
Approach		177	0.0	0.091	0.7	NA	0.0	0.0	0.00	0.08	59.1
West: Dan Pienaar - EB											
11	T1	71	0.0	0.058	0.3	LOS A	0.2	1.4	0.19	0.19	57.6
12	R2	34	0.0	0.058	6.0	LOS A	0.2	1.4	0.19	0.19	55.6
Approach		104	0.0	0.058	2.1	NA	0.2	1.4	0.19	0.19	56.9
All Vehicles		322	0.0	0.091	2.2	NA	0.2	1.4	0.09	0.21	57.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [SC7 2022 PM Background]

Erf 1211 Pierre van Ryneveld X2
Dan Pienaar & Les Beyers
SC7 - 2022 PM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Les Beyers - NB											
1	L2	16	0.0	0.020	8.7	LOS A	0.1	0.5	0.29	0.86	51.7
3	R2	5	0.0	0.020	8.8	LOS A	0.1	0.5	0.29	0.86	51.2
Approach		22	0.0	0.020	8.7	LOS A	0.1	0.5	0.29	0.86	51.6
East: Dan Pienaar - WB											
4	L2	11	0.0	0.097	5.5	LOS A	0.0	0.0	0.00	0.03	58.1
5	T1	179	0.0	0.097	0.0	LOS A	0.0	0.0	0.00	0.03	59.7
Approach		190	0.0	0.097	0.3	NA	0.0	0.0	0.00	0.03	59.6
West: Dan Pienaar - EB											
11	T1	82	0.0	0.052	0.1	LOS A	0.1	0.8	0.11	0.10	58.6
12	R2	16	0.0	0.052	6.0	LOS A	0.1	0.8	0.11	0.10	56.6
Approach		98	0.0	0.052	1.1	NA	0.1	0.8	0.11	0.10	58.3
All Vehicles		310	0.0	0.097	1.2	NA	0.1	0.8	0.06	0.11	58.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [SC8 2022 PM With dev]

Erf 1211 Pierre van Ryneveld X2
Dan Pienaar & Les Beyers
SC8 - 2022 PM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Les Beyers - NB											
1	L2	34	0.0	0.042	8.7	LOS A	0.2	1.1	0.29	0.87	51.6
3	R2	12	0.0	0.042	9.0	LOS A	0.2	1.1	0.29	0.87	51.2
Approach		46	0.0	0.042	8.8	LOS A	0.2	1.1	0.29	0.87	51.5
East: Dan Pienaar - WB											
4	L2	25	0.0	0.104	5.6	LOS A	0.0	0.0	0.00	0.07	57.7
5	T1	179	0.0	0.104	0.0	LOS A	0.0	0.0	0.00	0.07	59.3
Approach		204	0.0	0.104	0.7	NA	0.0	0.0	0.00	0.07	59.1
West: Dan Pienaar - EB											
11	T1	82	0.0	0.067	0.3	LOS A	0.2	1.6	0.20	0.19	57.6
12	R2	37	0.0	0.067	6.1	LOS A	0.2	1.6	0.20	0.19	55.6
Approach		118	0.0	0.067	2.1	NA	0.2	1.6	0.20	0.19	56.9
All Vehicles		368	0.0	0.104	2.2	NA	0.2	1.6	0.10	0.21	57.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection 2: Van Ryneveld & Klopper

MOVEMENT SUMMARY

Site: 102 [SC1 2017 AM Background]

Erf 1211 Van Ryneveld X2
Pierre van Ryneveld & Klopper
SC1 - 2017 AM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Pierre v Ryneveld - NB											
1	L2	8	0.0	0.111	5.6	LOS A	0.0	0.0	0.00	0.02	58.1
2	T1	210	0.0	0.111	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		218	0.0	0.111	0.2	NA	0.0	0.0	0.00	0.02	59.7
North: Pierre v Ryneveld - SB											
8	T1	535	0.0	0.274	0.0	LOS A	0.0	0.2	0.01	0.00	59.9
9	R2	4	0.0	0.274	6.4	LOS A	0.0	0.2	0.01	0.00	57.8
Approach		539	0.0	0.274	0.1	NA	0.0	0.2	0.01	0.00	59.9
West: Klopper - EB											
10	L2	10	0.0	0.104	8.9	LOS A	0.3	2.4	0.51	0.97	49.4
12	R2	46	0.0	0.104	13.0	LOS B	0.3	2.4	0.51	0.97	49.0
Approach		55	0.0	0.104	12.3	LOS B	0.3	2.4	0.51	0.97	49.1
All Vehicles		812	0.0	0.274	0.9	NA	0.3	2.4	0.04	0.07	59.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [SC2 2017 AM With dev]

Erf 1211 Van Ryneveld X2
Pierre van Ryneveld & Klopper
SC2 - 2017 AM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Pierre v Ryneveld - NB											
1	L2	25	0.0	0.120	5.6	LOS A	0.0	0.0	0.00	0.06	57.8
2	T1	210	0.0	0.120	0.0	LOS A	0.0	0.0	0.00	0.06	59.4
Approach		235	0.0	0.120	0.6	NA	0.0	0.0	0.00	0.06	59.2
North: Pierre v Ryneveld - SB											
8	T1	535	0.0	0.279	0.0	LOS A	0.1	0.7	0.02	0.01	59.8
9	R2	11	0.0	0.279	6.5	LOS A	0.1	0.7	0.02	0.01	57.6
Approach		546	0.0	0.279	0.2	NA	0.1	0.7	0.02	0.01	59.8
West: Klopper - EB											
10	L2	23	0.0	0.262	9.3	LOS A	1.0	6.8	0.56	0.99	48.8
12	R2	113	0.0	0.262	14.2	LOS B	1.0	6.8	0.56	0.99	48.4
Approach		136	0.0	0.262	13.4	LOS B	1.0	6.8	0.56	0.99	48.4
All Vehicles		917	0.0	0.279	2.2	NA	1.0	6.8	0.10	0.17	57.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [SC3 2022 AM Background]

Erf 1211 Van Ryneveld X2
Pierre van Ryneveld & Klopper
SC3 - 2022 AM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Pierre v Ryneveld - NB											
1	L2	12	0.0	0.132	5.6	LOS A	0.0	0.0	0.00	0.03	58.1
2	T1	247	0.0	0.132	0.0	LOS A	0.0	0.0	0.00	0.03	59.7
Approach		259	0.0	0.132	0.3	NA	0.0	0.0	0.00	0.03	59.6
North: Pierre v Ryneveld - SB											
8	T1	620	0.0	0.319	0.0	LOS A	0.1	0.4	0.01	0.01	59.9
9	R2	6	0.0	0.319	6.7	LOS A	0.1	0.4	0.01	0.01	57.7
Approach		627	0.0	0.319	0.1	NA	0.1	0.4	0.01	0.01	59.9
West: Klopper - EB											
10	L2	12	0.0	0.149	9.1	LOS A	0.5	3.4	0.60	0.96	48.4
12	R2	54	0.0	0.149	15.1	LOS C	0.5	3.4	0.60	0.96	48.0
Approach		66	0.0	0.149	14.0	LOS B	0.5	3.4	0.60	0.96	48.1
All Vehicles		952	0.0	0.319	1.1	NA	0.5	3.4	0.05	0.08	58.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [SC4 2022 AM With dev]

Erf 1211 Van Ryneveld X2
Pierre van Ryneveld & Klopper
SC4 - 2022 AM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Pierre v Ryneveld - NB											
1	L2	29	0.0	0.141	5.6	LOS A	0.0	0.0	0.00	0.06	57.8
2	T1	247	0.0	0.141	0.0	LOS A	0.0	0.0	0.00	0.06	59.4
Approach		276	0.0	0.141	0.6	NA	0.0	0.0	0.00	0.06	59.2
North: Pierre v Ryneveld - SB											
8	T1	620	0.0	0.325	0.0	LOS A	0.1	1.0	0.02	0.01	59.8
9	R2	13	0.0	0.325	6.8	LOS A	0.1	1.0	0.02	0.01	57.6
Approach		634	0.0	0.325	0.2	NA	0.1	1.0	0.02	0.01	59.7
West: Klopper - EB											
10	L2	25	0.0	0.341	10.2	LOS B	1.3	9.4	0.65	1.02	47.2
12	R2	122	0.0	0.341	17.2	LOS C	1.3	9.4	0.65	1.02	46.9
Approach		147	0.0	0.341	16.0	LOS C	1.3	9.4	0.65	1.02	46.9
All Vehicles		1057	0.0	0.341	2.5	NA	1.3	9.4	0.11	0.17	57.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [SC5 2017 PM Background]

Erf 1211 Van Ryneveld X2
Pierre van Ryneveld & Klopper
SC5 - 2017 PM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Pierre v Ryneveld - NB											
1	L2	29	0.0	0.183	5.6	LOS A	0.0	0.0	0.00	0.05	57.9
2	T1	330	0.0	0.183	0.0	LOS A	0.0	0.0	0.00	0.05	59.5
Approach		359	0.0	0.183	0.5	NA	0.0	0.0	0.00	0.05	59.4
North: Pierre v Ryneveld - SB											
8	T1	380	0.0	0.206	0.1	LOS A	0.2	1.1	0.05	0.03	59.6
9	R2	16	0.0	0.206	7.0	LOS A	0.2	1.1	0.05	0.03	57.4
Approach		396	0.0	0.206	0.4	NA	0.2	1.1	0.05	0.03	59.5
West: Klopper - EB											
10	L2	5	0.0	0.024	9.4	LOS A	0.1	0.6	0.48	0.90	50.1
12	R2	10	0.0	0.024	12.3	LOS B	0.1	0.6	0.48	0.90	49.7
Approach		15	0.0	0.024	11.2	LOS B	0.1	0.6	0.48	0.90	49.8
All Vehicles		770	0.0	0.206	0.6	NA	0.2	1.1	0.04	0.05	59.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [SC6 2017 PM With dev]

Erf 1211 Van Ryneveld X2
Pierre van Ryneveld & Klopper
SC6 - 2017 PM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Pierre v Ryneveld - NB											
1	L2	75	0.0	0.208	5.6	LOS A	0.0	0.0	0.00	0.11	57.4
2	T1	330	0.0	0.208	0.0	LOS A	0.0	0.0	0.00	0.11	59.0
Approach		405	0.0	0.208	1.0	NA	0.0	0.0	0.00	0.11	58.7
North: Pierre v Ryneveld - SB											
8	T1	380	0.0	0.227	0.3	LOS A	0.4	3.0	0.13	0.06	58.9
9	R2	41	0.0	0.227	7.3	LOS A	0.4	3.0	0.13	0.06	56.8
Approach		420	0.0	0.227	1.0	NA	0.4	3.0	0.13	0.06	58.7
West: Klopper - EB											
10	L2	13	0.0	0.063	9.4	LOS A	0.2	1.4	0.50	0.95	49.8
12	R2	24	0.0	0.063	13.0	LOS B	0.2	1.4	0.50	0.95	49.4
Approach		37	0.0	0.063	11.8	LOS B	0.2	1.4	0.50	0.95	49.5
All Vehicles		862	0.0	0.227	1.5	NA	0.4	3.0	0.08	0.12	58.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [SC7 2022 PM Background]

Erf 1211 Van Ryneveld X2
Pierre van Ryneveld & Klopper
SC7 - 2022 PM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Pierre v Ryneveld - NB											
1	L2	38	0.0	0.214	5.6	LOS A	0.0	0.0	0.00	0.05	57.9
2	T1	382	0.0	0.214	0.0	LOS A	0.0	0.0	0.00	0.05	59.5
Approach		419	0.0	0.214	0.5	NA	0.0	0.0	0.00	0.05	59.3
North: Pierre v Ryneveld - SB											
8	T1	441	0.0	0.242	0.2	LOS A	0.2	1.7	0.07	0.03	59.5
9	R2	22	0.0	0.242	7.5	LOS A	0.2	1.7	0.07	0.03	57.3
Approach		462	0.0	0.242	0.5	NA	0.2	1.7	0.07	0.03	59.4
West: Klopper - EB											
10	L2	11	0.0	0.037	9.7	LOS A	0.1	0.8	0.51	0.92	49.8
12	R2	11	0.0	0.037	13.9	LOS B	0.1	0.8	0.51	0.92	49.4
Approach		22	0.0	0.037	11.8	LOS B	0.1	0.8	0.51	0.92	49.6
All Vehicles		903	0.0	0.242	0.8	NA	0.2	1.7	0.05	0.06	59.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [SC8 2022 PM With dev]

Erf 1211 Van Ryneveld X2
Pierre van Ryneveld & Klopper
SC8 - 2022 PM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pierre v Ryneveld - NB											
1	L2	84	0.0	0.238	5.6	LOS A	0.0	0.0	0.00	0.11	57.4
2	T1	382	0.0	0.238	0.0	LOS A	0.0	0.0	0.00	0.11	59.0
Approach		466	0.0	0.238	1.0	NA	0.0	0.0	0.00	0.11	58.7
North: Pierre v Ryneveld - SB											
8	T1	441	0.0	0.266	0.4	LOS A	0.5	3.8	0.14	0.06	58.9
9	R2	46	0.0	0.266	7.9	LOS A	0.5	3.8	0.14	0.06	56.8
Approach		487	0.0	0.266	1.1	NA	0.5	3.8	0.14	0.06	58.7
West: Klopper - EB											
10	L2	18	0.0	0.082	9.8	LOS A	0.3	1.9	0.54	0.94	49.2
12	R2	25	0.0	0.082	14.8	LOS B	0.3	1.9	0.54	0.94	48.8
Approach		43	0.0	0.082	12.7	LOS B	0.3	1.9	0.54	0.94	49.0
All Vehicles		996	0.0	0.266	1.6	NA	0.5	3.8	0.09	0.12	58.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection 3: Van Ryneveld & Dan Pienaar

MOVEMENT SUMMARY

Site: 103 [SC1 2017 AM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Dan Pienaar
SC1 - 2017 AM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	56	0.0	0.195	5.6	LOS A	0.0	0.0	0.00	0.09	57.6
2	T1	320	0.0	0.195	0.0	LOS A	0.0	0.0	0.00	0.09	59.2
Approach		376	0.0	0.195	0.9	NA	0.0	0.0	0.00	0.09	58.9
North: Van Ryneveld - SB											
8	T1	215	0.0	0.113	0.0	LOS A	0.0	0.2	0.02	0.01	59.8
9	R2	4	0.0	0.113	6.9	LOS A	0.0	0.2	0.02	0.01	57.6
Approach		219	0.0	0.113	0.1	NA	0.0	0.2	0.02	0.01	59.8
West: Dan Pienaar - EB											
10	L2	9	0.0	0.338	10.2	LOS B	1.5	10.3	0.57	1.04	49.6
12	R2	207	0.0	0.338	12.1	LOS B	1.5	10.3	0.57	1.04	49.2
Approach		216	0.0	0.338	12.0	LOS B	1.5	10.3	0.57	1.04	49.2
All Vehicles		812	0.0	0.338	3.6	NA	1.5	10.3	0.16	0.32	56.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 103 [SC2 2017 AM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Dan Pienaar
SC2 - 2017 AM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	56	0.0	0.201	5.6	LOS A	0.0	0.0	0.00	0.09	57.6
2	T1	333	0.0	0.201	0.0	LOS A	0.0	0.0	0.00	0.09	59.2
Approach		389	0.0	0.201	0.8	NA	0.0	0.0	0.00	0.09	58.9
North: Van Ryneveld - SB											
8	T1	222	0.0	0.121	0.1	LOS A	0.1	0.5	0.04	0.02	59.6
9	R2	8	0.0	0.121	7.0	LOS A	0.1	0.5	0.04	0.02	57.4
Approach		231	0.0	0.121	0.3	NA	0.1	0.5	0.04	0.02	59.5
West: Dan Pienaar - EB											
10	L2	19	0.0	0.358	10.5	LOS B	1.6	11.2	0.58	1.04	49.4
12	R2	207	0.0	0.358	12.5	LOS B	1.6	11.2	0.58	1.04	49.0
Approach		226	0.0	0.358	12.4	LOS B	1.6	11.2	0.58	1.04	49.0
All Vehicles		846	0.0	0.358	3.8	NA	1.6	11.2	0.17	0.32	56.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [SC3 2022 AM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Dan Pienaar
SC3 - 2022 AM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	65	0.0	0.225	5.6	LOS A	0.0	0.0	0.00	0.09	57.6
2	T1	371	0.0	0.225	0.0	LOS A	0.0	0.0	0.00	0.09	59.2
Approach		435	0.0	0.225	0.8	NA	0.0	0.0	0.00	0.09	58.9
North: Van Ryneveld - SB											
8	T1	253	0.0	0.135	0.1	LOS A	0.1	0.4	0.03	0.01	59.7
9	R2	6	0.0	0.135	7.3	LOS A	0.1	0.4	0.03	0.01	57.5
Approach		259	0.0	0.135	0.2	NA	0.1	0.4	0.03	0.01	59.7
West: Dan Pienaar - EB											
10	L2	12	0.0	0.447	11.4	LOS B	2.2	15.3	0.65	1.08	48.4
12	R2	241	0.0	0.447	14.2	LOS B	2.2	15.3	0.65	1.08	48.0
Approach		253	0.0	0.447	14.1	LOS B	2.2	15.3	0.65	1.08	48.0
All Vehicles		947	0.0	0.447	4.2	NA	2.2	15.3	0.18	0.33	55.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [SC4 2022 AM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Dan Pienaar
SC4 - 2022 AM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	65	0.0	0.232	5.6	LOS A	0.0	0.0	0.00	0.09	57.6
2	T1	384	0.0	0.232	0.0	LOS A	0.0	0.0	0.00	0.09	59.2
Approach		448	0.0	0.232	0.8	NA	0.0	0.0	0.00	0.09	58.9
North: Van Ryneveld - SB											
8	T1	260	0.0	0.143	0.1	LOS A	0.1	0.8	0.05	0.02	59.6
9	R2	11	0.0	0.143	7.4	LOS A	0.1	0.8	0.05	0.02	57.3
Approach		271	0.0	0.143	0.4	NA	0.1	0.8	0.05	0.02	59.5
West: Dan Pienaar - EB											
10	L2	21	0.0	0.472	11.7	LOS B	2.4	16.7	0.67	1.09	48.1
12	R2	241	0.0	0.472	14.8	LOS B	2.4	16.7	0.67	1.09	47.7
Approach		262	0.0	0.472	14.5	LOS B	2.4	16.7	0.67	1.09	47.7
All Vehicles		981	0.0	0.472	4.4	NA	2.4	16.7	0.19	0.34	55.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [SC5 2017 PM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Dan Pienaar
SC5 - 2017 PM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	128	0.0	0.367	5.6	LOS A	0.0	0.0	0.00	0.11	57.4
2	T1	581	0.0	0.367	0.0	LOS A	0.0	0.0	0.00	0.11	58.9
Approach		709	0.0	0.367	1.0	NA	0.0	0.0	0.00	0.11	58.6
North: Van Ryneveld - SB											
8	T1	240	0.0	0.151	0.7	LOS A	0.3	2.4	0.16	0.06	58.6
9	R2	22	0.0	0.151	9.4	LOS A	0.3	2.4	0.16	0.06	56.4
Approach		262	0.0	0.151	1.4	NA	0.3	2.4	0.16	0.06	58.4
West: Dan Pienaar - EB											
10	L2	12	0.0	0.104	11.3	LOS B	0.3	2.3	0.66	0.99	48.3
12	R2	33	0.0	0.104	15.3	LOS C	0.3	2.3	0.66	0.99	47.9
Approach		45	0.0	0.104	14.2	LOS B	0.3	2.3	0.66	0.99	48.0
All Vehicles		1016	0.0	0.367	1.7	NA	0.3	2.4	0.07	0.13	58.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [SC6 2017 PM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Dan Pienaar
SC6 - 2017 PM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	128	0.0	0.371	5.6	LOS A	0.0	0.0	0.00	0.11	57.4
2	T1	589	0.0	0.371	0.0	LOS A	0.0	0.0	0.00	0.11	58.9
Approach		718	0.0	0.371	1.0	NA	0.0	0.0	0.00	0.11	58.7
North: Van Ryneveld - SB											
8	T1	267	0.0	0.185	1.1	LOS A	0.6	4.0	0.23	0.09	58.0
9	R2	38	0.0	0.185	9.7	LOS A	0.6	4.0	0.23	0.09	55.8
Approach		305	0.0	0.185	2.1	NA	0.6	4.0	0.23	0.09	57.7
West: Dan Pienaar - EB											
10	L2	19	0.0	0.121	11.4	LOS B	0.4	2.7	0.67	0.99	48.2
12	R2	33	0.0	0.121	16.2	LOS C	0.4	2.7	0.67	0.99	47.8
Approach		52	0.0	0.121	14.4	LOS B	0.4	2.7	0.67	0.99	47.9
All Vehicles		1074	0.0	0.371	2.0	NA	0.6	4.0	0.10	0.14	57.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [SC7 2022 PM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Dan Pienaar
SC7 - 2022 PM Peak - Background traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	153	0.0	0.429	5.6	LOS A	0.0	0.0	0.00	0.11	57.3
2	T1	676	0.0	0.429	0.1	LOS A	0.0	0.0	0.00	0.11	58.9
Approach		829	0.0	0.429	1.1	NA	0.0	0.0	0.00	0.11	58.6
North: Van Ryneveld - SB											
8	T1	282	0.0	0.190	1.2	LOS A	0.6	4.0	0.22	0.07	58.0
9	R2	29	0.0	0.190	11.1	LOS B	0.6	4.0	0.22	0.07	55.8
Approach		312	0.0	0.190	2.1	NA	0.6	4.0	0.22	0.07	57.7
West: Dan Pienaar - EB											
10	L2	18	0.0	0.174	12.4	LOS B	0.5	3.8	0.75	1.00	46.7
12	R2	41	0.0	0.174	18.9	LOS C	0.5	3.8	0.75	1.00	46.3
Approach		59	0.0	0.174	17.0	LOS C	0.5	3.8	0.75	1.00	46.5
All Vehicles		1200	0.0	0.429	2.1	NA	0.6	4.0	0.09	0.14	57.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [SC8 2022 PM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Dan Pienaar
SC8 - 2022 PM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	153	0.0	0.433	5.6	LOS A	0.0	0.0	0.00	0.11	57.3
2	T1	685	0.0	0.433	0.1	LOS A	0.0	0.0	0.00	0.11	58.9
Approach		838	0.0	0.433	1.1	NA	0.0	0.0	0.00	0.11	58.6
North: Van Ryneveld - SB											
8	T1	309	0.0	0.228	1.7	LOS A	0.9	6.5	0.29	0.09	57.2
9	R2	45	0.0	0.228	11.4	LOS B	0.9	6.5	0.29	0.09	55.1
Approach		354	0.0	0.228	3.0	NA	0.9	6.5	0.29	0.09	56.9
West: Dan Pienaar - EB											
10	L2	25	0.0	0.199	12.7	LOS B	0.6	4.5	0.76	1.01	46.4
12	R2	41	0.0	0.199	20.5	LOS C	0.6	4.5	0.76	1.01	46.0
Approach		66	0.0	0.199	17.6	LOS C	0.6	4.5	0.76	1.01	46.1
All Vehicles		1258	0.0	0.433	2.5	NA	0.9	6.5	0.12	0.15	57.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection 4: Van Ryneveld & Canberra

MOVEMENT SUMMARY

Site: 104 [SC1 2017 AM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC1 - 2017 AM Peak - Background traffic
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	6	0.0	0.980	95.8	LOS F	16.2	113.3	1.00	2.99	23.4
2	T1	353	0.0	0.980	95.4	LOS F	16.2	113.3	1.00	2.99	23.4
3	R2	16	0.0	0.047	11.1	LOS B	0.2	1.1	0.90	1.24	50.2
Approach		375	0.0	0.980	91.9	LOS F	16.2	113.3	1.00	2.92	23.9
East: Canberra - WB											
4	L2	17	0.0	0.411	20.9	LOS C	1.8	12.6	0.94	1.38	44.9
5	T1	24	0.0	0.411	20.6	LOS C	1.8	12.6	0.94	1.38	44.8
6	R2	127	0.0	0.411	20.6	LOS C	1.8	12.6	0.94	1.38	44.7
Approach		168	0.0	0.411	20.7	LOS C	1.8	12.6	0.94	1.38	44.7
North: Van Ryneveld - SB											
7	L2	22	0.0	0.571	23.8	LOS C	3.1	21.7	0.99	1.51	43.6
8	T1	187	0.0	0.571	23.5	LOS C	3.1	21.7	0.99	1.51	43.4
9	R2	52	0.0	0.157	12.7	LOS B	0.6	3.9	0.93	1.27	49.2
Approach		261	0.0	0.571	21.4	LOS C	3.1	21.7	0.98	1.46	44.4
West: Canberra - EB											
10	L2	59	0.0	0.829	142.0	LOS F	6.4	44.9	1.00	1.80	18.1
11	T1	8	0.0	0.829	141.7	LOS F	6.4	44.9	1.00	1.80	18.0
12	R2	19	0.0	0.829	141.7	LOS F	6.4	44.9	1.00	1.80	18.0
Approach		86	0.0	0.829	141.9	LOS F	6.4	44.9	1.00	1.80	18.0
All Vehicles		891	0.0	0.980	62.6	LOS F	16.2	113.3	0.98	2.09	29.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104v [SC1 2017 AM Background UPGR]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC1 - 2017 AM Peak - Background traffic, with upgrade
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	6	0.0	0.359	6.4	LOS A	2.6	18.3	0.54	0.60	52.2
2	T1	353	0.0	0.359	6.4	LOS A	2.6	18.3	0.54	0.60	52.9
3	R2	16	0.0	0.359	9.6	LOS A	2.6	18.3	0.54	0.60	52.6
Approach		375	0.0	0.359	6.5	LOS A	2.6	18.3	0.54	0.60	52.9
East: Canberra - WB											
4	L2	17	0.0	0.174	6.5	LOS A	1.0	7.2	0.50	0.67	51.0
5	T1	24	0.0	0.174	6.6	LOS A	1.0	7.2	0.50	0.67	51.7
6	R2	127	0.0	0.174	9.8	LOS A	1.0	7.2	0.50	0.67	51.3
Approach		168	0.0	0.174	9.0	LOS A	1.0	7.2	0.50	0.67	51.4
North: Van Ryneveld - SB											
7	L2	22	0.0	0.194	4.9	LOS A	1.3	9.2	0.21	0.51	53.1
8	T1	187	0.0	0.194	4.9	LOS A	1.3	9.2	0.21	0.51	53.8
9	R2	52	0.0	0.194	8.1	LOS A	1.3	9.2	0.21	0.51	53.5
Approach		261	0.0	0.194	5.5	LOS A	1.3	9.2	0.21	0.51	53.7
West: Canberra - EB											
10	L2	59	0.0	0.114	8.3	LOS A	0.7	4.7	0.66	0.71	50.9
11	T1	8	0.0	0.114	8.3	LOS A	0.7	4.7	0.66	0.71	51.7
12	R2	19	0.0	0.114	11.5	LOS B	0.7	4.7	0.66	0.71	51.3
Approach		86	0.0	0.114	9.0	LOS A	0.7	4.7	0.66	0.71	51.1
All Vehicles		891	0.0	0.359	6.9	LOS A	2.6	18.3	0.45	0.60	52.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104v [SC2 2017 AM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC2 - 2017 AM Peak - With dev traffic, with Background upgrade
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	6	0.0	0.377	6.4	LOS A	2.8	19.6	0.55	0.60	52.2
2	T1	373	0.0	0.377	6.4	LOS A	2.8	19.6	0.55	0.60	52.9
3	R2	16	0.0	0.377	9.7	LOS A	2.8	19.6	0.55	0.60	52.6
Approach		395	0.0	0.377	6.6	LOS A	2.8	19.6	0.55	0.60	52.9
East: Canberra - WB											
4	L2	17	0.0	0.176	6.6	LOS A	1.0	7.3	0.51	0.67	50.9
5	T1	24	0.0	0.176	6.6	LOS A	1.0	7.3	0.51	0.67	51.6
6	R2	127	0.0	0.176	9.9	LOS A	1.0	7.3	0.51	0.67	51.3
Approach		168	0.0	0.176	9.1	LOS A	1.0	7.3	0.51	0.67	51.3
North: Van Ryneveld - SB											
7	L2	22	0.0	0.201	4.9	LOS A	1.4	9.6	0.21	0.51	53.1
8	T1	198	0.0	0.201	4.9	LOS A	1.4	9.6	0.21	0.51	53.8
9	R2	52	0.0	0.201	8.1	LOS A	1.4	9.6	0.21	0.51	53.5
Approach		272	0.0	0.201	5.5	LOS A	1.4	9.6	0.21	0.51	53.7
West: Canberra - EB											
10	L2	59	0.0	0.117	8.4	LOS A	0.7	4.9	0.67	0.72	50.8
11	T1	8	0.0	0.117	8.4	LOS A	0.7	4.9	0.67	0.72	51.5
12	R2	19	0.0	0.117	11.7	LOS B	0.7	4.9	0.67	0.72	51.2
Approach		86	0.0	0.117	9.1	LOS A	0.7	4.9	0.67	0.72	51.0
All Vehicles		921	0.0	0.377	6.9	LOS A	2.8	19.6	0.45	0.60	52.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104v [SC3 2022 AM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC3 - 2022 AM Peak - Background traffic, with 2017 upgrade
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	11	0.0	0.442	6.9	LOS A	3.5	24.2	0.63	0.65	51.9
2	T1	411	0.0	0.442	6.9	LOS A	3.5	24.2	0.63	0.65	52.6
3	R2	21	0.0	0.442	10.2	LOS B	3.5	24.2	0.63	0.65	52.3
Approach		442	0.0	0.442	7.1	LOS A	3.5	24.2	0.63	0.65	52.6
East: Canberra - WB											
4	L2	21	0.0	0.217	7.0	LOS A	1.3	9.3	0.56	0.70	50.7
5	T1	32	0.0	0.217	7.0	LOS A	1.3	9.3	0.56	0.70	51.4
6	R2	147	0.0	0.217	10.2	LOS B	1.3	9.3	0.56	0.70	51.1
Approach		200	0.0	0.217	9.4	LOS A	1.3	9.3	0.56	0.70	51.1
North: Van Ryneveld - SB											
7	L2	26	0.0	0.234	5.0	LOS A	1.6	11.5	0.25	0.51	52.9
8	T1	221	0.0	0.234	5.0	LOS A	1.6	11.5	0.25	0.51	53.7
9	R2	63	0.0	0.234	8.2	LOS A	1.6	11.5	0.25	0.51	53.4
Approach		311	0.0	0.234	5.6	LOS A	1.6	11.5	0.25	0.51	53.6
West: Canberra - EB											
10	L2	68	0.0	0.146	9.1	LOS A	0.9	6.3	0.72	0.76	50.4
11	T1	11	0.0	0.146	9.1	LOS A	0.9	6.3	0.72	0.76	51.1
12	R2	21	0.0	0.146	12.3	LOS B	0.9	6.3	0.72	0.76	50.8
Approach		100	0.0	0.146	9.8	LOS A	0.9	6.3	0.72	0.76	50.5
All Vehicles		1053	0.0	0.442	7.3	LOS A	3.5	24.2	0.51	0.63	52.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104v [SC4 2022 AM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC4 - 2022 AM Peak - With dev traffic
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	11	0.0	0.461	7.0	LOS A	3.7	25.7	0.64	0.65	51.8
2	T1	431	0.0	0.461	7.0	LOS A	3.7	25.7	0.64	0.65	52.6
3	R2	21	0.0	0.461	10.2	LOS B	3.7	25.7	0.64	0.65	52.2
Approach		462	0.0	0.461	7.1	LOS A	3.7	25.7	0.64	0.65	52.6
East: Canberra - WB											
4	L2	21	0.0	0.219	7.1	LOS A	1.3	9.4	0.57	0.70	50.6
5	T1	32	0.0	0.219	7.1	LOS A	1.3	9.4	0.57	0.70	51.3
6	R2	147	0.0	0.219	10.3	LOS B	1.3	9.4	0.57	0.70	51.0
Approach		200	0.0	0.219	9.5	LOS A	1.3	9.4	0.57	0.70	51.0
North: Van Ryneveld - SB											
7	L2	26	0.0	0.241	5.0	LOS A	1.7	12.0	0.25	0.51	52.9
8	T1	232	0.0	0.241	5.0	LOS A	1.7	12.0	0.25	0.51	53.7
9	R2	63	0.0	0.241	8.2	LOS A	1.7	12.0	0.25	0.51	53.4
Approach		321	0.0	0.241	5.6	LOS A	1.7	12.0	0.25	0.51	53.6
West: Canberra - EB											
10	L2	68	0.0	0.149	9.3	LOS A	0.9	6.5	0.73	0.77	50.2
11	T1	11	0.0	0.149	9.3	LOS A	0.9	6.5	0.73	0.77	50.9
12	R2	21	0.0	0.149	12.5	LOS B	0.9	6.5	0.73	0.77	50.6
Approach		100	0.0	0.149	10.0	LOS A	0.9	6.5	0.73	0.77	50.4
All Vehicles		1083	0.0	0.461	7.4	LOS A	3.7	25.7	0.52	0.63	52.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104 [SC5 2017 PM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC5 - 2017 PM Peak - Background traffic
Stop (All-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	56	0.0	0.843	47.4	LOS E	8.6	60.2	1.00	2.15	34.0
2	T1	295	0.0	0.843	47.1	LOS E	8.6	60.2	1.00	2.15	33.9
3	R2	26	0.0	0.071	10.8	LOS B	0.2	1.6	0.89	1.24	50.4
Approach		377	0.0	0.843	44.6	LOS E	8.6	60.2	0.99	2.08	34.7
East: Canberra - WB											
4	L2	14	0.0	0.275	24.8	LOS C	1.1	7.6	0.98	1.31	42.9
5	T1	39	0.0	0.275	24.5	LOS C	1.1	7.6	0.98	1.31	42.8
6	R2	20	0.0	0.275	24.5	LOS C	1.1	7.6	0.98	1.31	42.7
Approach		73	0.0	0.275	24.6	LOS C	1.1	7.6	0.98	1.31	42.8
North: Van Ryneveld - SB											
7	L2	74	0.0	0.864	46.4	LOS E	9.7	67.9	1.00	2.29	34.3
8	T1	344	0.0	0.864	46.0	LOS E	9.7	67.9	1.00	2.29	34.2
9	R2	208	0.0	0.468	16.3	LOS C	2.2	15.3	0.94	1.42	46.9
Approach		626	0.0	0.864	36.2	LOS E	9.7	67.9	0.98	2.00	37.6
West: Canberra - EB											
10	L2	115	0.0	0.974	123.9	LOS F	13.4	93.5	1.00	2.61	19.8
11	T1	56	0.0	0.974	123.6	LOS F	13.4	93.5	1.00	2.61	19.8
12	R2	65	0.0	0.974	123.6	LOS F	13.4	93.5	1.00	2.61	19.8
Approach		236	0.0	0.974	123.7	LOS F	13.4	93.5	1.00	2.61	19.8
All Vehicles		1312	0.0	0.974	53.7	LOS F	13.4	93.5	0.99	2.10	31.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104v [SC5 2017 PM Background UPGR]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC5 - 2017 PM Peak - Background traffic, with upgrade
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	56	0.0	0.395	7.1	LOS A	2.9	20.5	0.63	0.66	51.9
2	T1	295	0.0	0.395	7.1	LOS A	2.9	20.5	0.63	0.66	52.6
3	R2	26	0.0	0.395	10.3	LOS B	2.9	20.5	0.63	0.66	52.3
Approach		377	0.0	0.395	7.3	LOS A	2.9	20.5	0.63	0.66	52.5
East: Canberra - WB											
4	L2	14	0.0	0.112	9.4	LOS A	0.7	4.8	0.73	0.75	50.1
5	T1	39	0.0	0.112	9.4	LOS A	0.7	4.8	0.73	0.75	50.8
6	R2	20	0.0	0.112	12.6	LOS B	0.7	4.8	0.73	0.75	50.5
Approach		73	0.0	0.112	10.2	LOS B	0.7	4.8	0.73	0.75	50.6
North: Van Ryneveld - SB											
7	L2	74	0.0	0.538	6.2	LOS A	5.1	36.0	0.58	0.60	51.7
8	T1	344	0.0	0.538	6.2	LOS A	5.1	36.0	0.58	0.60	52.4
9	R2	208	0.0	0.538	9.4	LOS A	5.1	36.0	0.58	0.60	52.1
Approach		626	0.0	0.538	7.2	LOS A	5.1	36.0	0.58	0.60	52.2
West: Canberra - EB											
10	L2	115	0.0	0.273	7.4	LOS A	1.8	12.9	0.64	0.71	51.4
11	T1	56	0.0	0.273	7.4	LOS A	1.8	12.9	0.64	0.71	52.1
12	R2	65	0.0	0.273	10.6	LOS B	1.8	12.9	0.64	0.71	51.8
Approach		236	0.0	0.273	8.3	LOS A	1.8	12.9	0.64	0.71	51.7
All Vehicles		1312	0.0	0.538	7.6	LOS A	5.1	36.0	0.61	0.65	52.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104v [SC6 2017 PM With dev.]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC6 - 2017 PM Peak - With dev traffic, with Background upgrade
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	56	0.0	0.409	7.1	LOS A	3.1	21.5	0.64	0.66	51.8
2	T1	308	0.0	0.409	7.1	LOS A	3.1	21.5	0.64	0.66	52.6
3	R2	26	0.0	0.409	10.3	LOS B	3.1	21.5	0.64	0.66	52.2
Approach		391	0.0	0.409	7.3	LOS A	3.1	21.5	0.64	0.66	52.5
East: Canberra - WB											
4	L2	14	0.0	0.117	9.8	LOS A	0.7	5.1	0.76	0.77	49.8
5	T1	39	0.0	0.117	9.8	LOS A	0.7	5.1	0.76	0.77	50.5
6	R2	20	0.0	0.117	13.0	LOS B	0.7	5.1	0.76	0.77	50.2
Approach		73	0.0	0.117	10.6	LOS B	0.7	5.1	0.76	0.77	50.3
North: Van Ryneveld - SB											
7	L2	74	0.0	0.569	6.2	LOS A	5.7	39.7	0.61	0.60	51.6
8	T1	382	0.0	0.569	6.2	LOS A	5.7	39.7	0.61	0.60	52.4
9	R2	208	0.0	0.569	9.5	LOS A	5.7	39.7	0.61	0.60	52.0
Approach		664	0.0	0.569	7.2	LOS A	5.7	39.7	0.61	0.60	52.2
West: Canberra - EB											
10	L2	115	0.0	0.277	7.5	LOS A	1.9	13.1	0.65	0.72	51.3
11	T1	56	0.0	0.277	7.5	LOS A	1.9	13.1	0.65	0.72	52.0
12	R2	65	0.0	0.277	10.8	LOS B	1.9	13.1	0.65	0.72	51.7
Approach		236	0.0	0.277	8.4	LOS A	1.9	13.1	0.65	0.72	51.6
All Vehicles		1363	0.0	0.569	7.6	LOS A	5.7	39.7	0.63	0.65	52.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104v [SC7 2022 PM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC7 - 2022 PM Peak - Background traffic, with 2017 upgrade
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	68	0.0	0.492	7.8	LOS A	3.9	27.6	0.73	0.73	51.5
2	T1	342	0.0	0.492	7.8	LOS A	3.9	27.6	0.73	0.73	52.2
3	R2	32	0.0	0.492	11.0	LOS B	3.9	27.6	0.73	0.73	51.9
Approach		442	0.0	0.492	8.0	LOS A	3.9	27.6	0.73	0.73	52.1
East: Canberra - WB											
4	L2	16	0.0	0.160	10.6	LOS B	1.0	7.3	0.82	0.82	49.2
5	T1	47	0.0	0.160	10.6	LOS B	1.0	7.3	0.82	0.82	49.9
6	R2	26	0.0	0.160	13.8	LOS B	1.0	7.3	0.82	0.82	49.6
Approach		89	0.0	0.160	11.6	LOS B	1.0	7.3	0.82	0.82	49.7
North: Van Ryneveld - SB											
7	L2	89	0.0	0.655	6.8	LOS A	7.2	50.2	0.73	0.65	51.2
8	T1	400	0.0	0.655	6.8	LOS A	7.2	50.2	0.73	0.65	51.9
9	R2	242	0.0	0.655	10.0	LOS B	7.2	50.2	0.73	0.65	51.6
Approach		732	0.0	0.655	7.9	LOS A	7.2	50.2	0.73	0.65	51.7
West: Canberra - EB											
10	L2	137	0.0	0.354	8.1	LOS A	2.5	17.7	0.72	0.76	50.9
11	T1	68	0.0	0.354	8.1	LOS A	2.5	17.7	0.72	0.76	51.7
12	R2	79	0.0	0.354	11.3	LOS B	2.5	17.7	0.72	0.76	51.3
Approach		284	0.0	0.354	9.0	LOS A	2.5	17.7	0.72	0.76	51.2
All Vehicles		1547	0.0	0.655	8.3	LOS A	7.2	50.2	0.74	0.70	51.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104v [SC8 2022 PM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Canberra
SC8 - 2022 PM Peak - With dev traffic
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	68	0.0	0.507	7.8	LOS A	4.1	29.0	0.74	0.73	51.4
2	T1	356	0.0	0.507	7.8	LOS A	4.1	29.0	0.74	0.73	52.2
3	R2	32	0.0	0.507	11.0	LOS B	4.1	29.0	0.74	0.73	51.8
Approach		456	0.0	0.507	8.0	LOS A	4.1	29.0	0.74	0.73	52.0
East: Canberra - WB											
4	L2	16	0.0	0.170	11.1	LOS B	1.1	7.9	0.84	0.84	48.9
5	T1	47	0.0	0.170	11.1	LOS B	1.1	7.9	0.84	0.84	49.6
6	R2	26	0.0	0.170	14.3	LOS B	1.1	7.9	0.84	0.84	49.3
Approach		89	0.0	0.170	12.1	LOS B	1.1	7.9	0.84	0.84	49.3
North: Van Ryneveld - SB											
7	L2	89	0.0	0.686	6.9	LOS A	7.9	55.3	0.77	0.65	51.1
8	T1	438	0.0	0.686	6.9	LOS A	7.9	55.3	0.77	0.65	51.8
9	R2	242	0.0	0.686	10.2	LOS B	7.9	55.3	0.77	0.65	51.5
Approach		769	0.0	0.686	7.9	LOS A	7.9	55.3	0.77	0.65	51.7
West: Canberra - EB											
10	L2	137	0.0	0.359	8.2	LOS A	2.6	18.0	0.74	0.77	50.8
11	T1	68	0.0	0.359	8.3	LOS A	2.6	18.0	0.74	0.77	51.6
12	R2	79	0.0	0.359	11.5	LOS B	2.6	18.0	0.74	0.77	51.2
Approach		284	0.0	0.359	9.1	LOS A	2.6	18.0	0.74	0.77	51.1
All Vehicles		1599	0.0	0.686	8.4	LOS A	7.9	55.3	0.76	0.71	51.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection 5: Van Ryneveld & Theron

MOVEMENT SUMMARY

Site: 105 [SC1 2017 AM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC1 2017 AM Peak - Background traffic
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	779	0.0	0.515	7.8	LOS A	8.4	59.1	0.35	0.69	51.9
2	T1	953	0.0	0.462	11.1	LOS B	10.2	71.1	0.67	0.59	50.7
Approach		1732	0.0	0.515	9.6	LOS A	10.2	71.1	0.52	0.63	51.3
North: Van Ryneveld - SB											
8	T1	314	0.0	0.256	6.1	LOS A	4.7	32.9	0.47	0.41	54.5
9	R2	357	0.0	1.329	344.2	LOS F	48.7	340.6	1.00	2.13	9.0
Approach		671	0.0	1.329	186.1	LOS F	48.7	340.6	0.75	1.32	14.8
West: Theron - EB											
10	L2	136	0.0	0.073	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	181	0.0	0.487	33.3	LOS C	5.7	39.9	0.93	0.80	38.2
Approach		317	0.0	0.487	21.4	LOS C	5.7	39.9	0.53	0.68	44.0
All Vehicles		2719	0.0	1.329	54.5	LOS D	48.7	340.6	0.58	0.81	31.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	9.8	LOS A	0.1	0.1	0.53	0.53
All Pedestrians		158	22.8	LOS C			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC1 2017 AM Background UPGR]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC1 2017 AM Peak - Background traffic, with upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	779	0.0	0.612	11.9	LOS B	14.4	100.6	0.59	0.77	49.0
2	T1	953	0.0	0.611	18.2	LOS B	13.1	91.5	0.85	0.74	46.2
Approach		1732	0.0	0.612	15.4	LOS B	14.4	100.6	0.73	0.76	47.5
North: Van Ryneveld - SB											
8	T1	314	0.0	0.256	6.1	LOS A	4.7	32.9	0.47	0.41	54.5
9	R2	357	0.0	0.748	23.5	LOS C	7.9	55.4	0.98	0.93	42.8
Approach		671	0.0	0.748	15.4	LOS B	7.9	55.4	0.74	0.68	47.6
West: Theron - EB											
10	L2	136	0.0	0.073	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	181	0.0	0.356	32.0	LOS C	4.0	28.2	0.89	0.76	38.7
Approach		317	0.0	0.356	20.7	LOS C	4.0	28.2	0.51	0.66	44.3
All Vehicles		2719	0.0	0.748	16.0	LOS B	14.4	100.6	0.71	0.73	47.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	16.5	LOS B	0.1	0.1	0.69	0.69
All Pedestrians		158	25.0	LOS C			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC2 2017 AM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC2 2017 AM Peak - With dev traffic, with Background upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	788	0.0	0.606	11.4	LOS B	14.0	98.0	0.56	0.77	49.4
2	T1	963	0.0	0.596	17.3	LOS B	12.9	90.5	0.83	0.73	46.7
Approach		1752	0.0	0.606	14.7	LOS B	14.0	98.0	0.71	0.74	47.9
North: Van Ryneveld - SB											
8	T1	320	0.0	0.261	6.2	LOS A	4.8	33.7	0.47	0.41	54.5
9	R2	357	0.0	0.788	26.2	LOS C	8.6	60.4	1.00	0.96	41.5
Approach		677	0.0	0.788	16.8	LOS B	8.6	60.4	0.75	0.70	46.7
West: Theron - EB											
10	L2	136	0.0	0.073	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	185	0.0	0.365	32.1	LOS C	4.1	28.9	0.89	0.77	38.6
Approach		321	0.0	0.365	20.9	LOS C	4.1	28.9	0.52	0.67	44.2
All Vehicles		2749	0.0	0.788	15.9	LOS B	14.0	98.0	0.70	0.72	47.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	15.8	LOS B	0.1	0.1	0.67	0.67
All Pedestrians		158	24.8	LOS C			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC3 2022 AM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC3 2022 AM Peak - Background traffic, with 2017 upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	905	0.0	0.920	34.5	LOS C	32.2	225.4	0.63	0.93	37.6
2	T1	1105	0.0	0.640	16.5	LOS B	14.8	103.7	0.83	0.74	47.2
Approach		2011	0.0	0.920	24.6	LOS C	32.2	225.4	0.74	0.82	42.4
North: Van Ryneveld - SB											
8	T1	363	0.0	0.283	5.4	LOS A	5.2	36.3	0.45	0.39	55.1
9	R2	416	0.0	0.942	53.8	LOS D	17.1	120.0	1.00	1.20	31.6
Approach		779	0.0	0.942	31.2	LOS C	17.1	120.0	0.74	0.82	39.5
West: Theron - EB											
10	L2	158	0.0	0.085	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	211	0.0	0.483	34.5	LOS C	5.0	34.7	0.93	0.78	37.7
Approach		368	0.0	0.483	22.1	LOS C	5.0	34.7	0.53	0.67	43.6
All Vehicles		3158	0.0	0.942	25.9	LOS C	32.2	225.4	0.72	0.81	41.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	14.5	LOS B	0.1	0.1	0.64	0.64
All Pedestrians		158	24.4	LOS C			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC3 2022 AM Background UPGR]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC3 2022 AM Peak - Background traffic, with upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	905	0.0	0.920	34.5	LOS C	32.2	225.4	0.63	0.93	37.6
2	T1	1105	0.0	0.640	16.5	LOS B	14.8	103.7	0.83	0.74	47.2
Approach		2011	0.0	0.920	24.6	LOS C	32.2	225.4	0.74	0.82	42.4
North: Van Ryneveld - SB											
8	T1	363	0.0	0.207	4.9	LOS A	3.6	24.9	0.41	0.35	55.5
9	R2	416	0.0	0.942	53.8	LOS D	17.1	120.0	1.00	1.20	31.6
Approach		779	0.0	0.942	31.0	LOS C	17.1	120.0	0.73	0.80	39.5
West: Theron - EB											
10	L2	158	0.0	0.085	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	211	0.0	0.483	34.5	LOS C	5.0	34.7	0.93	0.78	37.7
Approach		368	0.0	0.483	22.1	LOS C	5.0	34.7	0.53	0.67	43.6
All Vehicles		3158	0.0	0.942	25.9	LOS C	32.2	225.4	0.71	0.80	41.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	14.5	LOS B	0.1	0.1	0.64	0.64
All Pedestrians		158	24.4	LOS C			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC4 2022 AM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC4 2022 AM Peak - With dev traffic, with 2022 Background traffic upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	915	0.0	0.929	37.4	LOS D	34.1	239.0	0.64	0.95	36.6
2	T1	1116	0.0	0.785	21.0	LOS C	21.0	146.8	0.87	0.84	44.6
Approach		2031	0.0	0.929	28.4	LOS C	34.1	239.0	0.77	0.89	40.6
North: Van Ryneveld - SB											
8	T1	369	0.0	0.215	5.4	LOS A	3.8	26.5	0.43	0.36	55.1
9	R2	416	0.0	0.946	53.7	LOS D	17.1	119.8	1.00	1.20	31.7
Approach		785	0.0	0.946	31.0	LOS C	17.1	119.8	0.73	0.80	39.6
West: Theron - EB											
10	L2	158	0.0	0.085	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	215	0.0	0.455	33.5	LOS C	5.0	34.7	0.92	0.78	38.1
Approach		373	0.0	0.455	21.7	LOS C	5.0	34.7	0.53	0.67	43.8
All Vehicles		3188	0.0	0.946	28.2	LOS C	34.1	239.0	0.73	0.84	40.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P3	North Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
P4	West Full Crossing	53	15.1	LOS B	0.1	0.1	0.66	0.66
All Pedestrians		158	24.6	LOS C			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC5 2017 PM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC5 2017 PM Peak - Background traffic
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	207	0.0	0.135	6.2	LOS A	0.7	4.8	0.20	0.63	53.0
2	T1	402	0.0	0.219	11.7	LOS B	4.0	28.3	0.62	0.52	50.3
Approach		609	0.0	0.219	9.8	LOS A	4.0	28.3	0.48	0.56	51.2
North: Van Ryneveld - SB											
8	T1	793	0.0	1.095	143.9	LOS F	69.9	489.5	1.00	2.03	17.8
9	R2	175	0.0	0.447	22.1	LOS C	4.5	31.3	0.76	0.78	43.3
Approach		967	0.0	1.095	121.9	LOS F	69.9	489.5	0.96	1.81	19.9
West: Theron - EB											
10	L2	440	0.0	0.237	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	734	0.0	1.106	151.9	LOS F	65.0	455.2	1.00	1.61	17.1
Approach		1174	0.0	1.106	97.1	LOS F	65.0	455.2	0.63	1.20	23.1
All Vehicles		2751	0.0	1.106	86.5	LOS F	69.9	489.5	0.71	1.27	24.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	21.7	LOS C	0.1	0.1	0.79	0.79
P3	North Full Crossing	53	22.4	LOS C	0.1	0.1	0.80	0.80
P4	West Full Crossing	53	11.5	LOS B	0.1	0.1	0.57	0.57
All Pedestrians		158	18.5	LOS B			0.72	0.72

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC5 2017 PM Background UPGR]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC5 2017 PM Peak - Background traffic, with upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	207	0.0	0.153	8.6	LOS A	2.1	15.0	0.32	0.66	51.3
2	T1	402	0.0	0.328	20.0	LOS C	5.3	37.3	0.81	0.67	45.2
Approach		609	0.0	0.328	16.2	LOS B	5.3	37.3	0.64	0.67	47.1
North: Van Ryneveld - SB											
8	T1	793	0.0	0.936	39.3	LOS D	35.3	247.0	0.91	1.15	36.5
9	R2	175	0.0	0.333	17.2	LOS B	3.5	24.4	0.72	0.74	46.2
Approach		967	0.0	0.936	35.3	LOS D	35.3	247.0	0.88	1.07	37.9
West: Theron - EB											
10	L2	440	0.0	0.237	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	734	0.0	0.911	39.6	LOS D	22.9	160.2	0.94	0.98	35.8
Approach		1174	0.0	0.911	26.9	LOS C	22.9	160.2	0.59	0.81	41.2
All Vehicles		2751	0.0	0.936	27.5	LOS C	35.3	247.0	0.70	0.87	41.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	25.8	LOS C	0.1	0.1	0.86	0.86
P3	North Full Crossing	53	24.1	LOS C	0.1	0.1	0.83	0.83
P4	West Full Crossing	53	20.9	LOS C	0.1	0.1	0.77	0.77
All Pedestrians		158	23.6	LOS C			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC6 2017 PM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC6 2017 PM Peak - With dev traffic, with Background upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	213	0.0	0.157	8.6	LOS A	2.2	15.4	0.33	0.66	51.3
2	T1	411	0.0	0.335	20.1	LOS C	5.5	38.2	0.81	0.67	45.2
Approach		623	0.0	0.335	16.2	LOS B	5.5	38.2	0.64	0.67	47.1
North: Van Ryneveld - SB											
8	T1	813	0.0	0.957	46.6	LOS D	39.5	276.4	0.92	1.24	34.1
9	R2	175	0.0	0.336	17.2	LOS B	3.5	24.4	0.73	0.74	46.2
Approach		987	0.0	0.957	41.4	LOS D	39.5	276.4	0.89	1.15	35.7
West: Theron - EB											
10	L2	440	0.0	0.237	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	752	0.0	0.933	43.3	LOS D	24.9	174.0	0.94	1.01	34.6
Approach		1192	0.0	0.933	29.4	LOS C	24.9	174.0	0.60	0.83	40.2
All Vehicles		2802	0.0	0.957	30.7	LOS C	39.5	276.4	0.71	0.91	39.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	25.8	LOS C	0.1	0.1	0.86	0.86
P3	North Full Crossing	53	24.1	LOS C	0.1	0.1	0.83	0.83
P4	West Full Crossing	53	23.3	LOS C	0.1	0.1	0.82	0.82
All Pedestrians		158	24.4	LOS C			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC7 2022 PM Background]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC7 2022 PM Peak - Background traffic, with 2017 upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	242	0.0	0.183	9.0	LOS A	2.7	18.8	0.35	0.67	51.0
2	T1	468	0.0	0.400	21.4	LOS C	6.5	45.4	0.84	0.70	44.4
Approach		711	0.0	0.400	17.2	LOS B	6.5	45.4	0.67	0.69	46.5
North: Van Ryneveld - SB											
8	T1	921	0.0	1.089	134.3	LOS F	79.4	556.1	1.00	2.05	18.7
9	R2	205	0.0	0.399	17.6	LOS B	4.2	29.1	0.76	0.76	45.9
Approach		1126	0.0	1.089	113.0	LOS F	79.4	556.1	0.96	1.81	21.0
West: Theron - EB											
10	L2	511	0.0	0.275	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	853	0.0	1.084	105.7	LOS F	50.2	351.1	0.95	1.32	21.7
Approach		1363	0.0	1.084	68.2	LOS E	50.2	351.1	0.59	1.02	28.2
All Vehicles		3200	0.0	1.089	72.7	LOS E	79.4	556.1	0.74	1.23	27.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	25.8	LOS C	0.1	0.1	0.86	0.86
P3	North Full Crossing	53	24.1	LOS C	0.1	0.1	0.83	0.83
P4	West Full Crossing	53	21.7	LOS C	0.1	0.1	0.79	0.79
All Pedestrians		158	23.8	LOS C			0.83	0.83

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC7 2022 PM Background UPGR]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC7 2022 PM Peak - Background traffic, with upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	242	0.0	0.175	8.4	LOS A	2.4	16.9	0.31	0.66	51.5
2	T1	468	0.0	0.443	23.2	LOS C	6.8	47.4	0.88	0.73	43.4
Approach		711	0.0	0.443	18.2	LOS B	6.8	47.4	0.68	0.71	45.9
North: Van Ryneveld - SB											
8	T1	921	0.0	0.945	34.8	LOS C	28.3	198.0	0.82	0.97	38.2
9	R2	205	0.0	0.457	20.4	LOS C	4.7	32.8	0.83	0.77	44.4
Approach		1126	0.0	0.945	32.2	LOS C	28.3	198.0	0.82	0.93	39.2
West: Theron - EB											
10	L2	511	0.0	0.275	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	853	0.0	0.931	40.6	LOS D	27.6	193.3	0.91	0.99	35.5
Approach		1363	0.0	0.931	27.5	LOS C	27.6	193.3	0.57	0.82	40.9
All Vehicles		3200	0.0	0.945	27.1	LOS C	28.3	198.0	0.68	0.83	41.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	22.4	LOS C	0.1	0.1	0.80	0.80
P3	North Full Crossing	53	23.3	LOS C	0.1	0.1	0.82	0.82
P4	West Full Crossing	53	23.3	LOS C	0.1	0.1	0.82	0.82
All Pedestrians		158	23.0	LOS C			0.81	0.81

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 105 [SC8 2022 PM With dev]

Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC8 2022 PM Peak - With dev traffic, with 2022 Background traffic upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Van Ryneveld - NB											
1	L2	247	0.0	0.179	8.4	LOS A	2.5	17.3	0.32	0.66	51.5
2	T1	477	0.0	0.450	23.3	LOS C	6.9	48.4	0.88	0.73	43.4
Approach		724	0.0	0.450	18.2	LOS B	6.9	48.4	0.69	0.71	45.9
North: Van Ryneveld - SB											
8	T1	941	0.0	0.953	36.9	LOS D	30.2	211.2	0.83	1.00	37.4
9	R2	205	0.0	0.460	20.6	LOS C	4.7	32.8	0.84	0.78	44.3
Approach		1146	0.0	0.953	34.0	LOS C	30.2	211.2	0.83	0.96	38.5
West: Theron - EB											
10	L2	511	0.0	0.275	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
12	R2	871	0.0	0.957	46.6	LOS D	30.9	216.4	0.92	1.03	33.5
Approach		1381	0.0	0.957	31.5	LOS C	30.9	216.4	0.58	0.85	39.2
All Vehicles		3252	0.0	0.957	29.4	LOS C	30.9	216.4	0.69	0.86	40.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	22.4	LOS C	0.1	0.1	0.80	0.80
P3	North Full Crossing	53	23.3	LOS C	0.1	0.1	0.82	0.82
P4	West Full Crossing	53	23.3	LOS C	0.1	0.1	0.82	0.82
All Pedestrians		158	23.0	LOS C			0.81	0.81

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Intersection 6: Klopper & Grobbelaar/Site Access

MOVEMENT SUMMARY

Site: 103 [SC4 2022 AM With dev]

Pierre van Ryneveld Ext 2
Klopper & Grobbelaar/Site Access
SC4 - 2022 AM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Klopper - NB											
1	L2	6	0.0	0.020	5.6	LOS A	0.1	0.6	0.08	0.47	54.1
2	T1	6	0.0	0.020	0.1	LOS A	0.1	0.6	0.08	0.47	55.6
3	R2	24	0.0	0.020	5.5	LOS A	0.1	0.6	0.08	0.47	49.8
Approach		35	0.0	0.020	4.6	NA	0.1	0.6	0.08	0.47	52.1
East: Site Access - WB											
4	L2	79	0.0	0.098	4.9	LOS A	0.4	2.7	0.06	0.98	49.9
5	T1	22	0.0	0.098	4.7	LOS A	0.4	2.7	0.06	0.98	49.5
6	R2	22	0.0	0.098	5.0	LOS A	0.4	2.7	0.06	0.98	49.7
Approach		124	0.0	0.098	4.9	LOS A	0.4	2.7	0.06	0.98	49.8
North: Klopper - SB											
7	L2	9	0.0	0.012	5.5	LOS A	0.0	0.1	0.01	0.28	29.1
8	T1	12	0.0	0.012	0.0	LOS A	0.0	0.1	0.01	0.28	57.5
9	R2	1	0.0	0.012	5.5	LOS A	0.0	0.1	0.01	0.28	55.5
Approach		22	0.0	0.012	2.6	NA	0.0	0.1	0.01	0.28	45.1
West: Grobbelaar - EB											
10	L2	1	0.0	0.015	8.0	LOS A	0.1	0.4	0.09	0.98	51.8
11	T1	8	0.0	0.015	7.9	LOS A	0.1	0.4	0.09	0.98	29.3
12	R2	6	0.0	0.015	8.3	LOS A	0.1	0.4	0.09	0.98	51.4
Approach		15	0.0	0.015	8.1	LOS A	0.1	0.4	0.09	0.98	40.0
All Vehicles		196	0.0	0.098	4.8	NA	0.4	2.7	0.06	0.81	48.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Organisation: MARITENG MANAGEMENT SOLUTIONS CC | Processed: 07 December 2017 09:05:19 AM
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MOVEMENT SUMMARY

Site: 103 [SC8 2022 PM With dev]

Pierre van Ryneveld Ext 2
Klopper & Grobbelaar/Site Access
SC8 - 2022 PM Peak - With dev traffic
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Klopper - NB											
1	L2	6	0.0	0.057	5.6	LOS A	0.3	1.9	0.10	0.47	54.1
2	T1	18	0.0	0.057	0.1	LOS A	0.3	1.9	0.10	0.47	55.5
3	R2	78	0.0	0.057	5.5	LOS A	0.3	1.9	0.10	0.47	49.7
Approach		101	0.0	0.057	4.6	NA	0.3	1.9	0.10	0.47	51.6
East: Site Access - WB											
4	L2	24	0.0	0.043	4.9	LOS A	0.2	1.1	0.05	1.00	49.6
5	T1	13	0.0	0.043	5.1	LOS A	0.2	1.1	0.05	1.00	49.2
6	R2	13	0.0	0.043	5.5	LOS A	0.2	1.1	0.05	1.00	49.4
Approach		49	0.0	0.043	5.1	LOS A	0.2	1.1	0.05	1.00	49.5
North: Klopper - SB											
7	L2	19	0.0	0.017	5.5	LOS A	0.0	0.1	0.01	0.37	28.7
8	T1	12	0.0	0.017	0.0	LOS A	0.0	0.1	0.01	0.37	56.7
9	R2	1	0.0	0.017	5.5	LOS A	0.0	0.1	0.01	0.37	54.8
Approach		32	0.0	0.017	3.5	NA	0.0	0.1	0.01	0.37	39.8
West: Grobbelaar - EB											
10	L2	1	0.0	0.025	8.1	LOS A	0.1	0.6	0.19	0.94	51.9
11	T1	19	0.0	0.025	8.2	LOS A	0.1	0.6	0.19	0.94	29.4
12	R2	6	0.0	0.025	8.3	LOS A	0.1	0.6	0.19	0.94	51.4
Approach		26	0.0	0.025	8.2	LOS A	0.1	0.6	0.19	0.94	35.8
All Vehicles		208	0.0	0.057	5.0	NA	0.3	1.9	0.09	0.64	46.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ANNEXURE F:

CONCEPT SIGNAL PHASING DIAGRAM FOR VAN RYNEVELD & THERON INTERSECTION

PHASING SUMMARY

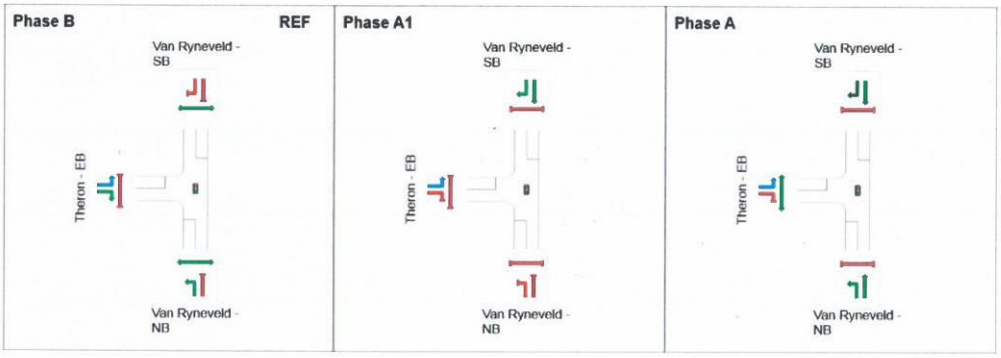
Site: 105 [SC4 2022 AM With dev]

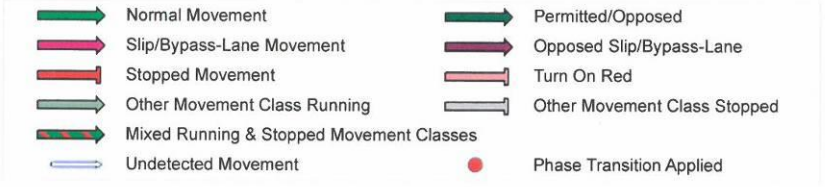
Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC4 2022 AM Peak - With dev traffic, with 2022 Background traffic upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Variable Phasing
Movement Class: All Movement Classes
Input Sequence: B, A1, A
Output Sequence: B, A1, A

Phase Timing Results

Phase	B	A1	A
Reference Phase	Yes	No	No
Phase Change Time (sec)	0	19	37
Green Time (sec)	13	12	30
Yellow Time (sec)	3	2	3
All-Red Time (sec)	3	1	3
Phase Time (sec)	19	18	33
Phase Split	27%	26%	47%





PHASING SUMMARY

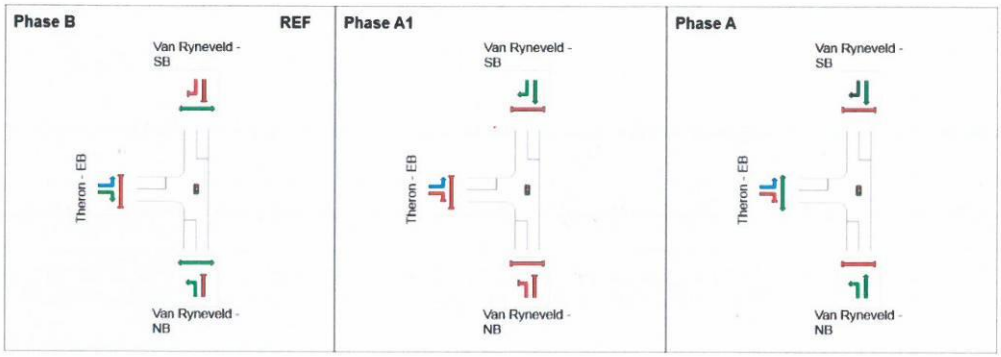
Site: 105 [SC8 2022 PM With dev]

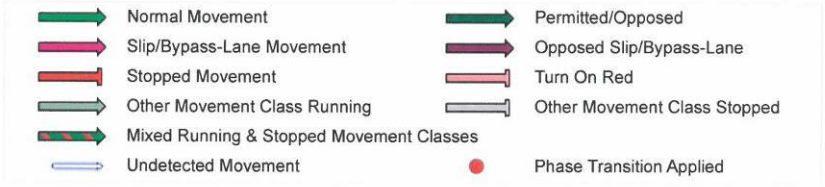
Erf 1211 Pierre van Ryneveld X2
Van Ryneveld & Theron
SC8 2022 PM Peak - With dev traffic, with 2022 Background traffic upgrade
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Variable Phasing
Movement Class: All Movement Classes
Input Sequence: B, A1, A
Output Sequence: B, A1, A

Phase Timing Results

Phase	B	A1	A
Reference Phase	Yes	No	No
Phase Change Time (sec)	0	33	48
Green Time (sec)	27	9	19
Yellow Time (sec)	3	2	3
All-Red Time (sec)	3	1	3
Phase Time (sec)	33	15	22
Phase Split	47%	21%	31%





ANNEXURE G:

PROPOSED ACCESS ARRANGEMENTS AND INTERNAL LAYOUT - MARITENG PLAN NO.: 185-86-01

ANNEXURE H:

EXTRACT FROM TSHWANE STANDARDS - ACCESS ARRANGEMENTS REQUIREMENTS - TSHWANE DRAWING NO.: STD021 (SHEET 1 OF 2)

ANNEXURE I:

DETAILED RESULTS:
OPERATIONAL ASSESSMENT OF ACCESS CONTROL

Residential Dev - Erf 1211 Pierre van Ryneveld X2

Access from Klopper Road

			1 Gate		2 Gates	
Peak hour traffic volume		=	98 veh / h		98 veh / h	
Peak hour factor		=	1		1	
Average arrival rate at peak	**Q**	=	98 veh / h		98 veh / h	
Average service rate			**14.40** sec / veh		**14.40** sec / veh	
	C	=	250 services/h		250 services/h	
Traffic intensity	ϕ	=	0.39		0.39	
Number of channels	**N**	=	1 gate		2 gates	
Traffic intensity per service channel	θ	=	0.39		0.20	
Probability that n vehicles will be in the system	*n*		*P (x=n)*	*P (x ≤ n)*	*P (x=n)*	*P (x ≤ n)*
	P_0	=	0.61	0.39	0.67	0.33
	P_1	=	0.24	0.76	0.26	0.74
	P_2	=	0.09	0.91	0.05	0.95
	P_3	=	0.04	0.96	0.01	0.99
	P_4	=	0.01	0.99	0.00	1.00
	P_5	=	0.01	0.99	0.00	1.00
	P_6	=	0.00	1.00	0.00	1.00
	P_7	=	0.00	1.00	0.00	1.00
	P_8	=	0.00	1.00	0.00	1.00
	P_9	=	0.00	1.00	0.00	1.00
	P_{10}	=	0.00	1.00	0.00	1.00
	P_{11}	=	0.00	1.00	0.00	1.00
	P_{12}	=	0.00	1.00	0.00	1.00
	P_{13}	=	0.00	1.00	0.00	1.00
	P_{14}	=	0.00	1.00	0.00	1.00
	P_{15}	=	0.00	1.00	0.00	1.00
	P_{16}	=	0.00	1.00	0.00	1.00
	P_{17}	=	0.00	1.00	0.00	1.00
	P_{18}	=	0.00	1.00	0.00	1.00
Average number in the system E(n)		=	0.6 vehicles		0.0 vehicles	
Average delay		=	23.7 seconds		0.9 seconds	
Average Vehicles per gate		=	0.6 vehicles		0.0 vehicles	