

# CITY OF JOHANNESBURG

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## APPLICATION FOR INCREASE IN THE FLOOR AREA RATIO FOR ERF 1327 STRUBENSVALLEI EXTENSION 24 (REVISION 0)

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## TRAFFIC IMPACT STATEMENT OCTOBER 2016

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## EXECUTIVE SUMMARY

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

- Application for the increase in floor area ratio for Erf 1327 Strubensvallei Extension 24.
- The site is located on Fiddle Avenue, Strubensvallei Township and is situated in the area of jurisdiction of the City of Johannesburg Metropolitan Municipality.

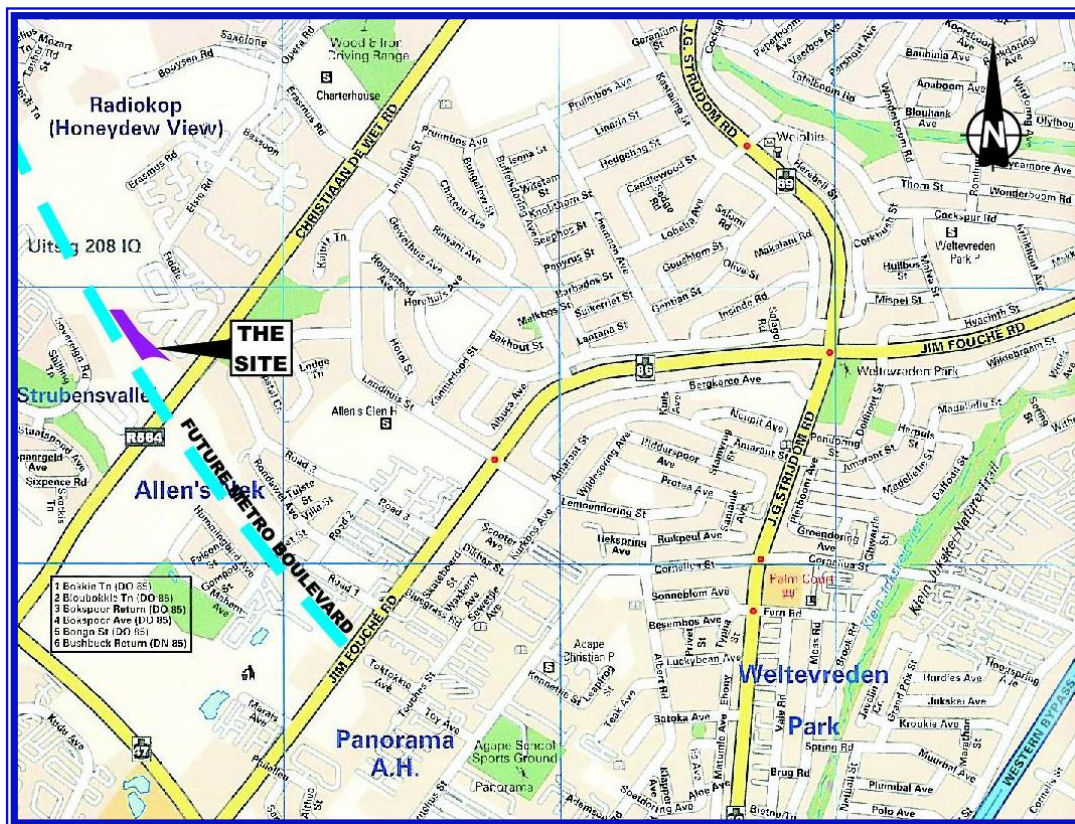
The township application is for the following development control:

- Zoning : "Res 3"
- FAR : 0.6
- Density : 40 units/ha


Erf 1327 measures 1.9724ha and based on the development controls is earmarked for a total of 78 dwelling units.

The proposed development will generate approximately 59 trips, during the weekday morning and weekday afternoon peak hour respectively.

Access is from a cul-de-sac intersecting with Fiddle Avenue (previously Sharon Road).



## MARITENG INFORMATION PAGE

<b>TITLE OF REPORT:</b> Traffic Impact Statement: Application for the increase in the floor area for Erf 1327 Strubensvallei Extension 24		
<b>DATE :</b> October 2016	<b>STATUS OF REPORT :</b> Revision 0	
<b>MARITENG PROJECT NUMBER:</b> 184/55	<b>MARITENG REPORT NUMBER:</b> 184-55-02 traffic report erf 1327 strubensvallei.doc	
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Revision No.	Date	Comments

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**TRAFFIC IMPACT STATEMENT:**  
**APPLICATION FOR THE INCREASE IN THE FLOOR AREA FOR**  
**ERF 1327 STRUBENSVALLEI EXTENSION 24**  
**(REVISION 0)**  
**TABLE OF CONTENTS**

	PAGE
1. INTRODUCTION.....	1
2. STUDY METHODOLOGY.....	2
3. PROPOSED DEVELOPMENT .....	3
3.1 DESCRIPTION OF PROPOSED DEVELOPMENT .....	3
3.2 EXISTING ZONING AND LAND USE RIGHTS .....	3
3.3 APPLICATION.....	3
3.4 TIME FRAME OF DEVELOPMENT .....	4
4. STUDY AREA.....	4
4.1 EXTENT OF STUDY AREA .....	4
4.2 LATENT LAND-USES AND DEVELOPMENTS IN STUDY AREA.....	4
4.3 EXISTING ROAD AND STREET NETWORK.....	4
4.4 INTERSECTIONS EVALUATED .....	5
5. SCENARIOS.....	5
6. DESIGN PEAK HOURS AND PEAK-HOUR FACTORS.....	5
6.1 DESIGN PEAK HOURS .....	5
6.2 PEAK HOUR FACTORS .....	5
7. GAUTENG TRANSPORT INFRASTRUCTURE ACT EVALUATION.....	5



---

8.	BACKGROUND TRAFFIC DEMAND .....	6
8.1	BASE YEAR BACKGROUND TRAFFIC DEMAND.....	6
8.2	IMPACT OF CHANGES TO ROAD NETWORK PLANNED BY THE ROAD AUTHORITIES .....	6
8.3	FUTURE TRAFFIC VOLUMES DEMAND DUE TO LATENT LAND USES .....	6
9.	PROPOSED DEVELOPMENT TRAFFIC .....	6
9.1	INTRODUCTION.....	6
9.2	TRIP GENERATION BY PROPOSED DEVELOPMENT .....	6
9.3	SUMMARY OF TRIP GENERATION BY PROPOSED DEVELOPMENT .....	7
10.	TRIP DISTRIBUTION AND ASSIGNMENT – PROPOSED DEVELOPMENT.....	7
10.1	TRIP DISTRIBUTION .....	7
10.2	TRIP ASSIGNMENT.....	8
11.	TOTAL TRAFFIC DEMAND .....	8
12.	CAPACITY ANALYSIS OF INTERSECTIONS .....	8
12.1	INTRODUCTION.....	8
12.2	MEASURE OF EFFECTIVENESS .....	8
12.3	EXISTING INTERSECTION CONFIGURATIONS.....	10
12.4	DISPLAY OF CAPACITY ANALYSIS.....	10
13.	ACCESS REQUIREMENTS .....	11
13.1	INTRODUCTION.....	11
13.2	EVALUATION OF THE SITE ACCESS CONTROL SYSTEM .....	12
14.	PUBLIC TRANSPORT & NON-MOTORIZED TRANSPORT REQUIREMENTS .....	12
14.1	INTRODUCTION.....	12
14.2	EXISTING PUBLIC TRANSPORT INFRASTRUCTURE.....	13

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14.3	ESTIMATED NUMBER OF PUBLIC TRANSPORT USERS .....	13
14.4	PROPOSED PUBLIC TRANSPORT INFRASTRUCTURE.....	13
14.5	EXISTING NON-MOTORIZED TRANSPORT INFRASTRUCTURE.....	13
14.6	PROPOSED NON-MOTORIZED TRANSPORT FACILITIES.....	13
15.	CONCLUSIONS AND RECOMMENDATIONS .....	13
15.1	CONCLUSIONS.....	13
15.2	RECOMMENDATIONS .....	14

#### ANNEXURE

ANNEXURE A:	EXTRACT FROM MOTIVATION REPORT PREPARED BY HUNTER THERON TOWN PLANNERS
ANNEXURE B:	RISFSA 2009 ROAD HIERARCHY
ANNEXURE C:	TRIP CALCULATION DETAILS - PROPOSED DEVELOPMENT
ANNEXURE D:	CAPACITY ANALYSIS RESULTS
ANNEXURE E:	PROPOSED ACCESS ARRANGEMENTS – MARITENG PLAN No.: 184-55-01
ANNEXURE F:	DETAILED RESULTS – OPERATIONAL ASSESSMENT OF ACCESS CONTROL SYSTEM

#### LIST OF TABLES

Table 1:	Total Number of Development Trips .....	-7-
Table 2:	Level of Service Results: Intersection 1 – Erasmus Road & Elsie Road/Opera Road .....	-11-
Table 3:	Expected Queuing and Stacking Requirements at the Security Control Point .....	-12-

#### LIST OF FIGURES

Figure 1:	Locality Plan
Figure 2:	Aerial View of Study Area
Figure 3:	Gauteng Strategic Road Network
Figure 4:	Existing Weekday Peak Hour Traffic Volumes - Background Traffic
Figure 5:	Trip Generation Characteristics - Proposed Development
Figure 6:	Estimated (2016) Weekday Peak Hour Traffic Volumes – With Development Traffic

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## 1. INTRODUCTION

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

- Application for the increase in floor area ratio for Erf 1327 Strubensvallei Extension 24.
- The site is located on Fiddle Avenue, Strubensvallei Township and is situated in the area of jurisdiction of the City of Johannesburg Metropolitan Municipality.

The details of the developer involved with the projects/development are:

- Lynxfield Investments 276 (Pty) Ltd

P.O. Box 822

### FLORIDA HILLS

1716

Tel No.: 011 431 0169

Cell No.: 082 788 3879

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 of 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:.....  




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## 2. STUDY METHODOLOGY

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

- Committee of Transportation Officials (COTO), August 2012, **South African Traffic Impact and Site Traffic Assessment Manual (TMH 16 - Volume 1) (Version 1.0)**.
- Committee of Transportation Officials (COTO), TMH 17, September 2012, **South African Trip Data Manual (Draft)**.
- Department of Transport, 1995, **Manual for Traffic Impact Studies**.

The proposed development will generate less than 150 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.
- 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, 2<sup>nd</sup> Edition, **Transportation and Traffic Engineering Handbook**.

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- Akcelik and Associates (Pty) Ltd, 2011, Sidra Version 7.0.
  - Dr J Sampson, November 2015, AutoJ.
  - Transport Research Board, 1994, Highway Capacity Manual.
  - Committee of Transportation Officials (COTO), February 2014, South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual (TMH 16 - Volume 2) (Version 1.01).
  - Committee of Transportation Officials (COTO), August 2012, South African Road Classification and Access Management Manual (TRH 26) (Version 1.0).
  - Department of Transport, South African Development Community, Road Traffic Signs Manual (SARTSM) Volume 1, Chapter 4 (3<sup>rd</sup> Edition).
  - Johannesburg Roads Agency SOC Limited (JRA), June 2015, Roads & Stormwater Manual - Volumes 2 - Standard Design Details for Roads & Stormwater Part 1 - Roads.
  - City of Johannesburg, Complete Street Design Guideline Manual - Complete Streets.

### **3. PROPOSED DEVELOPMENT**

#### **3.1 DESCRIPTION OF PROPOSED DEVELOPMENT**

This traffic impact statement was undertaken for Erf 1327 Strubensvallei Extension 24 to increase the FAR from 0.4 to 0.6

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

#### **3.2 EXISTING ZONING AND LAND USE RIGHTS**

Erf 1327 is currently zoned "Res 3" (FAR = 0.4 & 40 units/ha) in terms of the Roodepoort Town Planning Scheme, 1987 and is vacant. Erf 1328 is zoned "Public Open Space".

#### **3.3 APPLICATION**

The application is for the following development controls (refer to **Annexure A** for details):

- Zoning : "Res 3"
- FAR : 0.6
- Density : 40 units/ha

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Erf 1327 measures 1.9724ha in extent and given the controls, the total development potential equates to 78 "Res 3" dwelling units.

### **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 is Erasmus Road, Elsie Road and Opera Road.
- To the south the site abuts Christiaan de Wet Road (future Road K60).
- To the west, the site abuts the future alignment of the Metro Boulevard.

### **4.2 LATENT LAND-USES AND DEVELOPMENTS IN STUDY AREA**

No latent rights were identified in the study area that could affect the outcome of this traffic report.

### **4.3 EXISTING ROAD AND STREET NETWORK**

The existing surrounding road network is briefly discussed hereafter. The location of the roads is shown in **Figure 1 and 2** respectively:

- Fiddle Avenue (previously Sharon Road) is a single lane road serving the surrounding road network. The road provides access to the applicant site. Based on the RISFSA 2009 road classification (refer to **Annexure B**), Fiddle Avenue is a Class 5 road, and falls under the jurisdiction of the Johannesburg Roads Agency.
- Elsie Road is a single lane road and serves several residential clusters. The road is the main feeder route into the study area. Based on the RISFSA 2009 road classification (refer to **Annexure B**), Elsie Road is a Class 4 road, and falls under the jurisdiction of the Johannesburg Roads Agency.
- Opera Road is an extension of Elsie Road, north of the intersection with Erasmus Road. The road is a single lane road and serves several residential clusters. Based on the RISFSA 2009 road classification (refer to **Annexure B**), Opera Road is a Class 4 road, and falls under the jurisdiction of the Johannesburg Roads Agency.



#### **4.4 INTERSECTIONS EVALUATED**

The following intersection was analyzed as part of the traffic report:

- Intersection 1: Erasmus Road & Elsie/Opera Road – Traffic circle.

The above intersection was selected as it provides the main access to the study area and the additional development traffic will have the highest impact on these intersections.

#### **5. SCENARIOS**

It is expected, that the development will generate less than 150 peak hour trips and the following traffic assessment scenarios were analysed:

- Scenario 1: Base year (2016) AM peak background traffic;
- Scenario 2: Base year (2016) AM peak with development traffic;
- Scenario 3: Base year (2016) PM peak background traffic; and
- Scenario 4: Base year (2016) 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 (06:15 - 07:15).
- Weekday afternoon peak hour (16:15 - 17:15).

##### **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.

#### **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 affected by the

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future Road K60. This is an approved township and based on the township layout (refer to **Annexure A**) the applicant already makes provision for the future alignment of Road K60.

## **8. BACKGROUND TRAFFIC DEMAND**

### **8.1 BASE YEAR BACKGROUND TRAFFIC DEMAND**

Detailed traffic counts were carried out at the intersection, Thursday, the 13<sup>th</sup> of October 2016. 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 road construction is currently under construction that could affect the findings of this report.

### **8.3 FUTURE TRAFFIC VOLUMES DEMAND DUE TO LATENT LAND USES**

As indicated in **Section 4.2**, no latent rights were identified that could affected the findings of this report.

## **9. PROPOSED DEVELOPMENT TRAFFIC**

### **9.1 INTRODUCTION**

The development potential is for 78 "Res 3" dwelling units (1.9724ha \* 40units/ha).

### **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: 0.75 trips/dwelling units, with a directional split of 25:75 (in:out)
- Weekday morning peak hour: 0.75 trips/dwelling 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%

In terms of the manual a combined trip reduction factor can also be applied where a combination of the above factors are applicable to the applicant site. The calculation formula is as follows:

➤  $P_c = 1 - (1 - P_m) * (1 - P_v) * (1 - P_t)$

➤ In which:

- $P_c$  = Combined reduction factor
- $P_m$  = Reduction factor for mixed use development
- $P_v$  = Reduction factor for vehicle ownership
- $P_t$  = Reduction factor for transit nodes or corridors

Given the location of the land use and the low trip generation no reduction factors were as part of this application.

### 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 C**.

**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	78 dwelling units	15	44	59	41	18	59

**NOTE:** Trip calculations roundup for purpose of this study.

The proposed development will generate 59 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.



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For the purpose of this application, the following distribution was accepted (**Figure 5**):

**a) AM Peak**

- Opera Road: North - Inbound = 40%; Outbound = 44%
- Erasmus Road: East - Inbound = 60%; Outbound = 56%

**b) PM Peak**

- Opera Road: North - Inbound = 31%; Outbound = 43%
- Erasmus Road: East - Inbound = 69%; Outbound = 57%

## **10.2 TRIP ASSIGNMENT**

Given the trip distributions, the expected traffic volumes generated by the development were assigned to the road network. The details are shown in **Figure 5**.

## **11. TOTAL TRAFFIC DEMAND**

The total traffic demand on the road network was determined by adding the development traffic to the base year background traffic. The details are shown in **Figure 6**.

## **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 background traffic demand, using the existing intersection layout;
- Determine the road upgrades required to accommodate the background traffic scenarios;
- Analyse the expected base year scenarios, taking the additional development traffic into consideration;
- Determine the road upgrades required to accommodate the additional development traffic. It was assumed, as part of this application, that the upgrades required to accommodate the background traffic will be implemented; and
- 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* .

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AUTOJ 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.

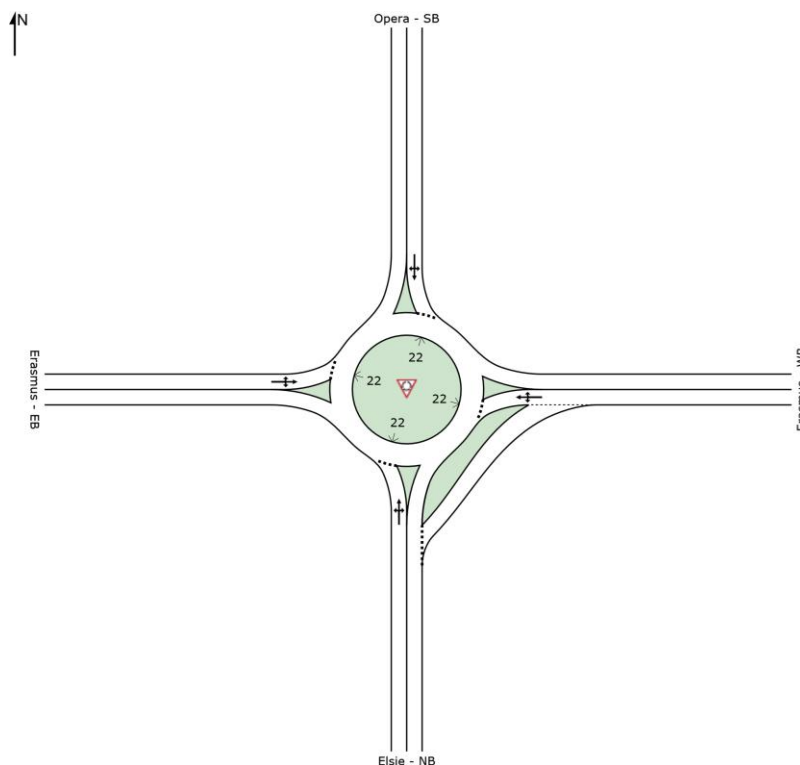
*LOS E* describes operations with delays greater than 35 sec and up to 50 sec per vehicle.

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

## 12.3 EXISTING INTERSECTION CONFIGURATIONS

**Sidra 7** and **AUTOJ** were used to assess the capacity for each intersection. The conceptual intersection layout for the intersection evaluated as part of this application is illustrated below:

### a) Intersection 1: Erasmus Road & Elsie/Opera Road



## 12.4 DISPLAY OF CAPACITY ANALYSIS

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

- Figure 4: Existing Weekday Morning Peak Hour Traffic Volumes - Background Traffic

- Figure 6: Estimated (2016) Weekday Peak Hour Traffic Volumes - With Development Traffic

The capacity results are summarised hereafter, with detailed results appended in **Annexure D**.

**a) Intersection 1 – Erasmus Road & Elsie/Opera Road**

**Table 2: Level of Service Results: Intersection 1 – Erasmus Road & Elsie/Opera Road**

PEAK	SCENARIO	TOTAL AVERAGE VEHICLE DELAY & LEVEL OF SERVICE (LOS)														
		NORTHBOUND			WESTBOUND			SOUTHBOUND			EASTBOUND			INTERSECTION		
		APPROACH			APPROACH			APPROACH			APPROACH					
		S	D	L	S	D	L	S	D	L	S	D	L	S	D	L
AM	SC1	0.44	7.5	A	0.17	6.9	A	0.45	5.6	A	0.03	6.7	A	0.45	6.6	A
	SC2	0.49	7.6	A	0.18	6.8	A	0.47	5.9	A	0.03	7.0	A	0.49	6.8	A
PM	SC3	0.18	7.7	A	0.43	6.4	A	0.40	4.5	A	0.03	5.6	A	0.43	5.9	A
	SC4	0.20	7.7	A	0.47	6.4	A	0.42	4.6	A	0.03	5.7	A	0.47	5.9	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 acceptable LOS. During the site visit, long queues were observed on some of the approaches. This, however, is as a result of the school activities in the area and the queues dissipate as soon as the school starts.

The intersection was also evaluated with AUTOJ and similar results were achieved - refer to details appended in **Annexure D**.

**13. ACCESS REQUIREMENTS**

**13.1 INTRODUCTION**

At present no site development plan is available for the applicant site and the following access arrangements are proposed for the site (also refer **Mariteng Plan No.: 184-55-01** appended in **Annexure E**):

- Access from a cul-de-sac which intersects with Fiddle Avenue (previously known as Sharon Road).
- The proposed access is located in a cul-de-sac which will only serve the applicant site. In light of this one inbound lane and one outbound lane is recommended.
- Assume some form of security control system will be implemented at the site access.
- The minimum lane width should be 3.0m. In the event lanes are separated by a raised median island, then one lane should have a minimum width of 4.5m (to accommodate refuse and emergency vehicles).
- A minimum throat length of 5m is proposed. Distance measured from the property boundary to the

centre of the access control.

- No vertical structures are currently proposed at the site access. However, should the need arise during the detail planning phase then provision should be made for a minimum vertical clearance of 4.2m.
- Access bellmouth on local authority road to have a minimum radius of 10.0m.

### 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 90<sup>th</sup> 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 3**, with detailed results appended in **Annexure F**.

**Table 3: Expected Queuing and Stacking Requirements at the Site Access Control System**

DESCRIPTION	ANALYSIS RESULTS
Average arrival rate inbound (vph)	41
Average service rate (sec/veh)	14.4
Average service rate (services/hour)	250
Number of lane (gates)	1
Traffic intensity per lane	0.16
90 <sup>th</sup> percentile queue length	0.02
Average number of vehicles in system	0.2
Average delay (sec)	17.2
Average number of vehicles per gate	0.2

Based on the results, the access layout and security access control system proposed for the applicant site can accommodate the expected 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

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well as the impact it may have on the existing public transport network.

#### **14.2 EXISTING PUBLIC TRANSPORT INFRASTRUCTURE**

During the site visit, taxis were observed operating along Erasmus Road and Opera Road, as well as Christiaan de Wet Road.

No formal taxi stops are provided along Erasmus Road and Opera Road and taxi makes unscheduled stops as and when required by their patronage.

Along Christiaan de Wet Road formal taxi/bus lay-bys are provided, downstream of the intersection with Erasmus Road.

#### **14.3 ESTIMATED NUMBER OF PUBLIC TRANSPORT USERS**

The erf is earmarked for approximately 78 “Res 3” dwelling units. It can therefore be assumed that the development will provide employment opportunities for domestic workers.

For the purpose of this study it was assumed that 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 8 domestic workers (i.e.  $78 * 0.50 * 0.2$ ) per weekday. It was also assumed that the development would employ at least one person per erf for gardening and general maintenance of the property as a whole. The total expected workforce equates to 9 workers per any weekday.

#### **14.4 PROPOSED PUBLIC TRANSPORT INFRASTRUCTURE**

It should be noted that a well-established taxi service is provided in the study area. The existing public transport network has sufficient capacity to accommodate the expected increase in demand.

#### **14.5 EXISTING NON-MOTORIZED TRANSPORT INFRASTRUCTURE**

Paved sidewalks are provided along the southern side of Fiddle Avenue, as shown in **Mariteng Plan No.: 184-55-01**, appended in **Annexure E**.

#### **14.6 PROPOSED NON-MOTORIZED TRANSPORT FACILITIES**

Provide 2.0m paved sidewalk along the northern side of the cul-de-sac section serving the applicant site - refer to **Mariteng Plan No.: 184-55-01**, appended in **Annexure E**.

### **15. CONCLUSIONS AND RECOMMENDATIONS**

#### **15.1 CONCLUSIONS**

The study addresses the impact the increase in floor area ratio for Erf 1327 Strubensvallei Extension 24, will

---

have on the surrounding road network. The following conclusion can be reached from the study:

- i. The site is earmarked for 78 "Res 3" dwelling units.
- ii. The proposed development will generate 59 additional trips during the weekday morning and weekday afternoon peak hour respectively.
- iii. **Gauteng Infrastructure Act:** The initial approval of the township acknowledged the road reserve requirements for the future provincial Road K60, planned along the existing alignment of Christian de Wet Road. The increase in floor area ratio does not affect the previous requirements.
- iv. **Proposed road network upgrade – background traffic:** No external road upgrade required to accommodate the existing traffic demand.
- v. **Proposed road network upgrade – proposed development:** No external road upgrade required to accommodate the additional development traffic demand.
- vi. **Access arrangements:** The site access will be provided from the cul-de-sac intersecting with Fiddle Avenue.
- vii. **Public transport assessments:** The area is well served by frequent public transport throughout the day. No additional public transport facilities are required.
- viii. **Non-motorized transport:** The upgrades required as part of this application is discussed under the "*Recommendations*".

## 15.2 RECOMMENDATIONS

Based on the traffic impact statement, it is recommended that the proposed increase in floor area ratio for Erf 1327 Strubensvallei Extension 24, be approved for:

- Zoning : "Res 3"
- FAR : 0.6
- Density : 40 units/ha

The erf measures 1.9724ha and given the above development controls, the total development potential equates to approximately 78 dwelling units.

The approval is subject to the following:

- i. Construct the following access arrangements, as shown in **Mariteng Plan No.: 184-55-01**, appended in **Annexure E**:
  - Access from a cul-de-sac which intersects with Fiddle Avenue (previously known as Sharon

Road).

- The proposed access is located in a cul-de-sac which will only serve the applicant site. In light of this one inbound lane and one outbound lane is recommended.
  - Assume some form of security control system will be implemented at the site access.
  - The minimum lane width should be 3.0m. In the event lanes are separated by a raised median island, then one lane should have a minimum width of 4.5m (to accommodate refuse and emergency vehicles).
  - A minimum throat length of 5m is proposed. Distance measured from the property boundary to the centre of the access control.
  - No vertical structures are currently proposed at the site access. However, should the need arise during the detail planning phase then provision should be made for a minimum vertical clearance of 4.2m.
  - Access bellmouth on local authority road to have a minimum radius of 10.0m.
- ii. Provide a 2.0m paved sidewalk along the northern side of the cul-de-sac, serving the applicant site - refer to **Mariteng Plan No.: 184-55-01**, appended in **Annexure E**.



## **FIGURES**

FIGURE 1: LOCALITY PLAN

FIGURE 2: AERIAL VIEW OF STUDY AREA

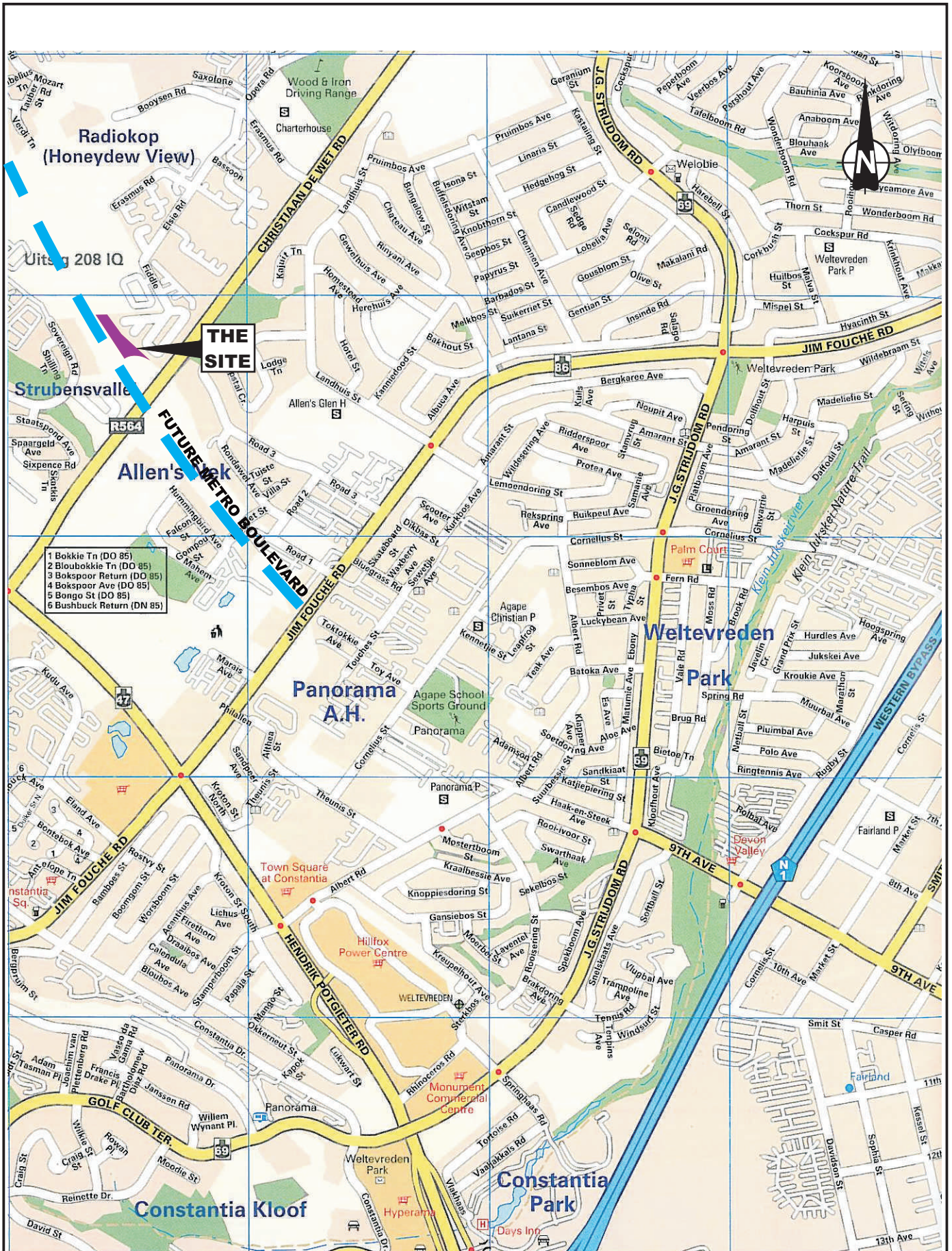
FIGURE 3: GAUTENG STRATEGIC ROAD NETWORK

FIGURE 4: EXISTING WEEKDAY PEAK HOUR TRAFFIC VOLUMES - BACKGROUND TRAFFIC

FIGURE 5: TRIP GENERATION CHARACTERISTICS - PROPOSED DEVELOPMENT

FIGURE 6: ESTIMATED (2016) WEEKDAY PEAK HOUR TRAFFIC VOLUMES – WITH DEVELOPMENT TRAFFIC





- 1 Bokkie Tn (DO 85)
- 2 Bloubokkie Tn (DO 85)
- 3 Bokspoer Return (DO 85)
- 4 Bokspoer Ave (DO 85)
- 5 Bongo St (DO 85)
- 6 Bushbuck Return (DN 85)

**MARITENG**  
**CONSULTING**  
**ENGINEERS**

P.O. Box 8864  
 Verwoerd Park  
 1453

Tel: 011 902 4075  
 Fax: 086 547 8882  
 Cell: 082 854 7358

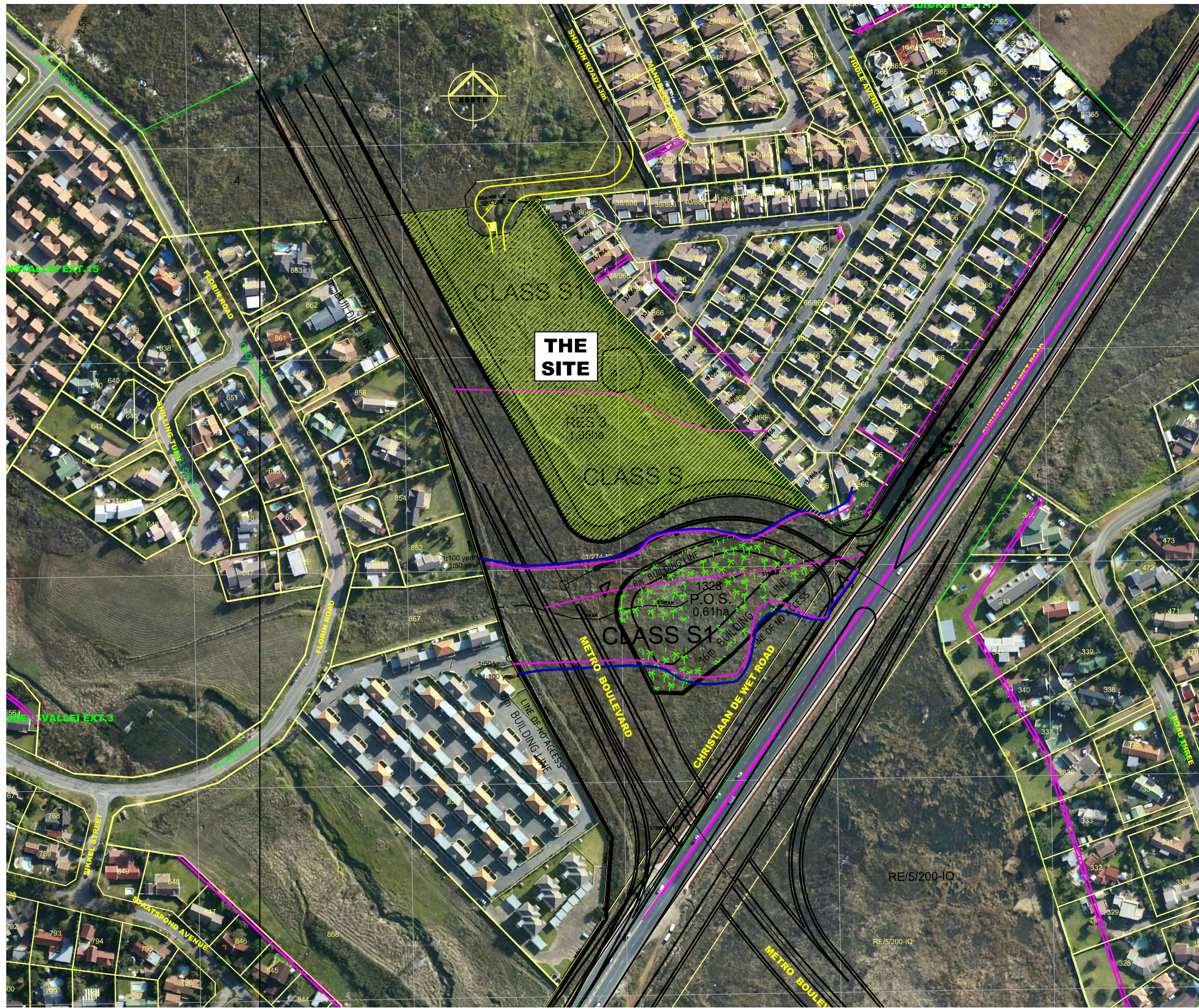
**ERF 1327 STRUBENSVALLEI EXTENSION 24**

**LOCALITY PLAN**

**FIGURE**

**1**





**ERF 1327 STRUBENSVALLEI EXTENSION 24**

**AERIAL VIEW OF STUDY AREA**

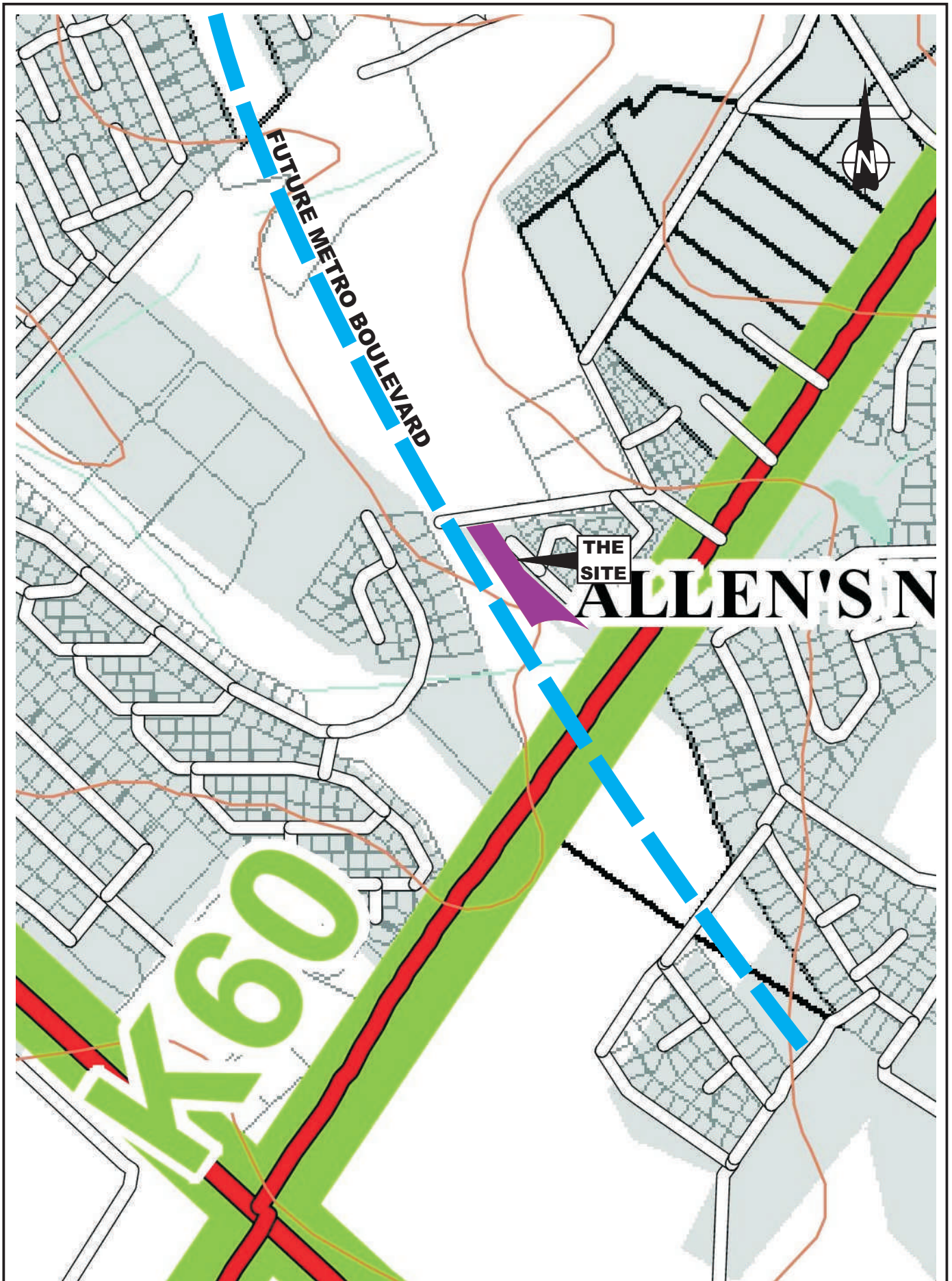
FIGURE

2

**MARITENG  
CONSULTING  
ENGINEERS**

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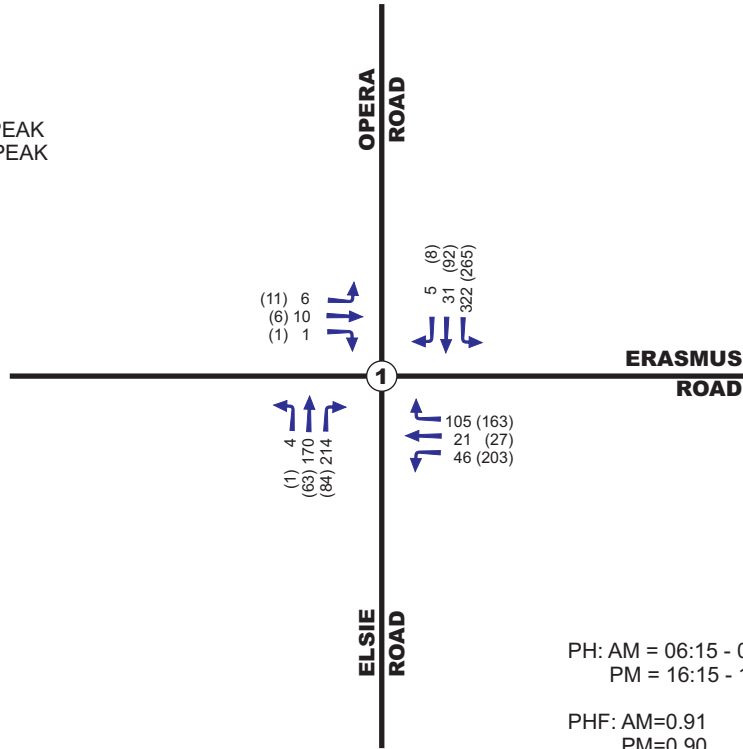


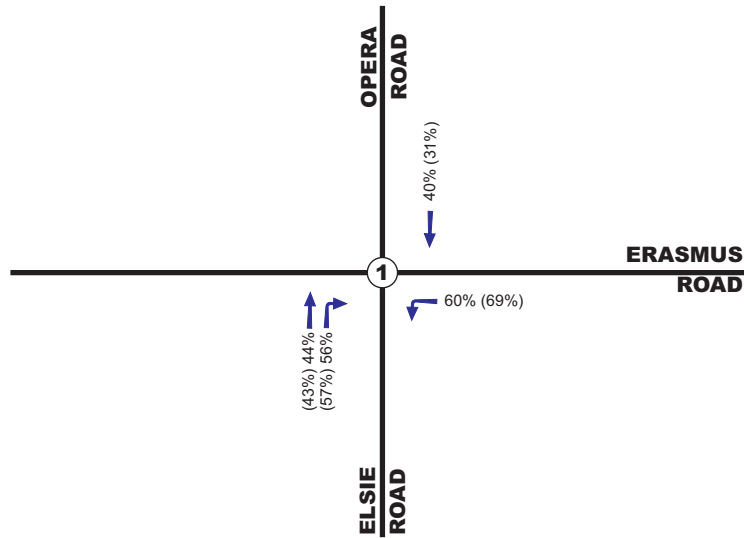
<b>M</b> ARITENG CONSULTING ENGINEERS	P.O. Box 8864 Verwoerd Park 1453	<b>ERF 1327 STRUBENSVALLEI EXTENSION 24</b>	<b>FIGURE</b>
	Tel: 011 902 4075 Fax: 086 547 8882 Cell: 082 854 7358	<b>GAUTENG STRATEGIC ROADS NETWORK</b>	<b>3</b>



**LEGEND:**

105 - AM PEAK  
 (203) - PM PEAK



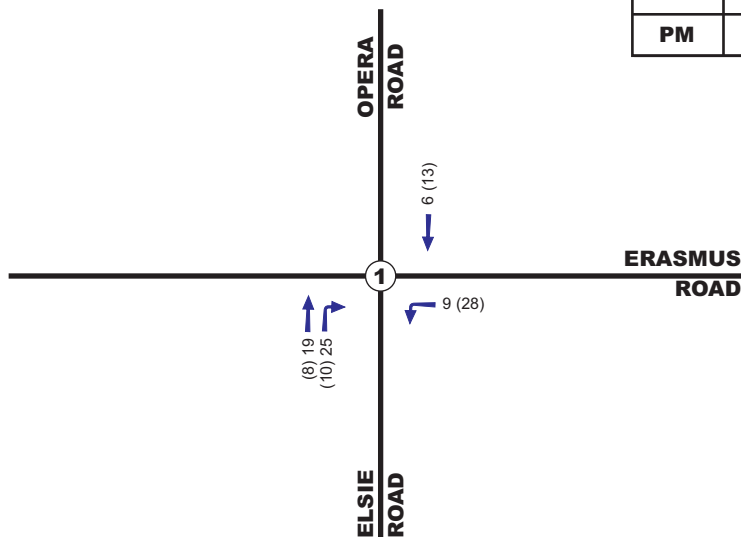


**TRIP DISTRIBUTION (%)**

**LEGEND:**

6 - AM PEAK  
 (13) - PM PEAK

	IN	OUT	TOTAL
AM	15	44	59
PM	41	18	59

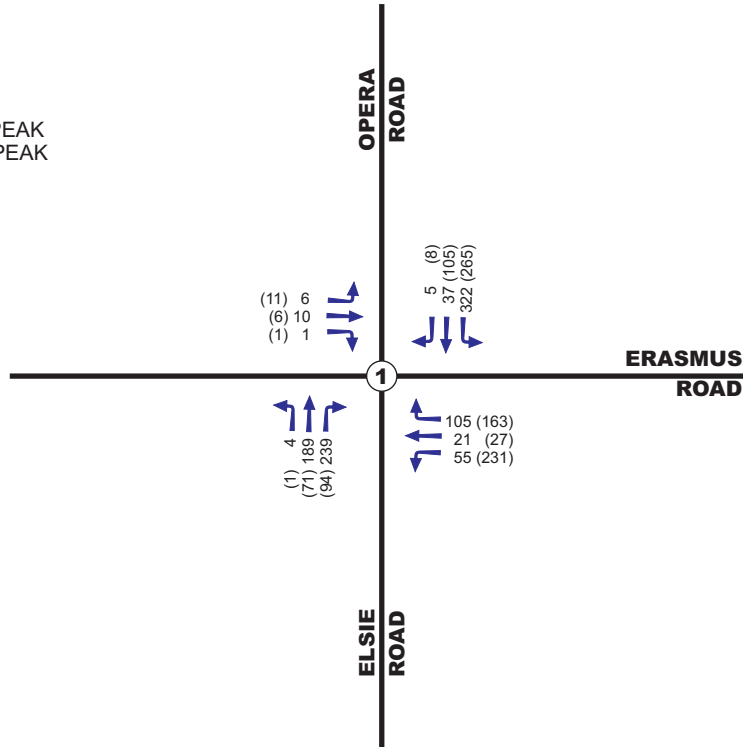


**TRIP ASSIGNMENT (VEHICLES/HR)**



**LEGEND:**

37 - AM PEAK  
 (105) - PM PEAK



**ANNEXURE A:**

**EXTRACT FROM MOTIVATION REPORT PREPARED  
BY HUNTER THERON TOWN PLANNERS**



## MOTIVATING MEMORANDUM

**APPLICATION IN TERMS OF CLAUSE 13 OF THE ROODEPOORT  
TOWN PLANNING SCHEME, 1987, READ IN CONJUNCTION WITH  
SECTION 2(2) AND THE RELEVANT PROVISIONS OF THE SPATIAL  
PLANNING AND LAND USE MANAGEMENT ACT, 2013 (ACT 16 OF  
2013)**

**ERF 1327 STRUBENSVALLEI EXTENSION 24**

**INCREASE IN THE FLOOR AREA RATIO**

**PREPARED BY** : **HUNTER THERON INCORPORATED**  
**DATE** : MARCH 2016  
**REFERENCE** : T1590L-REP\_REVISED  
**CLIENT** : SEVEN MILE TRADING 330 CLOSE  
CORPORATION



*Hunter Theron Inc*  
TOWNPLANNERS

*Contact Person:*  
*Lourens Toerien*  
*Tel: (011) 472-1613*  
*Fax: (011) 472 3454*  
*E-mail: [lourens@huntertheron.co.za](mailto:lourens@huntertheron.co.za)*

*Address:*  
*53 Conrad Street*  
*Florida Hills, 1709*  
*Johannesburg, Gauteng*

**CONTENTS:**

1 INTRODUCTION ..... 3

2 GENERAL INFORMATION ..... 3

    2.1 LOCALITY ..... 3

    2.2 PROPERTY DESCRIPTION ..... 3

    2.3 OWNERSHIP ..... 3

    2.4 SIZE ..... 4

    2.5 EXISTING ZONING ..... 4

    2.6 CONDITION OF TITLE AND BOND DETAILS ..... 4

    2.7 EXISTING LAND USE ..... 4

3 THE APPLICATION ..... 5

4 PROPOSED DEVELOPMENT CONTROLS: ..... 5

5 MOTIVATION IN SUPPORT OF THE APPLICATION: ..... 5

    5.1 BACKGROUND INFORMATION: ..... 5

    5.2 REGIONAL SPATIAL DEVELOPMENT FRAMEWORK: ..... 6

    5.3 SUITABILITY OF PROPOSED LAND USE: ..... 6

6 THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT, 2013 (ACT 16 OF 2013) -SPLUMA ..... 7

    6.1 DEVELOPMENT PRINCIPLES: ..... 7

    6.2 COMPLIANCE WITH SPATIAL DEVELOPMENT FRAMEWORKS: ..... 9

    6.3 NATIONAL, PROVINCIAL AND MUNICIPAL: ..... 9

    6.4 REGIONAL SPATIAL DEVELOPMENT FRAMEWORK: ..... 10

7 SUMMARY AND CONCLUSION: ..... 10

## 1 INTRODUCTION

- 1.1 Erf 1327 Strubensvallei Extension 24 (the site) is situated west and adjacent to Christiaan de Wet Road and directly north of Strubensvallei Extension 3 Township, within the Strubensvallei area.
- 1.2 The site falls within the jurisdiction of the City of Johannesburg Metropolitan Municipality (CoJMM), within the Roodepoort Town Planning Scheme, 1987.
- 1.3 Strubensvallei Extension 24 is a proclaimed two (2) erf township consisting of:
  - Erf 1327 – “Residential 3”
  - Erf 1328 – “Public Open Space”.
- 1.4 Erf 1327 measures 1.9724ha in extent, subject to a Floor Area Ratio (FAR) of 0.4.
- 1.5 The purpose of this application is to apply for council’s consent for an increase in the FAR on Erf 1327 Strubensvallei Extension 24.
- 1.6 Hunter Theron Inc. has been appointed by the registered owner of the site, Seven Mile Trading 330 CC, to apply in terms of Clause 13 of the Roodepoort Town Planning Scheme, 1987, read in conjunction with Section 2(2) and the relevant provisions of the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) for council’s consent for an increase in the FAR on Erf 1327 Strubensvallei Extension 24 from 0.4 to 0.6.
  - See Annexure B – Certificate of Registered Title No. T17004/2016
  - See Annexure D – Zoning Certificate
  - See Annexure E – Approved Map 3 Documentation

## 2 GENERAL INFORMATION

- 2.1 **Locality**
  - 2.1.1 The site is situated west and adjacent to Christiaan de Wet Road and directly adjacent to Strubensvallei Extension 3 Township, within the Strubensvallei area.
    - See Annexure A – Locality plan
- 2.2 **Property Description**
  - 2.2.1 According to the Certificate of Registered Title No. T17004/2016, the property is described as:
    - Erf 1327 Strubensvallei Extension 24
- 2.3 **Ownership**
  - 2.3.1 The property is registered in the name of the Seven Mile Trading 330 Close Corporation.

## 2.4 Size

2.4.1 According to the relevant Certificate of Registered Title the property measures 1. 9724 ha in extent.

- See Annexure B – Certificate of Registered Title No. T17004/2016
- See Annexure G – S.G. Diagram No. 2389/2012

## 2.5 Existing Zoning

2.5.1 In terms of the Roodepoort Town Planning Scheme, 1987, the site is currently zoned:

Use Zone	:	"Residential 3"
Height Zone	:	Two (2) storeys, provided that the height may be increased with the consent of the council
F.A.R	:	0.4, provided that the FAR may be increased with the consent of the council
Coverage	:	40%, provided that the coverage may be increased with the consent of the council
Density	:	40 dwelling units per hectare
Building Line	:	As per Amendment Scheme 05-6615 (16m)
Parking	:	As per scheme

- See Annexure D – Zoning Certificate
- See Annexure E – Approved Map 3 Documentation
- See Annexure F – Proclamation notice Dated 12 March 2014

## 2.6 Condition of Title and Bond Details

2.6.1 There are no restrictive conditions contained in the relevant Certificate of Registered Title prohibiting the proposed consent for an increase in FAR of the site from 0.4 to 0.6.

2.6.2 The site is not subject to a bond.

- See Annexure B – Certificate of Registered Title No. T17004/2016

## 2.7 Existing Land Use

2.7.1 The site is currently vacant and under-utilised.

2.7.2 Land uses in the surrounding area are as follows:

☞ North	:	Town houses (Strubenvallei Extension 25) Dwelling houses (Strubenvallei Extension 9)
☞ East	:	Dwelling houses (Strubenvallei Extension 9) Christiaan de Wet Road

Dwelling houses (Allen's Nek Extension 9

- cs South : Erf 1328 Strubensvallei Extension 24 – Public Open Space  
Proposed Metro Boulevard  
Town houses (Strubensvallei Extension 3)
- cs West : Proposed Metro Boulevard  
Strubensvallei Extension 3

➤ See Annexure A - Locality plan

### 3 THE APPLICATION

3.1 Application is made in terms of Clause 13 of the Roodepoort Town Planning Scheme, 1987, read in conjunction with Section 2(2) and the relevant provisions of the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) for council's consent for an increase in the FAR on Erf 1327 Strubensvallei Extension 24 from 0.4 to 0.6.

3.2 Notification of the application will be given in the following manner:

- Advertised in the "Beeld and "The Star" will occur on 4 November 2015 and 11 November 2015 and;
- A site notice will be erected on the site for a period of 14 days from 4 November 2015.

### 4 PROPOSED DEVELOPMENT CONTROLS:

4.1 It is the purpose of this application to apply for council's consent to increase the FAR on Erf 1327 Strubensvallei Extension 24 from 0.4 to 0.6, resulting in more gross developable area:

- With all other approved development controls remaining unchanged.

➤ See Annexure E – Approved Map 3 Documentation

### 5 MOTIVATION IN SUPPORT OF THE APPLICATION:

#### 5.1 Background Information:

5.1.1 In June of 2006 the proposed township Strubensvallei Extension 24, situated on Portion 1 of the farm Madeira 274 I.Q., was submitted to council on behalf of the registered owner Seven Mile Trading 330 CC.

5.1.2 Strubensvallei Extension 24 was proclaimed on 14 March 2014, being a two (2) erf township consisting of:

- Erf 1327 – "Residential 3";
- Erf 1328 – "Public Open Space".

5.1.3 Erf 1327 Strubensvallei Extension 24 is subject to the development controls as contained in the approved Map 3's, amendment scheme number 05-6615.

**ANNEXURE B:**  
**2009 RISFSA ROAD HIERARCHY**





**ANNEXURE C:**

**TRIP GENERATION CHARACTERISTICS –  
PROPOSED DEVELOPMENT**



# Erf 1327 Strubensvallei Extension 24

## Mariteng Project: 184/55 Trip Generation Calculations

Date: 16 October 2016

Description	No. of Res Erven	Dev Area (m <sup>2</sup> )	Zoning	Density (No. of units/ha)	Height Restriction (No. Storeys)	Dwelling Units	Trip Rate/ Unit	No. of Trips	Trip Reduction (No. of trips)	Directional Split			
										IN	OUT	IN	PM
Applicant site	1	19724	Res 3	40	2	78	0.75	59	0	15	44	41	18
<b>Total</b>	-	#REF!	-	-	-	78	-	59	0	15	44	41	18

	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%
Combined reduction factor (Pc)	-	-
<b>Total reduction factor</b>	-	<b>0.00%</b>

### Combined reduction factor

Combined factor:  $P_c = 1 - (1 - P_m) * (1 - P_v) * (1 - P_t)$

**ANNEXURE D:**  
**CAPACITY ANALYSIS RESULTS**

# SIDRA RESULTS

## Site: 101 [SC1 2016 AM Background]

Erf 1327 Strubensvallei X24  
Erasmus & Elsie/Opera  
SC1 - 2016 AM Peak - Background traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows 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
<b>South: Elsie - NB</b>											
1	L2	4	0.0	0.436	4.7	LOS A	2.3	16.4	0.39	0.62	52.4
2	T1	187	0.0	0.436	4.8	LOS A	2.3	16.4	0.39	0.62	53.6
3	R2	235	0.0	0.436	9.7	LOS A	2.3	16.4	0.39	0.62	53.6
Approach		426	0.0	0.436	7.5	LOS A	2.3	16.4	0.39	0.62	53.6
<b>East: Erasmus - WB</b>											
4	L2	51	0.0	0.174	3.6	LOS A	0.7	4.9	0.14	0.57	53.2
5	T1	23	0.0	0.174	3.9	LOS A	0.7	4.9	0.14	0.57	54.3
6	R2	115	0.0	0.174	8.9	LOS A	0.7	4.9	0.14	0.57	54.3
Approach		189	0.0	0.174	6.9	LOS A	0.7	4.9	0.14	0.57	54.0
<b>North: Opera - SB</b>											
7	L2	354	0.0	0.446	5.5	LOS A	2.3	15.9	0.50	0.65	54.0
8	T1	34	0.0	0.446	5.5	LOS A	2.3	15.9	0.50	0.65	55.3
9	R2	5	0.0	0.446	10.5	LOS B	2.3	15.9	0.50	0.65	55.3
Approach		393	0.0	0.446	5.6	LOS A	2.3	15.9	0.50	0.65	54.1
<b>West: Erasmus - EB</b>											
10	L2	7	0.0	0.028	6.4	LOS A	0.1	0.6	0.48	0.63	53.4
11	T1	11	0.0	0.028	6.4	LOS A	0.1	0.6	0.48	0.63	54.6
12	R2	1	0.0	0.028	11.3	LOS B	0.1	0.6	0.48	0.63	54.6
Approach		19	0.0	0.028	6.7	LOS A	0.1	0.6	0.48	0.63	54.2
All Vehicles		1027	0.0	0.446	6.6	LOS A	2.3	16.4	0.39	0.62	53.9

## Site: 101 [SC2 2016 AM With dev]

Erf 1327 Strubensvallei X24  
Erasmus & Elsie/Opera  
SC2 - 2016 AM Peak - With dev traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows 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
<b>South: Elsie - NB</b>											
1	L2	4	0.0	0.485	4.8	LOS A	2.8	19.6	0.42	0.62	52.3
2	T1	208	0.0	0.485	4.9	LOS A	2.8	19.6	0.42	0.62	53.5
3	R2	263	0.0	0.485	9.8	LOS A	2.8	19.6	0.42	0.62	53.5
Approach		475	0.0	0.485	7.6	LOS A	2.8	19.6	0.42	0.62	53.5
<b>East: Erasmus - WB</b>											
4	L2	60	0.0	0.184	3.6	LOS A	0.8	5.3	0.15	0.57	53.3
5	T1	23	0.0	0.184	4.0	LOS A	0.8	5.3	0.15	0.57	54.4
6	R2	115	0.0	0.184	8.9	LOS A	0.8	5.3	0.15	0.57	54.4
Approach		199	0.0	0.184	6.8	LOS A	0.8	5.3	0.15	0.57	54.0
<b>North: Opera - SB</b>											
7	L2	354	0.0	0.466	5.8	LOS A	2.4	17.0	0.53	0.68	53.9
8	T1	41	0.0	0.466	5.8	LOS A	2.4	17.0	0.53	0.68	55.2
9	R2	5	0.0	0.466	10.8	LOS B	2.4	17.0	0.53	0.68	55.2
Approach		400	0.0	0.466	5.9	LOS A	2.4	17.0	0.53	0.68	54.0
<b>West: Erasmus - EB</b>											
10	L2	7	0.0	0.030	6.7	LOS A	0.1	0.7	0.50	0.65	53.2
11	T1	11	0.0	0.030	6.7	LOS A	0.1	0.7	0.50	0.65	54.4
12	R2	1	0.0	0.030	11.6	LOS B	0.1	0.7	0.50	0.65	54.4
Approach		19	0.0	0.030	7.0	LOS A	0.1	0.7	0.50	0.65	54.0
All Vehicles		1092	0.0	0.485	6.8	LOS A	2.8	19.6	0.42	0.64	53.8

Site: 101 [SC3 2016 PM Background]

Erf 1327 Strubensvallei X24  
Erasmus & Elsie/Opera  
SC3 - 2016 PM Peak - Background traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
<b>South: Elsie - NB</b>											
1	L2	1	0.0	0.181	4.9	LOS A	0.7	4.9	0.36	0.64	52.4
2	T1	70	0.0	0.181	4.9	LOS A	0.7	4.9	0.36	0.64	53.6
3	R2	93	0.0	0.181	9.9	LOS A	0.7	4.9	0.36	0.64	53.6
Approach		164	0.0	0.181	7.7	LOS A	0.7	4.9	0.36	0.64	53.6
<b>East: Erasmus - WB</b>											
4	L2	226	0.0	0.430	4.2	LOS A	2.3	16.4	0.34	0.58	53.4
5	T1	30	0.0	0.430	4.6	LOS A	2.3	16.4	0.34	0.58	54.5
6	R2	181	0.0	0.430	9.5	LOS A	2.3	16.4	0.34	0.58	54.5
Approach		437	0.0	0.430	6.4	LOS A	2.3	16.4	0.34	0.58	53.9
<b>North: Opera - SB</b>											
7	L2	294	0.0	0.397	4.4	LOS A	2.1	14.5	0.31	0.50	54.5
8	T1	102	0.0	0.397	4.4	LOS A	2.1	14.5	0.31	0.50	55.9
9	R2	9	0.0	0.397	9.4	LOS A	2.1	14.5	0.31	0.50	55.9
Approach		406	0.0	0.397	4.5	LOS A	2.1	14.5	0.31	0.50	54.9
<b>West: Erasmus - EB</b>											
10	L2	12	0.0	0.025	5.3	LOS A	0.1	0.6	0.39	0.56	54.1
11	T1	7	0.0	0.025	5.3	LOS A	0.1	0.6	0.39	0.56	55.4
12	R2	1	0.0	0.025	10.3	LOS B	0.1	0.6	0.39	0.56	55.4
Approach		20	0.0	0.025	5.6	LOS A	0.1	0.6	0.39	0.56	54.6
All Vehicles		1027	0.0	0.430	5.9	LOS A	2.3	16.4	0.33	0.56	54.3

Site: 101 [SC4 2016 PM With dev]

Erf 1327 Strubensvallei X24  
Erasmus & Elsie/Opera  
SC4 - 2016 PM Peak - With dev traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
<b>South: Elsie - NB</b>											
1	L2	1	0.0	0.203	4.9	LOS A	0.8	5.6	0.37	0.64	52.4
2	T1	79	0.0	0.203	4.9	LOS A	0.8	5.6	0.37	0.64	53.6
3	R2	104	0.0	0.203	9.9	LOS A	0.8	5.6	0.37	0.64	53.6
Approach		184	0.0	0.203	7.7	LOS A	0.8	5.6	0.37	0.64	53.6
<b>East: Erasmus - WB</b>											
4	L2	257	0.0	0.468	4.3	LOS A	2.7	18.7	0.38	0.59	53.4
5	T1	30	0.0	0.468	4.7	LOS A	2.7	18.7	0.38	0.59	54.5
6	R2	181	0.0	0.468	9.7	LOS A	2.7	18.7	0.38	0.59	54.5
Approach		468	0.0	0.468	6.4	LOS A	2.7	18.7	0.38	0.59	53.9
<b>North: Opera - SB</b>											
7	L2	294	0.0	0.416	4.5	LOS A	2.2	15.5	0.34	0.51	54.4
8	T1	117	0.0	0.416	4.5	LOS A	2.2	15.5	0.34	0.51	55.8
9	R2	9	0.0	0.416	9.5	LOS A	2.2	15.5	0.34	0.51	55.8
Approach		420	0.0	0.416	4.6	LOS A	2.2	15.5	0.34	0.51	54.8
<b>West: Erasmus - EB</b>											
10	L2	12	0.0	0.025	5.4	LOS A	0.1	0.6	0.40	0.57	54.0
11	T1	7	0.0	0.025	5.4	LOS A	0.1	0.6	0.40	0.57	55.3
12	R2	1	0.0	0.025	10.4	LOS B	0.1	0.6	0.40	0.57	55.3
Approach		20	0.0	0.025	5.7	LOS A	0.1	0.6	0.40	0.57	54.5
All Vehicles		1092	0.0	0.468	5.9	LOS A	2.7	18.7	0.36	0.57	54.2

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: US HCM 2010.

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

Gap-Acceptance Capacity: Traditional M1.

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

# AUTOJ RESULTS - SCENARIOS 2 & 4 - WITH DEVELOPMENT TRAFFIC



**Autoj**

RR Roundabout or mini-circle, yield on all approaches

Elsie & Opera Erasmus

Erf 1327 Strubensvallei X24 - With Dev

V/C, delay, queue

i/s delay	PI
6	83%

Volume (evu/hr)

	from North			from South			from West			from East			intersection			
	peds	left	str	right	L+S+R	peds	left	str	right	L+S+R	peds	left	str	right	L+S+R	total
AM		322	37	5	364		4	189	239	432		6	10	1	17	994
off																
PM		265	105	8	378		1	71	94	166		11	6	1	18	983

Shared lane L:S or S:R = 0.5:0.5; L:S:R = 0.3:0.4:0.3

# lanes	L <sup>~</sup>	LSR
AM	1	364
off	0	0
PM	378	378

# lanes	L <sup>~</sup>	LSR
AM	1	432
off	0	0
PM	166	166

Control

from North			from South			from West			from East					
peds	left	str	right	yield	peds	left	str	right	yield	peds	left	str	right	yield

Volume to Capacity ratio (V/C)

	V/C from North			V/C from South			V/C from West			V/C from East					
	peds	left	str	right	L+S+R	peds	left	str	right	L+S+R	peds	left	str	right	L+S+R
AM		0,30	0,30	0,30	0,30		0,02	0,02	0,02	0,02		0,12	0,12	0,12	0,12
off															
PM		0,26	0,26	0,26	0,26		0,02	0,02	0,02	0,02		0,30	0,30	0,30	0,30

Average Delay per Vehicle (seconds)

	delay from North			delay from South			delay from West			delay from East					
	peds	left	str	right	L+S+R	peds	left	str	right	L+S+R	peds	left	str	right	L+S+R
AM		5	5	5	5		5	5	5	5		5	5	5	5
off															
PM		5	5	5	5		5	5	5	5		5	5	5	5

Average Queue Length (veh) (= total delay veh-hrs / hr)

	Q from North			Q from South			Q from West			Q from East					
	peds	left	str	right	L+S+R	peds	left	str	right	L+S+R	peds	left	str	right	L+S+R
AM		0,5	0,1	0,0	0,6		0,0	0,0	0,0	0,0		0,1	0,0	0,1	0,2
off															
PM		0,4	0,2	0,0	0,6		0,0	0,0	0,0	0,0		0,4	0,0	0,2	0,6

Professional: erasmus elsie opera 2016 with dev  
 Date: print: 2016/11/02  
 copyright: Dr John Sampson

**ANNEXURE E:**

**PROPOSED ACCESS ARRANGEMENTS &  
PUBLIC TRANSPORT FACILITIES –  
MARITENG PLAN NO.: 184-55-01**





**INSERT: ACCESS DETAIL**  
SCALE 1:500

**MARITENG CONSULTING ENGINEERS**  
P.O. Box 8864 Tel: 011 862 4076  
Verwoerd Park Fax: 086 947 8882  
1453 Cell: 082 854 7358

NR	DATE	AMENDMENTS	ENGINEER	DATE

PROJECT: **ERF1327 STRUBENSVALLEI EXTENSION 24**

**PROPOSED ACCESS ARRANGEMENTS AND NON-MOTORIZED TRANSPORT FACILITIES**

SCALE	DATE	REVISION
<b>1:1000</b>	<b>02/11/16</b>	<b>0</b>
PLAN NO.		
<b>184-55-01</b>		



**ANNEXURE F:**

**DETAILED RESULTS:**

**OPERATIONAL ASSESSMENT OF ACCESS CONTROL**



## Erf 1327, Strubens Vallei Extension 24

### Access from Fiddle Avenue

		1 Gate	
Peak hour traffic volume	=	41 veh / h	
Peak hour factor	=	1	
Average arrival rate at peak	<b>Q</b> =	41 veh / h	
Average service rate	<b>C</b> =	14.40 sec / veh	
		250 services/h	
Traffic intensity	$\phi$ =	0.16	
Number of channels	<b>N</b> =	1 gate	
Traffic intensity per service channel	$\theta$ =	0.16	
Probability that n vehicles will be in the system	$n$	$P(x=n)$	$P(x \leq n)$
	$P_0$ =	0.84	0.16
	$P_1$ =	0.14	0.86
	$P_2$ =	0.02	0.98
	$P_3$ =	0.00	1.00
	$P_4$ =	0.00	1.00
	$P_5$ =	0.00	1.00
	$P_6$ =	0.00	1.00
	$P_7$ =	0.00	1.00
	$P_8$ =	0.00	1.00
	$P_9$ =	0.00	1.00
	$P_{10}$ =	0.00	1.00
	$P_{11}$ =	0.00	1.00
	$P_{12}$ =	0.00	1.00
	$P_{13}$ =	0.00	1.00
	$P_{14}$ =	0.00	1.00
	$P_{15}$ =	0.00	1.00
	$P_{16}$ =	0.00	1.00
	$P_{17}$ =	0.00	1.00
	$P_{18}$ =	0.00	1.00
Average number in the system E(n)	=	0.2 vehicles	
Average delay	=	17.2 seconds	
Average Vehicles per gate	=	0.2 vehicles	