
**Application for Township Establishment on
Portion of Remainder for Bizweni Farm No.
18223 Within the
uMzimkhulu Local Municipality**

**Final Report
Rev A
Traffic Impact Assessment**

October 2023

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Project Ref No	01
Professional Engineer	Mr Clint Morck
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VERIFICATION FOR TRAFFIC IMPACT ASSESSMENT

PROPOSED APPLICATION FOR BIZWENI TOWNSHIP ESTABLISHMENT, SITUATED WITHIN BEZWENI FARM NO. 18223 OF THE UMZIMKHULU LOCAL MUNICIPALITY

"It is herewith certified that this Traffic Impact Assessment has been prepared according to requirements of the South African Traffic Impact and Site Traffic Assessment Manual".

1

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1. INTRODUCTION

Trans Traffic (Pty) Ltd have been appointed by **Mlala Emazweni** to undertake a Traffic Impact Assessment (TIA) for the **Proposed Application for Bizweni Township Establishment**, situated within **Bezweni Farm No. 18223** of the **uMzimkhulu Local Municipality**. The TIA is in support of the town planning application for the provision and implementation of Township Establishment projects that will occur in accordance with the terms of the Housing Scheme **(as described in the National Housing Code)**.

The Bezweni Township Establishment project is situated within Portions of **Wards 19** of the uMzimkhulu Local Municipality of KwaZulu-Natal. The size of the project area is described on a SDP. The project area will consist of **“Greenfield”** development thus creating new access roads with additional services. The Bezweni Township Establishment Development has been earmarked for a potential of **755 Mixed use Stands**.

The locality of the site is indicated in **Figure 1** (Site Location) and **Figure 2** (Locality Plan) below.

The aim of this study is to investigate the impact of the development of low cost housing project on the existing road network operating conditions during the base year and forecast year scenarios. The study will evaluate the need for the implementation of road upgrades and or intersection improvements necessary to mitigate the impact of current and envisaged operations resulting from on-site improvements.

The expected trip generation, distribution and assignment, capacity analyses, and access arrangements are discussed in the report. Additionally, comments are made on the road infrastructure and intersections within the primary study area of the site.

The site falls within the jurisdiction of the uMzimkhulu Local Municipality, with the roads under the responsibility of the KZN DoT and Local Municipality. This study is therefore undertaken in terms of the COTO - TMH 17 Vol 1 *“Manual for Traffic Impact Assessments and Site Traffic Assessments”* (**Reference 1**).

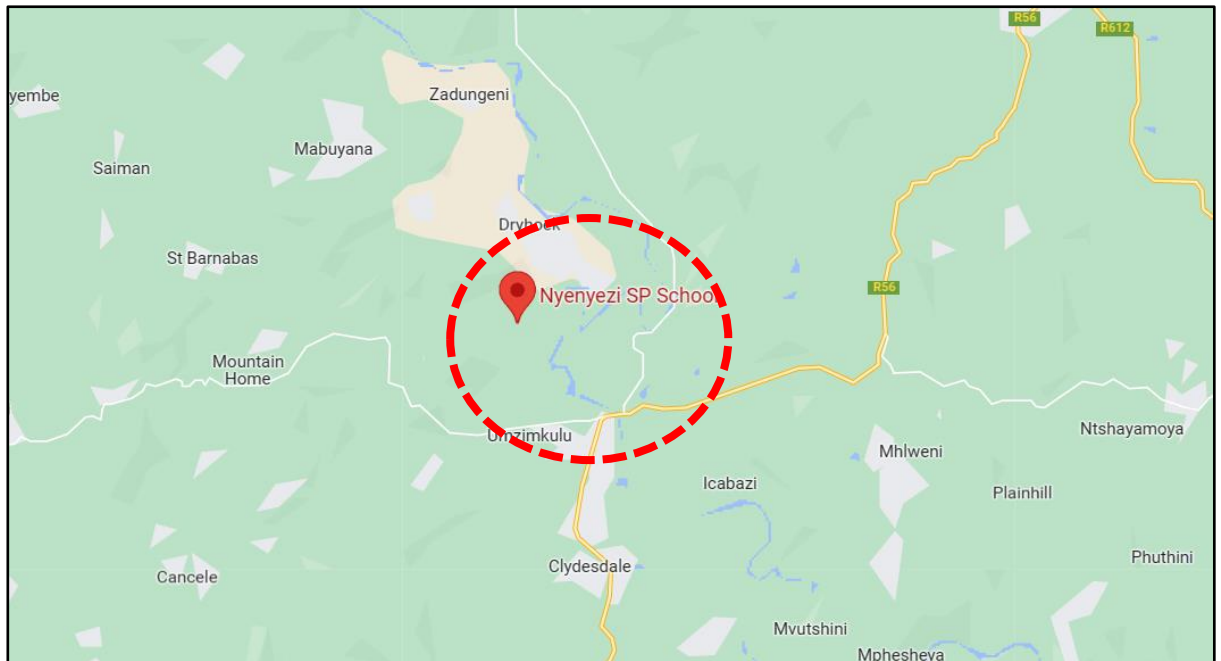


Figure 1: Site Location

Courtesy of Google Maps

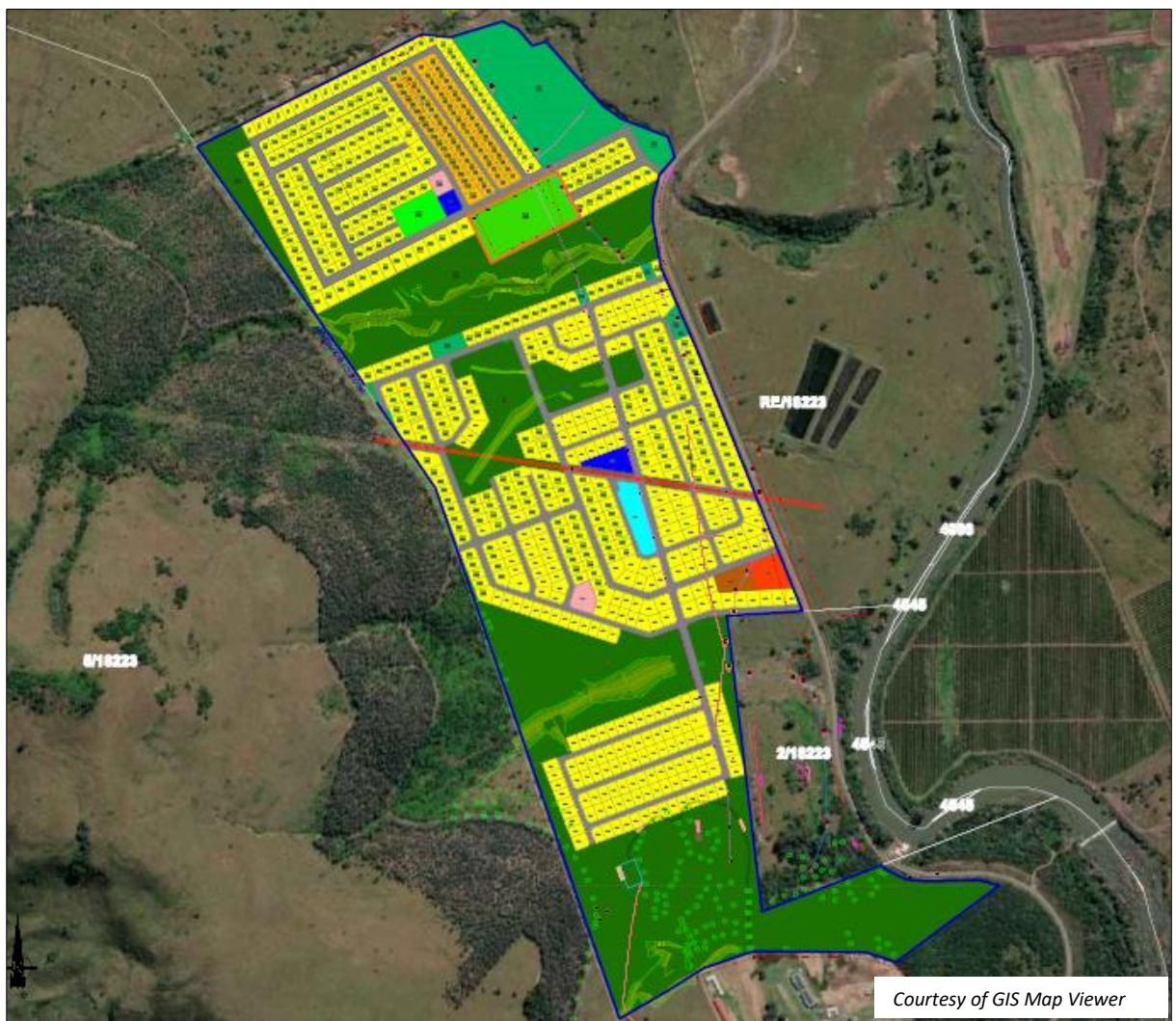


Figure 2: Locality Plan

Courtesy of GIS Map Viewer

2. DEVELOPMENT PARTICULARS

2.1 Existing Land Use

The application sites fall within Wards 19 of uMzimkhulu Local Municipality and are located within the Bezweni Township Establishment. Currently applicable site are vacant land used as grazing land.

The site was earmarked for the development but not zoned for such purpose. The predominant land uses in proximity of the site are schools, Hospital and low-Density Housing (rural development).

The site access will be obtained from the existing municipality roads and **KZN DoT Main Road (provincial road P 749)**. The site development Plan with a detailed area schedule is shown on **SDP** which is attached as **Annexure A (Site Development Plan)**.

2.2 Situational analysis

- This situational analysis was based on a combination of on-site observations during the morning and **afternoon peak periods**, together with the undertaking of observation along the main route.
- No detailed public transport surveys and interviews were initially undertaken for the situational analysis. However, a high-level qualitative assessment was undertaken based on site observations.
- No detailed pedestrian surveys were undertaken at this stage. Nonetheless, a pedestrian assessment was based on information gathered during the commuter peak hour site visits.

2.3 Proposed Land Use

The proposed development site will consist of:

- A 30m buffer was used around pristine vegetation, as depicted by the development layout.
- 15m Building line applies to all Provincial Roads and a 10m building line to all District Roads.
- An 12m clearance should be kept from Eskom overhead medium voltage lines and 3m from low voltage lines.

LAND USE					
ZONING	LAND USE		NO. OF STANDS	AREA HECTARES	% OF AREA
RESIDENTIAL ONLY DETACHED	RESIDENTIAL		657	61.3	38.1
RESIDENTIAL ONLY MEDIUM DENSITY	RESIDENTIAL		77	4.3	2.6
BUSINESS 1	SHOPS		2	0.6	0.3
EDUCATIONAL	SCHOOL		1	2.9	1.8
EDUCATIONAL	CRECHE		2	0.5	0.12
ENVIRONMENTAL SERVICE	CONSERVATION		6	59	36.7
ACTIVE OPEN SPACE	PARK		1	0.7	0.4
ACTIVE OPEN SPACE	SPORT FIELD		1	0.8	0.5
PASSIVE OPEN SPACE	OPEN SPACE		7	7.9	4.92
GOVERNMENT AND MUNICIPAL	LIBRARY		1	0.4	0.24
GOVERNMENT AND MUNICIPAL	COMMUNITY FACILITY		1	0.6	0.3
STREETS	*		*	22	13.7
TOTAL	*		755	160.5	100

3. STUDY AREA

3.1 Primary Study Area

The primary study area is one from which transportation elements are selected for a traffic impact assessment study. These elements include, but are not limited to the site access, existing external roads and planned roads.

3.1.1 General

The selection of lane width is based on traffic volume and vehicle type and speed. Higher volumes and speeds require wider lanes, and the greatest lane width recommended is **3,7 m**. Where traffic volumes are such that a multilane cross-section or a divided cross-section is required, **3,7 m** is a logical lane width to adopt. No operational or safety benefit accrues from lane widths wider than **3,7 m**, although some urban authorities allow lane widths as broad as **5,5 m**.

In peak hours, these wider lanes tend to carry two lanes of moving passenger cars each. They also ease the process of passenger cars overtaking buses without encroaching significantly on the opposing lane. Finally, they enable informal parking in the absence of demarcated parking bays. As such, **5,5 m** lanes tend to be used only in higher-order mixed-usage streets.

The narrowest lane width recommended is **3,1 m**, which gives a clear space of **0,25 m** on either side of a vehicle that is **2,6 m** wide i.e. a bus. This width would normally be employed only where speeds or traffic volumes are expected to be low and buses infrequent, e.g. on residential streets. If the route is not intended ever to accommodate buses, the lane width could be reduced to as little as **2,7 m**. Intermediate conditions of volume and speed can be adequately catered for by a lane width of **3,4 m**. Streets where pedestrian activities are expected to predominate may have only one lane, with provision for passing made at intervals. In this case, the lane width should not be less than **3,1 m**. Passing bays should be provided at not more than **50 m** spacings.

3.1.2 Site Access

The proposed development is to be accessed via the existing intersection of **P 749/ Unnamed Gravel**.

- **Access 1**

Access to the development is proposed via P 749/ Existing Gravel Road which is the existing intersection toward west direction. The access is proposed to serve the development. The access are recommended to be developed as per KZN DoT Standard or guidelines in this instance the access will have to be as per recommendation since is an existing.

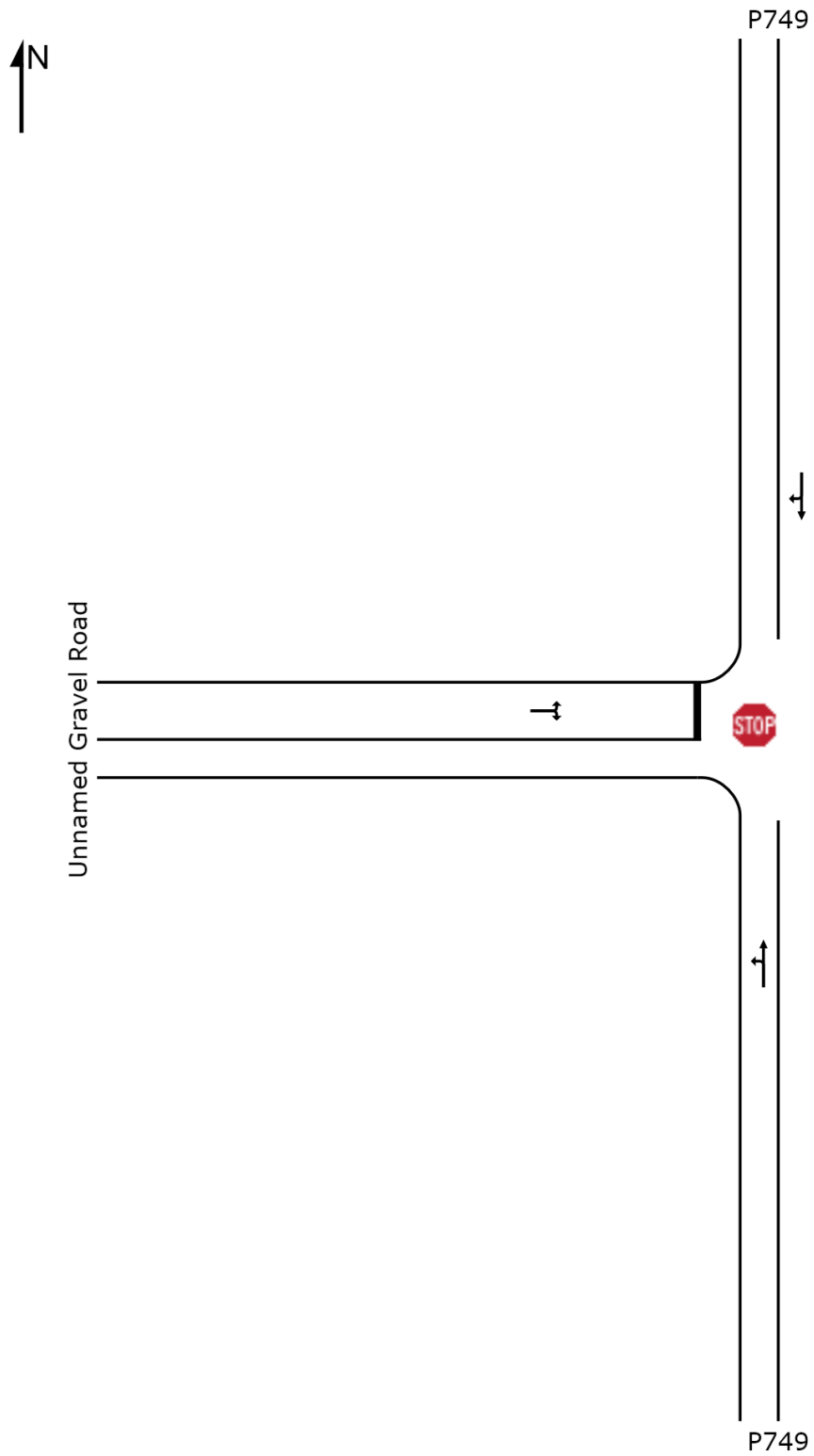


Figure 3: Recommended Access 1



Figure 4: Existing Access 1

3.1.3 External Road Network

External roads are those that are likely to be impacted upon by the site. These are normally restricted to Class 4 and Class 5 roads in the vicinity of a development up to the first Class 1 to Class 3 roads that can be reached by the lower order roads.

The external roads applicable for purposes of this study are the following:

- P 749
- Unnamed Gravel

3.2 Existing Intersection.

The existing intersections in the primary study area is summarised as follows:

P 749 / Unnamed Gravel – this is the main 3 - leg stop-controlled intersection south – north is P 749 which is the main road and east – west is unnamed gravel forming a T junction. The pertinent roads network is illustrated in **Figure 5 (Existing Intersections)** below

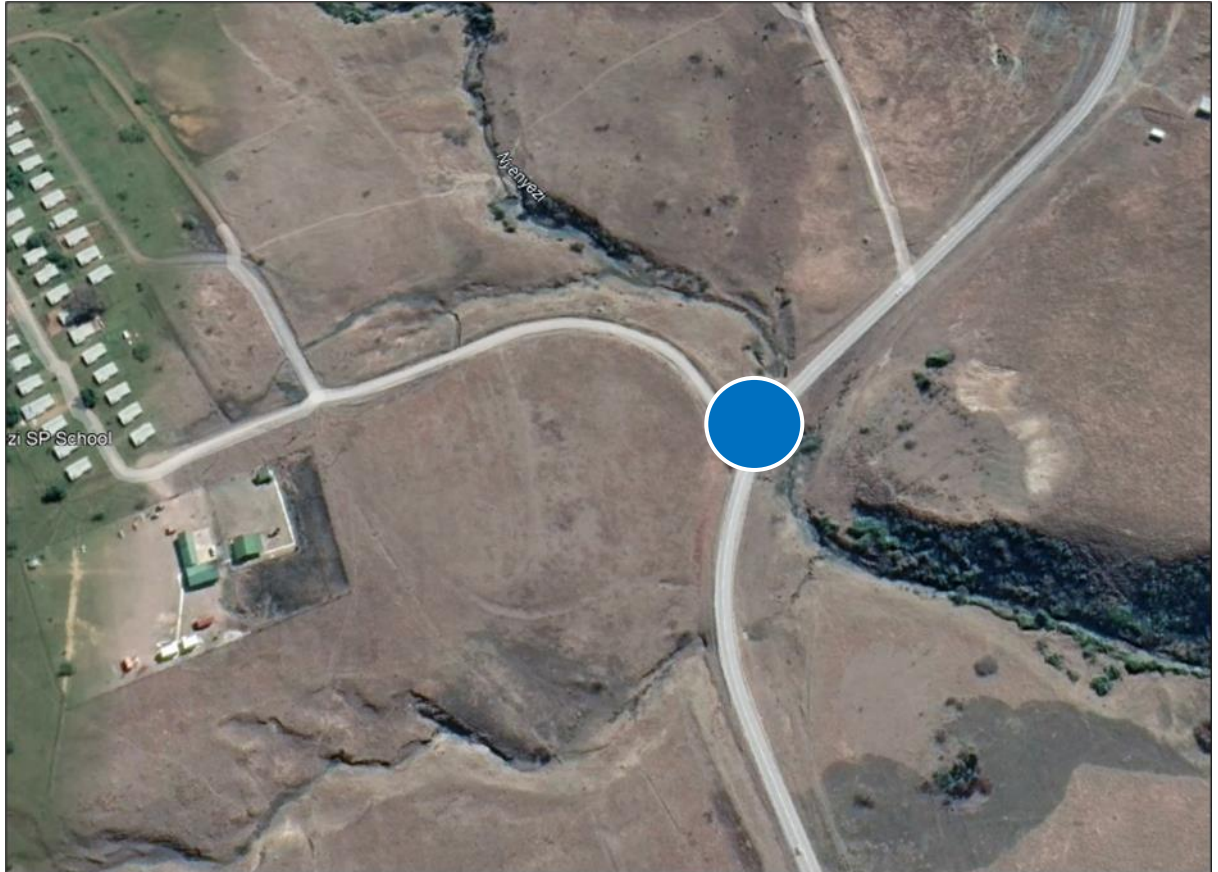


Figure 5: Existing Intersections

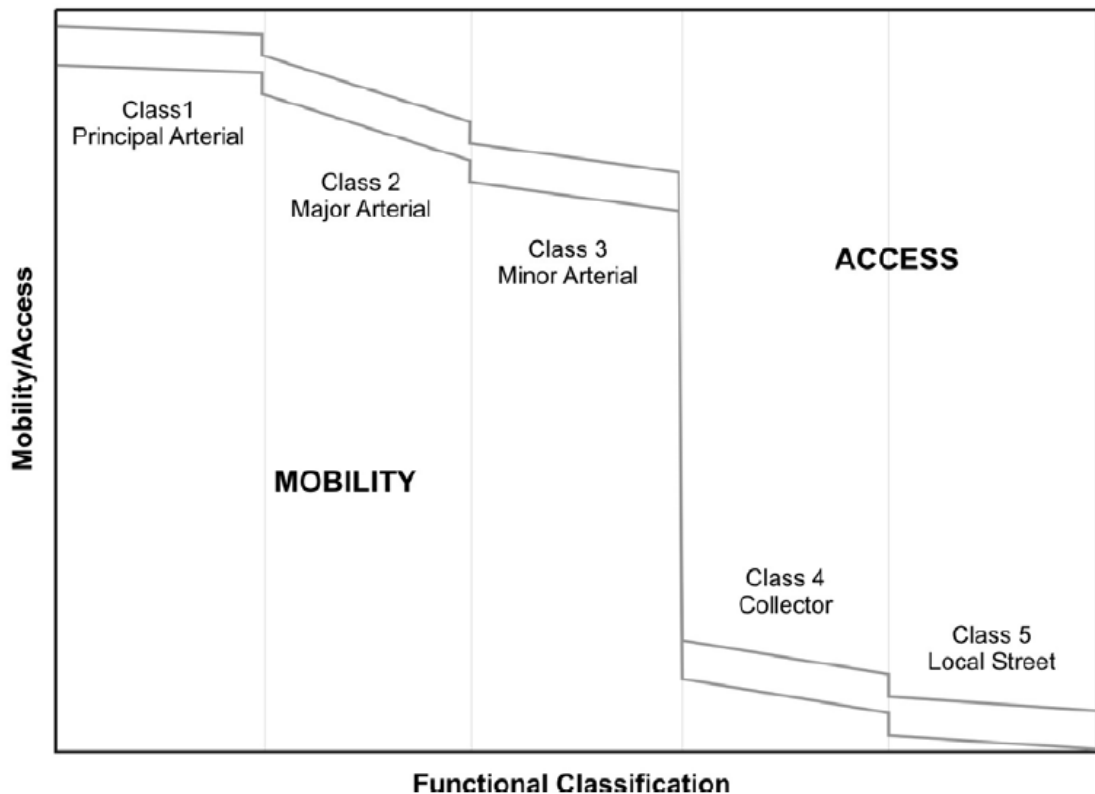
4. BACKGROUND INFORMATION

This part of the study details the transportation facilities that are relevant to the assessment, and include amongst others, existing roads, intersections, public transport services and infrastructure, and non-motorised transport facilities.

4.1 Important Definitions and Functional Classification of Roads

Due to recent changes and updates made on TRH26, the following definitions are applicable in the description of the site.

- **Arterial** - class 1, 2 or 3 vehicle priority, access managed, mobility route whose major function is to provide for movement of person and goods vehicles between cities, towns or urban districts with as few restrictions as possible.
- **Collector** - a road which collects (or distributes) traffic in a local district. Collectors do not carry traffic passing through the district with destinations elsewhere but serve as activity spines and streets. Although all roads have a “collection function”, the term “collector” is reserved for Class 4 roads.
- **Distributor** - long distance arterials which distribute traffic over wide areas. Although all roads have a “distribution function”, the term “distributor” is reserved for Class 1 to 3 roads and is often preferred to the word “arterial” in rural areas.
- **Functional classification** - the classification of roads and streets according to their primary function, i.e. mobility/movement or access/activity, subdivided into Classes according to the character of service they are intended to render.
- **Street** - a town or village “road” typically with access to buildings on one or both sides. A street is exclusively associated with the access/activity function (see road).
- **Road** - a wide way between places. Roads are generally but not exclusively associated with the mobility function (see street).
- **Local road/street** - A Class 5 road (rural) or street (urban) carrying traffic with origins or destinations in the immediate (local) area with the main purpose of giving access to individual properties



4.2 Existing Road Network

The site is bound by P 749 to the east and Gravel road to the – west. The surrounding road network is briefly described below and classified according to the KZN- DoT GIS Viewer and COTO “Manual for Traffic Impact Assessment and Site Traffic Assessment” (*Reference 1*).

P 749 is a Class 3 - The road is a single carriageway with one lane in either direction under the auspice of KZN DOT providing access to the phase one of the development and proposed to continue serve the proposed development.

Gravel Road is a class 4 local street providing a primary access to local housing development.



Figure 6: Existing Road Network

4.3 Planned Transport Upgrades

Not applicable.

5. SITE INVESTIGATIONS

A site visit was undertaken on Thursday 28 September 2023 during the typical weekday AM and PM peak period.

The intersection operating performance and access arrangements were observed during the peak period site investigations. The following are some of the important observations during the AM and PM peak hour site visit:

- Mini- bus taxis and trucks were observed travelling P 749 during the peak hour.
- Minor Pedestrian activity were observed along Gravel Road during peak hour;
- No queueing observed at any of the intersections of during peak hours.
- Mostly private vehicles were observed at the intersection P 749/ Gravel Road during peak hours.



Photo 1 – P 749 towards north



Photo 2 – P 749 toward south



Photo 3 – P 749 and Proposed access (Existing Gravel)

6. OTHER PLANNING AUTHORITIES

The site currently falls within of **Wards 19** within the uMzimkhulu Municipality's area of jurisdiction, with the roads falling under its jurisdiction of **uMzimkhulu Local Municipality and KZN DoT**.

7. TRAFFIC DEMAND ESTIMATION

It is a requirement that where elements of the transportation system that have been identified may be affected by increased traffic demand or change in traffic patterns, such demand must be estimated for those elements.

7.1 Assessment Years

The manual for traffic impact assessments requires the assessment of various horizon years depending on the determined trip generation of the site.

A design horizon year of 5 years is applicable for the site as the current and forecast traffic demand is less than 1 000 peak hour vehicle trips.

The appropriate assessment years are summarised as follows:

- **Base Year 2023:** This is the present year when traffic volumes are representative of the current traffic demand on the existing road network
- **Design Horizon Year 2028:** This is the forecast year that is 5 years from the base year.

7.2 Assessment Hours

The critical peak hour from a road capacity occurs when the traffic generated by the site is at a maximum, or when the highest combination of existing background traffic and site generated traffic occurs.

It can be noted that the COTO “Manual for Traffic Impact Assessments and Site Traffic Assessments” makes provision for trip generation rates for the weekday AM and PM peak hour.

Therefore, based on the applicable land use, the following peak hours were evaluated:

- Weekday AM peak hour
- Weekday PM peak hour

7.3 Background Traffic Demand

7.3.1 Introduction

The background traffic demand on the surrounding road network is defined as the base year and design horizon year traffic volumes, without the site traffic demand.

The base year traffic volumes are usually determined from current and historic traffic counts.

The design horizon year traffic volumes are estimated through a combination of traffic growth and build-up methods. A traffic growth factor is applied to the base year traffic volumes with trips from other latent developments taken into account.

The appropriate growth rate depends on the expected growth in the area of the site as well as the extent of approved but not yet realised development (i.e. latent rights). A growth rate of **3%** is assumed for this study, representing the low end of the scale for an “Average growth area

7.3.2 Traffic Growth Rate

The forecast traffic demand, which is 5 years from the base year, is adjusted with a growth factor to account for any growth in background traffic.

The appropriate growth rate depends on the expected growth in the area of the site as well as the extent of approved but not yet realised development (i.e. latent rights).

The following **Table 1 (Typical Growth Rates)** provides a summary of typical growth rates applicable to different development areas.

Table 1: Typical Growth Rates

Development Area	Growth Rate (%)
Low growth area	0 – 3
Average growth area	3 – 4
Above average growth area	4 – 6
Fast growing area	6 – 8
Exceptionally high growth area	> 8

A growth rate of **3%** has been applied for the area, the growth factor has been applied from the date of counts for the design horizon of 5 years.

7.4 Trip Generation by Others

During the estimation of forecast background traffic, other developments and potential developments must be taken into account. These include approved developments not fully implemented and those likely to occur by the design horizon year.

During the compilation of this study there were no known developments within the immediate vicinity of the study area likely to occur. Therefore, no latent development trips were considered.

Nonetheless, future development trips are accounted for as part of the traffic growth rate that is applied to the base year traffic to derive a design horizon year traffic demand

7.5 Possible Land Uses

Possible relevant land uses for this development as described in the TMH 17 are as follows.

Service Industries 110

Service industries provide industrial services to the general public. Typical service industries include vehicle repairs, appliance and television repairs, etc.

Warehousing and Distribution 150

Warehouses are primarily used for the storage and distribution of materials, but may include office and other functions associated with such storage. Goods are often sorted and distributed from these warehouses.

Single Dwelling Unit 210

Single dwelling units are detached houses on individual erven. The units usually have individual accesses to streets.

Shopping Centre 820

A shopping centre is an integrated (mixed-use) group of commercial establishments that operate as a unit. May include small components of other land uses, such as restaurants, hardware and paint shops, etc.

Bulk Trade Centre 830

Bulk trade centres are generally free-standing commercial facilities at which goods are sold in bulk to either the public or to businesses.

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7.6 Trip Generation Rates

The trip generation rates for various developments are provided in the **COTO manual for traffic impact assessments**. The trip generation should be applied to the land-use generating the worst-case site traffic demand.

Table 2: Trip Generation Rates (Combined Reduction)

Development	Size/Number of Units	Unit	AM Peak	PM Peak	Total Adjustment Factor	AM Peak	PM Peak
Single Dwelling Units	651	1 D/Unit	1	1	0.35	228	228
Apartments and Flats (Medium Density)	77	1 D/Unit	0.65	0.65	0.4	20	20
Public Primary School	150	1 Student	0.85	0.3	0.05	6	2
Places of Public Worship (Weekend)	250	1 Seat	0.05	0.05	0.25	3	3
Pre-School (Day Care)	40	1 Student	1	0.8	0.3	12	10
Offices	250	100 m ² GLA	2.1	2.1	0.45	2	2
Shopping Centre	6000	100 m ² GLA	0.6		0.45	52	295
TOTAL TRIPS GENERATED						324	560

Table 3: Trip Generation Splits (Combined Reduction)

Land Use	AM					PM				
Single Dwelling Units	AM		Trips	AM		PM		Trips	PM	
	IN	OUT		IN	OUT	IN	OUT		IN	OUT
	25.00%	75.00%		57	171	70.00%	30.00%		159.6	68.4
Apartments and Flats (Medium Density)	AM		Trips	AM		PM		Trips	PM	
	IN	OUT		IN	OUT	IN	OUT		IN	OUT
	25.00%	75.00%		5	15	65.00%	35.00%		13	7
Public Primary School	AM		Trips	AM		PM		Trips	PM	
	IN	OUT		IN	OUT	IN	OUT		IN	OUT
	50.00%	50.00%		3	3	50.00%	50.00%		1.5	1.5
Pre-School (Day Care)	AM		Trips	AM		PM		Trips	PM	
	IN	OUT		IN	OUT	IN	OUT		IN	OUT
	50.00%	50.00%		6	6	50.00%	50.00%		5	5
Shopping Centre	AM		Trips	AM		PM		Trips	PM	
	IN	OUT		IN	OUT	IN	OUT		IN	OUT
	65.00%	35.00%		33.8	18.2	50.00%	50.00%		147.5	147.5
Library - offices	AM		Trips	AM		PM		Trips	PM	
	IN	OUT		IN	OUT	IN	OUT		IN	OUT
	85.00%	15.00%		1.7	0.3	20.00%	80.00%		0.4	1.6
Place of worship	AM		Trips	AM		PM		Trips	PM	
	IN	OUT		IN	OUT	IN	OUT		IN	OUT
	55.00%	45.00%		1.65	1.35	50.00%	50.00%		1.5	1.5
			324	In Am	out AM			560	In PM	Out PM
				108.15	214.85				328.5	232.5

7.7 Trip Reduction Factor

Trips reduction factors for low vehicle-ownership, Mixed Use Development and public transport nodes and corridors are provided for in the manual for traffic impact assessment.

Trips reduction factors for low vehicle ownership and public transport nodes and corridors are provided for in the **TMH17 V1** manual for traffic impact studies.

According to the study area the site within the area of a low vehicle-ownership, Mixed Use Development and public transport nodes.

Therefore, the trip reduction factor based on very low vehicle ownership, Mixed Use Development and public transport nodes or corridors.

The **total adjusted** trip generated by the **Proposed Development** Are **560** vehicle trips in the AM peak hour and **324** vehicle trips in the PM peak hour.

7.8 Trip Types

Trip types generated by any development can be classified into either *Primary Trips*, *Pass-by Trips*, *Diverted Trips*, and *Transferred Trips*.

- **Primary trips** – these are trips that are new to the study area and have the site as the primary destination
- **Pass-by trips** – these are existing trips already on the road network directly adjacent to the site access, from which traffic can turn directly in and out
- **Diverted trips** – these are existing trips already on the road network that is not directly adjacent to the site access. They are like pass-by trips but have to access the site indirectly via other roads
- **Transferred trips** – these are trips already on the road network that are visiting other similar developments near the site, and that have the potential of transferring or switching their destination to the site as a primary destination.

For purposes of this traffic impact assessment study, all trips generated by the site are assumed as primary trips.

7.9 Trip Distribution

7.9.1 Introduction

The trips generated by the site must be distributed and assigned onto the surrounding road network in order to determine the traffic demand per traffic stream.

The site percentage trip distribution (**AM and PM**) is summarised in **Figure 7 (Percentage Trip Distribution)** below.

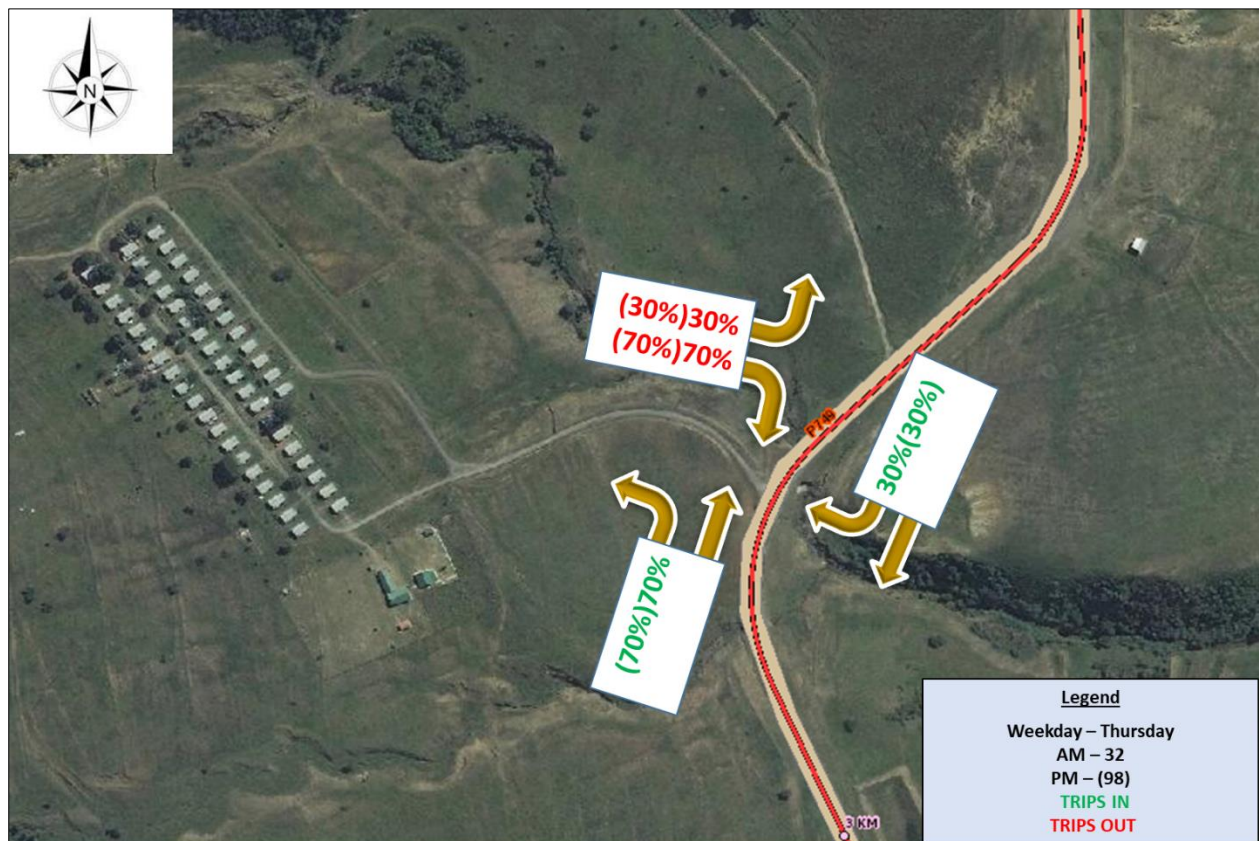


Figure 7: Percentage Trip Distribution Weekday AM and PM

7.9.2 Distribution Methods

The trip distribution of primary trips may be determined by using various distribution models, including the *Gravity Model*, *Analogy Model* or *Surrogate Model*.

- **Gravity Model** – that assumes that *“trip distribution is proportional to the relative magnitude of origin and destination zones, and inversely proportional to the travel time between the zones”*
- **Analogy Model** – that uses *“directional distribution observed at another similar development in the vicinity of the site”*
- **Surrogate Method** – that uses *“available socio-economic data to determine trip origins and destinations”*.

A trip distribution model is however not germane to this traffic impact assessment study and is therefore not considered further. Trip distribution was undertaken based on the traffic counts, spatial location and local knowledge of the area.

7.10 Traffic Assignment

The assignment of the site traffic demand is based on the product of the trip generation and percentage trip distribution.

The trip distribution and assignment were based on an assessment of traffic counts, spatial location and local knowledge.

The traffic assignment is indicated in **Figure 8, (Site Traffic Assignment)** below for AM and PM peak hour.

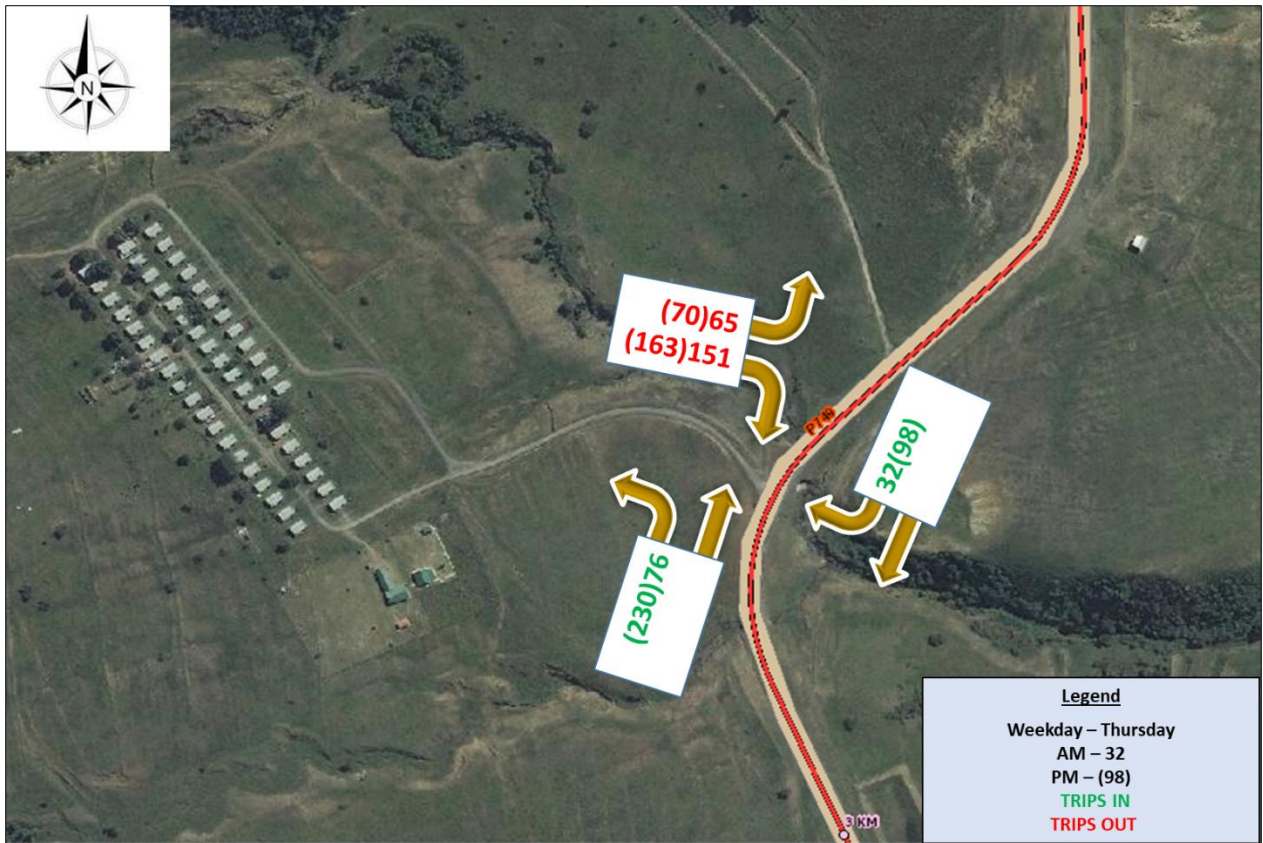


Figure 8: Site Traffic Assignment Weekday AM and PM

8. TOTAL TRAFFIC DEMAND

8.1 Introduction

The total traffic demand for the site is determined by estimating the background traffic and then adding the trip generation of the site to this background traffic.

The background traffic demand is based on existing traffic counts, which already include the site generated trip demand. Therefore, the background traffic (“with” site) is only considered for the various scenarios analysed, which are discussed in detail in ensuing chapters.

8.2 Required Information

The following information on traffic demand is usually provided for the design horizon year during various peak hours analysed for a general traffic impact assessment study:

The total traffic demand has been estimated for the following scenarios:

- **2023 existing volumes** – which includes existing peak hour traffic volumes, future traffic growth.
- **2028 forecast volumes** – which includes total trip generation of the road network without development traffic.
- **2028 forecast plus development** – which includes total trip generation of the site with development traffic.

8.3 Existing Traffic Counts

Classified manual traffic counts were conducted by **Trans Traffic** on **Thursday 28 September 2023**.

The traffic counts were conducted in 15-minute intervals during the typical Weekday AM and PM peak periods. The traffic counts are classified into passenger cars, mini-bus taxis, heavy vehicles and buses.

The traffic counts were conducted at the following intersections:

- Intersection 1: **P 749 / Gravel Road**

The AM and PM peak hour were further determined based on the highest traffic volumes recorded during the morning and afternoon period respectively. The AM peak was recorded from **07H00 to 08H00** and the PM peak hour was recorded at **15H30 to 16H30**.

The traffic counts for the critical peak hours are summarised in **Figure 9 (Base Year Traffic Counts AM and PM (2023))** below.

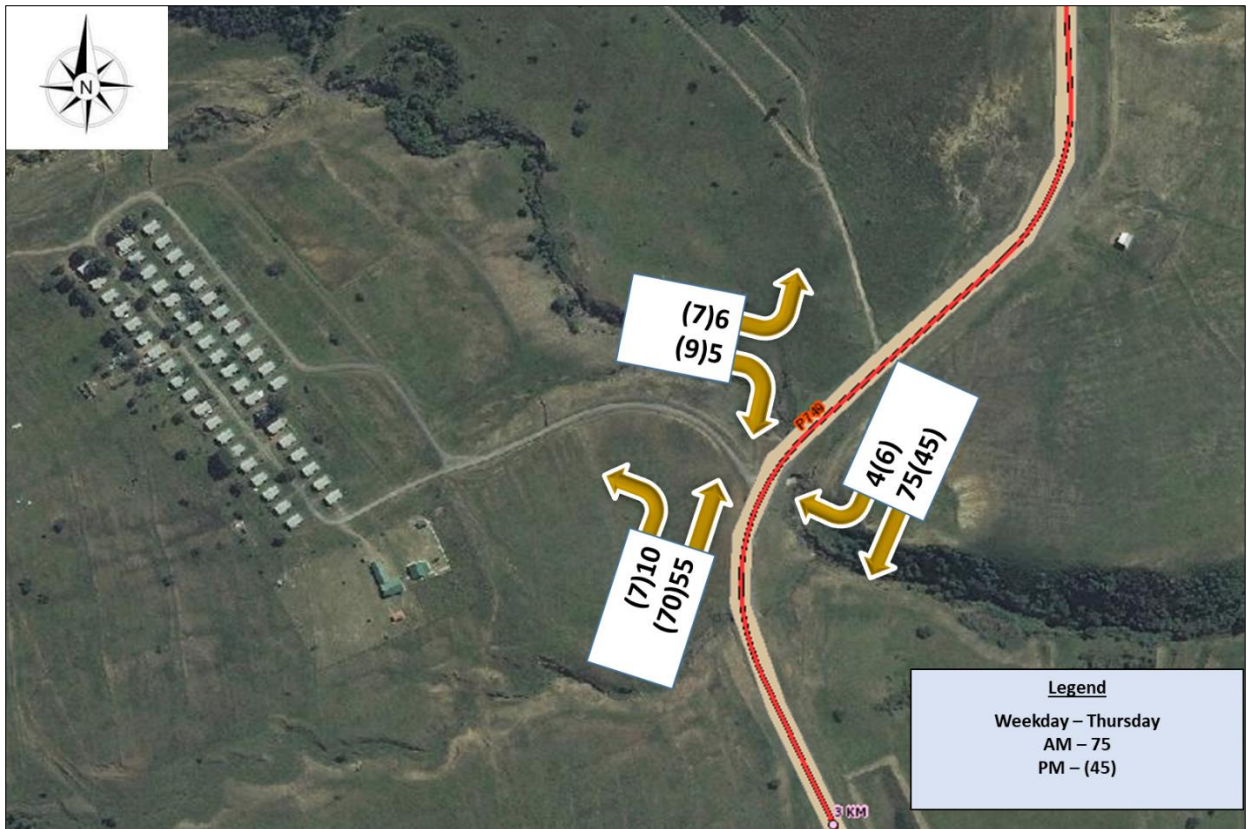


Figure 9: Base Year Traffic Counts (2023) – Morning and Afternoon Peak Hour Volumes

The future total traffic demand for the design horizon year “without” site generated trips is indicated in **Figure 10 (Design Horizon Year Total Demand (2028))** without development traffic below.

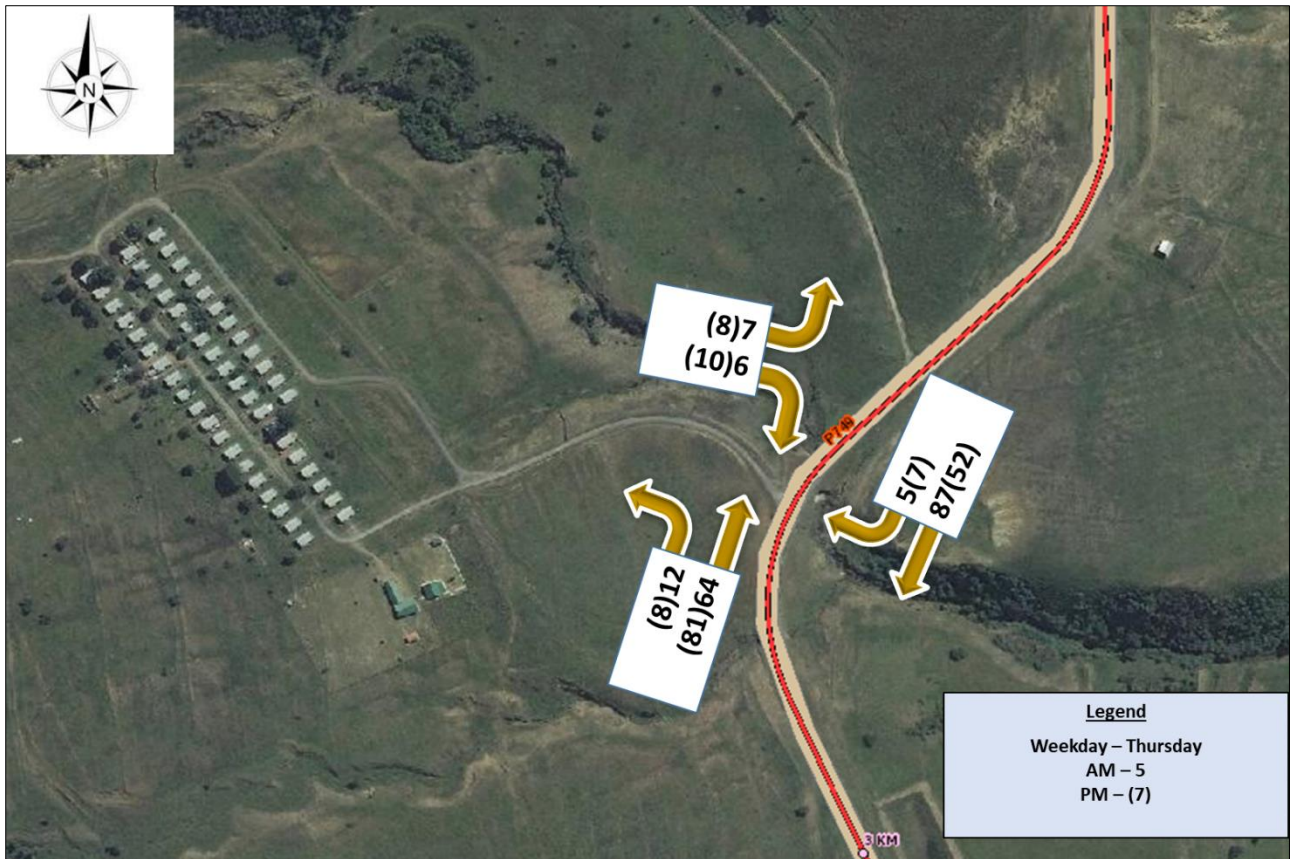


Figure 10: Design Horizon Year Demand without site traffic (2028) – AM and PM Peak Hour Volumes

The future total traffic demand for the design horizon year “**with**” site generated trips is indicated in **Figure 11** (Design Year Total Demand with Site Traffic 2028) below.

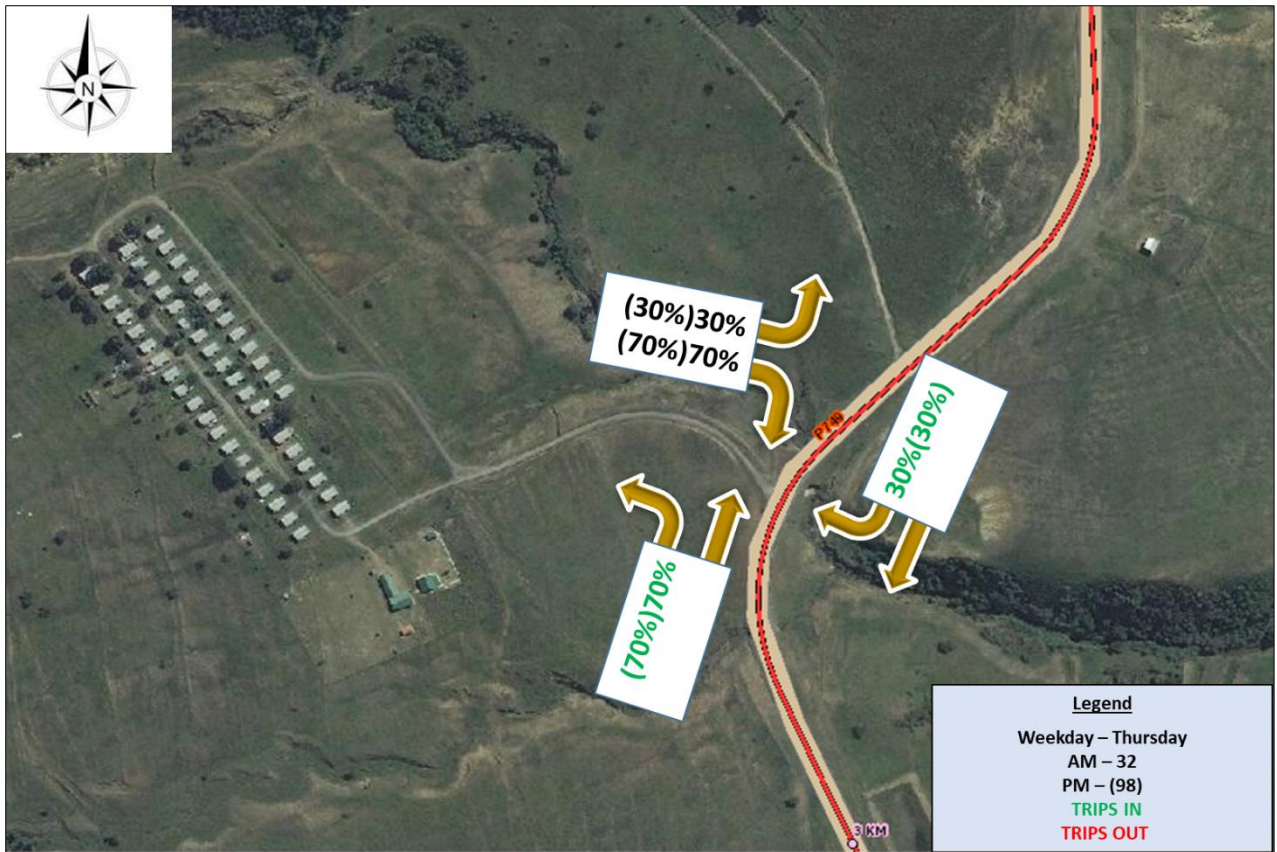


Figure 11: Design Year Total Demand with site traffic 2028 AM and PM

9. TRAFFIC IMPACT ASSESSMENT

9.1 Assessment Scenarios

The assessment scenarios relevant for determining the site traffic impact on the surrounding road network are indicated in **Table 5** (Assessment Scenarios) below.

Table 4: Assessment Scenarios

Scenario	Year	Demand
Scenario 1	2023 Base Year	Background Traffic from Existing Traffic Counts
Scenario 2	2028 Design Year	Design Traffic with growth factor and “ without ” Site Generated Trips
Scenario 3	2028 Design Year	Design Traffic with growth factor and “ including ” Site Generated Trips

9.2 Capacity Analyses

The performance of intersections in urban road networks is defined by the level of service (“**LOS**”) for each approach to the intersection. This level of service is defined in the Highway Capacity Manual (TRB 2010) as shown in **Table 5** (LOS Definitions) below.

Table 5: LOS Definitions

Level of Service	Delay (d) (secs)		V/C (x) (%)
	Signals	Stop / Yield	
A	$d \leq 10$	$d \leq 10$	$0 < x \leq 0.90$
B	$10 < d \leq 20$	$10 < d \leq 15$	$0 < x \leq 0.90$
C	$20 < d \leq 35$	$15 < d \leq 25$	$0 < x \leq 0.90$
	$0 < d \leq 35$	$0 < d \leq 25$	$0.90 < x \leq 0.93$
D	$35 < d \leq 55$	$25 < d \leq 35$	$0 < x \leq 0.93$
	$0 < d \leq 55$	$0 < d \leq 35$	$0.93 < x \leq 0.95$
E	$55 < d \leq 80$	$35 < d \leq 50$	$0 < x \leq 0.95$
	$0 < d \leq 80$	$0 < d \leq 50$	$0.95 < x \leq 1.00$
F	$80 < d$	$80 < d$	$1.00 < x$

During the peak hour, the traffic operation at an intersection of urban roads should *ideally* not exceed “**LOS D**”; for example, the average approach delays or V/C ratio for a signalised intersection should not exceed **55 seconds** or **95%** as predicted by the traffic analysis software.

The intersection approach performance and capacity were determined using the “SIDRA Intersection 6” software.

The results of the capacity analysis during the various scenarios are summarised in **Table 6** (Capacity Analysis Results) below, with the detailed outputs attached as **Annexure B** (SIDRA Capacity Analysis Output) of the report.



Unnamed Gravel Road

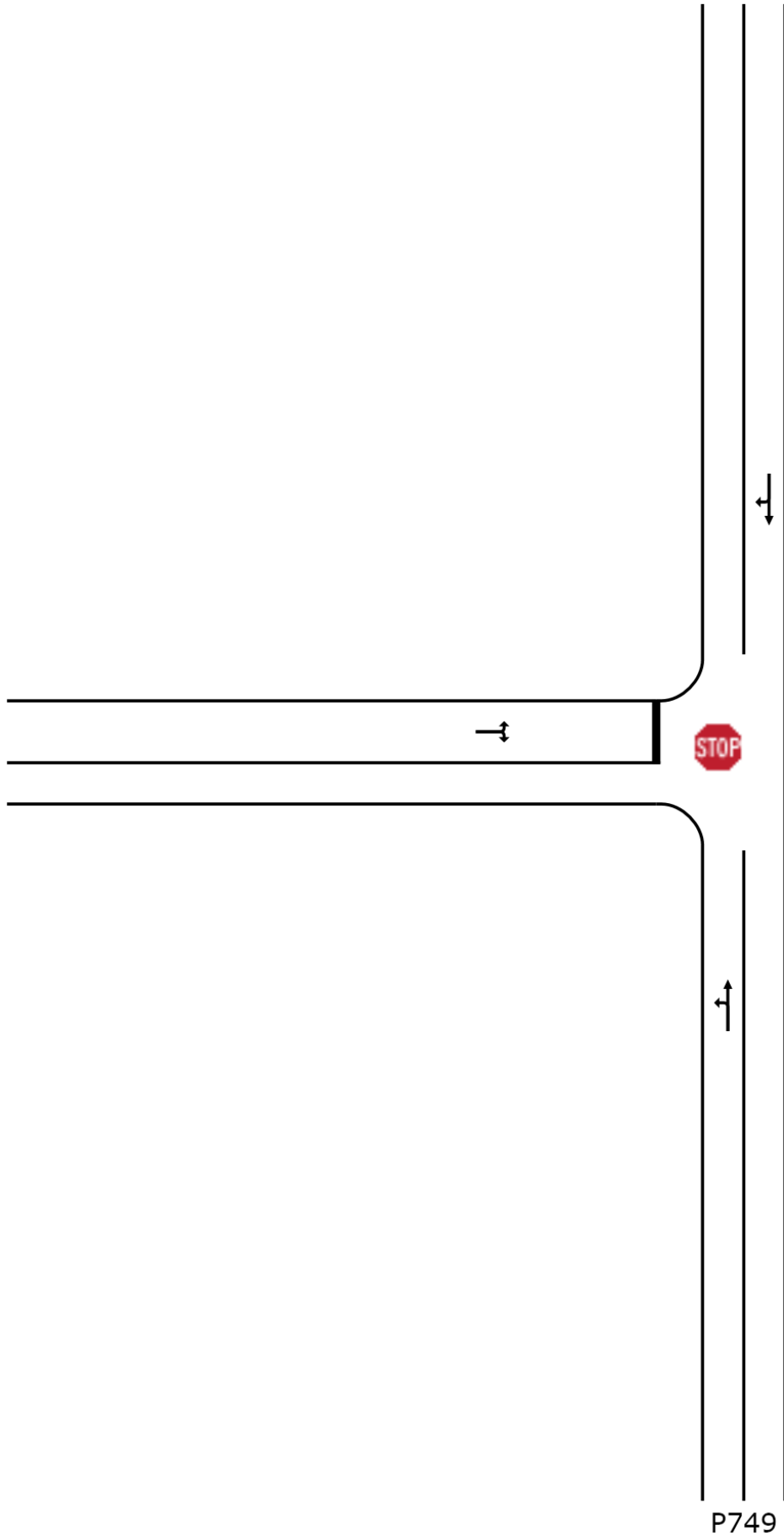


Figure 12: P749/ Gravel Road

Table 6: Capacity Analysis Results

Intersection Approach		Intersection 1: P 749 / Windham Street					
		Weekday AM Peak Hour			Weekday Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
Scenario 1 2023 Base Year	South	0.034	0.9	A	0.040	0.5	A
	North	0.042	0.5	A	0.027	0.9	A
	East						
	West	0.010	8.2	A	0.015	8.2	A
Overall (LOS)		A			A		
Scenario 2 2028 Design Year	South	0.040	0.9	A	0.047	0.5	A
	North	0.049	0.5	A	0.032	0.9	A
	East						
	West	0.012	8.3	A	0.047	8.3	A
Overall (LOS)		A			A		
Scenario 3 2028 with Site	South	0.081	3.2	A	0.178	4.2	A
	North	0.071	2.1	A	0.113	5.0	A
	East				0.292		
	West	0.236	8.8	A		9.6	A
Overall (LOS)		A			A		

The following observations and comments can be made regarding the performance and capacity analysis results of the key intersections:

- The intersection of P 749 and Gravel Road to currently performs at an acceptable level of service for the Base Year 2023 and continue during Design Year Total Demand 2028.
- The development therefore has non-material impact on the traffic operating conditions on the current road network as new trips are generated and has no impact on the existing intersection.

10. SITE TRAFFIC ASSESSMENT

The Site Development Plan (SDP) is contained in the Preliminary Town Planning Motivation Report and on **Annexure A (SDP)**.

10.1 Access

Access to the development site is proposed as priority-controlled to all intersection, with priority given to the main road. This would suffice to accommodate the **844** anticipated to be generated by the proposed residential development. Accordingly, to the access would need to be recessed by 3.0 metres from the back of the boundary line to accommodate access control.

The access will be designed in accordance with the uMzimkhulu Municipality and KZN DoT town planning standards and specifications with a minimum width of six metres for two-way movement. The minimum shoulder sight distance for a Stop Condition access point on a road with a design speed of 60 km/h. Since the line of sight is more than 90.0 metres at the access point of the development site, the sight distance at the access point is adequate along access road in both directions.

10.2 Parking

The uMzimkhulu Municipality's parking requirements for a two-bedroom residential unit are as follows:

Resident Parking

- Two-bedroom unit - 1.0 bay / per unit
- Visitors - 0.5 bay / per unit

The Developer proposes to establish Residential units which is a mixed use development. Accordingly, using the applicable parking ratio, it is therefore required that a sufficient parking bays are to be provided on site to meet the parking demand. The Developer would provide the minimum parking bays on the development site. All parking facilities, accesses and driveways are to be designed and dimensioned in accordance with the schedule of guidelines for off-street parking as per the Municipality standards and specifications for off-street parking.

10.3 Pedestrians and Public Transport

The proposed application site to establish a residential development is expected to generate some pedestrian activity along access route or local street, The pedestrians walking local street are to be implemented minimum of **2M both side of the road** and with pedestrian infrastructure implemented mean the traffic entering and leaving the proposed development is therefore not expected to have any impact on the pedestrian movement along its edges in the vicinity of the development site.

There are current no sidewalks provided along main road and local roads within the vicinity of the development site, however, verges with an approximate width of 1.8

It is anticipated that the pedestrians that could be generated as a result of the proposed development would be accommodated in the public transport system. it is recommended that the development to provide public transport facilities and drop off zones on the main road.



The KZN DoT is the roads authority responsible for planning of the major road network and the development of road network master plans ensures that all design guidelines and building line restrictions are abided by for all roads falling under its jurisdiction.

12. TRAFFIC AND TRANSPORTATION MANAGEMENT STRATEGIES

The main road **P 749** within study area is generally good and in acceptable condition. The road's basic structure is still intact and surface faults are relatively minor.

This implies that the main road is still at stages **(a)** and **(b)** of the road lifecycle. However, other roads within the study area are narrow about 4m to 3m two-way traffic and gravel. Some of these are slowly reaching a state of disrepair with potholes and require substantial upgrading. Most of these roads are approaching stage **(c)** which is a total destruction stage.

It is further recommended great road servitude and must be allocated and the current exiting provincial Road are recommended to be upgraded only with public transport drop off zones and be inline with the layout potential pedestrian links roads.

12.2 Classification of the Road System

For the purpose of transportation planning, the South African Road Classification and Access Management Manual, published by the Committee of Transport Officials (COTO) was applied throughout this report.

The first step in transportation planning is to classify the proposed road network. The process of functionally classifying the roads in the network is carried out by examining the entire road network and assessing the function of each element of the network. It is important that the road classification for the long-term future should be considered when classifying the network.

12.3 Urban Edge

Usually the urban edge (as defined in the Spatial Development Framework) is used to define Urban/Rural transitions. In this case of the Bizweni Township Establishment, the bulk of the study area is situated outside the urban edge. However, before future development of the area takes place, the urban edge has to be increased to include the entire area and therefore the future roadside classification will be based on an Urban environment.

12.4 Roadside Development Environment

It is important to recognize that there are varying roadside characteristics through which a road could pass and that varying specifications may be applied to the different roadside environments. The current Bizweni Township Establishment internal Roadside environment is of a Rural environment, but it is envisaged that once development of the area commences, this classification will change to a mainly township environment, with pockets of intermediate (especially within the mixed used zone) environments.

The proposed service road network must comply with **all road design standard and guidelines**. It is clear from the proposed layout that the link road providing access to Bizweni Township Establishment can be classified as a Class 4 rural Road with P 749 being class 3. The other roads indicated in the layout plan will classify as Class 4 and 5 local street which will link the Class 4 and 3. (The Class 5 Residential Local Streets are

indicated on the plan, as the layout will be a function of the type and size of the developable portions of land.

12.5 Intersection Spacing

The function of transport infrastructure is to provide a balance between accessibility and mobility. As the spacing between intersections on a specific section of road increases, it leads to a proportional increase in the accessibility and a direct decrease in the mobility of the road. It is therefore important to have a balance between these two concepts.

The COTO guidelines provides clear guidance with regards to access spacing and suggests that the following table be used for intersection spacing on mobility (Class 1,2 and 3) roads:

Class	Rural	Urban signals	Urban roundabouts and priority*
Class 1	8.0 km	n/a	n/a
Class 2	5.0 km	800 m \pm 15%	800 m \pm 15%
Class 3	1.6 km	600 m \pm 20%	600 m \pm 20%
* These values can be halved for the leg of T-junctions.			
Class 4a	600 - 800 m	200 - 300 m	200 - 300 m
Class 4b	600 - 800 m	150 - 250 m	150 - 250 m
Class 5a	450 - 600 m	150 - 250 m	150 - 250 m
Class 5b	450 - 600 m	150 m	75 - 150 m
* The longer spacing should be maintained as far as possible and the shorter spacing may only be considered under exceptional circumstances.			

The angle of crossing manoeuvres should be approximately a right angle. The maximum departure from a right angle should not exceed 20°.

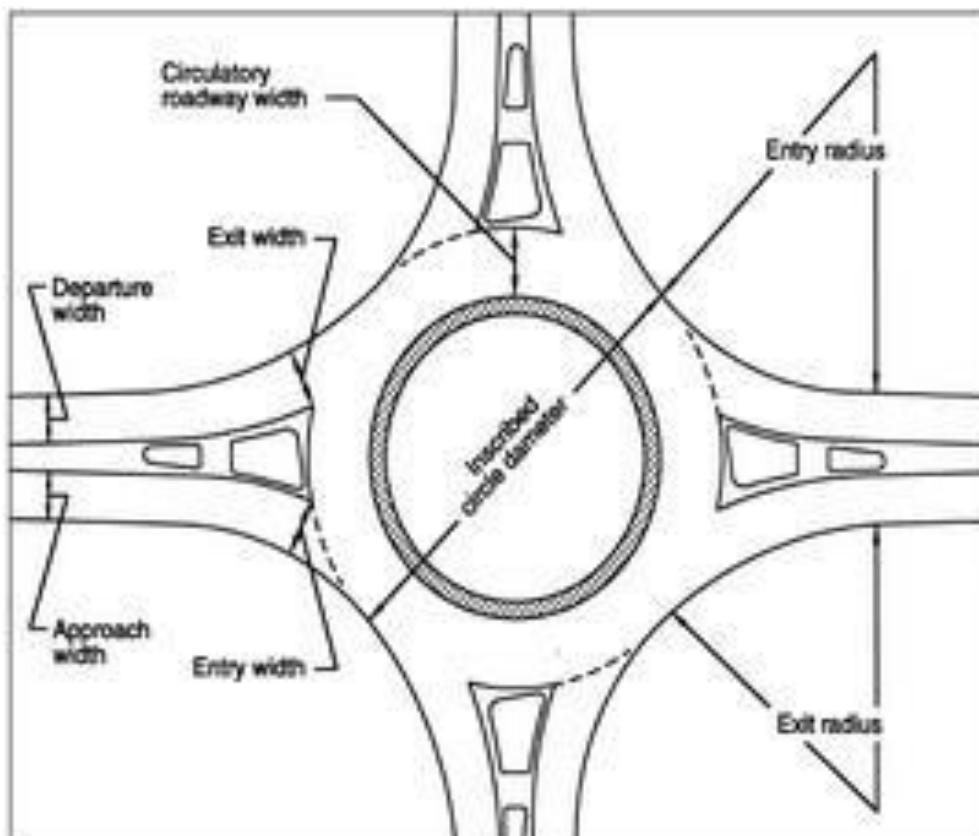
12.6 Traffic Circles

In order to increase capacity and provide traffic calming measures, it is envisaged that traffic circles will be required in the future to regulate traffic at the major intersections. Traffic circles generally require more area at the junction than conventional (signalized) intersections and hence it is important to make the allocation for additional land during this planning stage.

Traffic Circles bring together conflicting traffic streams, allowing the streams to safely merge and traverse the circle, and exit the streams to their desired directions. The geometric elements of a traffic circle provide guidance to drivers approaching, entering, and traveling through a traffic circle.

The following dimensions are proposed for the various traffic circles:

	Class 4/Class 4 intersection	Class 3/ Class 4 intersections
Type of Circle	Urban Single lane	Urban Double lane
Max entry design speed	35km/h	40km/h
Max No. of lanes per approach	1	2
Typical Inscribed diameter	25m to 30m	45m to 55m
Splitter Island treatment	Raised with crosswalk cut	
Circulatory Roadway Width	4.5m	
Apron width	2m	



It is recommended that a traversable apron be constructed around the centre islands. These should generally be 1 to 4m wide and have a cross slope of 3 to 4 percent away from the centre island. The apron should be raised by a minimum of 30mm and be constructed of textured paving to clearly differentiate them from the circulatory roadway.

The **P 749** linking Mzimkulu Town to Bizweni Township Establishment(Indicated in proposed Layout) can be considered a **Class 3** Urban Arterial. The prime function of arterial roads is the movement of traffic. Class 3 roads are meant to allow for a balance between mobility and access, providing relatively frequent high order access while not severely compromising mobility along the route.

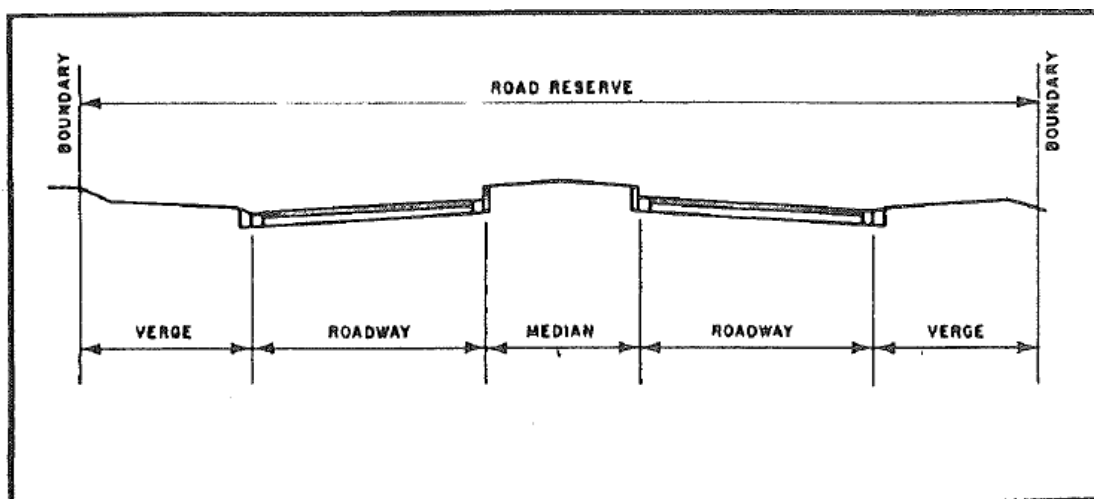
12.7 Design Concepts

Based on the guidelines published in the **UTG1** the following provisions should be implemented for Urban Arterial Roads in order for them to perform their function satisfactorily:

- No direct access to the road from adjacent properties
- Design speed of 80km/h with posted operating speeds of 60km/h
- **Adequate** lane widths to accommodate all types of vehicles, including trucks and busses

12.8 Typical Section, Lane Widths and Parking

An arterial road would normally be a divided road with two or more lanes in each direction. The typical roadway elements encountered on an Urban Arterial Road are indicated in the figure below:-



The recommended lane width for an arterial road be **3.4m**. Lane width is measured from the centre of the lane line to the centre of the adjacent line for inside lanes, and to the edge of the channel or offset from the kerb, in the case of a kerbside lane. On-Street parking should not be provided on the arterial roads.

The Collector roads are clearly indicated in the proposed layout. Class 4 collector roads are "**access**" roads and are intended to allow for frequent access and intersections. They provide access between the road and the adjacent properties. The function of these Urban Collector roads is twofold:

- They need to serve the movement of traffic
- They need to provide access to local streets and adjacent properties

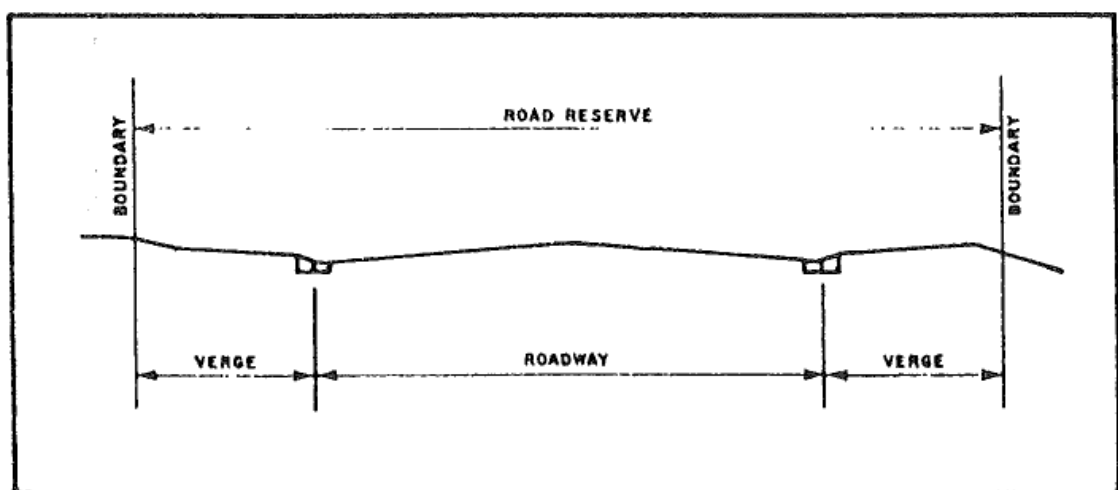
12.9 Design Concepts

Based on the guidelines published in the **UTG 5**, the following provisions should be Implemented for Urban Collector Roads for them to perform their function satisfactorily:

- Intersections with arterial roads generally within 1km from any point on the collector road, but in relation to the land development and the amount of traffic to be served.
- Intersection spacing to aid traffic signal/circle coordination
- Design speeds of **60km/h** with operating speeds of **50km/h**
- Adequate lane width to accommodate all types of vehicles, including trucks and busses.

12.10 Typical Sections, Lane Widths and Parking

A collector road is normally undivided, has one or two basic lanes in each direction and often need right turn lanes at intersections to accommodate traffic demands.



Pedestrian footways and bicycle lanes should be standard on lower order collector roads (**Class 4 and 5**). The recommended lane width for an Urban Collector Road is 3.4m. Lane width is measured from the centre of the lane line to the centre of the adjacent line for inside lanes, and to the edge of the channel or offset from the kerb, in the case of a kerbside lane.

On-Street parking may be provided on Urban Collector roads, either in parking lanes or on the verge. If On- street parking is to be provided, it is recommended that the parking lane has the same width as the basic through lane, so that it can be used for moving traffic during the peak periods.

12.11 Intersection Control

As a matter of policy, all intersections on a Collector Road should be controlled. The minimum degree of control would be yielding control of the minor road only. This applies to T-type intersections, whereas it is preferable to have stop control on the minor road of four-leg intersections. Where two collectors of equal importance cross, four-way stop control can be considered, but it is usually preferable to identify in the system one of the roads for the through movement. Traffic circles can also be used very successfully on collector roads to act as speed calming and to help direct traffic through intersections.

The **COTO** guidelines provides the following recommendation with regards to road reserve widths:

Class	Rural		Urban	
	Typical	Range	Typical	Range
Class 1	62	60 – 80	60	60 – 120
Class 2	48	40 – 70	40	38 – 62
Class 3	30	30 – 50	30	25 – 40*
Class 4a	25	-	25	20 – 40
Class 4b			20	16 – 30
Class 5a	20	-	22	15 – 25
Class 5b			14**	10 – 16

* Reserve up to 62 m is required to allow for Strategic Bus Rapid Transit (BRT).

** Reserve of 10.5 m is typical if street is less than 100 m long.

Based on the above table and the future implementation of traffic circles, the following Road Reserve widths are recommended:-

- Class 3 Urban Minor Arterial: **40m** Road Reserve Width
- Class 4a & 4b Collector Roads: **30m** Road Reserve Width
- Class 5b Local Residential Streets: **15m** Road Reserve Width

It is recommended that an accurate survey of the area be conducted, and the road layouts be designs with the maximum slope in mind. Road reserve positions might even have to change to accommodate increases in road lengths.

13. CONCLUSIONS AND RECOMMENDATIONS

13.1 Concluding Remarks

The study was required to assess the impact of the site on the surrounding road network and to evaluate the necessity of implementing any mitigating road upgrades and / or intersection improvements.

Given the findings of the assessment and capacity analysis results, the following concluding remarks can be made:

- The proposed access is recommended to be designed in accordance with the KZN DoT Planning and Road division standards and specifications with a minimum width for two-way movement. The minimum shoulder sight distance for a Stop Condition access point on a road with a design speed of **60 km/h**. **Since the line of sight is more than 90.0 metres at the access point of the development site, the sight distance at the access point is adequate in both directions.**
- It is anticipated that the pedestrians that could be generated as a result of the proposed development must be accommodated by means of public transport system. It is further recommended the bus and taxi laybys are proposed to form part of the layout along the internal main road.
- All parking facilities, accesses and driveways are to be designed and dimensioned in accordance with the schedule of guidelines for off-street parking as per the uMzimkhulu Municipality standards and specifications for off-street parking.
- The background traffic demand in the design year was estimated by applying a growth factor of **3%** on the existing traffic counts over 5 years. The total design year traffic demand was determined by adding the site generated traffic to the background traffic
- The assessment scenarios considered relevant for determining the expected traffic impact of the site were identified as follows:
 - **Scenario 1** – current traffic demand from existing traffic counts
 - **Scenario 2** – design background traffic demand
 - **Scenario 3** – design background traffic demand with site traffic
- The appropriate assessment years for purposes of this study are the Base Year 2023 and Design Horizon Year 2028, which is the forecast year that is 5 years from the base year. Based on the applicable land use, the typical Weekday AM and PM peak hours were analysed.

- Based on the performance and capacity analysis results of the key intersections, the following observations are made:
 - It must be noted that the analyses have been undertaken using worst case scenario for developments.
 - The intersection of P 749/ Gravel Road performs at acceptable levels of services during the typical Weekday AM and Weekday PM peak hours during the Base Year 2023.
 - The additional vehicles generated by the sites have minimal impact on the intersection performance of Gravel road and during future continues to operate at an acceptable level of service for the intersection.
- The Intersection of P749 / Gravel Road is recommended to be upgraded with more of tar road to avoid gravel spillage on the main road in order to accommodate proposed Development.
- Gravel Road is recommended to be upgraded to serve two way motor traffic with side walk for pedestrians.
- All internal road are recommended to accommodate two way traffic minimum of 7m wide road and 2m pedestrian side walk with public transport facility by means of bus / taxi stop.
- P749 is must provide bus/ Taxi Drop off zones in line with the proposed layout in order to potential mitigate the potential cut over pedestrians from the development in order to get public transport.

13.2 Recommendations

Given the findings of this traffic impact assessment study, it is recommended that: will not have a negative impact on the existing road network within the study area. It is recommended that be favourably considered from a traffic engineering point of view by the relevant regulating authorities and **BE SUPPORTED**.

14. REFERENCES

The following references were used in the compilation of this report:

Reference 1 – COTO - TMH 17 Vol 1 *“Manual for Traffic Impact Assessments and Site Traffic Assessments”*

ANNEXURE A:

Site Development Plan

ANNEXURE B:

Sidra Capacity Analysis Output

MOVEMENT SUMMARY



Site: 2023 - AM Base Year

Proposed Application for Bizweni Township Establishment, situated within Bezweni Farm No. 18223 of the uMzimkhulu Local Municipality
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows Total	Deg. Satn HV	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec	veh	m		per veh	km/h
South: P749										
1	L2	11	0.0	0.034	5.5	LOS A	0.0	0.0	0.00	57.6
2	T1	58	0.0	0.034	0.0	LOS A	0.0	0.0	0.00	59.2
Approach		68	0.0	0.034	0.9	NA	0.0	0.0	0.00	58.9
North: P749										
8	T1	79	0.0	0.042	0.2	LOS A	0.2	1.6	0.16	59.0
9	R2	4	0.0	0.042	5.7	LOS A	0.2	1.6	0.16	57.3
Approach		83	0.0	0.042	0.5	NA	0.2	1.6	0.16	58.9
West: Unnamed Gravel Road										
10	L2	6	0.0	0.010	8.4	LOS A	0.0	0.2	0.15	51.8
12	R2	5	0.0	0.010	8.1	LOS A	0.0	0.2	0.15	51.5
Approach		12	0.0	0.010	8.2	LOS A	0.0	0.2	0.15	51.7
All Vehicles		163	0.0	0.042	1.2	NA	0.2	1.6	0.09	58.3

Level of Service (LOS) Method: Delay (HCM 2000).

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

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

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

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

MOVEMENT SUMMARY



Site: 2028 - PM Design Year

Proposed Application for Bizweni Township Establishment, situated within Bezweni Farm No. 18223 of the uMzimkhulu Local Municipality
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows Total	Deg. Satn HV	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	sec		veh	m		per veh	km/h
South: P749										
1	L2	8	0.0	0.047	5.5	LOS A	0.0	0.0	0.00	57.9
2	T1	85	0.0	0.047	0.0	LOS A	0.0	0.0	0.00	59.5
Approach		94	0.0	0.047	0.5	NA	0.0	0.0	0.00	59.4
North: P749										
8	T1	55	0.0	0.032	0.3	LOS A	0.2	1.2	0.19	58.5
9	R2	7	0.0	0.032	5.8	LOS A	0.2	1.2	0.19	56.8
Approach		62	0.0	0.032	0.9	NA	0.2	1.2	0.19	58.3
West: Unnamed Gravel Road										
10	L2	8	0.0	0.017	8.5	LOS A	0.1	0.4	0.20	51.8
12	R2	11	0.0	0.017	8.2	LOS A	0.1	0.4	0.20	51.5
Approach		19	0.0	0.017	8.3	LOS A	0.1	0.4	0.20	51.7
All Vehicles		175	0.0	0.047	1.5	NA	0.2	1.2	0.09	58.1

Level of Service (LOS) Method: Delay (HCM 2000).

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

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

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

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

MOVEMENT SUMMARY



Site: 2028 - AM Design Year

Proposed Application for Bizweni Township Establishment, situated within Bezweni Farm No. 18223 of the uMzimkhulu Local Municipality
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows Total	Deg. Satn HV	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed	
		veh/h	%	v/c	sec	veh	m		per veh	km/h	
South: P749											
1	L2	13	0.0	0.040	5.5	LOS A	0.0	0.0	0.00	0.09	57.6
2	T1	67	0.0	0.040	0.0	LOS A	0.0	0.0	0.00	0.09	59.1
Approach		80	0.0	0.040	0.9	NA	0.0	0.0	0.00	0.09	58.9
North: P749											
8	T1	92	0.0	0.049	0.2	LOS A	0.3	1.9	0.18	0.03	58.9
9	R2	5	0.0	0.049	5.7	LOS A	0.3	1.9	0.18	0.03	57.2
Approach		97	0.0	0.049	0.5	NA	0.3	1.9	0.18	0.03	58.8
West: Unnamed Gravel Road											
10	L2	7	0.0	0.012	8.5	LOS A	0.0	0.3	0.17	0.90	51.8
12	R2	6	0.0	0.012	8.1	LOS A	0.0	0.3	0.17	0.90	51.5
Approach		14	0.0	0.012	8.3	LOS A	0.0	0.3	0.17	0.90	51.6
All Vehicles		191	0.0	0.049	1.2	NA	0.3	1.9	0.10	0.12	58.3

Level of Service (LOS) Method: Delay (HCM 2000).

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

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

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

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

MOVEMENT SUMMARY



Site: 2023 - PM Base Year

Proposed Application for Bizweni Township Establishment, situated within Bezweni Farm No. 18223 of the uMzimkhulu Local Municipality
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows Total	Deg. Satn HV	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	sec		veh	m		per veh	km/h
South: P749										
1	L2	7	0.0	0.040	5.5	LOS A	0.0	0.0	0.00	57.9
2	T1	74	0.0	0.040	0.0	LOS A	0.0	0.0	0.00	59.5
Approach		81	0.0	0.040	0.5	NA	0.0	0.0	0.00	59.4
North: P749										
8	T1	47	0.0	0.027	0.2	LOS A	0.1	1.0	0.18	58.6
9	R2	6	0.0	0.027	5.7	LOS A	0.1	1.0	0.18	56.9
Approach		54	0.0	0.027	0.9	NA	0.1	1.0	0.18	58.4
West: Unnamed Gravel Road										
10	L2	7	0.0	0.015	8.4	LOS A	0.1	0.4	0.18	51.8
12	R2	9	0.0	0.015	8.1	LOS A	0.1	0.4	0.18	51.6
Approach		17	0.0	0.015	8.2	LOS A	0.1	0.4	0.18	51.7
All Vehicles		152	0.0	0.040	1.5	NA	0.1	1.0	0.08	58.1

Level of Service (LOS) Method: Delay (HCM 2000).

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

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

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

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

MOVEMENT SUMMARY



Site: 2028 - AM Design Year Total Demand

Proposed Application for Bizweni Township Establishment, situated within Bezweni Farm No. 18223 of the uMzimkhulu Local Municipality
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows Total	Deg. Satn HV	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed	
		veh/h	%	v/c	sec	veh	m		per veh	km/h	
South: P749											
1	L2	93	0.0	0.081	5.5	LOS A	0.0	0.0	0.00	0.34	55.5
2	T1	67	0.0	0.081	0.0	LOS A	0.0	0.0	0.00	0.34	57.0
Approach		160	0.0	0.081	3.2	NA	0.0	0.0	0.00	0.34	56.1
North: P749											
8	T1	92	0.0	0.071	0.5	LOS A	0.4	2.7	0.27	0.17	57.3
9	R2	39	0.0	0.071	6.0	LOS A	0.4	2.7	0.27	0.17	55.7
Approach		131	0.0	0.071	2.1	NA	0.4	2.7	0.27	0.17	56.8
West: Unnamed Gravel Road											
10	L2	76	0.0	0.236	9.1	LOS A	1.0	6.7	0.24	0.91	51.5
12	R2	165	0.0	0.236	8.7	LOS A	1.0	6.7	0.24	0.91	51.2
Approach		241	0.0	0.236	8.8	LOS A	1.0	6.7	0.24	0.91	51.3
All Vehicles		532	0.0	0.236	5.5	NA	1.0	6.7	0.18	0.56	54.0

Level of Service (LOS) Method: Delay (HCM 2000).

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

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

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

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

MOVEMENT SUMMARY



Site: 2028 - PM Design Year Total Demand

Proposed Application for Bizweni Township Establishment, situated within Bezweni Farm No. 18223 of the uMzimkhulu Local Municipality
Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows Total	Deg. Satn HV	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed	
		veh/h	%	v/c	sec	veh	m		per veh	km/h	
South: P749											
1	L2	261	0.0	0.178	5.6	LOS A	0.0	0.0	0.00	0.44	54.7
2	T1	85	0.0	0.178	0.0	LOS A	0.0	0.0	0.00	0.44	56.1
Approach		346	0.0	0.178	4.2	NA	0.0	0.0	0.00	0.44	55.0
North: P749											
8	T1	55	0.0	0.113	1.3	LOS A	0.6	4.1	0.44	0.43	55.1
9	R2	111	0.0	0.113	6.8	LOS A	0.6	4.1	0.44	0.43	53.5
Approach		165	0.0	0.113	5.0	NA	0.6	4.1	0.44	0.43	54.0
West: Unnamed Gravel Road											
10	L2	82	0.0	0.292	9.8	LOS A	1.2	8.4	0.30	0.93	51.0
12	R2	182	0.0	0.292	9.5	LOS A	1.2	8.4	0.30	0.93	50.7
Approach		264	0.0	0.292	9.6	LOS A	1.2	8.4	0.30	0.93	50.8
All Vehicles		776	0.0	0.292	6.2	NA	1.2	8.4	0.20	0.60	53.3

Level of Service (LOS) Method: Delay (HCM 2000).

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

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

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

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

ANNEXURE C:

Traffic Counts

ANNEXURE D:

Town Planning Report