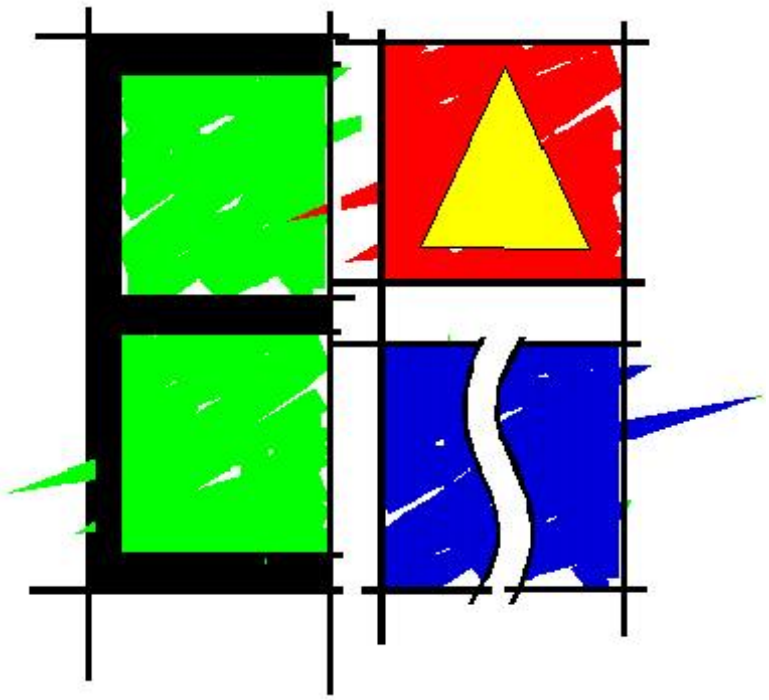
TRAFFIC IMPACT ASSESSMENT

FOR PROPOSED FUNCTION VENUE
ON
ERF 2377, THEESCOMBE, PORT ELIZABETH



November 2024

Prepared for: **Mr Wickus Saunders**

Prepared by: **Engineering Advice and Services (Pty) Ltd**
(041) 5812421

DOCUMENT CONTROL SHEET

CLIENT REF: **MR WICKUS SAUNDERS**

PROJECT NAME: **FUNCTION VENUE ON ERF 2377, THEESCOMBE**

DOCUMENT TITLE: **TRAFFIC IMPACT ASSESSMENT**

DOCUMENT FILE REF: F:\1800-1899\1874\Reports\Version 2 - October 2024\REP002 - TIA - Erf 2377, Theescombe - Function Venue - .docx

Version	**1**		
Compiled by	JK Charlton Candidate Eng Technologist (201580304) M Simon – Technician	June 2021	
Reviewed by	CGA Hastie Pr Tech. Eng (200070122)	July 2021	
Amendments made by			
Version	**2**		
Compiled by	M Mallick Candidate Eng Technologist (2019701273)	October 2024	
Reviewed by	CGA Hastie Pr Tech. Eng (200070122)	November 2024	
Amendments made by			

DISTRIBUTION:
1) Original : Client – Mr Wickus Saunders
2) Copy : Blackhound Architecture – Mr Dewald Potgieter
3) Copy : Route 2 – Mrs M Weyers
4) Copy : Nelson Mandela Bay Municipality – Mr S Abrahams
5) Copy : District Roads Engineer – Mr Khulile Siqiti
6) Copy : EAS File 1874

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ANNEXURES

1 INTRODUCTION

1.1 BACKGROUND

Engineering Advice & Services (Pty) Ltd was appointed by Wickus Saunders during March 2021 to prepare a Traffic Impact Assessment (TIA) for a proposed function venue including a coffee shop, restaurant and accommodation on erf 2377, Theescombe situated on Kragga Kamma Road in the Nelson Mandela Bay Municipality.

View of site from Kragga Kamma Road

1.2 OBJECTIVES OF THE STUDY

In broad terms, the purpose of the TIA is to determine the extent and nature of traffic generated by the proposed development, assess the impact of this traffic on the operation of the adjacent road network, and devise solutions for any problems identified.

The following key elements, *inter alia*, are addressed:

The suitability and safety of proposals for access to and egress from the site;

- The capacity of the existing and future road network within the influence radius;
- The road upgrading measures required to accommodate the proposed development; and
- On-site parking configuration and circulation.

In general, this report serves to satisfy the Nelson Mandela Bay Municipality that the traffic impact of the envisaged development is within acceptable limits and that suggested improvements conform to the standards and parameters set by these authorities.

1.3 METHODOLOGY

The approach followed in conducting the traffic impact assessment was in accordance with the guidelines set by the Nelson Mandela Bay Municipality [(1)], as well as those contained in **TMH 16 Volume 1- South African Traffic Impact and Site Assessment Manual** [(2)]. The methodology used was as follows:

- Present traffic flow patterns were obtained for a typical weekday PM and Saturday late morning peak periods and the affected intersections analysed, where after recommendations were made on the present need for road upgrading, without taking the proposed development into account;
- Given the extent of the development, the number of additional trips that will be generated by the development were determined by using applicable trip generation rates as specified in **TMH 17 Volume 1 - South African Trip Data Manual** [(3)];
- The generated traffic was assigned to the surrounding road network;
- Once again, the functioning of the affected intersections was analysed, and recommendations made on the need for road upgrading taking cognisance of the proposed development for the development (2024) and development plus 5-year (2029) planning horizons given the phasing of the development components;
- The access arrangements, parking configuration and circulation were assessed in terms of traffic operations and safety to ensure that they operate at acceptable levels of service and conform to traffic safety requirements for both motorised and non-motorised transport modes and
- By taking into account the major findings of the study, conclusions were made regarding financial responsibilities of the affected parties for the required road upgrading measures.

1.4 STUDY AREA

Based on the extent of the development and its intended hours of operation the study area was restricted to the junctions of Welcome Avenue and Pickwick Road with Kragga Kamma Road given that trips generated by the proposed development will approach along these roads and impact on these intersections.

It is considered that outside the above-mentioned study area trips will be further dispersed such that impact on individual road sections and intersections becomes minimal.

1.5 ASSUMPTIONS AND LIMITATIONS

The scope of this TIA is limited to the project as described in this report. The scope only deals with vehicular traffic related impacts at the intersections within the prescribed study area and excludes consideration of the following:

- Any vehicular activity outside of the study as defined in **Chapter 1.4** above;

The report is based on a number of assumptions and is subject to certain limitations. These are as follows:

- That operational trip frequency is based on development information supplied by the site owner / developer; and
- That trips generated by the proposed development are distributed to and from the site based on the location of the development site relative to residential areas and the major road network.

Notwithstanding these assumptions it is our view that this Traffic Impact Assessment provides the necessary framework to allow the operator to conduct activities within the necessary legal, planning and operational requirements set by the relevant road authorities.

2 THE DEVELOPMENT AND ENVIRONS

2.1 CURRENT LAND USE RIGHTS

The site is situated to the west of Port Elizabeth immediately adjacent to Kragga Kamma Road (MR452) as indicated on **Figure 1,** attached as **Annexure A**.

The erf of 2.8828 ha in extent is currently zoned for agricultural Zone 1 purposes and is primarily utilised as an agricultural small-holding. The site currently contains a residential dwelling and outbuildings.

Special consent (SC 48 / 2024) to operate a function venue on the site was granted by Council on 18 September 2024.

A copy of the approval letter is attached as **Annexure A**.

2.2 DEVELOPMENT ENVIRONS

The development is proposed on a portion of land located approximately 0.65 km from the Kamma Park residential area. The site is bounded by Kragga Kamma Road (MR452) to the south and the narrow-gauge railway reserve to the north with the Sherwood residential suburb on the northern side of the railway reserve as indicated on **Figure 1.**

The land use surrounding the site can be categorised as rural residential to the west, south and east, and residential to the north.

2.3 PROPOSED DEVELOPMENT

The proposed development comprises of the following:

Table 1: Proposed Development Components

Component	Additional GLA
Farm Stall shop	165m^2
Restaurant	162m^2
Function room	327m^2
Store rooms	23m^2
Accommodation	7 cottages

The intention is to use the existing house structure as part of the proposed new extended building. The 4 existing outbuildings will be converted to 4 accommodation units.

Engineering Advice and Services
Tel: (041) 581 2421

N

Legend

Subject Site

Project Title: Traffic Impact Assessment for Proposed Farmstall and Restaurant (The Stables) on Erf 2377, Theescombe, Port Elizabeth	Drawing No: 1874-P-001
Drawing Title: Figure 1: Locality Plan	Drawing Date: November 2024

Meters
0 50 100 200

Scale 1:10 000

Prepared by : TF

Checked by : CH

3 DATA COLLECTION

3.1 PEAK HOUR TRAFFIC VOLUMES

Peak hour traffic turning movement counts were conducted during Friday PM and Saturday AM peak periods on 1 and 2 November 2024 at the following intersections:

- Kragga Kamma Road / Welcome Avenue
- Kragga Kamma Road / Pickwick Road

The detailed survey data is attached as **Annexure B** and summarised on **Figure 2** below.

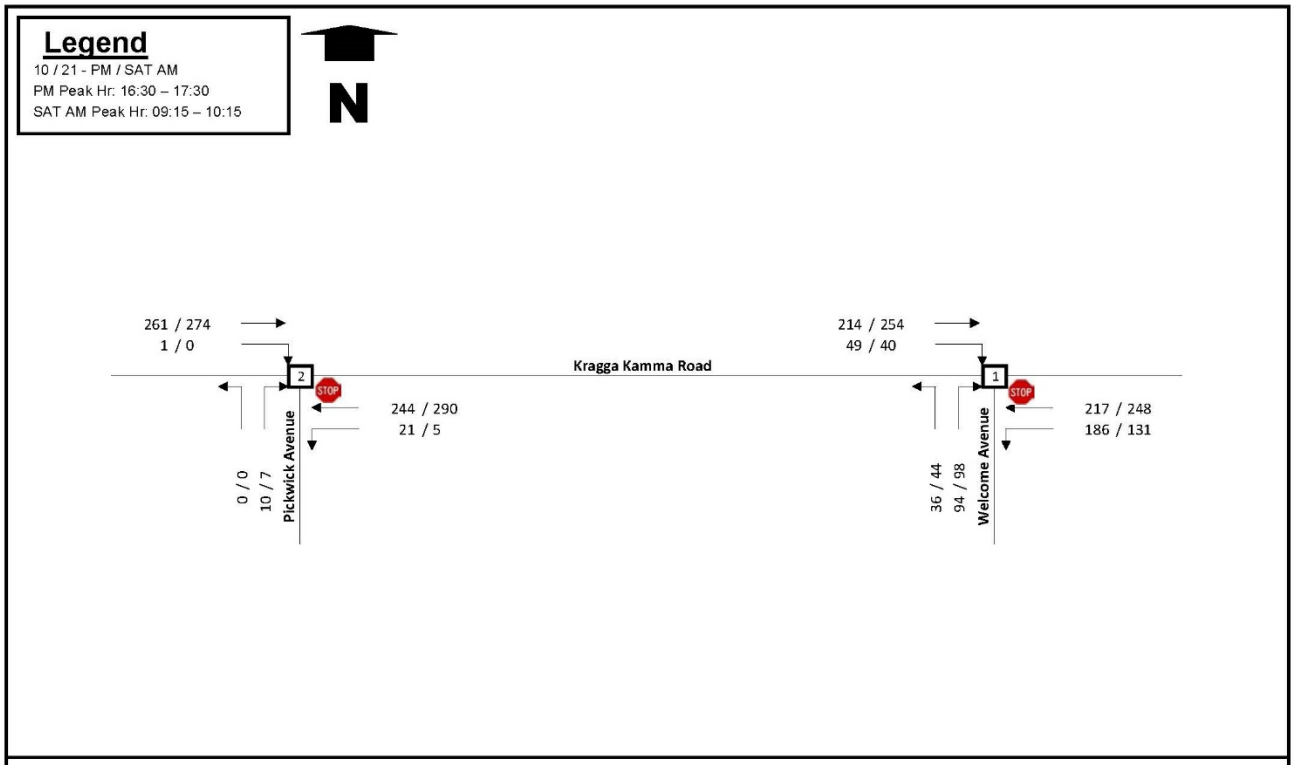


Figure 2: Existing Peak Hour Traffic Volumes - 2024

3.2 DAILY TRAFFIC VOLUMES

Unfortunately, no daily (24-hr) traffic counts have been conducted in the area since 2011. As such, we have made use of the PM peak hour counts conducted at the Kragga Kamma Road / Welcome Avenue junction in 2010 and 2021 to determine the approximate historic traffic growth.

As indicated in **Annexure C**, the growth in traffic passing through the junction during the weekday PM peak hour between 2010 and 2021 is approximately 1.9% per annum. The growth in traffic on the western and eastern legs of Kragga Kamma Road are 2.6% and 1.6% per annum respectively.

Based on the historical PM peak hour growth, the background traffic has been escalated by 3% in order to be conservative.

The escalated 2029 peak hour traffic volumes are indicated on **Figure 3** overleaf.

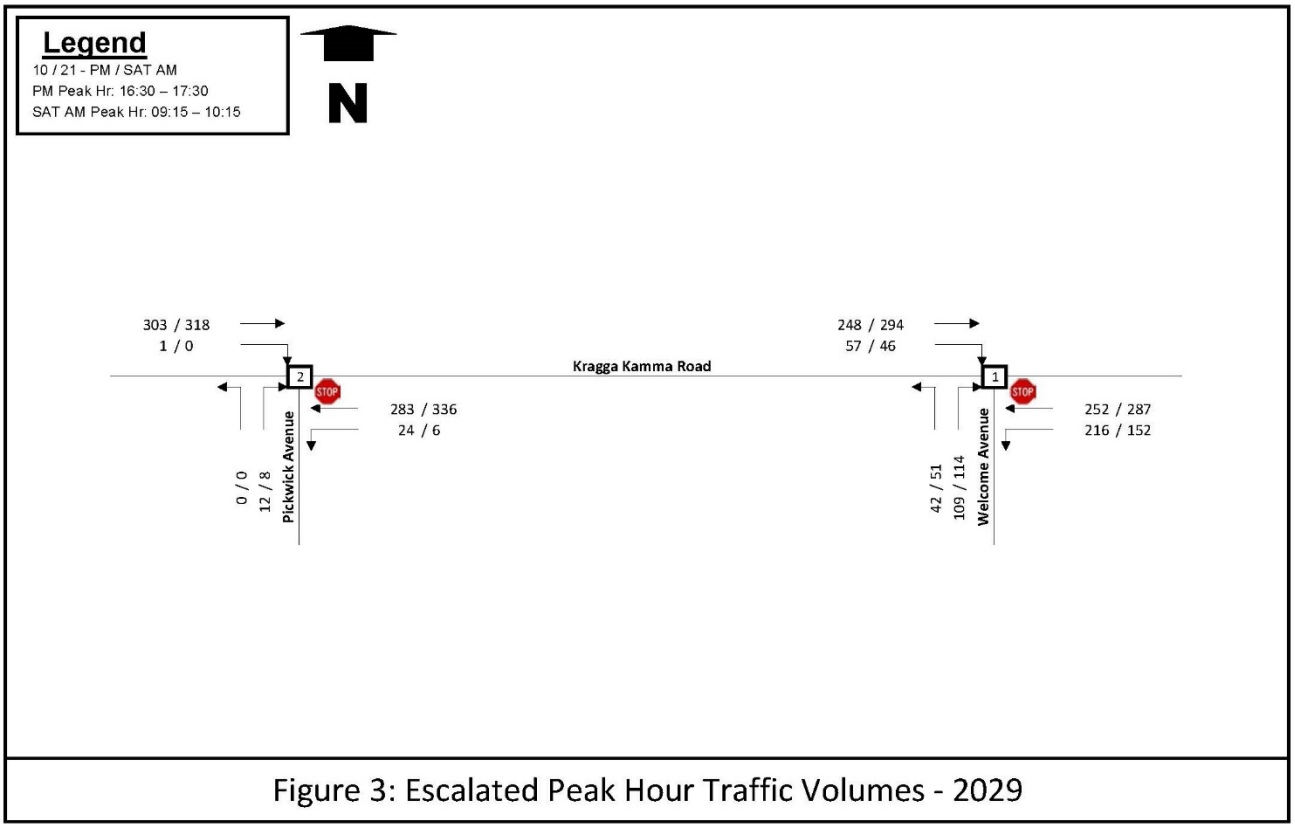


Figure 3: Escalated Peak Hour Traffic Volumes - 2029

3.3 ROAD NETWORK

3.3.1 Existing

Kragga Kamma Road (MR452) is a provincial main road which links outlying rural areas of Theescombe, Chelsea and Collen Glen with the city and comprises of a single surfaced traffic lane in each direction. The road is in a good condition with localised undulations having recently been resurfaced. The posted speed limit is 60km/h in the vicinity of the development.

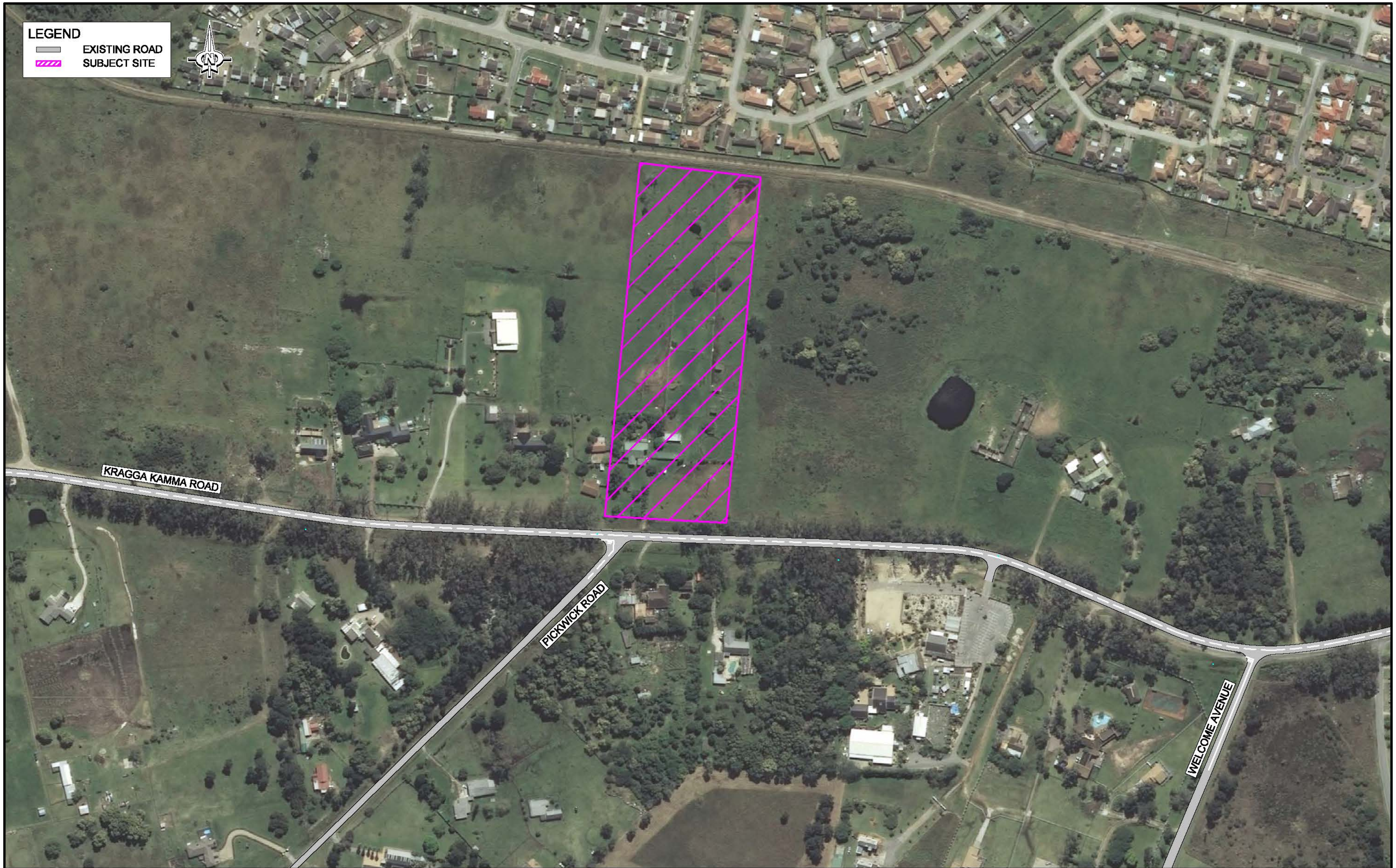
Welcome Avenue (DR1906) is a provincial district road which links Kragga Kamma Road with Seaview Road. The road is surfaced and comprises of a single 3.4m wide lane per direction. The posted speed limit is 60km/h from Kragga Kamma Road to a point approximately 150m north of Christian Road and 80km/h from this point southwards.

Pickwick Road is a local access road which provides direct access to properties situated west of Welcome Avenue. The road is surfaced and is 5 m wide and can be considered to be in a fair condition.

The existing road network configuration is indicated on **Figure 4** overleaf.

Kragga Kamma Road towards the east

Pickwick Road towards the south



FOR REPORT

UTSHINTSHO / AMENDMENTS

INANI NO.	UMHLA DATE	IMKCAZA DESCRIPTION	IVUNYELWE APPROVED

UMLINGANISELO SCALE: 1 : 3000

UMLINGANISELO WOMZOBO OHLINIWEYO SCALE ON REDUCED DRAWING
50mm ON ORIGINAL DRAWING

UMENZI DESIGN	MS
UMZOBI DRAWN	TF
IVUNYELWE APPROVED	CH
UMHLA DATE	NOV 2024

ENGINEERING ADVICE AND SERVICES associated with ULWAZI
73 Haugh Road, Walmer
P.O. Box 13867
Humewood
Port Elizabeth
6013
tel/fax: (041) 581 2421

IVUNYELWE APPROVED — INJINELI/ENG. — UMHLA / DATE

IVUNYELWE APPROVED — UMENZELWA / CLIENT — UMHLA / DATE

IPROJETI / PROJECT: TRAFFIC IMPACT ASSESSMENT FOR PROPOSED FUNCTION VENUE ON ERF 2377, THEESCOMBE, PORT ELIZABETH

INANI LESIVUMELWANO CONTRACT NO.

UMZOBONKCAZA / DWG DESCRIPTION: FIGURE 4: EXISTING ROAD CONFIGURATION

INANI LOMZOBO DWG.NO. 1874-P-004

3.3.2 Future

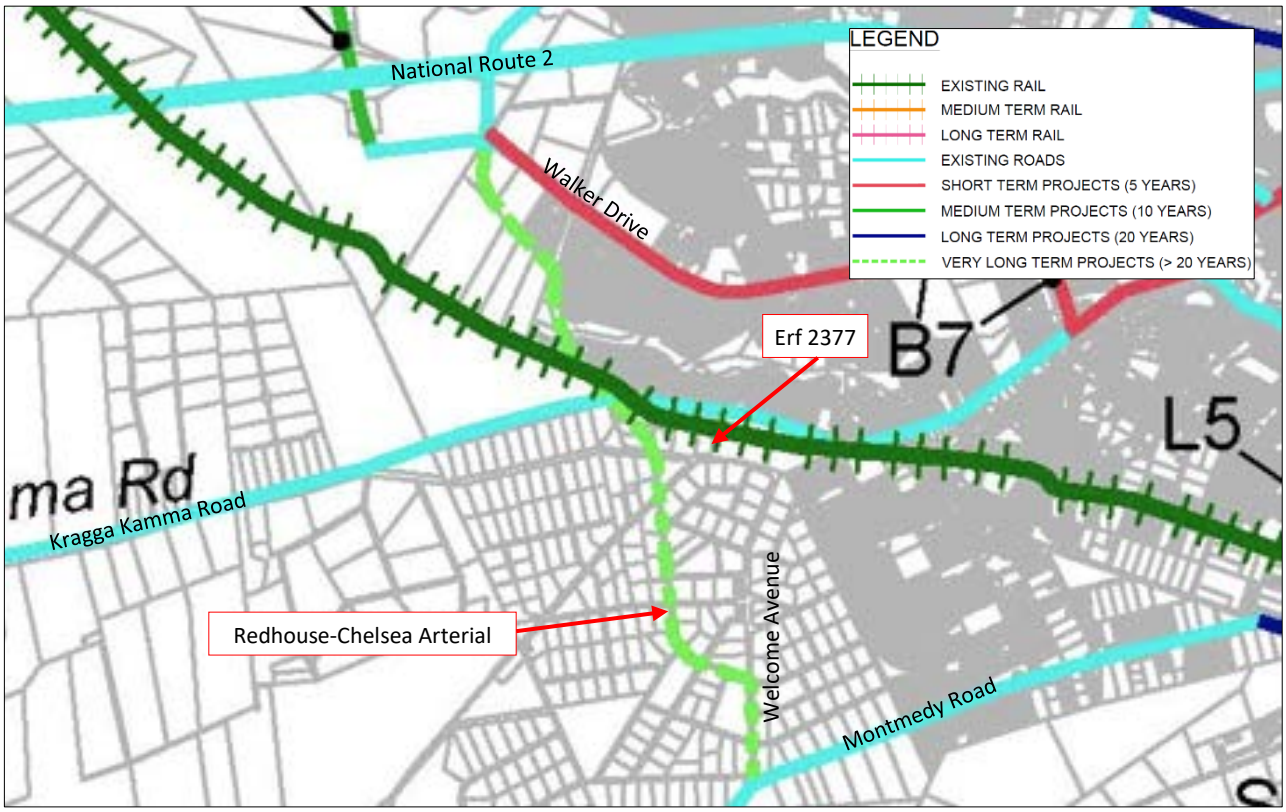
In terms of the **NMBM Comprehensive Integrated Transport Plan 2023/28** [4], there is only one major road network link proposed in the vicinity of the proposed development that is likely to impact on the development and Kragga Kamma Road in the long term.

This is the portion of the Redhouse-Chelsea Arterial (which links Cape Road to Seaview Road) between Walker Drive and Montmedy Road as indicated in **Figure 5** below

Once the link is implemented, the traffic volumes along Kragga Kamma Road passing erf 2377 are expected to increase significantly.

This link is planned to be implemented in the Very Long Term, and is very dependent upon the rate of development in the Bay West Precinct, with the portion between the N2 and Kragga Kamma Road only likely be implemented once the full extent of the Bay West City Development adjacent to the N2 is reached.

The Very Long-Term scenario refers to routes likely to be implemented more than 20 years from now.



3.4 PUBLIC TRANSPORT

Bus and minibus-taxi services currently operate along Kragga Kamma, Welcome Avenue, Cromwell Road and Monmedy Road providing a service for residents, domestic workers, students and employees.

Public transport stops for buses and minibus-taxis are provided along these roads at regular intervals.

The **NMBM Comprehensive Integrated Transport Plan 2023/28** [(4)] indicates that future public transport operations in the vicinity of the development will consist of feeder routes between the Greenacres Terminus and the western suburbs along Kragga Kamma Road (Route 449), between Greenacres and the public transport stop at Verdun Road (Route 447) and route 455 between Bay West and the Buffelsfontein Road Terminus in Walmer as indicated on **Figure 6** below.

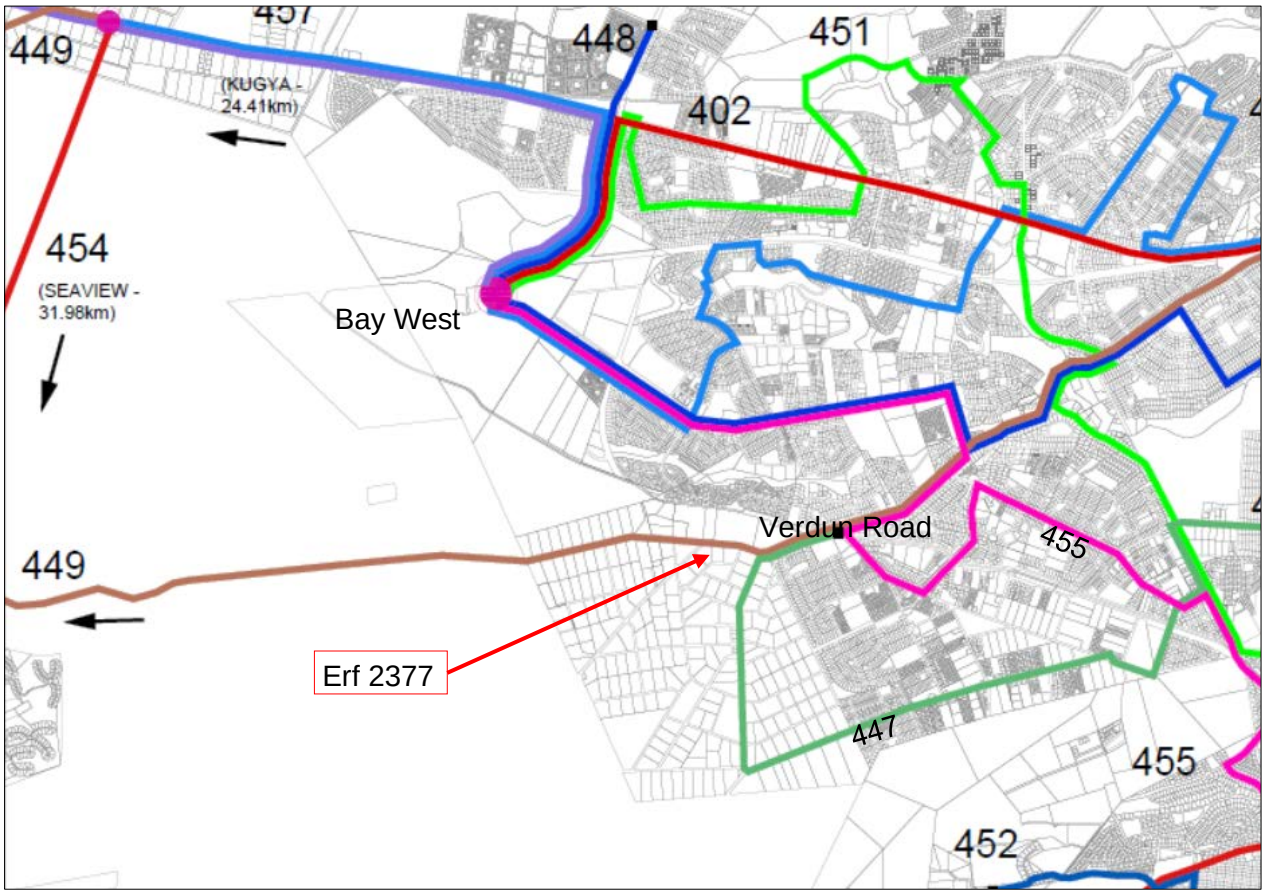


Figure 6: Public Transport Services

3.5 NON-MOTORISED TRANSPORT

No pedestrian sidewalk facilities exist along Kragga Kamma Road given that persons destined for properties in this peri-urban area would either drive into each property by vehicles or be dropped off picked up by minibus-taxi or bus.

3.6 SPATIAL DEVELOPMENT FRAMEWORK

Figure 7 below is an extract of the **Metropolitan Spatial Development Framework** [5] approved by the NMBM in 2015.

The area where the development is located falls inside the urban edge.

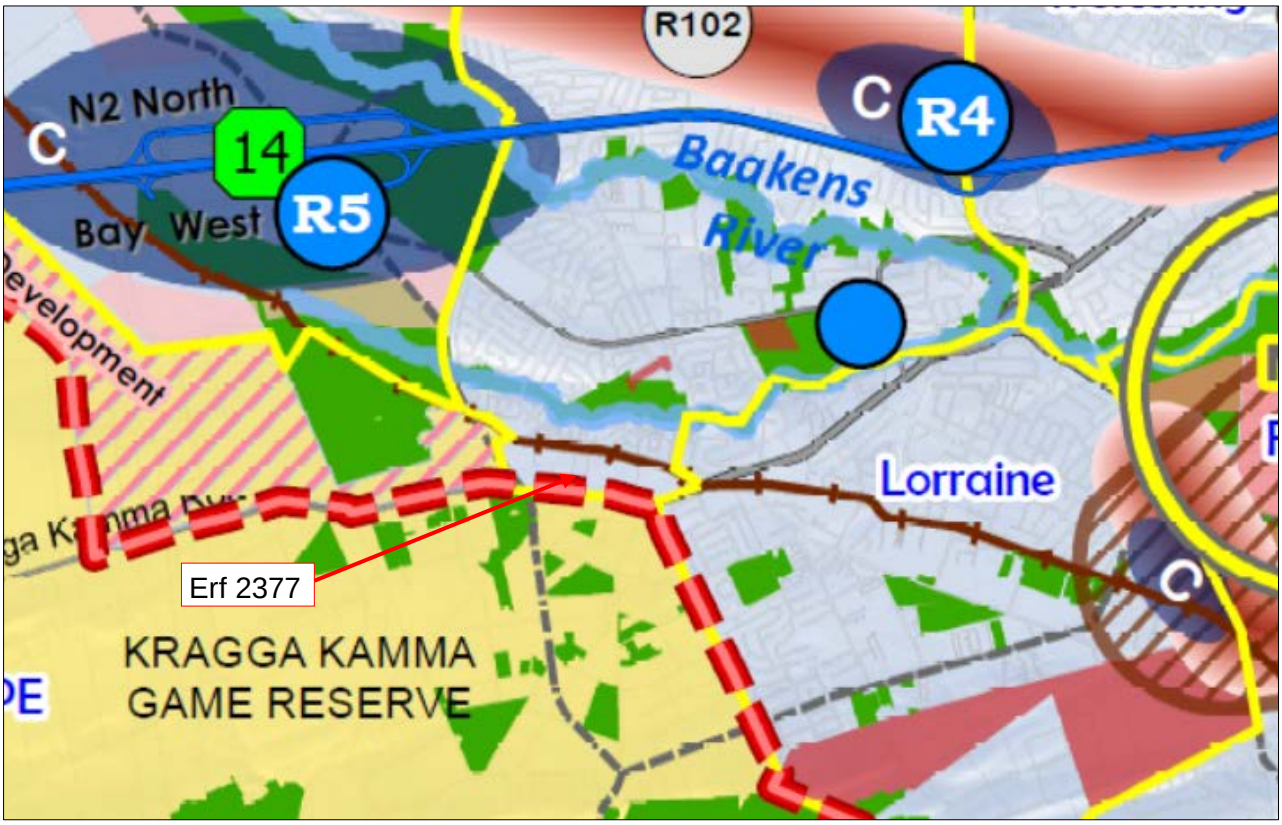


Figure 7: Extract of Metropolitan Spatial Development Framework

4 CAPACITY ANALYSIS – BEFORE DEVELOPMENT

Level of Service (LOS) is defined as the operating condition that may occur at an intersection when it accommodates various traffic volumes. LOS is a qualitative measure of the effect of speed, travel time, traffic interruptions, freedom to manoeuvre, safety, driving comfort and convenience, and operating costs. The LOS applicable to intersections under various control conditions, as defined in the **Highway Capacity Manual** [6] are indicated in **Table 2** below:

Table 2: Level of Service definitions for Vehicles (Highway Capacity Manual [6] method)

Level of Service	Control delay per vehicle in seconds (d) (Including geometric delay)		LOS Colour Rating
	Signals and Roundabouts	Stop Signs and Yield Signs	
A	d ≤ 10	d ≤ 10	Excellent
B	10 < d ≤ 20	10 < d ≤ 15	Very Good
C	20 < d ≤ 35	15 < d ≤ 25	Good
D	35 < d ≤ 55	25 < d ≤ 35	Acceptable
E	55 < d ≤ 80	35 < d ≤ 50	Poor
F	80 < d	50 < d	Very Poor

The capacity analysis was undertaken using the **SIDRA Intersection Network 9** [7] capacity analysis method.

The results are shown in **Table 3**, below and the detailed SIDRA output sheets attached as **Annexure D.**

Table 3: Results of Intersection Capacity Analysis – 2024 Before Development

Intersection	Delay (s)		V/C		LOS*	
	PM	SAT AM	PM	SAT AM	PM	SAT AM
Kragga Kamma Road / Welcome Avenue	3.7	3.3	0.223	0.220	A*	A*
Kragga Kamma Road / Pickwick Road	0.4	0.4	0.149	0.145	A*	A*

* - **SIDRA Intersection Network** [7] does not calculate intersection LOS for stop-controlled intersections. The LOS indicated is sourced from the **Highway Capacity Manual** [6] (**Table 2** above).

The Welcome Avenue and Pickwick Road approaches experience a maximum average vehicle delay of 11.1 and 10.3 seconds respectively.

However, as can be seen from the results contained in **Table 3**, both of the analysed intersections operate satisfactorily with no capacity problems.

5 TRIP GENERATION AND DISTRIBUTION

5.1 PROPOSED DEVELOPMENT TRIPS

As stated in Chapter 2.2, the proposed development comprises of the following elements:

- Farm Stall Shop – 165 m^2
- Restaurant and Function Room – 489 m^2
- Accommodation Lodges – 7 units / 14 rooms

TMH 17 Volume 1 - South African Trip Data Manual [3] recommends the following trip generation rates for each component of the proposed development.

Table 4: Trip Generation Rates

COMPONENT	PM			SAT AM		
	RATES	SPLIT		RATES	SPLIT	
		IN	OUT		IN	OUT
Farm Stall shop * (820)	3.40 / 100m² GLA	50	50	4.5 / 100m² GLA	50	50
Restaurant & Function room (932)	10 / 100m² GLA	70	30	20 / 100m² GLA	60	40
Guest Cottages (350)	0.45 / room	50	50	0.45 / room	50	50

***** The following size adjustment factor (SAF) is applied to the retail rate depending on the size of the development**.**

$$SAF = 1 + \left[{}^{6}/_{\left(1 + {}^{GLA}/_{3500}\right)} \right]$$

TMH17 also provides for a reduction in peak hour vehicle trips based on a range of factors, namely car-ownership (-30%), location on a public transport route (-15%) and part of a mixed-use development (-10%).

Given that visitors to the development are likely to access more than one component of the development projected peak hour trips have been reduced by 10% (Shop / Restaurant) and 20% (Accommodation).

It is generally also accepted that only 58% of the trips generated by retail developments are considered to be primary (i.e., new) trips with the remaining trips being made up of pass-by trips (13%) and diverted trips (29%). However, given the mixed use of this development and the proposed reduction all generated trips are assumed to be primary trips

The trips generated by each component are indicated below:

Shop (820)
For a farm stall size of 165m^2 this relates to the following peak hour trip generation:

TGR (Weekday PM) = 3.4 * [1+ (6/(1+(GLA/3500)))] * GLA/100
= 3.4* [1+ (6/(1+(165/3500)))] * 1.65
= 3.4* 22.88 * 1.65
= **38 trips** (in and out – 50:50)

Less 10% = **- 4** trips
= **34 trips** (in and out)

TGR (Saturday AM) = 4.5 * [1+ (6/(1+(GLA/3500)))] * GLA/100
= 4.5 * [1+ (6/(1+(**165**/3500)))] * 1.65
= 4.5* 30.28 * 1.65
= **50 trips** (in and out – 50:50)

Less 10% = **- 5** trips
= **45 trips** (in and out)

Restaurant and Function Room (Family sit down) (932)
For a total of 489m^2 this relates to the following peak hour trip generation:

TGR (Weekday PM)	=	8 * GLA / 100
	=	8 * **4.89**
	=	**39 trips** (in and out – 40: 60)
Less 10%	=	**- 4** trips
	=	**35 trips** (in and out)
TGR (Saturday AM)	=	20 * GLA / 100
	=	20 * **4.89**
	=	**98 trips** (in and out – 60:40)
Less 10%	=	**-** 10 trips
	=	**88 trips** (in and out)

Guest House (350)
For a total of 14 rooms this relates to the following peak hour trip generation:

TGR (Weekday PM)	=	0.45 * No. rooms
	=	0.45 * 14
	=	**6 trips** (in and out – 50:50)
Less 20%	=	- 2 trips
	=	**4 trips** (in and out)
TGR (Saturday AM)	=	0.25 * No. rooms
	=	0.2 * 14
	=	**4 trips** (in and out – 50:50)
Less 20%	=	- 1 trips
	=	**3 trips** (in and out)

Table 5: Peak Hour Trip Generation Summary

	PM		SAT AM	
	IN	OUT	IN	OUT
Farm Stall shop * (820)	17	17	23	22
Restaurant & Function room (932)	23	12	53	35
Guest Cottages (350)	2	2	1	2
Total Trips	42	31	77	59

5.2 TRIP DISTRIBUTION

Given the location of the proposed development the following trip distribution is assumed

- 70% to and from the east via Kragga Kamma Road;
- 20% to and from the South via Kragga Kamma Road and Welcome Avenue
- 10% to and from the west via Kragga Kamma Road; and

The generated peak hour trips are indicated on **Figure 8** overleaf.

The generated trips added to the weekday PM and Saturday AM peak hour volumes for the 2024 and 2029 development horizons are indicated on **Figure 9** and **Figure 10** overleaf.

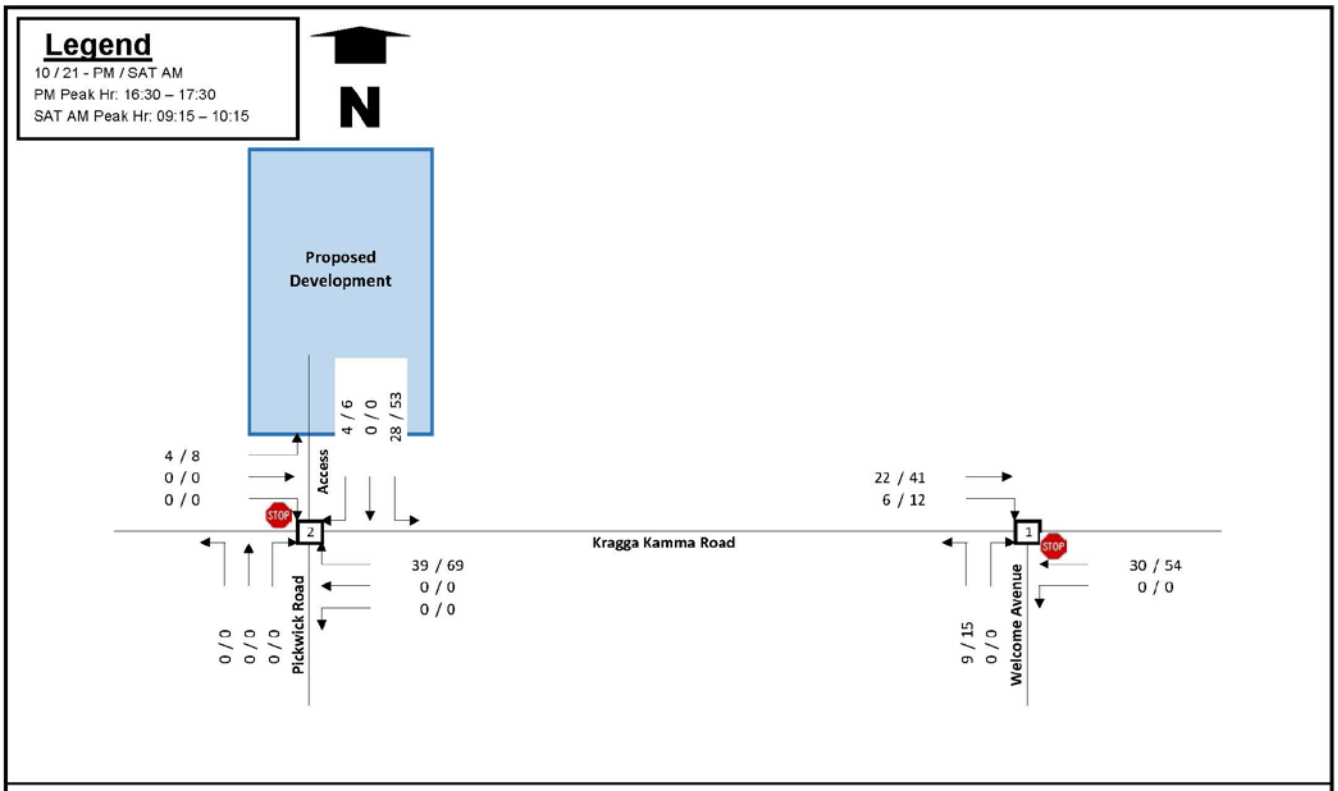


Figure 8: Generated Peak Hour Traffic Volumes

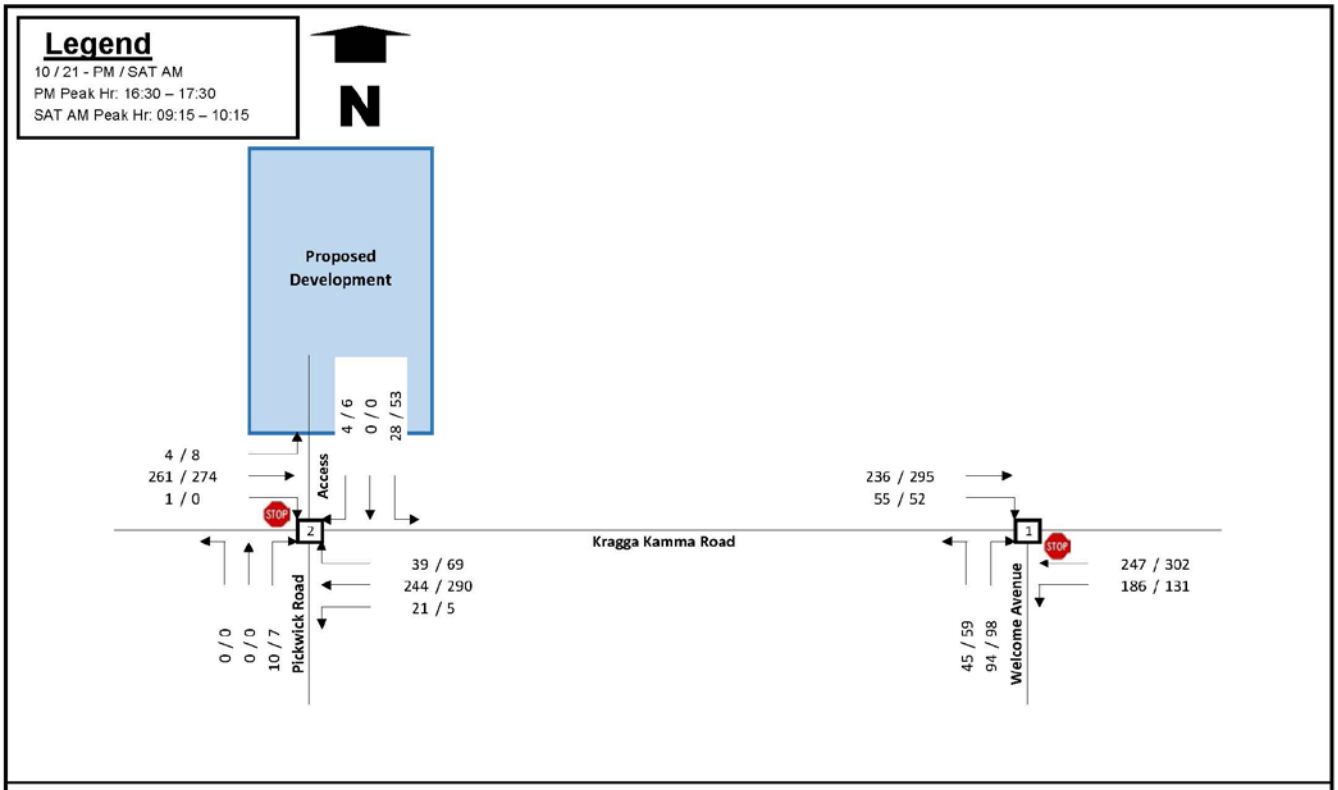


Figure 9: Peak Hour Traffic Volumes after Development - 2024

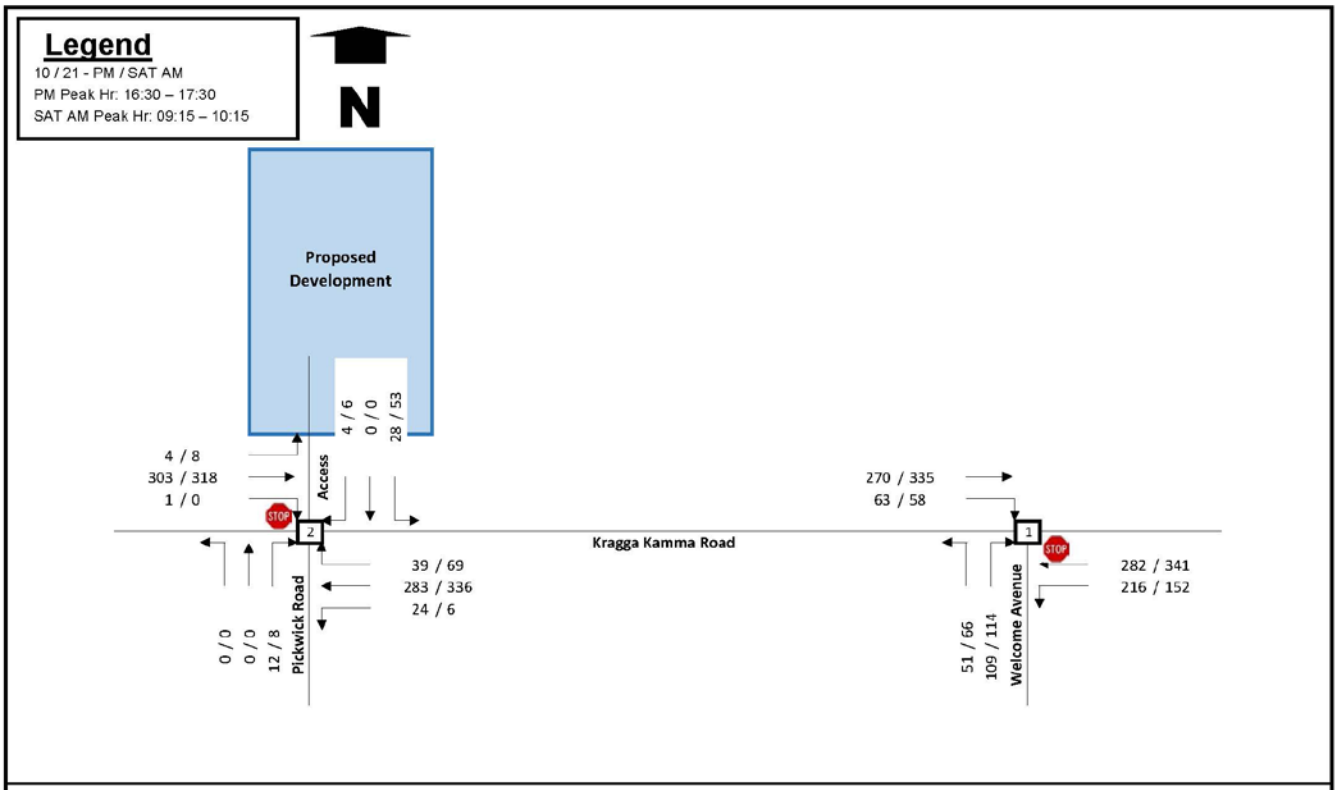


Figure 10: Peak Hour Traffic Volumes after Development - 2029

6 ACCESS ARRANGEMENTS

6.1 JUNCTION CONFIGURATION

Access to the site is currently obtained directly opposite Pickwick Road with an exit point 25m east of the entrance, as indicated on **Figure 11**. This arrangement accommodates an on-site drive-thru coffee shop.

The posted speed limit is currently 60km/h. However, for the purposes of this study, and to be conservative, it was assumed that posted speed was 80km/h to compensate for higher operating speeds.

Shoulder sight distance was assessed in terms of Figure 2.5.5(a) of **TRH 17: Geometric Design of Rural Roads** [8]. TRH17 indicates that a single unit vehicle entering a 7.5m road with a design speed of 80 kph (Kragga Kamma Road) requires shoulder sight distance of 235m. The requirement for a passenger car is 155m.

A visual assessment of the shoulder sight distances from the proposed access point was undertaken by driving along Kragga Kamma Road to and from the exit point. From this inspection, it appears that visibility is fair on the approaches to the exit point, with shoulder sight distances in excess of 250m to the east and west along Kragga Kamma Road as indicated in **Table 6** below

Table 6: Shoulder Sight Distance (SD)

Vehicle	Design Speed (kph)	Road width (m)	SD (m) Required	SD (m) Achieved
Single Unit Truck	80	7.5	235	>250
Passenger Car	80	7.5	155	>250


View of SD to the west


View of SD to the East

Given that a maximum of 77 trips will enter during the Saturday AM peak hour (69 of which are assumed to approach from the east and turn right into the access), this relates to just over 1 vehicle per minute entering the site.

The impact from a capacity and delay perspective is discussed further in **Chapter 7**.

6.2 ACCESS GATE CONFIGURATION

The service flow rates at access-controlled entrances in vehicles per hour from Table 30 of TMH 16 Volume 2- South African Traffic Impact and Site Assessment Standards and Requirements Manual [9] are indicated in Table 7 below. A service flow of 600 vph is assumed for an open gate i.e., no access control.

Up to 77 vehicles are projected to enter the development during the Saturday AM peak hour.

Table 7: Access Control Service Flow Rates

Service flow rates (veh/h) for different control types	
Control type	**Service flow (vph)**
Swipe magnetic card	480
Remote controlled gates	450
Ticket dispenser: Automatic	390 -450
Ticket dispenser: Push button	220 - 360
Pin number operated gates	150
Pay fee on entry	120
Cell-phone operated gates (gate opens when a call is received)	100
Manual recording, Visitor completes form	80
Intercom operated gates (visitor contacts resident by intercom)	50

The number of entry lanes and the number of vehicles queuing in each lane are calculated after determining a Traffic Ratio over all entry lanes using the following formula:

$$\text{Traffic ratio} = \frac{\text{Total Volume} / \text{PHF}}{\text{Service flow rate}} \cdot 100$$

The number of lanes and queue length is then determined from **Table 8** below (Table 31 in TM16 Vol 2).

Table 8: Access Control Queue Lengths

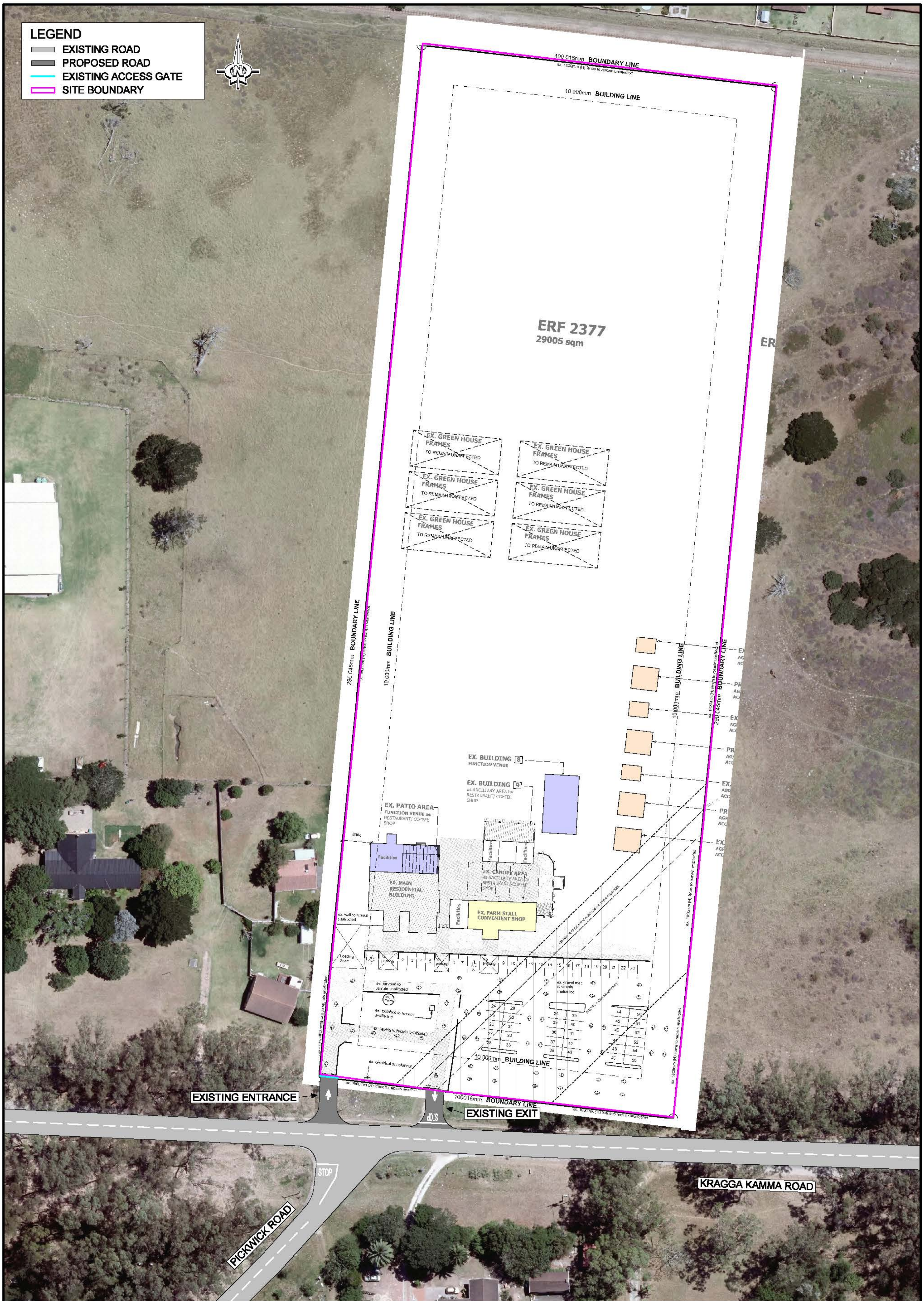
95th Percentile queue length (vehicles per channel) at controlled accesses						
Storage (Vehs)	Traffic ratio (Percentage) for different Numbers of Channels					
N_{Que}	1 Channel	2 Channel	3 Channel	4 Channel	5 Channel	6 Channel
1	23	58	97	140	188	235
2	39	94	155	220	292	363
3	49	115	186	261	341	421
4	56	128	205	283	367	449
5	61	137	216	297	382	466
6	65	143	224	306	392	476
7	68	147	229	312	399	484
8	70	151	233	317	403	489
9	71	153	236	321	407	493
10	73	155	239	324	410	496

Assuming that access will remain open during the hours of operation this relates to the following traffic ratio with detailed calculations attached as **Annexure E**:

Traffic Ratio (Open Gate) = ((77/0.90)/600) x 100

= 14.26

Table 8 indicates that one lane accommodating a queue of at least 1 vehicle is required between the access gate and the road edge.



FOR REPORT

UTSHINTSHO / AMENDMENTS

1 : 1000

ENGINEERING ADVICE AND SERVICES associated with ULWAZI
73 Heugh Road, Walmer
P.O. Box 13067
Humewood
Port Elizabeth
6013
tel/fax: (041) 581 2421

UMENZI DESIGN: MM
UMZOBI DRAWN: MM
IVUNYELWE APPROVED: CH
UMHLA DATE: NOV 2024

IVUNYELWE APPROVED
IVUNYELWE APPROVED
UMHLA / DATE

IPROJETI / PROJECT
TRAFFIC IMPACT ASSESSMENT FOR PROPOSED FARMSTALL AND RESTAURANT (THE STABLES) ON ERF 2377, THEESCOMBE, PORT ELIZABETH

UMZOBONKCAZA / DWG DESCRIPTION
FIGURE 11: PROPOSED ACCESS ARRANGEMENTS

CONTRACT NO.
DWG. NO. 1574-P-011

7 CAPACITY ANALYSIS – AFTER DEVELOPMENT

7.1 2024 AFTER DEVELOPMENT

The capacity analysis was undertaken using the **SIDRA Intersection Network 9** [7] capacity analysis method.

After adding generated traffic volumes to the background peak hour volumes, the traffic situation was analysed in order to determine the LOS at which the intersections and access point would operate after adding the traffic generated by the development. The results are shown in **Table 9** below and the detailed SIDRA output sheets attached as **Annexure F.**

Table 9: Results of Intersection Capacity Analysis – 2024 After Development

Intersection	Delay (s)		V/C		LOS*	
	PM	SAT AM	PM	SAT AM	PM	SAT AM
Kragga Kamma Road / Welcome Avenue	3.7	3.3	0.239	0.271	A*	A*
Kragga Kamma Road / Pickwick Road / Access	1.5	1.9	0.175	0.214	A*	A*

* - **SIDRA Intersection Network** [7] does not calculate intersection LOS for stop-controlled intersections. The LOS indicated is sourced from the **Highway Capacity Manual** [6] (**Table 2** above).

The Welcome Avenue and Pickwick Road approaches experience a maximum average vehicle delay of 12.4 and 13 seconds respectively increasing by approximately 10% - 25% as a result of traffic generated by the proposed development, albeit from a low base.

However, as can be seen from the results contained in **Table 9**, the additional traffic generated by the development has minimal impact on operations at the affected intersections.

7.2 2029 AFTER DEVELOPMENT

After adding generated traffic volumes to the escalated background peak hour volumes, the traffic situation was analysed in order to determine the LOS at which the intersections would operate after adding the traffic generated by the development (including the possible additional components). The results are shown in **Table 10** below and the detailed SIDRA output sheets attached as **Annexure G.**

Table 10: Results of Intersection Capacity Analysis – 2029After Development

Intersection	Delay (s)		V/C		LOS*	
	PM	SAT AM	PM	SAT AM	PM	SAT AM
Kragga Kamma Road / Welcome Avenue	4.0	3.8	0.285	0.349	A*	A*
Kragga Kamma Road / Pickwick Road / Access	1.5	7.2	0.198	0.689	A*	A*

* - SIDRA Intersection Network [77] does not calculate intersection LOS for stop-controlled intersections. The LOS indicated is sourced from the **Highway Capacity Manual** [6] (**Table 2** above).

The Welcome Avenue and Access Road approaches experience a maximum average vehicle delay of 14.0 and 20.1 seconds respectively increasing by approximately 13% and 50% compared with 2024 as a result of increased background traffic volumes. Although the access road delay does increase 50% this is again coming off a low base.

Again, as with the 2024 after development assessment, the results contained in **Table 10** indicate that the additional traffic generated by the full development has minimal impact on operation of the affected intersections.

8 PUBLIC TRANSPORT OPERATIONS AND PEDESTRIAN ARRANGEMENTS

8.1 PUBLIC TRANSPORT

Public transport stops are provided in close proximity to the site and as such, no additional facilities are proposed.

8.2 PEDESTRIAN ARRANGEMENTS

No additional pedestrian facilities are required.

9 PARKING AND LOADING REQUIREMENTS

9.1 PARKING REQUIREMENTS

The parking requirement (based on **National Department of Transport** standards [10]) is indicated in **Table 11** below.

Table 11: Parking Requirements

Component	GLA / rooms / seats	Requirement	No of Bays
Farm Stall shop	165m^2	6 / 100m^2	22.26
Restaurant & Function room	780m^2	6 / 100 m^2	46.2
Offices	13.5m^2	4 / 100m^2	0.54
Store rooms	45.6m^2	1 / 100m^2	0.46
Accommodation	4 cottages	2 per cottage	8
TOTAL	**Required**		**77.46**
	Provided		**110**

As indicated in **Table 11** a total of 78 bays are required. Approximately 110 bays will be provided on the site.

9.2 LOADING REQUIREMENTS

Delivery bays are provided on-site with easy access and egress.

10 CONCLUSIONS

10.1 BEFORE DEVELOPMENT

- Under existing traffic conditions, the results of the capacity analysis indicate that the affected intersections operate at LOS A or better in terms of capacity during weekday PM and Saturday AM peak hours;
- Kragga Kamma Road in this area has a posted speed limit of 60km/h;

10.2 AFTER DEVELOPMENT

- Separate entrance and exit can be accommodated as indicated on **Figure 11,** with sight distance from the exit on both approaches along Kragga Kamma Road;
- A total of 73 and 136 trips are generated during the PM and Saturday AM peak hours respectively;
- The access gate on the boundary can accommodate the required stacking distance of one vehicle length from the road edge;
- The required parking can be provided on site as indicated on **Figure 11;**
- When considering additional traffic generated by the proposed development the results of the capacity analysis indicate that the additional traffic generated by the proposed development has minimal impact at the proposed access point; and
- Kragga Kamma Road requires no upgrading to accommodate the additional traffic volumes.

11 RECOMMENDATIONS

In view of the findings of this study, it is recommended that:

- This traffic impact assessment be approved by the Nelson Mandela Bay Municipality;
- Access/egress to the proposed be provided opposite Pickwick Road with the access configured as indicated on **Figure 11** with the cost of provision of the access to be met by the developer.

12 REFERENCES

1. *City Engineer's Department*, **Requirements for Traffic Impact Assessments**, PEMET, September 1995.
2. *Joubert, Sampson, et al*, **TMH 16 Volume 1- South African Traffic Impact and Site Assessment Manual**, COTO, August 2012.
3. *Joubert, Sampson, et al*, **TMH 17 Volume 1- South African Trip Data Manual**, COTO, August 2012.
4. *RGM Consortium,* Draft **NMBM Comprehensive Integrated Transport Plan 2023/2028**, NMBM I&ED, November 2023.
5. *Human Settlements Directorate – Land Planning,* **Nelson Mandela Bay Municipality Metropolitan Spatial Development Framework 2015,** NMBM, 2015.
6. *Transportation Research Board*, **Highway Capacity Manual**, 2000.
7. *Akcelik & Associates (Pty) Ltd*, **SIDRA Intersection Network 9 User Guide**, SIDRA Solutions, April 2020.
8. NITRR, **TRH 17 - Geometric Design of Rural Roads,** CSRA, September 1984
9. *Joubert, Sampson, et al*, **TMH 16 Volume 2- South African Traffic Impact and Site Assessment Standards and Requirements Manual**, COTO, August 2012
10. *Department of Transport*, **PG3/85 - Parking Standards**, Department of Transport, November 1985.

ANNEXURE A
Land Use
Rights

nelson mandela bay MUNICIPALITY

Human Settlements

Your ref:
Our ref: CF30/02377
Date: 19 September 2024
Who deals with this: Mr M Msimanga

Tel: +27 (0) 41 506 1095
Fax: +27 (0) 41 506 3430
PO Box 9, Port Elizabeth, 6000
Republic of South Africa
e-Mail: mmsimanga@mandelametro.gov.za

PER EMAIL

maartje@route2.co.za

Route² EC
Private Bag X0002
SUNRIDGE PARK
6008

Dear Madam

COUNCIL'S SPECIAL CONSENT (SC 48/2024) : ERF 2377, THEESCOMBE

I refer to previous correspondence in this regard and wish to advise that, by resolution of full Council at its meeting held on 16 July 2015 and in terms of Section 24(2) of the Spatial Planning and Land Use Management By-Law 2023, and Section 42 of the Spatial Planning and Land Use Management Act 16 of 2013, the Authorised Official on 18 September 2024 resolved as follows:

(a) That the application for Council's Special Consent (SC 48/2024) to allow a function venue on Erf 2377, Theescombe **BE APPROVED,** subject to the following conditions:

(i) the function venue to be restricted to 319m² (as per Plan No: 20240909_STABLES_MS01 dated 10 September 2024);
(ii) on-site parking being provided in terms of Nelson Mandela Bay Metropolitan Municipality Land Use Scheme, 2023;
(iii) the submission and approval of a Site Development Plan in accordance with Clause 70 of the Nelson Mandela Bay Metropolitan Municipality Land Use Scheme, 2023 for the approval by the Executive Director: Human Settlements prior to the submission of building plans. If considered necessary, the Executive Director: Human Settlements may at the time of assessing the Site Development Plan request the construction of a 2,4m brick high wall to protect the amenity of adjacent properties, and request landscaping measures to be implemented on the property;
(iv) in terms of the National Building Regulations and Building Standards Act 103 of 1977 and before the new use rights are exercised, building plans showing the new or change in use and the layout of the parking area shall be submitted for the approval of the Executive Director: Human Settlements;
(v) a Consent Use may not be implemented, where the Primary Use for Agriculture Zone 1 has not been exercised. The Consent Use will lapse if the Municipality establishes that the Primary Uses are no longer exercised on the Land Unit;
(vi) the Consent Use rights granted shall be subject to termination if any breach of a condition upon which such consent was granted is not remedied in compliance with a notice served in terms of the By-law upon the owner or occupier of the site concerned, which notice shall require that the breach be remedied within a specific period;
(vii) vehicular access being to the satisfaction of the Executive Director: Infrastructure and Engineering;
(viii) a Transportation Development Levy in respect of related traffic accommodation costs being payable. This levy, shall be determined by the Executive Director: Roads and Transportation on submission of the Site Development Plan, and will be payable prior to building plan approval;
(ix) all advertising and signage shall conform to Council's approved Outdoor Advertising Policy and shall be submitted to the Executive Director: Human Settlements for approval in terms of that policy;
(x) the requirements that may be specified by the Environmental Health Directorate with regard to the control of emissions such as smoke, noise, odors, disposal of refuse etc., shall be complied with at the cost of the owner;

(xi) prior to the operation of the Function Venue the owner submitting a report together with an Acoustic Certificate confirming that the premises are soundproofed and that no disturbing noise and or noise nuisance will be created in the conduct of the proposed use that will be audible outside the limits of the property to the satisfaction of the Executive Director: Environmental Health failing which the Special Consent shall be withdrawn;

(xii) the acoustic certificate shall be issued by a competent authority registered with the Engineering Council of South Africa;

(xiii) the owner shall not cause or permit the playing of music (i.e. live or recorded music) that is audible outside of the Function Venue or music which is played inside the building and is audible outside of the building to the extent that it causes any type of common law nuisance;

(xiv) the owner taking all reasonable steps to ensure that patrons leave the premises in an acceptable and orderly manner;

(xv) the residential amenity shall not be adversely affected by the Function Venue activity. (This means that the resident neighbours must not be adversely affected by any Function Venue activities beyond those which flow from operating in compliance with all town planning conditions imposed on the business);

(xvi) If the Executive Director Roads and Transport Directorate determines that a Traffic Impact Assessment or Study is required, such approvals must be obtained before the approval of the Site Development Plan;

(xvii) the remaining conditions pertaining to the Agricultural Zone 1 use zone contained in the Nelson Mandela Bay Metropolitan Municipality Land Use Scheme, 2023 applying;

(xviii) the approval granted lapsing after 5 years, in terms of Section 43(2) of the Spatial Planning and Land Use Management Act 2013 (Act 16 of 2013) if Condition (iv) above is not complied with within the stated period.

(b) That the application for Council's Special Consent (SC 48/2024) to allow a convenience shop on Erf 2377, Theescombe **IS APPROVED** subject to the following conditions:

(i) the convenience shop being restricted to 165.38m² (as per Plan No: 20240909_STABLES_MS01 dated 10 September 2024);

(ii) the submission and approval of a Site Development Plan in accordance with Clause 70 of the Nelson Mandela Bay Metropolitan Municipality Land Use Scheme, 2023 for the approval by the Executive Director: Human Settlements prior to the submission of building plans. If considered necessary, the Executive Director: Human Settlements may at the time of assessing the Site Development Plan request the construction of a 2,4 m brick high wall to protect the amenity of adjacent properties, and request landscaping measures to be implemented on the property;

(iii) in terms of the National Building Regulations and Building Standards Act 103 of 1977 and before the new use rights are exercised, building plans showing the new or change in use and the layout of the parking area shall be submitted for the approval of the Executive Director: Human Settlements;

(iv) a Consent Use may not be implemented, where the Primary Use for Agriculture Zone 1 has not been exercised. The Consent Use will lapse if the Municipality establishes that the Primary Uses are no longer exercised on the Land Unit;

(v) the Consent Use rights granted shall be subject to termination if any breach of a condition upon which such consent was granted is not remedied in compliance with a notice served in terms of the By-law upon the owner or occupier of the site concerned, which notice shall require that the breach be remedied within a specific period;

(vi) the remaining conditions pertaining to the Agricultural Zone 1 use zone contained in the Nelson Mandela Bay Metropolitan Municipality Land Use Scheme, 2023 applying;

(vii) the approval granted lapsing after 5 years, in terms of Section 43(2) of the Spatial Planning and Land Use Management Act 2013 (Act 16 of 2013) if Condition above is not complied with within the stated period.

(c) That the application for Council's Special Consent (SC 48/2024) to allow agriculture employee accommodation on Erf 2377, Theescombe **IS APPROVED** subject to the following conditions:

(i) the agricultural employee accommodation is restricted to seven buildings (as per Plan No: 20240909_STABLES_MS01 dated 10 September 2024);

(ii) each agriculture employee dwelling unit or residential building not exceeding 50m² in size;

(iii) the agriculture employee accommodation is for the accommodation of bona fide agriculture employees engaged in agricultural activities on that Land Unit only;

(iv) agriculture employee accommodation shall not be utilized for sub-letting, other than sub-letting permitted in terms of the Nelson Mandela Bay Metropolitan Municipality Land Use Scheme, 2023;

(v) agriculture employee accommodation shall not be registered as a sectional title scheme;

(vi) proof of compliance with agriculture employee accommodation to be submitted in the form of an affidavit containing the names and identity numbers and a copy of identity documents of agriculture employees to be submitted with the Site Development Plan;

(vii) the Municipality may require the property owner to provide an updated list of the employees occupying the agriculture employee units;

(viii) the submission and approval of a Site Development Plan in accordance with Clause 70 of the Nelson Mandela Bay Metropolitan Municipality Land Use Scheme, 2023 for the approval by the Executive Director: Human Settlements prior to the submission of building plans. If considered necessary, the Executive Director: Human Settlements may at the time of assessing the Site Development Plan request the construction of a 2,4m brick high wall to protect the amenity of adjacent properties, and request landscaping measures to be implemented on the property;

(ix) in terms of the National Building Regulations and Building Standards Act 103 of 1977 and before the new use rights are exercised, building plans showing the new or change in use shall be submitted for the approval of the Executive Director: Human Settlements;

(x) a Consent Use may not be implemented, where the Primary Use for Agriculture Zone 1 has not been exercised. The Consent Use will lapse if the Municipality establishes that the Primary Uses are no longer exercised on the Land Unit;

(xi) the Consent Use rights granted shall be subject to termination if any breach of a condition upon which such consent was granted is not remedied in compliance with a notice served in terms of the By-law upon the owner or occupier of the site concerned, which notice shall require that the breach be remedied within a specific period;

(xii) the remaining conditions pertaining to the Agricultural Zone 1 use zone contained in the Nelson Mandela Bay Metropolitan Municipality Land Use Scheme, 2023 applying;

(xiii) the approval granted lapsing after 5 years, in terms of Section 43(2) of the Spatial Planning and Land Use Management Act 2013 (Act 16 of 2013) if Condition above is not complied with within the stated period.

(d) That the application for Council's Special Consent (SC 48/2024) to allow a Place of Entertainment on Erf 2377, Theescombe **IS REFUSED.**

The Authorised Official's decision was based on the following reasons:

- The application is in line with the Nelson Mandela Bay Metropolitan Municipality Land Use Scheme, 2023.
- The application is in line with the Spatial Planning and Land Use Management Act, 2013 Development Principles.
- The property is on the edge of the urban edge and close to properties earmarked for Peri Urban zone and Mixed-use development in terms of the Nelson Mandela Bay Metropolitan Municipality Spatial Development Framework.
- The proposal is compatible with surrounding land uses.
- The proposed development is within the 20% coverage permitted on the property.
- No objection submitted during the Public Participation process.
- A Place of Entertainment is envisaged to have negative impacts on the properties in the vicinity as far as noise is concerned. There are Single Residential erven at the back of the property that will be impacted by the proposed Place of Entertainment.

Please note, should you have any query relating to the above decision, please contact Ms N Ketelo, 506 3324 (Town Planning Admin), alternatively Town Planning Reception, 506 2241.

Your attention is also drawn to the provisions of Section 43 of the Spatial Planning and Land Use Management Act in respect of the lapsing of applications.

Furthermore, your attention is also drawn to the provisions of Section 51 of the Spatial Planning and Land Use Management Act in terms of which a right of appeal exists. Should you wish to exercise your right in terms hereof, such an appeal, accompanied by proof of payment in the amount of R4565,00 (VAT included) in favour of the Nelson Mandela Bay Municipality, must be directed to the Office of the City Manager (mailto: sthebe@mandelametro.gov.za, Attention: Senior Director: Strategic Planning and Co-ordination), Nelson Mandela Bay Municipality, P O Box 9, Port Elizabeth, 6000 within 21 days of the date of notification of the decision. (please refer to the attached Appeal Application Form)

Bank details:

1. Fees to be paid on Electronic Funds Transfer (EFT) into the following Municipal account:

Bank	**ABSA Bank**
Account Name	**NMBMM**
Account Number:	**40 7953 3826**
Account Type:	**Current Account**
Branch Code:	**632005**

2. The bank reference must be in the following format:

1021307082 xx xxxxx
(1)[2][3] NB: Refer to [Our ref: CF xx/xxxxx] above for Nos. 2&3

1. The first 10 digits is the vote number for Properties.
2. Followed by a space - then 2 digits for the allotment area number.
3. Followed by a space - then 5 digits for the erf number of the subject property.
4. Applications that comprise of multiple erven - only one erf number will be sufficient.

Yours faithfully

SENIOR DIRECTOR: LAND PLANNING AND MANAGEMENT

ENCLOSURE : As stated

2377-Theescombe-Route2/MMsimanga

nelson mandela bay
MUNICIPALITY

Human Settlements

Your ref:
Our ref: CF30/02377
Date: 3 October 2023
Who deals with this: Mr M Msimanga

Tel: +27 (0) 41 506 1095
Fax: +27 (0) 41 506 3430
PO Box 9, Port Elizabeth, 6000
Republic of South Africa
e-Mail: mmsimanga@mandelametro.gov.za

PER EMAIL

maartje@route2.co.za
Route² EC
Private Bag X0002
SUNRIDGE PARK
6008

Dear Madam

TOWN PLANNING DEPARTURE APPLICATION (TPD 5141) : ERF 2377, THEESCOMBE

I refer to previous correspondence in this regard and wish to advise that, by resolution of full Council at its meeting held on 16 July 2015 and in terms of Section 35 of the Spatial Planning and Land Use Management Act 16 of 2013, the Authorised Official on 21 September 2023 resolved as follows:

That, the application for Town Planning Departure (TPD 5141) for a side building line to be reduced from 30m to 8m applicable to Erf 2377, Theescombe, **BE SUPPORTED**, subject to:

(i) the departure being limited to the buildings depicted on Drawing No. 20230912_STABLES_SK08 dated 12 September 2023 only;
(ii) compliance with all other requirements as stipulated in Section 8 Zoning Scheme regulations for Agricultural 1 zoned properties;
(iii) approval lapsing after 5 years, in terms of Section 43(2) of the Spatial Planning and Land Use Management Act 2013 (SPLUMA) if conditions imposed are not implemented within the above stated period.

The Authorised Official's decision was based on the following reasons:

- The proposal is not considered to have a negative effect on the character of the area, subject to the conditions as set out in the Recommendation.

Please note, should you have any query relating to the above decision, please contact Ms N Ketelo, 506 3324 (Town Planning Admin), alternatively Town Planning Reception, 506 2241.

Your attention is also drawn to the provisions of Section 43 of the Spatial Planning and Land Use Management Act in respect of the lapsing of applications.

Furthermore, your attention is also drawn to the provisions of Section 51 of the Spatial Planning and Land Use Management Act in terms of which a right of appeal exists. Should you wish to exercise your right in terms hereof, such an appeal, accompanied by proof of payment in the amount of R4307,00 (VAT included) in favour of the Nelson Mandela Bay Municipality, must be directed to the Office of the City Manager (mailto: sthebe@mandelametro.gov.za, Attention: Senior Director: Strategic Planning and Co-ordination), Nelson Mandela Bay Municipality, P O Box 9, Port Elizabeth, 6000 within 21 days of the date of notification of the decision. (please refer to the attached Appeal Application Form)

Yours faithfully

SENIOR DIRECTOR: LAND PLANNING AND MANAGEMENT
ENCLOSURE : As stated
3-2377-Route2-AO/MMsimanga

cc Budget and Treasury - Valuations (Attention: I Forster)
Office of the City Manager (Attention S Thebe)
Building Inspectorate (Attention: N Naidoo
Land Planning (Attention: Ms V van der Mescht)
Properties (Attention: Carol Piers)
Senior Director: Land Planning and Management (Attention: D Magilindane)

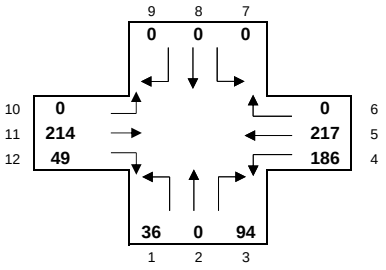
ANNEXURE B
Peak Hour
Traffic Counts

Project :	TIA : PROPOSED DEVELOPMENT IN THEESCOMBE			Day & date :	25/10/2024
Intersection :	KRAGGA KAMMA ROAD / WELCOME AVENUE	NO. 1		Time period:	15:00 - 18:00

STARTING TIME	WELCOME AVENUE Northbound				KRAGGA KAMMA ROAD Westbound				- Southbound				KRAGGA KAMMA ROAD Eastbound				INTER-SECTION	
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total	Hour
15:00	12	0	31	43	39	44	0	83	0	0	0	0	0	45	10	55	181	
15:15	4	0	34	38	42	56	0	98	0	0	0	0	0	55	6	61	197	
15:30	11	0	26	37	36	54	0	90	0	0	0	0	0	64	4	68	195	
15:45	4	0	23	27	44	54	0	98	0	0	0	0	0	42	6	48	173	746
16:00	6	0	31	37	38	53	0	91	0	0	0	0	0	45	11	56	184	749
16:15	5	0	30	35	32	49	0	81	0	0	0	0	0	47	9	56	172	724
16:30	12	0	17	29	45	50	0	95	0	0	0	0	0	53	13	66	190	719
16:45	12	0	24	36	44	61	0	105	0	0	0	0	0	51	15	66	207	753
17:00	6	0	29	35	48	61	0	109	0	0	0	0	0	59	10	69	213	782
17:15	6	0	24	30	49	45	0	94	0	0	0	0	0	51	11	62	186	796
17:30	3	0	23	26	31	36	0	67	0	0	0	0	0	38	5	43	136	742
17:45	9	0	23	32	28	98	0	126	0	0	0	0	0	40	10	50	208	743
Total	90	0	315	405	476	661	0	1137	0	0	0	0	0	590	110	700	2242	
Peak hour	36	0	94	130	186	217	0	403	0	0	0	0	0	214	49	263	796	
Peak 15 min				36				109				0				69	213	
PHF				0.90				0.92				#####				0.95	0.93	

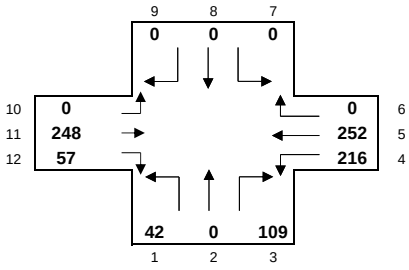
36

AM PEAK HOUR
2024



WELCOME AVENUE

AM PEAK HOUR
2029

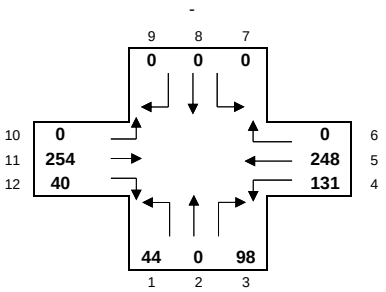


WELCOME AVENUE

Project :	TIA : PROPOSED DEVELOPMENT IN THEESCOMBE			Day & date :	26/10/2024
Intersection :	KRAGGA KAMMA ROAD / WELCOME AVENUE	NO. 1		Time period:	09:00 - 12:00

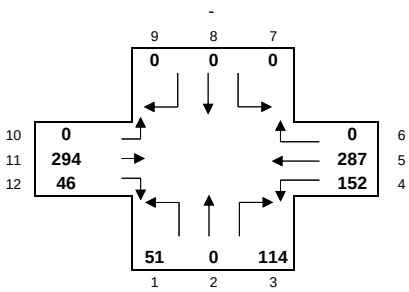
STARTING TIME	WELCOME AVENUE Northbound				KRAGGA KAMMA ROAD Westbound				- Southbound				KRAGGA KAMMA ROAD Eastbound				INTER-SECTION	
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total	Hour
9:00	11	0	24	35	33	64	0	97	0	0	0	0	0	65	13	78	210	
9:15	17	0	30	47	31	62	0	93	0	0	0	0	0	74	8	82	222	
9:30	7	0	28	35	37	66	0	103	0	0	0	0	0	52	7	59	197	
9:45	9	0	16	25	30	56	0	86	0	0	0	0	0	63	12	75	186	815
10:00	6	0	65	71	32	62	0	94	0	0	0	0	0	55	6	61	226	831
10:15	7	0	4	11	32	53	0	85	0	0	0	0	0	59	5	64	160	769
10:30	11	0	30	41	22	47	0	69	0	0	0	0	0	48	5	53	163	735
10:45	8	0	28	36	30	66	0	96	0	0	0	0	0	75	9	84	216	765
11:00	5	0	15	20	22	45	0	67	0	0	0	0	0	58	14	72	159	698
11:15	5	0	23	28	32	56	0	88	0	0	0	0	0	52	5	57	173	711
11:30	5	0	19	24	29	54	0	83	0	0	0	0	0	52	13	65	172	720
11:45	3	0	28	31	25	38	0	63	0	0	0	0	0	74	5	79	173	677
Total	94	0	310	404	355	669	0	1024	0	0	0	0	0	727	102	829	2084	
Peak hour	44	0	98	142	131	248	0	379	0	0	0	0	0	254	40	294	815	
Peak 15 min				47				103				0				82	222	
PHF				0.76				0.92				#####				0.90	0.92	

PM PEAK HOUR
2024



WELCOME AVENUE

PM PEAK HOUR
2029

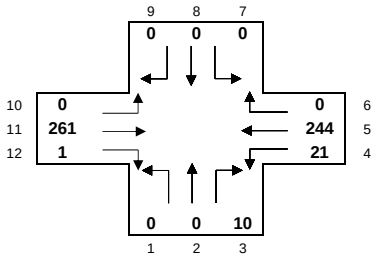


WELCOME AVENUE

Project :	TIA : PROPOSED DEVELOPMENT IN THEESCOMBE																		
Intersection :	KRAGGA KAMMA ROAD / PICKWICK AVENUE					NO. 2					Day & date :				25/10/2024				
											Time period:				15:00 - 18:00				
STARTING TIME	PICKWICK AVENUE Northbound				KRAGGA KAMMA ROAD Westbound				- Southbound				KRAGGA KAMMA ROAD Eastbound				INTER-SECTION	
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total	Hour
15:00	0	0	0	0	7	43	0	50	0	0	0	0	0	53	0	53	103	
15:15	0	0	4	4	1	57	0	58	0	0	0	0	0	47	0	47	109	
15:30	0	0	0	0	2	59	0	61	0	0	0	0	0	75	1	76	137	
15:45	0	0	0	0	0	52	0	52	0	0	0	0	0	47	0	47	99	448
16:00	0	0	0	0	1	75	0	76	0	0	0	0	0	58	1	59	135	480
16:15	0	0	2	2	4	61	0	65	0	0	0	0	0	58	0	58	125	496
16:30	0	0	1	1	5	58	0	63	0	0	0	0	0	77	0	77	141	500
16:45	0	0	3	3	6	73	0	79	0	0	0	0	0	62	0	62	144	545
17:00	0	0	5	5	7	48	0	55	0	0	0	0	0	59	1	60	120	530
17:15	0	0	1	1	3	65	0	68	0	0	0	0	0	63	0	63	132	537
17:30	0	0	1	1	5	42	0	47	0	0	0	0	0	45	0	45	93	489
17:45	0	0	3	3	5	51	0	56	0	0	0	0	0	39	2	41	100	445
Total	0	0	20	20	46	684	0	730	0	0	0	0	0	683	5	688	1438	
Peak hour	0	0	10	10	21	244	0	265	0	0	0	0	0	261	1	262	537	
Peak 15 min				5				79				0				77	144	
PHF				0.50				0.84				#####				0.85	0.93	

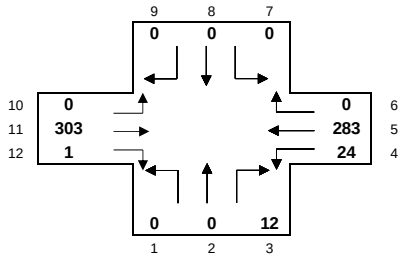
3

AM PEAK HOUR 2024



PICKWICK AVENUE

AM PEAK HOUR 2029



PICKWICK AVENUE

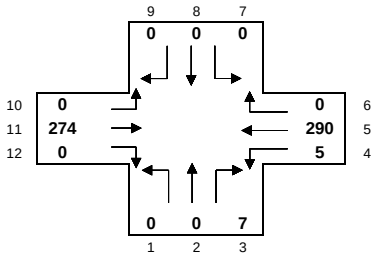
N

N

Project :	TIA : PROPOSED DEVELOPMENT IN THEESCOMBE																		
Intersection :	KRAGGA KAMMA ROAD / PICKWICK AVENUE					NO. 2					Day & date :				26/10/2024				
											Time period:				09:00 - 12:00				
STARTING TIME	PICKWICK AVENUE Northbound				KRAGGA KAMMA ROAD Westbound				- Southbound				KRAGGA KAMMA ROAD Eastbound				INTER-SECTION	
	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total	Hour
9:00	0	0	2	2	2	67	0	69	0	0	0	0	0	69	0	69	140	
9:15	0	0	3	3	1	72	0	73	0	0	0	0	0	77	0	77	153	
9:30	0	0	0	0	0	87	0	87	0	0	0	0	0	54	0	54	141	
9:45	0	0	2	2	2	64	0	66	0	0	0	0	0	74	0	74	142	576
10:00	0	0	1	1	3	52	0	55	0	0	0	0	0	59	0	59	115	551
10:15	0	0	1	1	1	67	0	68	0	0	0	0	0	61	0	61	130	528
10:30	1	0	3	4	2	56	0	58	0	0	0	0	0	44	0	44	106	493
10:45	0	0	2	2	2	74	0	76	0	0	0	0	0	70	0	70	148	499
11:00	0	0	1	1	2	57	0	59	0	0	0	0	0	80	1	81	141	525
11:15	0	0	4	4	1	63	0	64	0	0	0	0	0	54	1	55	123	518
11:30	0	0	0	0	2	64	0	66	0	0	0	0	0	77	0	77	143	555
11:45	0	0	2	2	2	41	0	43	0	0	0	0	0	69	0	69	114	521
Total	1	0	21	22	20	764	0	784	0	0	0	0	0	788	2	790	1482	
Peak hour	0	0	7	7	5	290	0	295	0	0	0	0	0	274	0	274	576	
Peak 15 min				3				87				0				77	153	
PHF				0.58				0.85				#####				0.89	0.94	

PM PEAK HOUR 2024

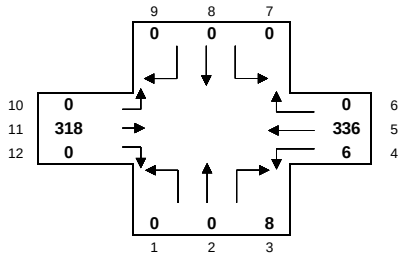
-



PICKWICK AVENUE

PM PEAK HOUR 2029

-



PICKWICK AVENUE

ANNEXURE C
Historical
Traffic Volumes

Erf 2377, Theescombe

Peak Hr Count Volumes

Count Period	Location	2010	2011	2021	Total Growth (%)	Average Growth Per Annum (from 2001)
PM	Kragga Kamma / Welcome - junction	701		861	22.82	1.89 %
PM	Kragga Kamma / Welcome - Krragga Kamma West	428		570	33.18	2.64 %
PM	Kragga Kamma / Welcome - Krragga Kamma East	655		781	19.24	1.61 %
	AVERAGE (All stations)					2.05 %

ANNEXURE D
SIDRA
OUTPUT
SHEETS: 2024
Before
Development

MOVEMENT SUMMARY

Site: 01 [[01] 01 PM ND (Site Folder: [01] 2024 Before Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[01] 2021 AM Before Development (Network Folder: [01] 2021 Before Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2024 Before Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Welcome Avenue															
1	L2	All MCs	38	0.0	38	0.0	0.197	9.1	LOS A	0.3	2.0	0.50	0.93	0.50	45.4
3	R2	All MCs	99	0.0	99	0.0	0.197	11.5	LOS B	0.3	2.0	0.50	0.93	0.50	49.5
Approach			137	0.0	137	0.0	0.197	10.9	LOS B	0.3	2.0	0.50	0.93	0.50	48.8
East: Kragga Kamma Road															
4	L2	All MCs	196	0.0	196	0.0	0.223	5.6	LOS A	0.0	0.0	0.00	0.27	0.00	55.2
5	T1	All MCs	228	0.0	228	0.0	0.223	0.1	LOS A	0.0	0.0	0.00	0.27	0.00	55.3
Approach			424	0.0	424	0.0	0.223	2.6	NA	0.0	0.0	0.00	0.27	0.00	55.2
West: Kragga Kamma Road															
11	T1	All MCs	225	0.0	225	0.0	0.160	0.5	LOS A	0.2	1.3	0.22	0.26	0.22	58.1
12	R2	All MCs	52	0.0	52	0.0	0.160	7.2	LOS A	0.2	1.3	0.22	0.26	0.22	55.5
Approach			277	0.0	277	0.0	0.160	1.8	NA	0.2	1.3	0.22	0.26	0.22	57.6
All Vehicles			838	0.0	838	0.0	0.223	3.7	NA	0.3	2.0	0.15	0.37	0.15	54.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 01 [[01] 01 SAT AM ND (Site Folder: [01] 2024 Before Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[01] 2021 PM Before Development (Network Folder: [01] 2021 Before Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2024 Before Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Welcome Avenue															
1	L2	All MCs	46	0.0	46	0.0	0.220	9.3	LOS A	0.3	2.3	0.52	0.93	0.52	45.1
3	R2	All MCs	103	0.0	103	0.0	0.220	12.0	LOS B	0.3	2.3	0.52	0.93	0.52	49.3
Approach			149	0.0	149	0.0	0.220	11.1	LOS B	0.3	2.3	0.52	0.93	0.52	48.5
East: Kragga Kamma Road															
4	L2	All MCs	138	0.0	138	0.0	0.208	5.6	LOS A	0.0	0.0	0.00	0.21	0.00	55.7
5	T1	All MCs	261	0.0	261	0.0	0.208	0.1	LOS A	0.0	0.0	0.00	0.21	0.00	56.4
Approach			399	0.0	399	0.0	0.208	2.0	NA	0.0	0.0	0.00	0.21	0.00	56.0
West: Kragga Kamma Road															
11	T1	All MCs	267	0.0	267	0.0	0.173	0.4	LOS A	0.2	1.1	0.16	0.19	0.16	58.6
12	R2	All MCs	42	0.0	42	0.0	0.173	7.1	LOS A	0.2	1.1	0.16	0.19	0.16	55.9
Approach			309	0.0	309	0.0	0.173	1.3	NA	0.2	1.1	0.16	0.19	0.16	58.2
All Vehicles			858	0.0	858	0.0	0.220	3.3	NA	0.3	2.3	0.15	0.33	0.15	55.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 02 [[01] 02 PM ND (Site Folder: [01] 2024 Before Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[01] 2021 AM Before Development (Network Folder: [01] 2021 Before Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2024 Before Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Pickwick Avenue															
1	L2	All MCs	1	0.0	1	0.0	0.017	9.0	LOS A	0.0	0.2	0.46	0.88	0.46	50.0
3	R2	All MCs	11	0.0	11	0.0	0.017	10.4	LOS B	0.0	0.2	0.46	0.88	0.46	45.9
Approach			12	0.0	12	0.0	0.017	10.3	LOS B	0.0	0.2	0.46	0.88	0.46	46.5
East: Kragga Kamma Road															
4	L2	All MCs	22	0.0	22	0.0	0.144	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	57.0
5	T1	All MCs	257	0.0	257	0.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.5
Approach			279	0.0	279	0.0	0.144	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.3
West: Kragga Kamma Road															
11	T1	All MCs	282	0.0	282	0.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	All MCs	1	0.0	1	0.0	0.145	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	57.1
Approach			283	0.0	283	0.0	0.145	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles			574	0.0	574	0.0	0.145	0.4	NA	0.0	0.2	0.01	0.04	0.01	59.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 02 [[01] 02 SAT AM ND (Site Folder: [01] 2024 Before Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[01] 2021 PM Before Development (Network Folder: [01] 2021 Before Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2024 Before Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Pickwick Avenue															
1	L2	All MCs	1	0.0	1	0.0	0.012	9.0	LOS A	0.0	0.1	0.46	0.87	0.46	50.1
3	R2	All MCs	7	0.0	7	0.0	0.012	10.4	LOS B	0.0	0.1	0.46	0.87	0.46	45.9
Approach			8	0.0	8	0.0	0.012	10.3	LOS B	0.0	0.1	0.46	0.87	0.46	46.8
East: Kragga Kamma Road															
4	L2	All MCs	22	0.0	22	0.0	0.144	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	57.0
5	T1	All MCs	257	0.0	257	0.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.5
Approach			279	0.0	279	0.0	0.144	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.3
West: Kragga Kamma Road															
11	T1	All MCs	288	0.0	288	0.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12	R2	All MCs	1	0.0	1	0.0	0.149	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	57.1
Approach			289	0.0	289	0.0	0.149	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles			577	0.0	577	0.0	0.149	0.4	NA	0.0	0.1	0.01	0.04	0.01	59.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

ANNEXURE E
Access Control Calculation Sheet

Table 5: Access Control Queue Lengths

Nque	1 Channel	2 Channel	3 Channel	4 Channel	5 Channel	6 Channel
1	23	58	97	140	188	235
2	39	94	155	220	292	363
3	49	115	186	261	341	421
4	56	128	205	283	367	449
5	61	137	216	297	382	466
6	65	143	224	306	392	476
7	68	147	229	312	399	484
8	70	151	233	317	403	489
9	71	153	236	321	407	493
10	73	155	239	324	410	496

Inputs

Max Que	Max Lanes
1	1

Table 4: Access Control Service Flow Rates

Control Type	Service Flow (vph)
Swipe Magnetic card	480
Remote controlled gates	450
Ticket dispenser: Automatic	390
Ticket dispenser: Push Button	220
Pin number operated gates	150
Pay fee on entry	120
Cell-phone operated gates (gate opens when a call is received)	100
Manual recording, visitor completes form	80
Intercom operated gates (visitor contacts resident by intercom)	50
Boom open	600

Total volume		77	
PHF		0.9	
Service Flow rate			
Control type	Boom open	600	
Traffic ratio		14.25926	23
Maximum queue length Available Storage (Vehicles per channel)		1	
Maximum number of lanes available		1	

The number of entry lanes and the number of vehicles queuing in each lane are

$$\text{Traffic ratio} = \frac{\text{Total Volume} / \text{PHF}}{\text{Service flow rate}} \cdot 100$$

The number of lanes and queue length is then determined from **Table 5** below (Table 31 in TM16 Vol 2).

ANNEXURE F
SIDRA
OUTPUT
SHEETS: 2024
After
Development

MOVEMENT SUMMARY

Site: 01 [[02] 01 PM AD (Site Folder: [02] 2024 After Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[02] 2021 AM After Development (Network Folder: [02] 2021 After Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2024 After Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Welcome Avenue															
1	L2	All MCs	47	0.0	47	0.0	0.220	9.2	LOS A	0.3	2.3	0.53	0.93	0.53	45.0
3	R2	All MCs	99	0.0	99	0.0	0.220	12.3	LOS B	0.3	2.3	0.53	0.93	0.53	49.2
Approach			146	0.0	146	0.0	0.220	11.3	LOS B	0.3	2.3	0.53	0.93	0.53	48.3
East: Kragga Kamma Road															
4	L2	All MCs	196	0.0	196	0.0	0.239	5.6	LOS A	0.0	0.0	0.00	0.25	0.00	55.3
5	T1	All MCs	260	0.0	260	0.0	0.239	0.1	LOS A	0.0	0.0	0.00	0.25	0.00	55.6
Approach			456	0.0	456	0.0	0.239	2.4	NA	0.0	0.0	0.00	0.25	0.00	55.4
West: Kragga Kamma Road															
11	T1	All MCs	248	0.0	248	0.0	0.179	0.6	LOS A	0.2	1.5	0.23	0.28	0.23	58.0
12	R2	All MCs	58	0.0	58	0.0	0.179	7.4	LOS A	0.2	1.5	0.23	0.28	0.23	55.4
Approach			306	0.0	306	0.0	0.179	1.9	NA	0.2	1.5	0.23	0.28	0.23	57.5
All Vehicles			908	0.0	908	0.0	0.239	3.7	NA	0.3	2.3	0.16	0.37	0.16	54.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 01 [[02] 01 SAT AM AD (Site Folder: [02] 2024 After Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[02] 2021 PM After Development (Network Folder: [02] 2021 After Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2024 After Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Welcome Avenue															
1	L2	All MCs	62	0.0	62	0.0	0.271	10.0	LOS B	0.4	3.0	0.58	0.98	0.64	43.9
3	R2	All MCs	103	0.0	103	0.0	0.271	13.8	LOS B	0.4	3.0	0.58	0.98	0.64	48.6
Approach			165	0.0	165	0.0	0.271	12.4	LOS B	0.4	3.0	0.58	0.98	0.64	47.4
East: Kragga Kamma Road															
4	L2	All MCs	104	0.0	104	0.0	0.231	5.6	LOS A	0.0	0.0	0.00	0.14	0.00	56.2
5	T1	All MCs	341	0.0	341	0.0	0.231	0.1	LOS A	0.0	0.0	0.00	0.14	0.00	57.5
Approach			445	0.0	445	0.0	0.231	1.4	NA	0.0	0.0	0.00	0.14	0.00	57.0
West: Kragga Kamma Road															
11	T1	All MCs	311	0.0	311	0.0	0.208	0.5	LOS A	0.2	1.5	0.19	0.23	0.19	58.4
12	R2	All MCs	55	0.0	55	0.0	0.208	7.4	LOS A	0.2	1.5	0.19	0.23	0.19	55.7
Approach			365	0.0	365	0.0	0.208	1.5	NA	0.2	1.5	0.19	0.23	0.19	58.0
All Vehicles			976	0.0	976	0.0	0.271	3.3	NA	0.4	3.0	0.17	0.31	0.18	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 02 [[02] 02 PM AD (Site Folder: [02] 2024 After Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[02] 2021 AM After Development (Network Folder: [02] 2021 After Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2024 After Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Pickwick Avenue															
1	L2	All MCs	1	0.0	1	0.0	0.025	9.0	LOS A	0.0	0.2	0.53	0.92	0.53	49.0
2	T1	All MCs	1	0.0	1	0.0	0.025	11.5	LOS B	0.0	0.2	0.53	0.92	0.53	49.0
3	R2	All MCs	11	0.0	11	0.0	0.025	12.4	LOS B	0.0	0.2	0.53	0.92	0.53	44.1
Approach			13	0.0	13	0.0	0.025	12.0	LOS B	0.0	0.2	0.53	0.92	0.53	45.4
East: Kragga Kamma Road															
4	L2	All MCs	22	0.0	22	0.0	0.175	6.4	LOS A	0.2	1.1	0.15	0.19	0.15	56.0
5	T1	All MCs	257	0.0	257	0.0	0.175	0.2	LOS A	0.2	1.1	0.15	0.19	0.15	58.4
6	R2	All MCs	41	0.0	41	0.0	0.175	6.6	LOS A	0.2	1.1	0.15	0.19	0.15	55.7
Approach			320	0.0	320	0.0	0.175	1.5	NA	0.2	1.1	0.15	0.19	0.15	57.8
North: Access Road															
7	L2	All MCs	29	0.0	29	0.0	0.038	9.2	LOS A	0.1	0.4	0.40	0.86	0.40	46.7
8	T1	All MCs	1	0.0	1	0.0	0.038	11.7	LOS B	0.1	0.4	0.40	0.86	0.40	50.5
9	R2	All MCs	4	0.0	4	0.0	0.038	12.1	LOS B	0.1	0.4	0.40	0.86	0.40	50.3
Approach			35	0.0	35	0.0	0.038	9.6	LOS A	0.1	0.4	0.40	0.86	0.40	47.6
West: Kragga Kamma Road															
10	L2	All MCs	8	0.0	8	0.0	0.153	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.3
11	T1	All MCs	288	0.0	288	0.0	0.153	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
12	R2	All MCs	1	0.0	1	0.0	0.153	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.0
Approach			298	0.0	298	0.0	0.153	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.5
All Vehicles			665	0.0	665	0.0	0.175	1.5	NA	0.2	1.1	0.10	0.16	0.10	57.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 02 [[02] 02 SAT AM AD (Site Folder: [02] 2024 After Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[02] 2021 PM After Development (Network Folder: [02] 2021 After Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2024 After Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Pickwick Avenue															
1	L2	All MCs	1	0.0	1	0.0	0.021	9.2	LOS A	0.0	0.2	0.56	0.92	0.56	48.4
2	T1	All MCs	1	0.0	1	0.0	0.021	12.2	LOS B	0.0	0.2	0.56	0.92	0.56	48.4
3	R2	All MCs	7	0.0	7	0.0	0.021	13.7	LOS B	0.0	0.2	0.56	0.92	0.56	43.2
Approach			9	0.0	9	0.0	0.021	13.0	LOS B	0.0	0.2	0.56	0.92	0.56	44.9
East: Kragga Kamma Road															
4	L2	All MCs	5	0.0	5	0.0	0.214	6.7	LOS A	0.2	1.7	0.19	0.22	0.19	55.8
5	T1	All MCs	305	0.0	305	0.0	0.214	0.4	LOS A	0.2	1.7	0.19	0.22	0.19	58.2
6	R2	All MCs	73	0.0	73	0.0	0.214	6.6	LOS A	0.2	1.7	0.19	0.22	0.19	55.5
Approach			383	0.0	383	0.0	0.214	1.6	NA	0.2	1.7	0.19	0.22	0.19	57.6
North: Access Road															
7	L2	All MCs	56	0.0	56	0.0	0.068	9.3	LOS A	0.1	0.7	0.41	0.88	0.41	46.6
8	T1	All MCs	1	0.0	1	0.0	0.068	12.6	LOS B	0.1	0.7	0.41	0.88	0.41	50.4
9	R2	All MCs	6	0.0	6	0.0	0.068	13.5	LOS B	0.1	0.7	0.41	0.88	0.41	50.2
Approach			63	0.0	63	0.0	0.068	9.7	LOS A	0.1	0.7	0.41	0.88	0.41	47.3
West: Kragga Kamma Road															
10	L2	All MCs	8	0.0	8	0.0	0.153	5.6	LOS A	0.0	0.0	0.01	0.02	0.01	57.3
11	T1	All MCs	288	0.0	288	0.0	0.153	0.0	LOS A	0.0	0.0	0.01	0.02	0.01	59.6
12	R2	All MCs	1	0.0	1	0.0	0.153	5.6	LOS A	0.0	0.0	0.01	0.02	0.01	57.0
Approach			298	0.0	298	0.0	0.153	0.2	NA	0.0	0.0	0.01	0.02	0.01	59.5
All Vehicles			754	0.0	754	0.0	0.214	1.9	NA	0.2	1.7	0.14	0.20	0.14	57.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

ANNEXURE G
SIDRA
OUTPUT
SHEETS: 2029
After
Development

MOVEMENT SUMMARY

Site: 01 [[03] 01 PM AD (Site Folder: [03] 2029 After Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[03] 2026 AM After Development (Network Folder: [03] 2026 After Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2029 After Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Welcome Avenue															
1	L2	All MCs	54	0.0	54	0.0	0.285	9.8	LOS A	0.5	3.3	0.59	0.98	0.67	43.6
3	R2	All MCs	115	0.0	115	0.0	0.285	14.0	LOS B	0.5	3.3	0.59	0.98	0.67	48.4
Approach			168	0.0	168	0.0	0.285	12.7	LOS B	0.5	3.3	0.59	0.98	0.67	47.4
East: Kragga Kamma Road															
4	L2	All MCs	227	0.0	227	0.0	0.275	5.6	LOS A	0.0	0.0	0.00	0.26	0.00	55.3
5	T1	All MCs	297	0.0	297	0.0	0.275	0.1	LOS A	0.0	0.0	0.00	0.26	0.00	55.5
Approach			524	0.0	524	0.0	0.275	2.5	NA	0.0	0.0	0.00	0.26	0.00	55.4
West: Kragga Kamma Road															
11	T1	All MCs	284	0.0	284	0.0	0.210	0.8	LOS A	0.3	1.9	0.26	0.31	0.26	57.9
12	R2	All MCs	66	0.0	66	0.0	0.210	7.9	LOS A	0.3	1.9	0.26	0.31	0.26	55.3
Approach			351	0.0	351	0.0	0.210	2.1	NA	0.3	1.9	0.26	0.31	0.26	57.4
All Vehicles			1043	0.0	1043	0.0	0.285	4.0	NA	0.5	3.3	0.18	0.39	0.19	54.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 01 [[03] 01 SAT AM AD (Site Folder: [03] 2029 After Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[03] 2026 PM After Development (Network Folder: [03] 2026 After Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2029 After Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Welcome Avenue															
1	L2	All MCs	69	0.0	69	0.0	0.349	10.7	LOS B	0.6	4.4	0.64	1.03	0.81	42.3
3	R2	All MCs	120	0.0	120	0.0	0.349	16.0	LOS C	0.6	4.4	0.64	1.03	0.81	47.6
Approach			189	0.0	189	0.0	0.349	14.1	LOS B	0.6	4.4	0.64	1.03	0.81	46.3
East: Kragga Kamma Road															
4	L2	All MCs	160	0.0	160	0.0	0.270	5.6	LOS A	0.0	0.0	0.00	0.18	0.00	55.9
5	T1	All MCs	359	0.0	359	0.0	0.270	0.1	LOS A	0.0	0.0	0.00	0.18	0.00	56.7
Approach			519	0.0	519	0.0	0.270	1.8	NA	0.0	0.0	0.00	0.18	0.00	56.3
West: Kragga Kamma Road															
11	T1	All MCs	353	0.0	353	0.0	0.240	0.6	LOS A	0.3	1.8	0.21	0.25	0.21	58.3
12	R2	All MCs	61	0.0	61	0.0	0.240	7.9	LOS A	0.3	1.8	0.21	0.25	0.21	55.6
Approach			414	0.0	414	0.0	0.240	1.7	NA	0.3	1.8	0.21	0.25	0.21	57.9
All Vehicles			1122	0.0	1122	0.0	0.349	3.8	NA	0.6	4.4	0.18	0.35	0.21	55.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 02 [[03] 02 PM AD (Site Folder: [03] 2029 After Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[03] 2026 AM After Development (Network Folder: [03] 2026 After Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2029 After Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Pickwick Avenue															
1	L2	All MCs	1	0.0	1	0.0	0.033	9.2	LOS A	0.0	0.3	0.57	0.94	0.57	48.4
2	T1	All MCs	1	0.0	1	0.0	0.033	12.2	LOS B	0.0	0.3	0.57	0.94	0.57	48.4
3	R2	All MCs	13	0.0	13	0.0	0.033	13.4	LOS B	0.0	0.3	0.57	0.94	0.57	43.2
Approach			15	0.0	15	0.0	0.033	13.0	LOS B	0.0	0.3	0.57	0.94	0.57	44.4
East: Kragga Kamma Road															
4	L2	All MCs	25	0.0	25	0.0	0.198	6.5	LOS A	0.2	1.2	0.14	0.19	0.14	56.1
5	T1	All MCs	298	0.0	298	0.0	0.198	0.2	LOS A	0.2	1.2	0.14	0.19	0.14	58.5
6	R2	All MCs	41	0.0	41	0.0	0.198	6.7	LOS A	0.2	1.2	0.14	0.19	0.14	55.8
Approach			364	0.0	364	0.0	0.198	1.4	NA	0.2	1.2	0.14	0.19	0.14	58.0
North: Access Road															
7	L2	All MCs	29	0.0	29	0.0	0.040	9.4	LOS A	0.1	0.4	0.43	0.87	0.43	46.4
8	T1	All MCs	1	0.0	1	0.0	0.040	12.5	LOS B	0.1	0.4	0.43	0.87	0.43	50.3
9	R2	All MCs	4	0.0	4	0.0	0.040	13.0	LOS B	0.1	0.4	0.43	0.87	0.43	50.1
Approach			35	0.0	35	0.0	0.040	9.9	LOS A	0.1	0.4	0.43	0.87	0.43	47.3
West: Kragga Kamma Road															
10	L2	All MCs	4	0.0	4	0.0	0.167	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.4
11	T1	All MCs	319	0.0	319	0.0	0.167	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
12	R2	All MCs	1	0.0	1	0.0	0.167	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.1
Approach			324	0.0	324	0.0	0.167	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.7
All Vehicles			738	0.0	738	0.0	0.198	1.5	NA	0.2	1.2	0.10	0.16	0.10	57.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 02 [[03] 02 SAT AM AD (Site Folder: [03] 2029 After Development)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [[03] 2026 PM After Development (Network Folder: [03] 2026 After Development)]

Traffic Impact Assessment for a Proposed
Function Venue on Erf 2377, Theescombe, Port Elizabeth
2029 After Development
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Pickwick Avenue															
1	L2	All MCs	1	0.0	1	0.0	0.037	9.5	LOS A	0.0	0.3	0.72	0.99	0.72	45.6
2	T1	All MCs	1	0.0	1	0.0	0.037	12.9	LOS B	0.0	0.3	0.72	0.99	0.72	45.6
3	R2	All MCs	8	0.0	8	0.0	0.037	19.6	LOS C	0.0	0.3	0.72	0.99	0.72	39.0
Approach			11	0.0	11	0.0	0.037	17.9	LOS C	0.0	0.3	0.72	0.99	0.72	40.9
East: Kragga Kamma Road															
4	L2	All MCs	6	0.0	6	0.0	0.240	6.7	LOS A	0.3	1.8	0.18	0.20	0.18	55.9
5	T1	All MCs	354	0.0	354	0.0	0.240	0.3	LOS A	0.3	1.8	0.18	0.20	0.18	58.3
6	R2	All MCs	73	0.0	73	0.0	0.240	6.7	LOS A	0.3	1.8	0.18	0.20	0.18	55.6
Approach			433	0.0	433	0.0	0.240	1.5	NA	0.3	1.8	0.18	0.20	0.18	57.8
North: Access Road															
7	L2	All MCs	8	0.0	8	0.0	0.689	14.3	LOS B	2.0	14.0	0.82	1.27	1.65	37.7
8	T1	All MCs	335	0.0	335	0.0	0.689	20.2	LOS C	2.0	14.0	0.82	1.27	1.65	44.7
9	R2	All MCs	1	0.0	1	0.0	0.689	21.8	LOS C	2.0	14.0	0.82	1.27	1.65	44.5
Approach			344	0.0	344	0.0	0.689	20.1	LOS C	2.0	14.0	0.82	1.27	1.65	44.6
West: Kragga Kamma Road															
10	L2	All MCs	14	0.0	14	0.0	0.157	5.6	LOS A	0.0	0.1	0.01	0.03	0.01	57.2
11	T1	All MCs	288	0.0	288	0.0	0.157	0.0	LOS A	0.0	0.1	0.01	0.03	0.01	59.3
12	R2	All MCs	2	0.0	2	0.0	0.157	5.9	LOS A	0.0	0.1	0.01	0.03	0.01	56.9
Approach			304	0.0	304	0.0	0.157	0.3	NA	0.0	0.1	0.01	0.03	0.01	59.1
All Vehicles			1092	0.0	1092	0.0	0.689	7.2	NA	2.0	14.0	0.34	0.50	0.60	52.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.