



INNOVATIVE  
TRANSPORT  
SOLUTIONS

---

# **Transport Impact Assessment for the Greenfields and Koppie Development, Postmasburg**

**May 2017**

29 De Havilland Crescent  
Pro Park  
Building 1  
Persequor Park  
0020

Tel: +27 (012) 349 1664  
Fax: +27(012) 349 1665  
e-mail: [gauteng@itsglobal.co.za](mailto:gauteng@itsglobal.co.za)

---

---

**Title:** Transport Impact Assessment – Proposed Greenfields and Koppie Developments, Postmasburg

**Client:** Bigen Africa Pty (Ltd)

**Authorities:** Tsantsabane Local Municipality

**Project Team:** Janneke Snijder  
Amelia Daniels  
Mpho Koza  
Lesego Mahlo  
Elma Human

**Reviewed by:** Johan Brink Pr Eng

**Director:** Pieter Pretorius Pr Eng

**Project nr:** ITS 3719

**Date:** May 2017

**Report Status:** Final

---

# Transport Impact Assessment for the Proposed Greenfields and Koppie Developments, Postmasburg

## Contents

1. Introduction .....	1
2. Land Use .....	2
3. Road Network and Surrounding Area.....	3
3.1 External Road Network .....	3
3.2 Internal Road Network for the Greenfields and Koppie Developments.....	4
4. Access .....	4
4.1 Vehicular Access .....	4
4.2 Non-Motorised Access.....	5
5. Public Transport and Non-Motorised Transport (NMT).....	5
5.1 Existing Public Transport and NMT facilities .....	5
5.2 Proposed Public Transport and NMT Facilities .....	5
6. Traffic Volumes.....	6
6.1 Background Traffic Volumes .....	6
6.2 Latent Right Developments.....	6
6.3 Future Background Traffic Volumes.....	7
7. Trip Generation.....	7
8. Trip Distribution and Trip Assignment .....	9
9. Capacity Analysis.....	10
10. Proposed Upgrades.....	13
11. Conclusions and Recommendations .....	14
12. References.....	16

# 1. INTRODUCTION

Two mixed typology and integrated infrastructure developments are planned to be constructed in the Tsantsabane Local Municipality, Northern Cape. The proposed developments are:

- Located on Part of the Remainder of Erf 1 and Part of Erf 761, Postmasburg and is from now on referred to as the Greenfields development. The R385 and R325 are located south and west of the Greenfields development respectively. A freight railway forms the northern boundary of the proposed development. Refer to **Appendix A, Figure 1**.
- Located on Part of the Remainder of Erf 1, Part of Erf 2 and Part of Erf 89, Postmasburg and is from now on referred to as the Koppie development. The R385 is located north of the Koppie development and the R325 is located to the east of the Koppie development. Refer to **Appendix A, Figure 2**.

The following tasks will be carried out as part of this Transport Impact Assessment:

- Investigation of the internal roads in the proposed development
- Analyses of the access routes to the proposed development
- Trip generation and capacity analyses of the current and additional generated traffic on the external road network
- Mitigation measures required at the existing intersections
- Investigation of Public Transport and Non-Motorised Transport facilities and demand in the surrounding area.



## 2. LAND USE

The proposed land use for the Greenfields development is summarised in **Table 1** below. Refer to **Appendix A, Figure 3** for the development plan.

**Table 1: Land use for the Proposed Greenfields Development**

No	Zoning	Land Use	Extent	Units
1	Multilevel Townhouses	Subsidised Housing	2476	Dwelling units
2	Business	Business Premises	10870	m <sup>2</sup> GLA
3	Place of Instruction	Primary School	1100	Pupils
		Secondary School	1200	Pupils
		Creche	7018	Pupils
4	Institution	Church	800	Seats
		Clinic	250	m <sup>2</sup> GLA

The proposed land use for the Koppie development is summarised in **Table 2** below. Refer to **Appendix A, Figure 4** for the development plan.

**Table 2: Land use for the Proposed Koppie Development**

No	Zoning	Land Use	Extent	Units
1	Multilevel Townhouses	Subsidised Housing	2820	Dwelling units
2	Business	Business Premises	16418	m <sup>2</sup> GLA
3	Place of Instruction	Primary School	1100	Pupils
		Secondary School	1200	Pupils
		Creche	5248	Pupils
4	Institution	Church	600	Seats
		Clinic	300	m <sup>2</sup> GLA

### 3. ROAD NETWORK AND SURROUNDING AREA

#### 3.1 EXTERNAL ROAD NETWORK

The external road network surrounding the proposed developments is summarised in **Table 3** below. Refer to **Appendix A, Figure 5**.

**Table 3: External Road Network Surrounding the Proposed Developments**

Road Name	Road Class	Description
R 385	Class 2 and 3	East-west arterial linking Postmasburg with Danielskuil and Kimberley to the east and the N14 to the west. This provincial road is classified as a Class 2 road in the area outside the Postmasburg township, however, it is classified as a Class 3 road in the urban areas of Postmasburg.
R 325	Class 2 and 3	North-south link connecting Postmasburg with Kathu to the north and the N8 to the south. The R325 is a provincial road with a road classification of Class 3 in the urban areas of Postmasburg, but is classified as a Class 2 road in the rural areas outside Postmasburg.
DR 3387 (Gravel Road)	Class 3	North-south connector road that serves as a link road between Postmasburg and Jenn-Haven village.
Shone St	Class 4	Shone Street link the R385 with the Postmasburg CBD in an east-westerly direction.

## **3.2 INTERNAL ROAD NETWORK FOR THE GREENFIELDS AND KOPPIE DEVELOPMENTS**

The internal road network for the proposed Greenfields and the Koppie developments was investigated and a Road Network Plan was done to ensure that there is an effective and optimal road hierarchy in the proposed development. Link roads were proposed to ensure connectivity between the proposed developments and the existing external road network. Refer to **Appendix A, Figure 5**.

The final intersection layout of the internal intersections should be finalised and discussed with the authorities in order to ensure optimal intersection control and design in the developments.

## **4. ACCESS**

### **4.1 VEHICULAR ACCESS**

#### **Greenfields Development:**

It is proposed that CAM Street will serve as the primary access route to the development. CAM Street is a direct link between the proposed development and the R385. This road forms a strong east-west link that connects all the internal roads of the development.

A future north-south link road is proposed on the eastern boundary of the proposed development. This link will also serve as a second access route to the proposed development. This road will tie in with the existing gravel road (DR 3387) that intersects with the R385 (intersection 7).

#### **Koppie Development:**

The Koppie development will gain access to the north from the existing Stasie and Dolomiet Streets. These access routes lead to the R385 north of the proposed development.

End Street is an existing east-west link located on the northern boundary of the proposed development. This link provides access to the development in an east-westerly direction. These roads connect the existing Postmasburg township with the proposed Koppie development.

On the Road Network Plan it is shown that there is future proposed east-west and north-south links that will serve as access routes. These links will only be constructed in future and is therefore not considered as part of the access routes in this study. Refer to **Appendix A, Figure 5**.

## **4.2 NON-MOTORISED ACCESS**

### **Greenfields Development:**

A pedestrian access across the railway line is proposed. This access enables pedestrians and cyclists to access the development located to the north of the Greenfields development.

Sidewalks from the external roads surrounding the development to the Greenfields development are proposed in order for pedestrians and cyclists to safely access the proposed development from the external roads.

### **Koppie Development:**

Pedestrian sidewalks and public transport lay-bays are proposed to ensure safe pedestrian access to the proposed development. Refer to Section 5.2 for the proposed pedestrian and public transport facilities.

## **5. PUBLIC TRANSPORT AND NON-MOTORISED TRANSPORT (NMT)**

### **5.1 EXISTING PUBLIC TRANSPORT AND NMT FACILITIES**

There is one taxi rank located in the existing Postmasburg town. It is situated on the corner of the R325 and Shone Street. This taxi rank is located approximately 2.5km from the Greenfields development and approximately 1.5 km from the Koppie development. Public transport lay-bays are located at the Station St / End St intersection. It was proposed in the study done for the Transnet SOC Residential Development that provision for signal pedestrian crossings at the R385 / R325 should be made. [1]

There is limited to no formal pedestrian sidewalks located along the R325 and R385 outside the Postmasburg township. Pedestrians use the gravel shoulders located on both sides of the R325 and R385 to walk to and from their destinations. Sidewalks are, however, provided in the Postmasburg township. Refer to **Appendix A, Figure 6**.

### **5.2 PROPOSED PUBLIC TRANSPORT AND NMT FACILITIES**

It is likely that a portion of the trips generated by the development will be Public Transport (PT) or NMT trips. It is therefore important to provide adequate PT and NMT facilities to accommodate the additional PT and NMT trips. Refer to **Appendix A, Figure 6**.

## **Public Transport**

It is proposed to construct two taxi ranks in the Greenfields development and three taxi ranks are proposed in the Koppie development. These ranks will serve the public transport users generated by the proposed developments. The taxi ranks are located close to the business and community facility land uses.

Public transport lay-bys on the internal road network of the developments should be constructed downstream of the entrances to schools and business premises and of the major intersections on the taxi routes.

## **Non-Motorised Transport**

It is proposed to construct pedestrian sidewalks along the internal Class 4 roads in the Greenfields and Koppie developments to ensure pedestrian safety and to provide connectivity with the proposed PT lay-bys. The sidewalks should be at least 2.5m wide and should be such that both pedestrians and cyclists can use it without causing safety hazards.

# **6. TRAFFIC VOLUMES**

## **6.1 BACKGROUND TRAFFIC VOLUMES**

Traffic counts were conducted at intersections in the vicinity of the proposed development. The counts were conducted during the AM and PM peak hours on 8 February 2017. The peak hours were found to be from 06:45 to 07:45 for the AM peak and from 16:15 to 17:15 for the PM peak. Refer to **Appendix A, Figure 7** and **Figure 8**. For the existing geometry refer to **Figure 9**.

## **6.2 LATENT RIGHT DEVELOPMENTS**

The Transnet SOC Residential Development was regarded as a latent right development in the Postmasburg area. Refer to **Appendix A, Figure 1** for the locality of the latent right development.

### Transnet SOC Residential Development

The Transnet SOC Residential Development is located to the west of the proposed Greenfields development and to the north of the proposed Koppie development. It consists of 185 dwelling units and is expected to generate 81 vehicles per hour during both AM and PM peak hours [1]. Refer to **Appendix A, Figure 10** and **11**.

**Table 4: Latent Right Development Trip Generation**

Land Use	Extent (units)	AM Peak Hour		PM Peak Hour		Total Peak Hour Trips (vph)
		In (vph)	Out (vph)	In (vph)	Out (vph)	
Dwelling units	185	21	60	60	21	81

### 6.3 FUTURE BACKGROUND TRAFFIC VOLUMES

It is assumed that the proposed development will be fully developed in five years. Taking the surrounding area into account, it is expected that the latent right and proposed developments will be the expected traffic growth for the area. No traffic growth to the existing traffic volumes was therefore applied to determine the future background traffic volumes for the 2022 horizon year.

## 7. TRIP GENERATION

The expected trip generation for the proposed developments is summarised in **Tables 5, 6, 7** and **8** below.

**Table 5: Trip Generation for the Proposed Greenfields Development for the weekday AM Peak Hour**

Land Use	Extent	Units	Trip Rate (vph/unit)	Trip Adjustment factor	Directional Split		In (vph)	Out (vph)	Total trips (vph)
					In	Out			
Residential	2476	units	0.75	0.70	25%	75%	325	975	1300
Business Premises	10870	m <sup>2</sup>	1.50	0.80	85%	15%	111	20	130
Primary School	1100	pupils	0.85	0.35	50%	50%	164	164	327
Secondary School	1200	pupils	0.75	0.35	50%	50%	158	158	315
Clinic	7018	m <sup>2</sup>	6.00	0.50	60%	40%	126	84	211
Church	800	seat	0.05	0.45	55%	45%	10	8	18
Creche	250	pupils	1.00	0.48	50%	50%	59	59	119
<b>Total</b>							<b>953</b>	<b>1467</b>	<b>2420</b>

**Table6: Trip Generation for the Proposed Greenfields Development for the weekday PM Peak Hour**

Land Use	Extent	Units	Trip Rate (vph/unit)	Trip Adjustment factor	Directional Split		In (vph)	Out (vph)	Total trips (vph)
					In	Out			
Residential	2476	units	0.75	0.70	70%	30%	910	390	1300
Business Premises	10870	m <sup>2</sup>	1.50	0.80	20%	80%	26	104	130
Primary School	1100	pupils	0.30	0.35	50%	50%	58	58	116
Secondary School	1200	pupils	0.25	0.35	50%	50%	53	53	105
Clinic	7018	m <sup>2</sup>	6.00	0.50	40%	60%	84	126	211
Church	800	seat	0.05	0.45	50%	50%	9	9	18
Creche	250	pupils	0.80	0.48	50%	50%	48	48	95
<b>Total</b>							<b>1187</b>	<b>787</b>	<b>1974</b>

**Table 7: Trip Generation for the Proposed Koppie Development for the weekday AM Peak Hour**

Land Use	Extent	Units	Trip Rate (vph/unit)	Trip Adjustment factor	Directional Split		In (vph)	Out (vph)	Total trips (vph)
					In	Out			
Residential	2820	units	0.75	0.70	25%	75%	370	1110	1481
Business Premises	16418	m <sup>2</sup> GLA	1.50	0.80	85%	15%	167	30	197
Primary School	1100	pupils	0.85	0.35	50%	50%	164	164	327
Secondary School	1200	pupils	0.75	0.35	50%	50%	158	158	315
Clinic	5248	m <sup>2</sup> GLA	6.00	0.50	60%	40%	94	63	157
Church	600	seat	0.05	0.45	55%	45%	7	6	14
Creche	300	pupils	1.00	0.48	50%	50%	71	71	143
<b>Total</b>							<b>1032</b>	<b>1601</b>	<b>2633</b>

**Table 8: Trip Generation for the Proposed Koppie Development for the weekday PM Peak Hour**

Land Use	Extent	Units	Trip Rate (vph/unit)	Trip Adjustment factor	Directional Split		In (vph)	Out (vph)	Total trips (vph)
					In	Out			
Residential	2820	units	0.75	0.70	70%	30%	1036	444	1481
Business Premises	16418	m <sup>2</sup> GLA	1.50	0.80	20%	80%	39	158	197
Primary School	1100	pupils	0.30	0.35	50%	50%	58	58	116
Secondary School	1200	pupils	0.25	0.35	50%	50%	53	53	105
Clinic	5248	m <sup>2</sup> GLA	6.00	0.50	40%	60%	63	94	157
Church	600	seat	0.05	0.45	50%	50%	7	7	14
Creche	300	pupils	0.80	0.48	50%	50%	57	57	114
<b>Total</b>							<b>1313</b>	<b>870</b>	<b>2183</b>

The trip generation for the proposed developments was calculated based on the trip rates provided in the COTO TMH 17 Manual [2]. The trips generated for all land uses were adjusted by applying the recommended adjustment factors for low vehicle ownership listed in Table 3.2 of the COTO TMH 17 Manual. Also, the trips generated by the primary and secondary schools were reduced with the reduction factor for mixed use.

The trips were reduced using the formula below:

$$P_C = 1 - (1 - P_M) \times (1 - P_V) \times (1 - P_T)$$

Where  $P_C$  = Combined reduction factor

$P_M$  = Reduction factor for mixed-use development

$P_V$  = Reduction factor for vehicle ownership

$P_T$  = Reduction factor for transit nodes or corridors

## **8. TRIP DISTRIBUTION AND TRIP ASSIGNMENT**

The trip distribution was done based on the background traffic volume patterns. The surrounding area and land uses as well as future land uses were also taken into account for the trip distribution. Refer to **Appendix A, Figures 12 to 17** for the trip distribution and trip assignment for the AM and PM peak hours respectively for the Greenfields and the Koppie developments.



## 9. CAPACITY ANALYSIS

The capacity analyses for the intersections surrounding the proposed development were done using the PTV Vistro software.

A summary of the analysed scenarios are listed in **Table 9**.

**Table 9: Scenarios analysed for the Greenfields and Koppie Developments**

Scenario No	Scenario	Volume Figure	Geometry Figure
1	2017 AM and PM Peak Hour Background Traffic (including Transnet Development) with existing geometry	10 and 11	9
2	2022 AM and PM Peak Hour Total Traffic volumes (including Base volumes, Transnet Development with Koppie and Greenfields Developments) on existing geometry	18 and 19	9
2U	2022 AM and PM Peak Hour Total Traffic volumes (including Base volumes, Transnet Development with Koppie and Greenfields Developments) on upgraded geometry	20 and 21	22

The capacity analysis results can be seen in the tables below. Upgrades were proposed at intersections where the level of service (LOS) and v/c ratio were at unacceptable levels. Refer to Section 10 for the proposed intersection upgrades.

**Table 10: Capacity Analysis Results for the weekday AM Peak Hour**

No	Intersection	Scenario 1			Scenario 2			Scenario 2U		
		2017 AM Peak Hour Background Traffic Demand with existing geometry			2022 AM Peak Hour Background + Latent Rights + Development Traffic Demand with existing geometry			2022 AM Peak Hour Background + Latent Rights + Development Traffic Demand with upgraded geometry		
		LOS	Del (s)	v/c	LOS	Del (s)	v/c	LOS	Del (s)	v/c
1	R385 / Dolomiet St	C	19.7	0.17	F	>50	7.45	C	21	0.9
2	R385 / Stasie St	C	24.6	0.30	F	>50	16.58	B	13.1	0.64
3	R385 / R325	C	26.2	0.33	C	34.4	0.91	C	34.4	0.91
4	R325 / Plein St	D	26.5	0.03	F	>50	0.65	C	22.7	0.71
5	R385 / CAM St	B	14.9	0.05	F	>50	5.35	C	31.8	0.9
6	R385 / Shone St	B	10.9	0.05	C	22.7	0.27	C	21.0	0.26
7	R385 / Gravel Rd	A	9.7	0.04	F	>50	0.92	E	56.0	0.85
8	R325 / Shone St	B	11.3	-	F	>50	3.16	C	22.7	0.95
9	R325 / End St	B	12.8	-	F	>50	2.35	D	40.8	0.95
10	End St / Stasie St	B	13.5	0.01	F	>50	2.72	C	23.5	0.86
11	End St / Dolomiet St	A	8.4	0.08	B	10	0.45	B	10	0.45

**Table 11: Capacity Analysis Results for the weekday PM Peak Hour**

No	Intersection	Scenario 1			Scenario 2			Scenario 2U		
		2017 PM Peak Hour Background Traffic Demand with existing geometry			2022 PM Peak Hour Background + Latent Rights + Development Traffic Demand with existing geometry			2022 PM Peak Hour Background + Latent Rights + Development Traffic Demand with upgraded geometry		
		LOS	Del (s)	v/c	LOS	Del (s)	v/c	LOS	Del (s)	v/c
1	R385 / Dolomiet St	C	19.9	0.23	F	>50	3.56	A	7.8	0.61
2	R385 / Stasie St	F	98.2	0.69	F	>50	49.4	B	12.7	0.78
3	R385 / R325	C	26	0.39	D	37.7	0.92	D	37.7	0.92
4	R325 / Plein St	D	31.7	0.04	F	>50	0.66	C	27.5	0.71
5	R385 / CAM St	D	26.3	0.4	F	>50	2.92	C	20.2	0.73
6	R385 / Shone St	B	11.7	0.16	F	>50	0.60	E	49.5	0.56
7	R385 / Gravel Rd	A	9.9	0.01	D	33.0	0.46	C	21.9	0.41
8	R325 / Shone St	C	15.3	-	F	>50	2.87	C	30.5	0.95
9	R325 / End St	C	19.3	-	F	>50	2.97	C	21.0	0.88
10	End St / Stasie St	B	13.8	0.01	F	>50	5.33	B	17.6	0.63
11	End St / Dolomiet St	A	8.4	0.09	A	9	0.35	A	9	0.35

## 10. PROPOSED UPGRADES

The following upgrades are proposed to accommodate the traffic volumes of the Greenfields and the Koppie Developments as well as the Transnet development traffic on the network. Intersections will operate at acceptable levels of service with the proposed upgrades. The recommended intersection improvements are summarised in **Appendix A, Figure 22**.

The Greenfields and Koppie developments are expected to be developed simultaneously. The upgrades proposed are to accommodate the total volume, with both developments fully developed. The responsibility to upgrade should be divided between the two developments. In Table 12, an apportionment of responsibility is suggested, with the intersection improvements closest to each development falling under the responsibility of that development.

Both traffic signals and roundabouts were investigated as part of the upgrades. Due to road reserve and space limitations, traffic signals were regarded as the desirable upgrade option.

**Table 12: Proposed upgrades to accommodate all Greenfields and Koppie Development traffic on the road network**

No	Intersection	Existing Control	Proposed control	Proposed lane upgrades	Suggested Responsibility
1	R385 / Dolomiet St	Two-way stop	Signalised (when warranted)	- Eastbound: add exclusive right turn lane - Westbound: add exclusive left turn lane - Northbound: add exclusive right turn lane	Koppie
2	R385 / Stasie St	Two-way stop	Signalised (when warranted)	- Eastbound: add exclusive right turn lane - Westbound: add exclusive left turn lane - Northbound: add exclusive right turn lane	Koppie
4	R325 / Plein St	Two-way stop	Signalised (when warranted)	No lane upgrades proposed	Greenfields and Koppie
5	R385 / CAM St	Two-way stop	Signalised (when warranted)	- Eastbound: add two exclusive left turn lanes - Westbound: add exclusive right turn lane - Southbound: add two exclusive right turn lanes	Greenfields
7	R385 / Gravel Rd	Two-way stop	Two-way stop	- Eastbound: add exclusive left turn lane - Westbound: add exclusive right turn lane - Southbound: add exclusive right turn lane - Construction of link road (approximately 2km) leading to the Greenfields Development	Greenfields

**Table 12: Proposed upgrades to accommodate all Greenfields and Koppie Development traffic on the road network (continue)**

No	Intersection	Existing Control	Proposed control	Proposed lane upgrades	Suggested Responsibility
8	R325 / Shone St	All-way stop	Signalised (when warranted)	- Southbound: add exclusive left and exclusive right turn lanes - Northbound: add exclusive left and exclusive right turn lanes - Westbound: add exclusive left and exclusive right turn lanes	Greenfields
9	R325 / End St	All-way stop	Signalised (when warranted)	- Eastbound: add two exclusive right turn lanes - Northbound: add exclusive left turn lane - Southbound: add exclusive right turn lane	Koppie
10	End St / Stasie St	Two-way stop	Signalised (when warranted)	- Eastbound: add exclusive right turn - Westbound: add exclusive left and exclusive right turn lanes - Southbound: add exclusive left and exclusive right turn lanes - Northbound: add exclusive left and exclusive right turn lanes	Koppie

The COTO TMH 16 manual [3] specifies intersection spacing of 300m ± 20% on Class 2 roads. The intersection spacing between all intersections, except for the R385 / CAM St intersection, comply with the specified intersection spacing.

It should be noted that the R385 approach capacity and might in future require upgrades.

## 11. CONCLUSIONS AND RECOMMENDATIONS

Two mixed typology and integrated infrastructure developments are planned to be constructed in the Tsantsabane Local Municipality, Northern Cape. The proposed developments are:

- The proposed Greenfields development and is located on Part of the Remainder of Erf 1 and Part of Erf 761, Postmasburg
- The proposed Koppie development and is located on Part of the Remainder of Erf 1, Part of Erf 2, and Part of Erf 89, Postmasburg;
- A Road Network Plan for the proposed developments was done and was used to assess the internal road network of the proposed developments;

- The proposed Greenfields development will gain access from CAM Street as well as from a future north-south link which will tie in with the existing Gravel Road (DR 3387). The latter was not assumed to be in place for this development;
- A pedestrian bridge to the north of the Greenfields development is proposed in order to provide safe pedestrian access over the railway line;
- The proposed Koppie development will gain access from Stasie and Dolomiet Streets to the north and End Street provide access in an east-west direction;
- Non-motorised Transport users will gain access to the Koppie development by means of pedestrian sidewalks alongside the access routes;
- There is a lack of Public Transport and Non-Motorised Transport facilities in and around the existing Postmasburg development;
- The Transnet SOC Residential development was analysed as part of the latent right development in this assessment;
- The expected trip generation for the proposed Greenfields development during the AM Peak Hour is 2420 vph and 1974 vph during the PM Peak Hour;
- The expected trip generation for the proposed Koppie development during the AM Peak Hour is 2633 vph and 2183 vph during the PM Peak Hour;
- Trip adjustment factors for low vehicle ownership was taken into account during the calculation of the trip generation;
- The trip distribution of the expected trips were done by taking the existing traffic patterns as well as the land uses in the vicinity of the proposed development into account;
- Capacity analyses of intersections in the vicinity of the proposed developments were done and upgrades were proposed at intersections where the level of service was unacceptable.
- The proposed upgrades for the Greenfields and Koppie developments are summarised in **Section 10, Table 12**.
- It is concluded that the proposed developments will not have a negative impact on the external road network if all the upgrades are in place and it is therefore recommended that the developments should be considered favourably from a traffic engineering point of view.

## 12. REFERENCES

[1] Aurecon, Postmasburg – Northern Cape, Traffic Impact Statement for a Proposed Housing Development in Postmasburg, Northern Cape, 2 September 2013

[2] Committee of Transport Officials (COTO) Technical Methods for Highways (TMH 17) Volume 1, *South African Trip Data Manual*, September 2012.

[3] Committee of Transport Officials (COTO) Technical Methods for Highways (TMH 16) Volume 2, *South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual*, August 2012

# Appendix A

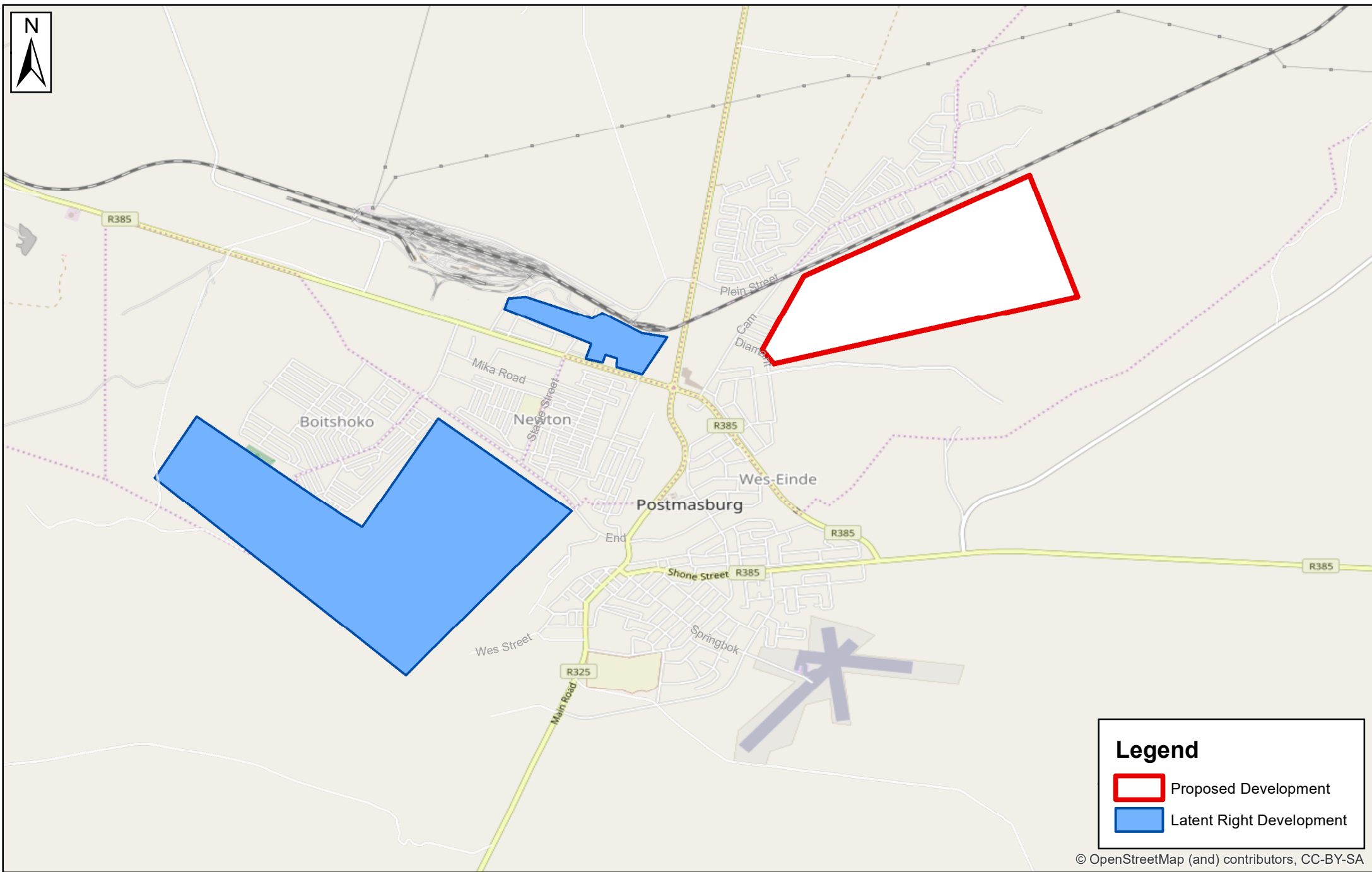
---

## Figures



## List of Figures

Figure Nr	Title
1	Locality Plan - Greenfields
2	Locality Plan - Koppie
3	Development Plan - Greenfields
4	Development Plan - Koppie
5	Road Network Plan
6	Public Transport Plan
7	2017 AM Peak Hour Base Volumes
8	2017 PM Peak Hour Base Volumes
9	Existing Geometry
10	Scenario 1: 2017 AM Peak Hour Background Traffic volumes (including Transnet Dev) with analysis results on existing geometry
11	Scenario 1: 2017 PM Peak Hour Background Traffic volumes (including Transnet Dev) with analysis results on existing geometry
12	Trip Distribution - Greenfields Development
13	Trip Distribution - Koppie Development
14	AM Peak Hour Trip Assignment - Koppie Development
15	PM Peak Hour Trip Assignment - Koppie Development
16	AM Peak Hour Trip Assignment - Greenfields Development
17	PM Peak Hour Trip Assignment - Greenfields Development
18	Scenario 2: 2022 AM Peak Hour Total Traffic volumes (including Transnet, Greenfields and Koppie Developments) with analysis results on existing geometry
19	Scenario 2: 2022 PM Peak Hour Total Traffic volumes (including Transnet, Greenfields and Koppie Developments) with analysis results on existing geometry
20	Scenario 2U: 2022 AM Peak Hour Total Traffic volumes (including Transnet, Greenfields and Koppie Developments) with analysis results on proposed upgraded geometry
21	Scenario 2U: 2022 PM Peak Hour Total Traffic volumes (including Transnet, Greenfields and Koppie Developments) with analysis results on proposed upgraded geometry
22	Proposed Updated geometry to accommodate Total Traffic Volumes



© OpenStreetMap (and) contributors, CC-BY-SA

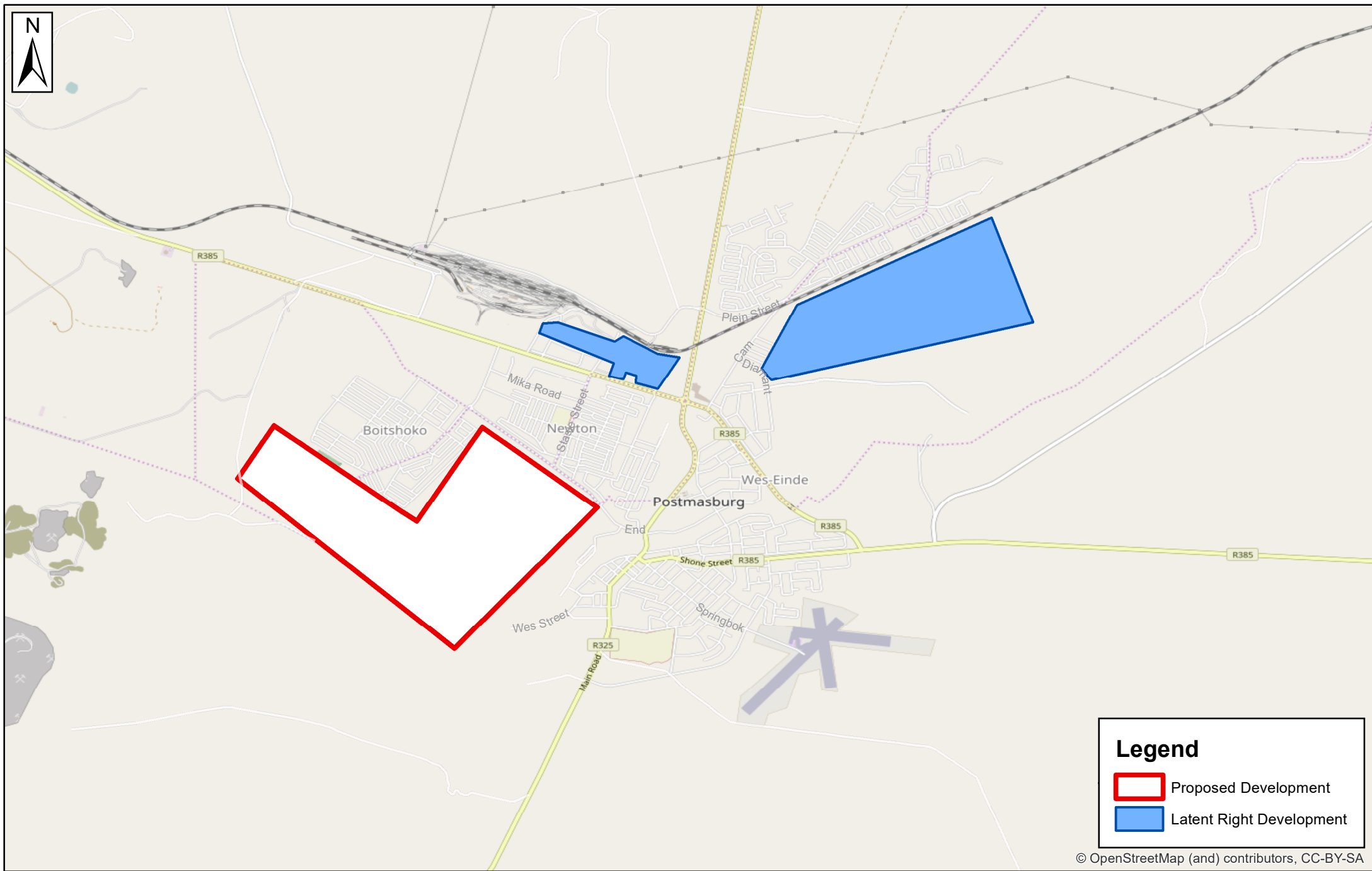
3719 /Fig 1





**PROJECT:**  
POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS

**FIGURE:**  
LOCALITY MAP - GREENFIELDS

**NO:**  
1



**Legend**

-  Proposed Development
-  Latent Right Development

© OpenStreetMap (and) contributors, CC-BY-SA

3719 /Fig 2

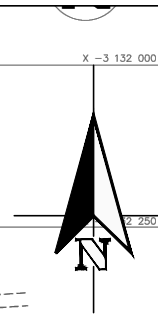
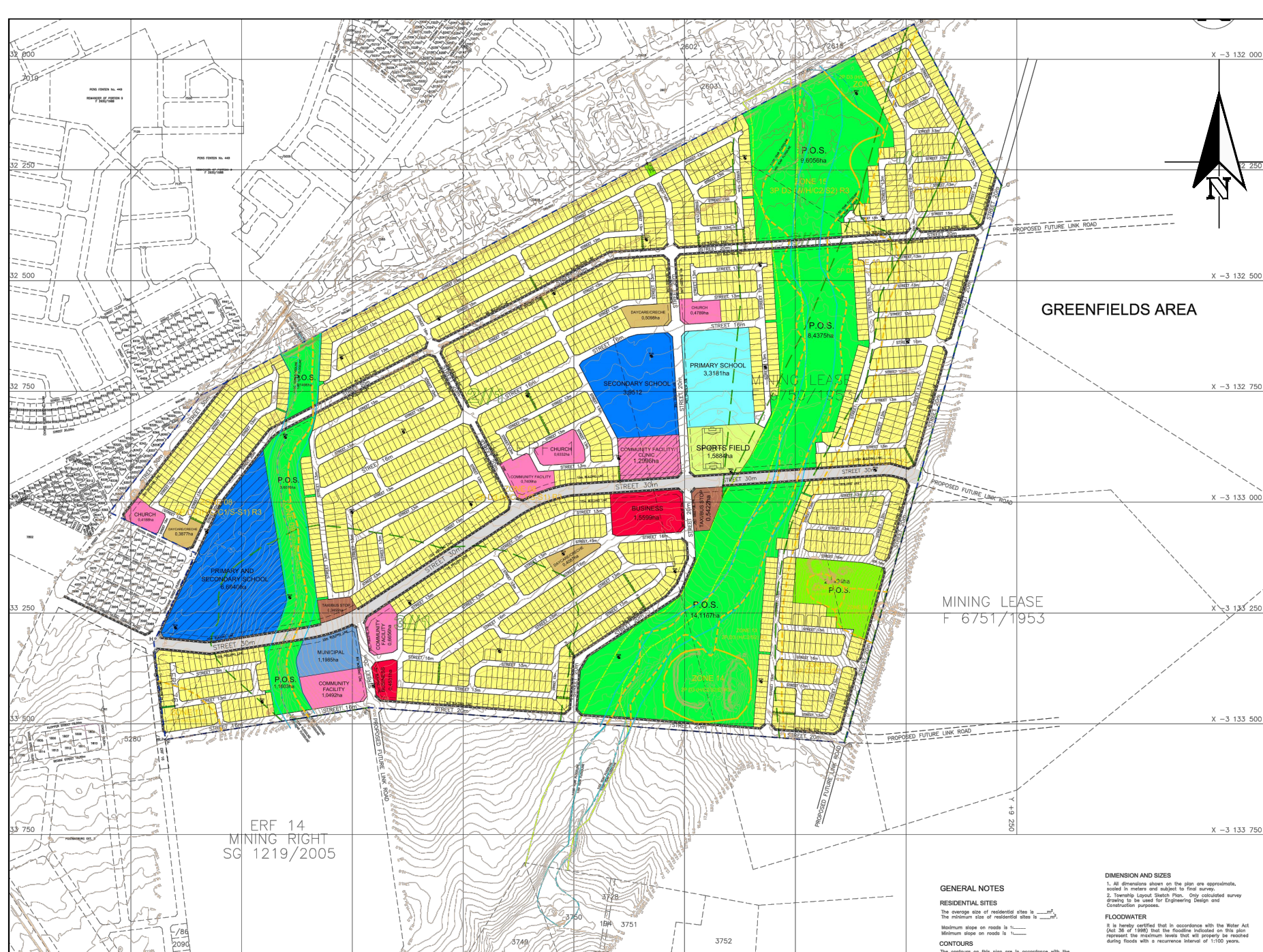


**PROJECT:**  
POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS

**FIGURE:**  
LOCALITY MAP - KOPPIE

**NO:**  
2





1 AND PART OF ERF 761 POSTMASBURG.  
 LOCAL AUTHORITY : TSANTSABANE LOCAL MUNICIPALITY  
 DISTRICT : ZF MCGAWU  
 GEODETICAL SYSTEM : WG 23

LOCALITY SCALE: 1:50 000

**LAND USE TABLE**

ZONING	LAND USE	ERF NUMBERS	No. OF STANDS	AREA OF STANDS	% OF AREA
SUBSIDISED HOUSING	RESIDENTIAL (R300P ERVEN)		2476	85,4102	42,80
BUSINESS PREMISES	BUSINESS		2	2,0159	1,00
SPECIAL ZONE	BUS. STOP/TAXI RANK		2	0,8878	0,44
PLACE OF INSTRUCTION	SECONDARY SCHOOL		1	3,9512	1,97
	PRIMARY SCHOOL		1	6,6940	3,34
	PRIMARY SCHOOL		1	3,3181	1,66
	DAYCARE / CRèche		3	1,3092	0,65
INSTITUTION	COMMUNITY FACILITY		3	2,4557	1,23
	COMMUNITY FACILITY		1	1,2996	0,65
PLACE OF WORSHIP	CHURCH		3	1,3308	0,72
MUNICIPAL USES	MUNICIPAL USES		1	1,1985	0,60
PUBLIC PARKS	OPEN SPACES		20	2,6879	1,34
RIVERS OR RIVERBEDS	FLOOD AREA		36	38,1621	19,03
SPORT FIELDS AND RELATED INFRASTRUCTURE	SPORT FIELDS		1	1,8084	0,79
MINOR ROADS	MINOR ROADS		5	5,4667	2,73
PUBLIC STREETS	PUBLIC STREETS			42,3321	21,22
TOTAL			2521	200,4846	100%

**GENERAL NOTES**

THE FIGURE ABCDEF04AKA REPRESENTS OUTSIDE BOUNDARY OF THE PROPOSED TOWNSHIP POSTMASBURG\_GREENFIELDS BEING APPROXIMATELY 200,4846HA IN EXTENT.

- OUTSIDE BOUNDARY OF TOWNSHIP
- GEOTECHNICAL ZONES
- SOILS ZONES
- ENVIRONMENTAL ZONE
- 1:50 YEARS FLOODLINE
- 1:100 YEARS FLOODLINE
- LINE OF NO ACCESS
- FARM PORTIONS
- 32m FLOODLINE BUFFER
- TEST PITS

**REVISIONS**

NO.	DESCRIPTION	D: DRAFT	C: CIRCULATED	A: APPROVED
01.	1:50 AND 1:100 YEARS FLOODLINE ADDED.			C. MASON 2017/01/24
02.	RE-LAYOUT.			C. MASON 2017/02/24
03.	AMEND INTERSECTIONS.			C. MASON 2017/03/01
04.	AMEND LAND USE TABLE.			C. MASON 2017/03/08
05.	AMEND LAYOUT TO ADD STORMWATER AND AMEND LAND USE TABLE.			C. MASON 2017/04/10

CLIENT:

TOWN PLANNER: Renier MaitJes COPYRIGHT RESERVED

SCALE: 1:3 000

DRAWING REF: PosMas\_Greenfields D5/2017.04.10

DRAWING STATUS: DRAFT SCHEMATIC

**GENERAL NOTES**

**RESIDENTIAL SITES**  
 The average size of residential sites is \_\_\_\_\_m<sup>2</sup>,  
 the minimum size of residential sites is \_\_\_\_\_m<sup>2</sup>.

Maximum slope on roads is 1:\_\_\_\_\_  
 Minimum slope on roads is 1:\_\_\_\_\_

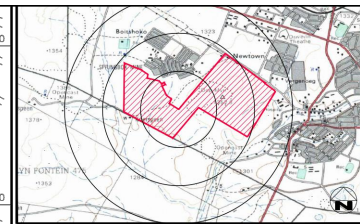
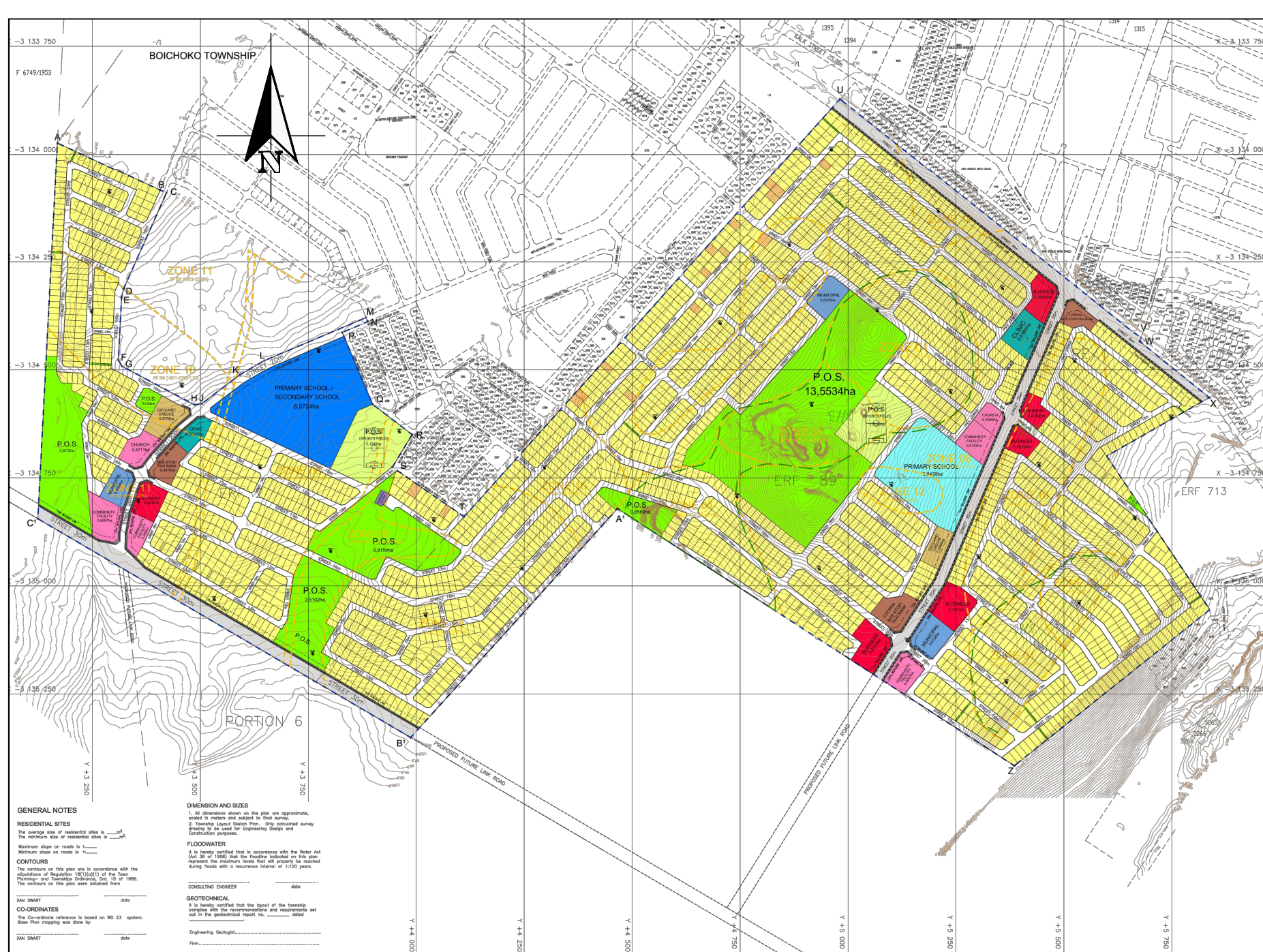
**CONTOURS**  
 The contours on this plan are in accordance with the \_\_\_\_\_

**FLOODWATER**  
 It is hereby certified that in accordance with the Water Act (Act 36 of 1956) that the floodline indicated on this plan represent the maximum levels that will properly be reached during floods with a recurrence interval of 1:100 years.

ERF 14  
 MINING RIGHT  
 SG 1219/2005








**LAND USE TABLE**

ZONING	LAND USE	ERF NUMBERS	No. OF STANDS	AREA OF STANDS	% OF AREA
SUBSIDISED HOUSING	RESIDENTIAL (350m <sup>2</sup> ERFVEN)		2820	105,1106	53,16
BUSINESS PREMISES	BUSINESS		6	3,0404	1,54
SPECIAL ZONE	ERF 89 (SPECIAL ZONE)		3	1,3609	0,70
PLACE OF INSTRUCTION	EDUCATIONAL		1	8,0724	3,07
	PRIMARY SCHOOL		1	3,8438	1,99
	DAYCARE / CRECHE		2	0,9775	0,49
PLACE OF WORSHIP	CHURCH		2	0,7667	0,39
INSTITUTION	COMMUNITY FACILITY		4	2,0848	1,04
	COMMUNITY FACILITY		2	0,9718	0,49
MUNICIPAL USES	MUNICIPAL		3	1,5769	0,80
	OPEN SPACES		9	22,7598	11,57
SPORT FIELDS AND OTHER INFRASTRUCTURE	SPORT FIELDS AND RECREATION INFRASTRUCTURE		2	3,8114	1,93
PUBLIC STREETS	STREETS			39,0949	19,72
	30m ROAD			6,1511	3,11
<b>TOTAL</b>			<b>2894</b>	<b>197,7417</b>	<b>100%</b>

- GENERAL NOTES**
- THE FIGURE ABCDEFHJKLMNPQRSTUWXYZ REPRESENTS OUTSIDE BOUNDARY OF THE PROPOSED TOWNSHIP KOPPIE-REKEMABAM BOICHOKO, BEING APPROXIMATELY 197,7417ha IN EXTENT.
- OUTSIDE BOUNDARY OF TOWNSHIP
  - GEOTECHNICAL ZONES
  - SOILS ZONES
  - 1:50 YEARS FLOODLINE
  - 1:100 YEARS FLOODLINE
  - LINE OF NO ACCESS
  - FARM PORTIONS
  - TEST PITS
  - PERMANENT STRUCTURES

**REVISIONS**

NO.	DESCRIPTION	D: DRAFT	C: CIRCULATED	A: APPROVED
01.	LAYOUT AMENDED TO ACCOMMODATE TRAFFIC ENGINEER'S COMMENTS.			C. MASON 2017.02.08
02.	AMEND LAYOUT TO ACCOMMODATE STORMWATER AND UPDATE LAND USE TABLE.			C. MASON 2017.04.10

CLIENT:  TSANTSABANE LOCAL MUNICIPALITY

TOWN PLANNER: Renier Meintjes

SCALE: 1:3 000

DRAWING REF: **Posmas Koppie D2/2017.04.10**

DRAWING STATUS: **DRAFT**

**URBAN DYNAMICS**

37 EMPIRE ROAD  
PARKTOWN  
P.O. BOX 291 803  
MELVILLE  
2109

TEL: (+27 11) 482-4131  
FAX: (+27 11) 482-9999  
E-MAIL: renierm@urbandynamics.co.za



**GENERAL NOTES**

**RESIDENTIAL SITES**  
The average size of residential sites is      m<sup>2</sup>.  
The minimum size of residential sites is      m<sup>2</sup>.

**FLOODWATER**  
It is hereby certified that in accordance with the Water Act (Act 36 of 1956) that the floodline indicated on this plan represent the maximum levels that will properly be reached during floods with a recurrence interval of 1100 years.

**CONTOURS**  
The contours on this plan are in accordance with the stipulations of Regulation 18(1)(a)(1) of the Town Planning and Townships Ordinance, Ord. 15 of 1986. The contours on this plan were obtained from     .

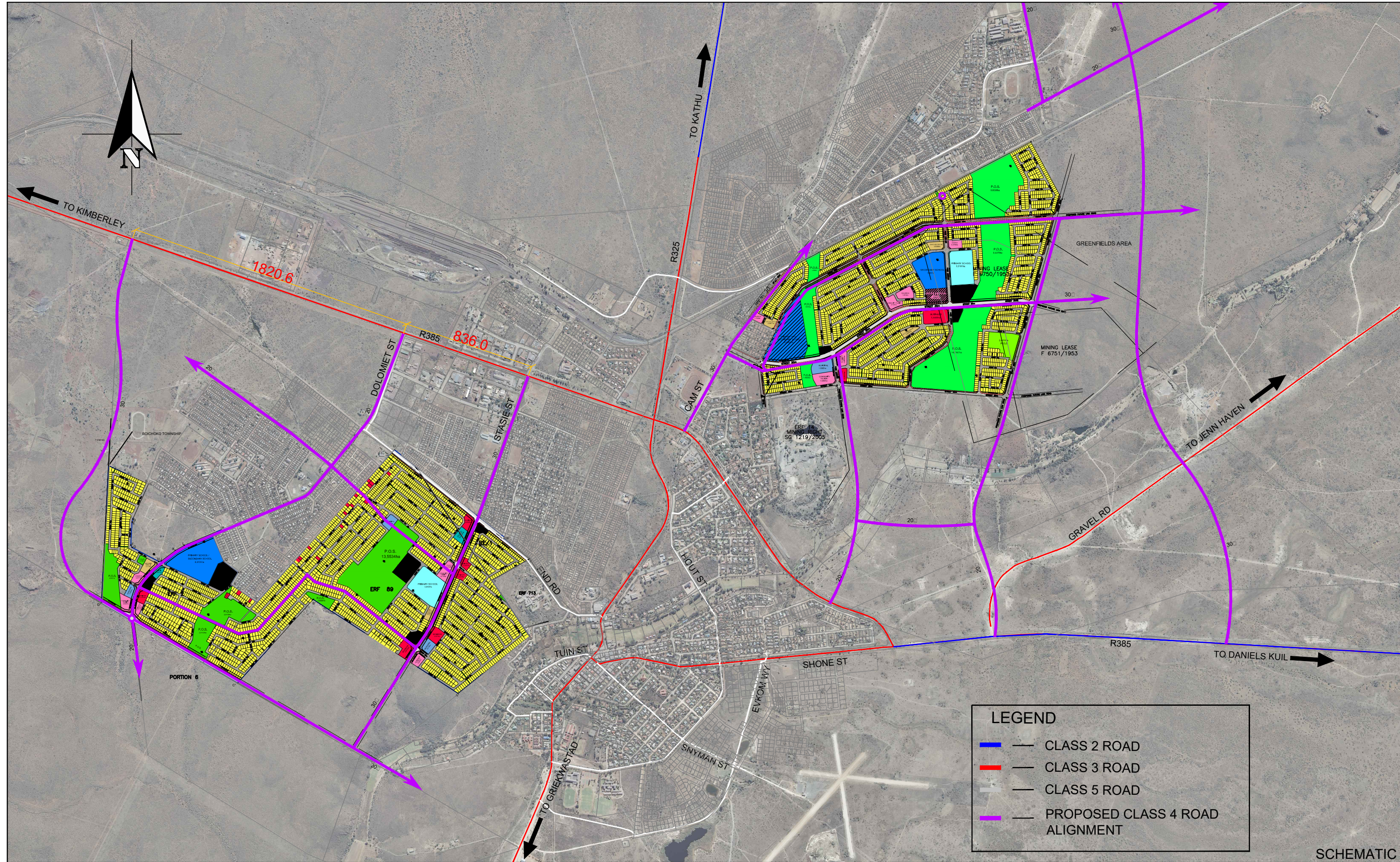
**DIMENSION AND SIZES**  
1. All dimensions shown on the plan are approximate, based in meters and subject to final survey.  
2. Township Layout Search Plan. Only calculated survey drawings to be used for Engineering Design and Construction purposes.

**CONSULTING ENGINEER**  
date     

**GEOTECHNICAL**  
It is hereby certified that the layout of the township complies with the recommendations and requirements set out in the geotechnical report no.      dated     .

Engineering Geologist       
date





SCHEMATIC

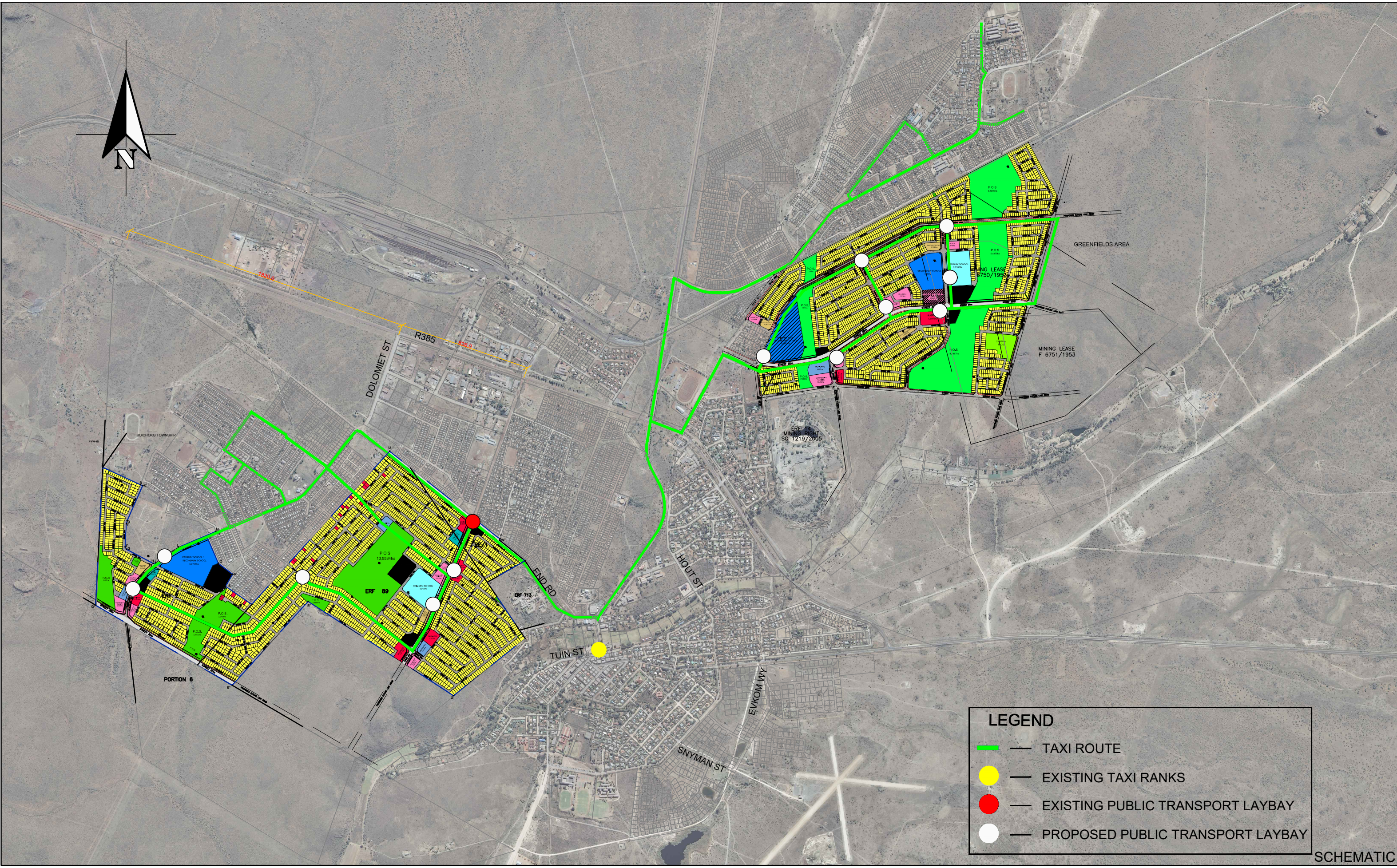


PROJECT:  
**POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS**

FIGURE:  
**ROADS NETWORK PLAN**

NUMBER:  
**5**





**LEGEND**

- TAXI ROUTE
- EXISTING TAXI RANKS
- EXISTING PUBLIC TRANSPORT LAYBAY
- PROPOSED PUBLIC TRANSPORT LAYBAY

SCHEMATIC

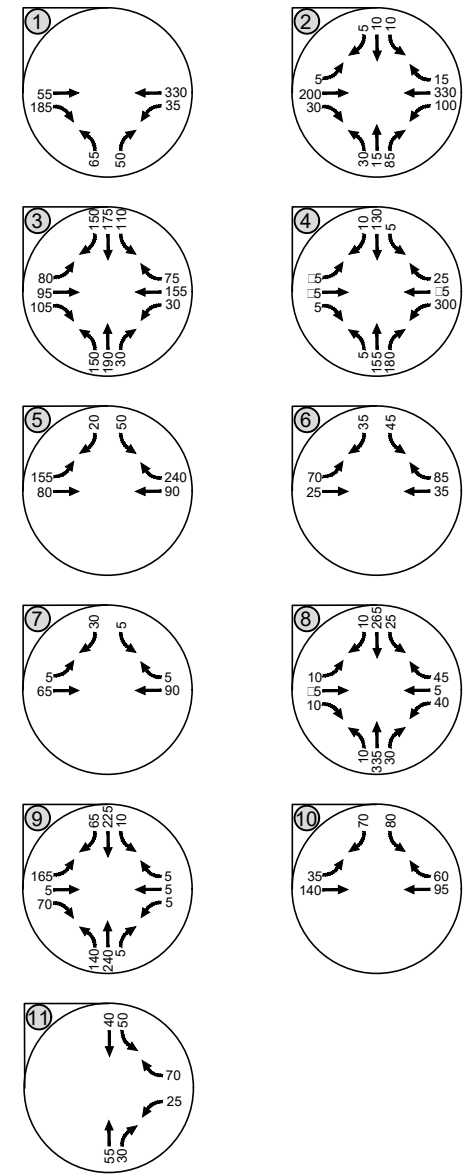
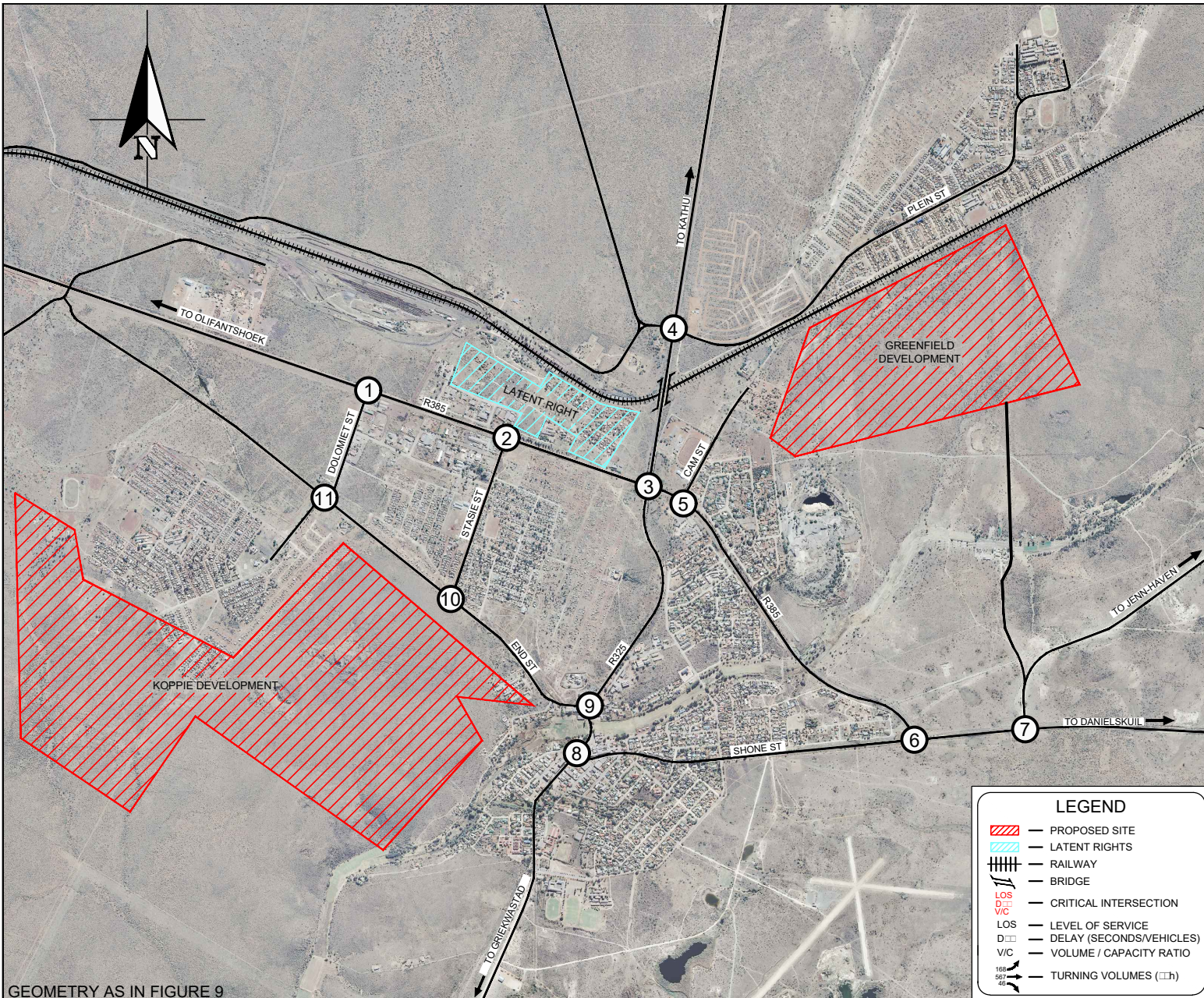


PROJECT:  
**POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS**

FIGURE:  
**PUBLIC TRANSPORT PLAN**

NUMBER:  
**6**





SCHMATIC

GEOMETRY AS IN FIGURE 9



PROJECT:3719

POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS

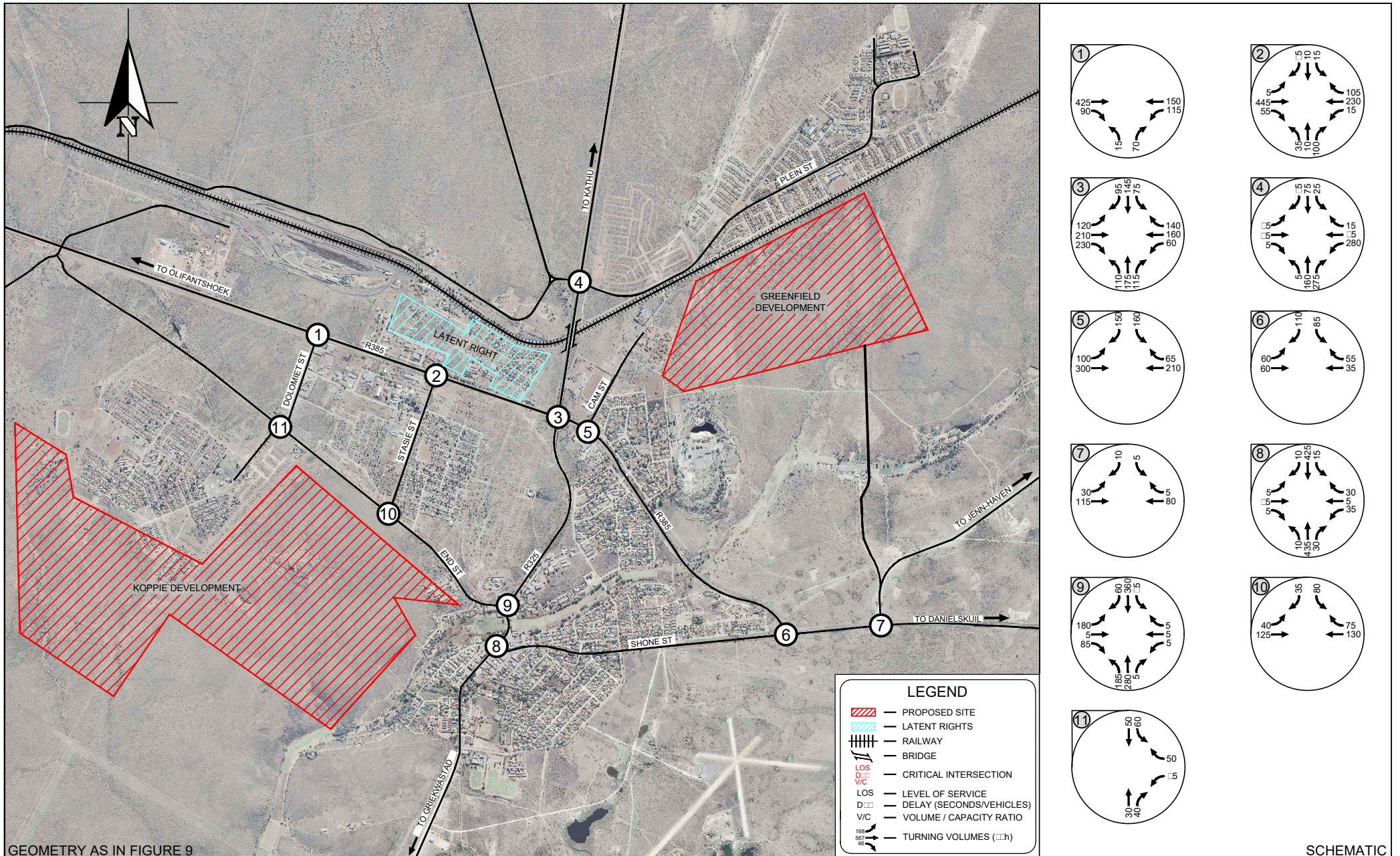
FIGURE:

2017 AM PEAK HOUR BASE VOLUMES

NUMBER:

7





PROJECT:3719

POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS

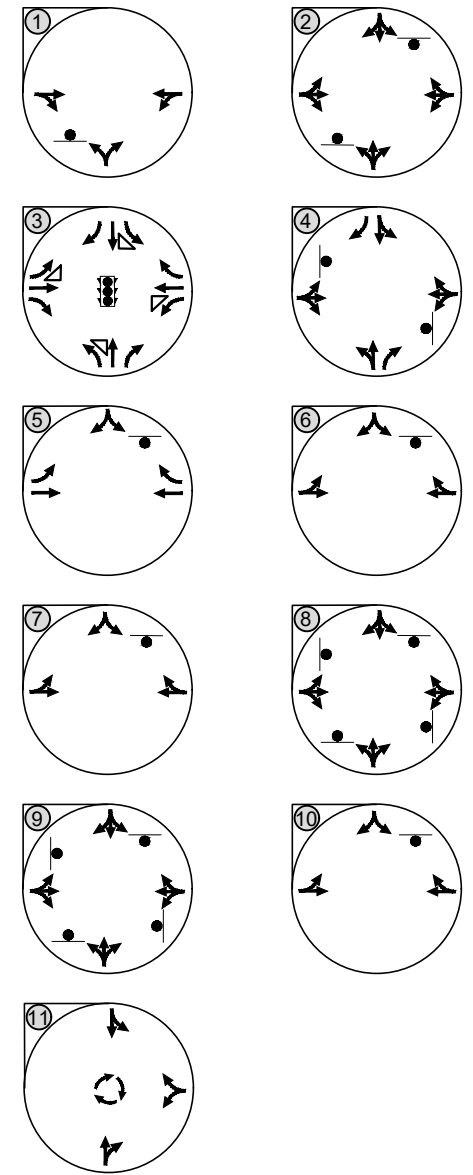
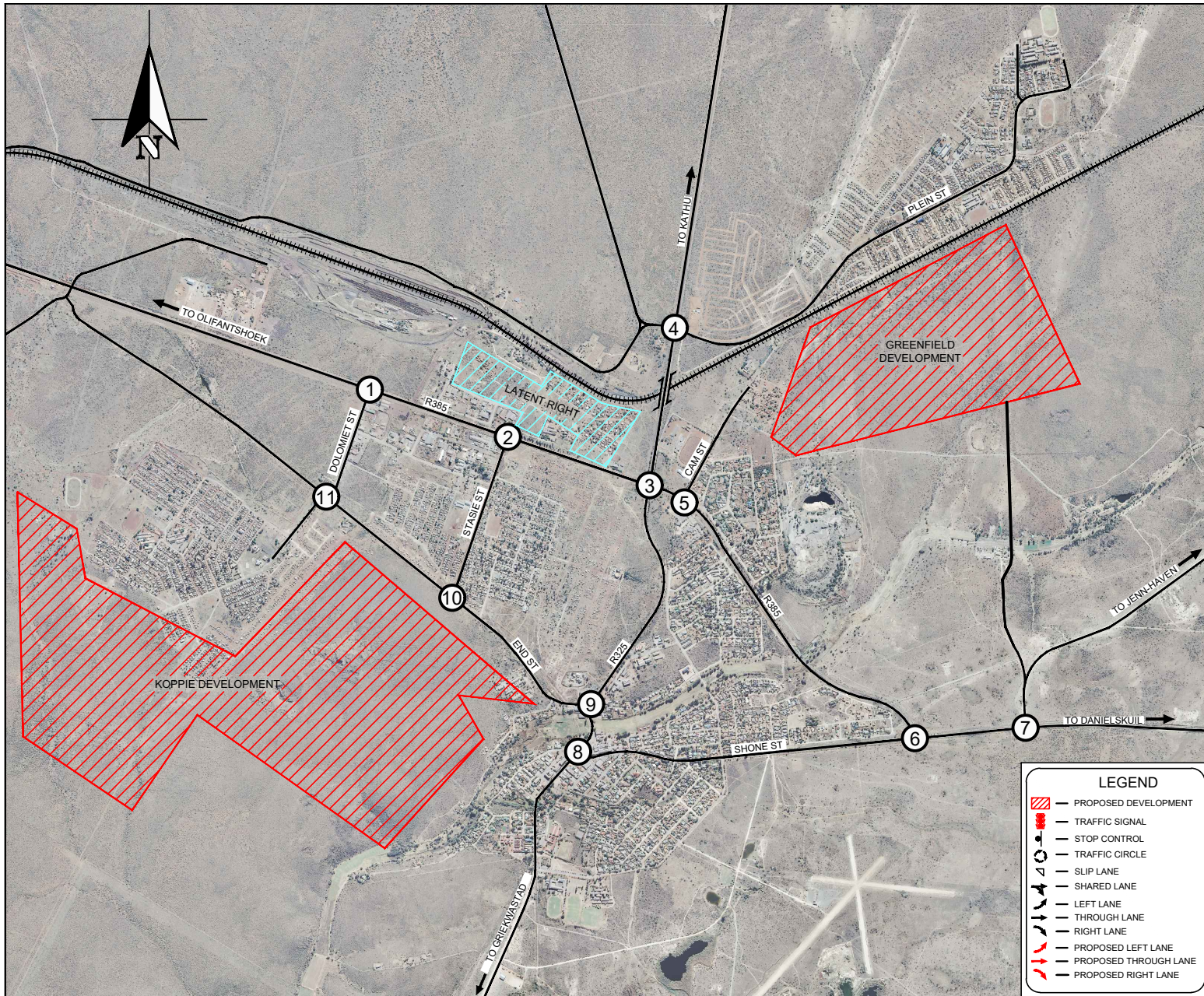
FIGURE:

2017 PM PEAK HOUR BASE VOLUMES

NUMBER:

8





SCHMATIC



PROJECT:3719

POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS

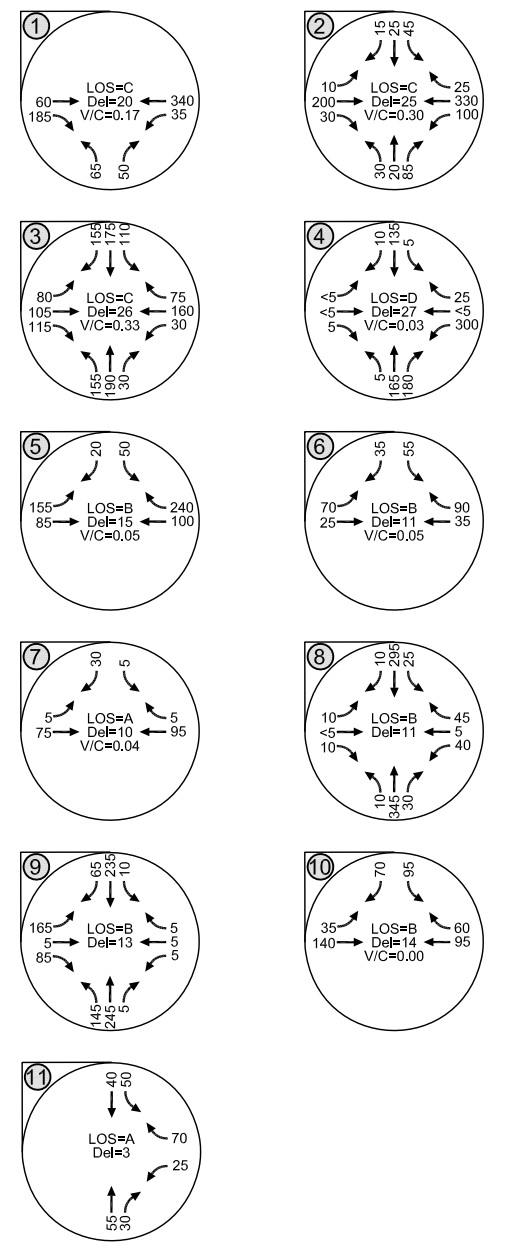
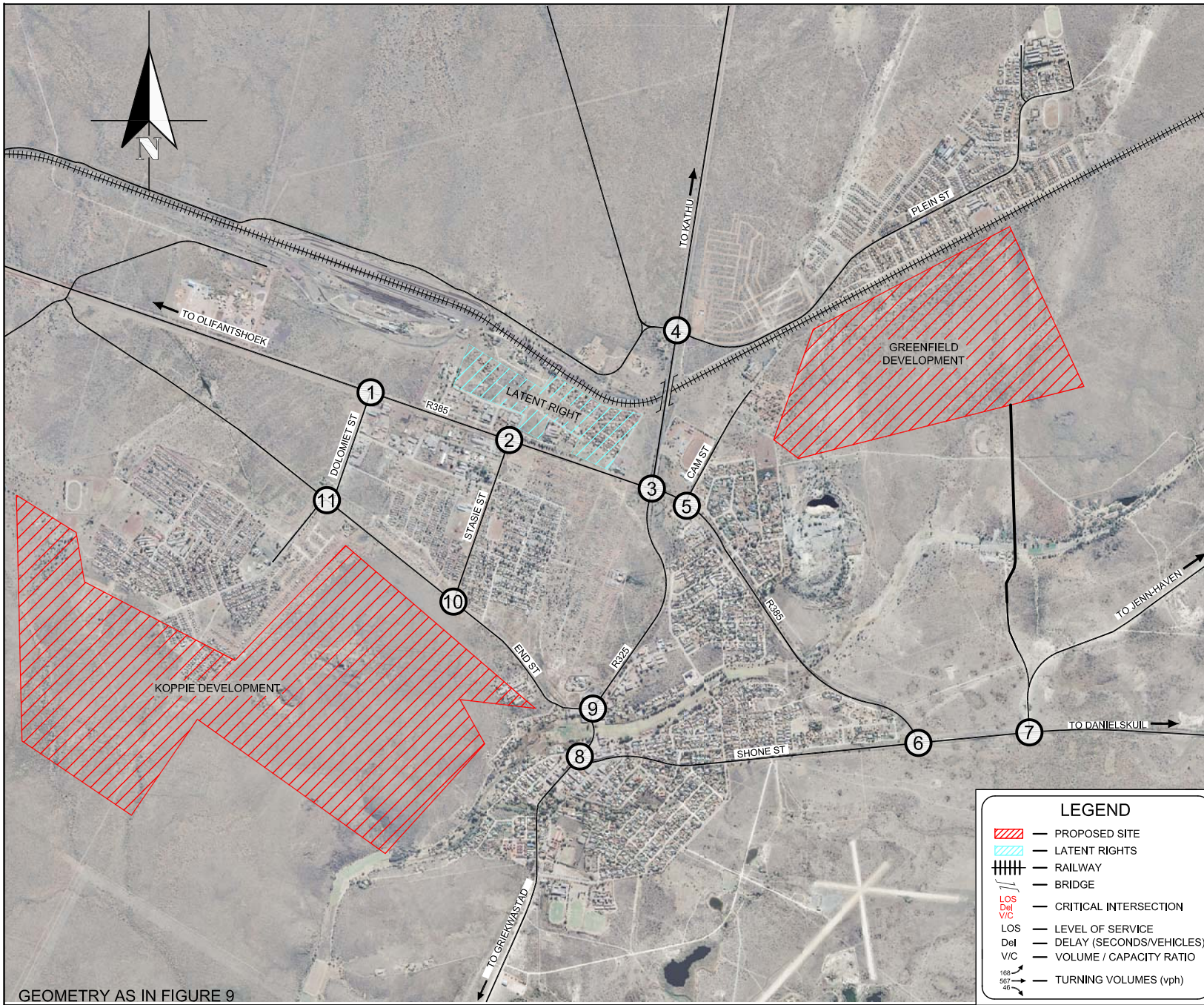
FIGURE:

EXISTING GEOMETRY

NUMBER:

9



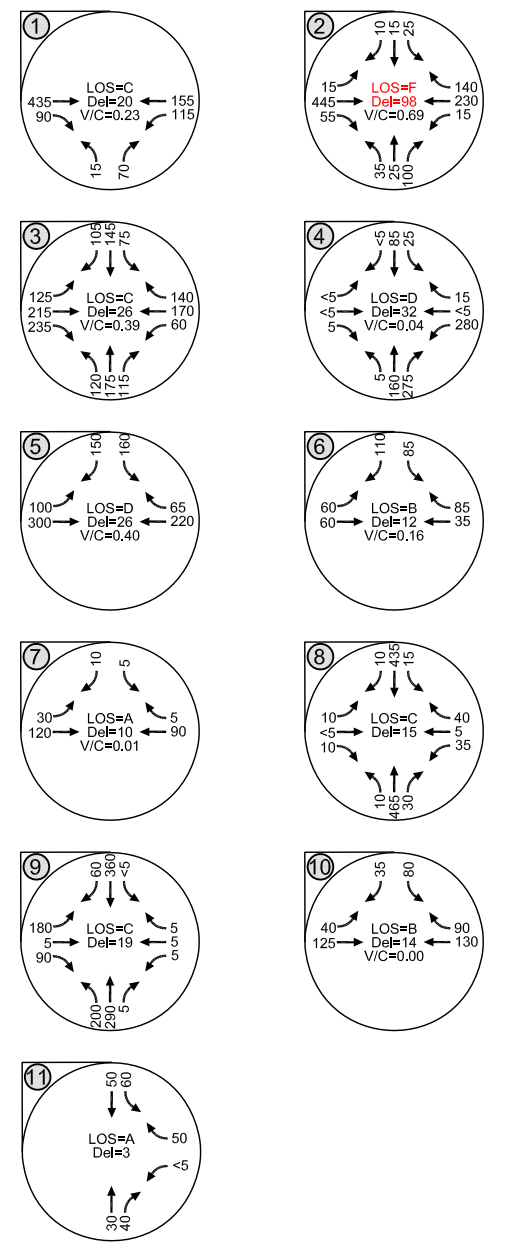
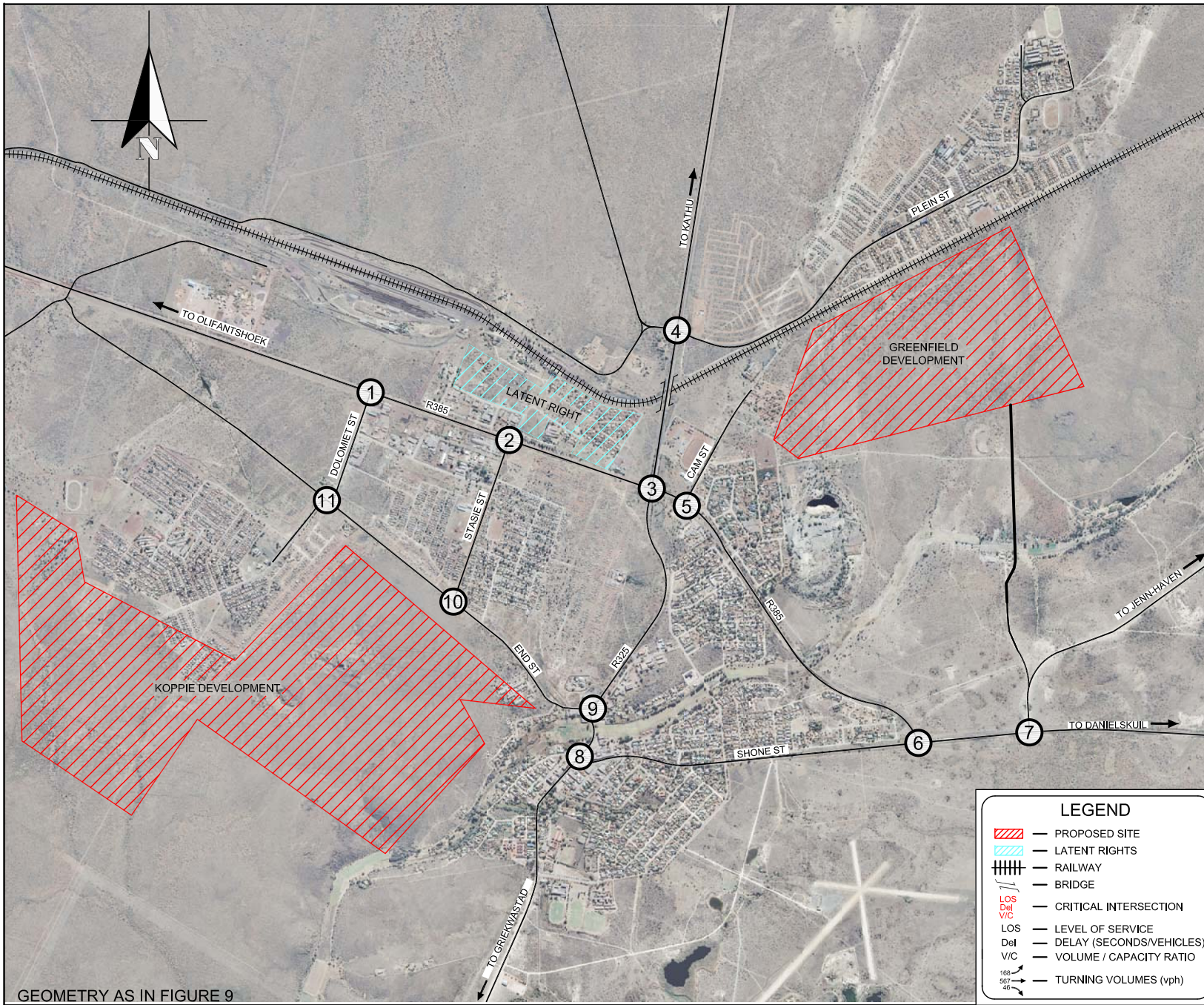


GEOMETRY AS IN FIGURE 9

SCHEMATIC





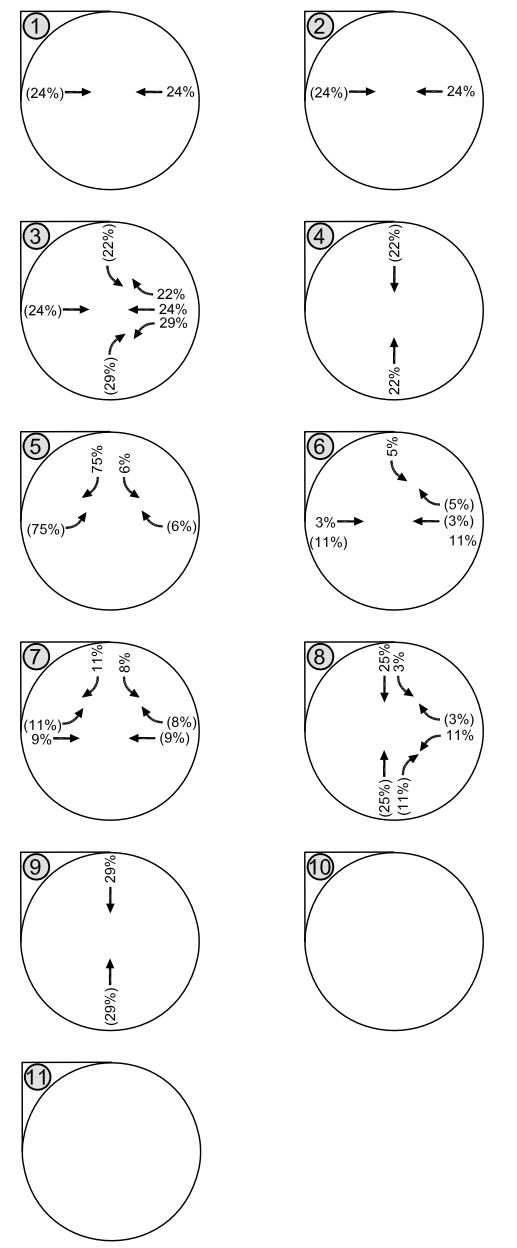
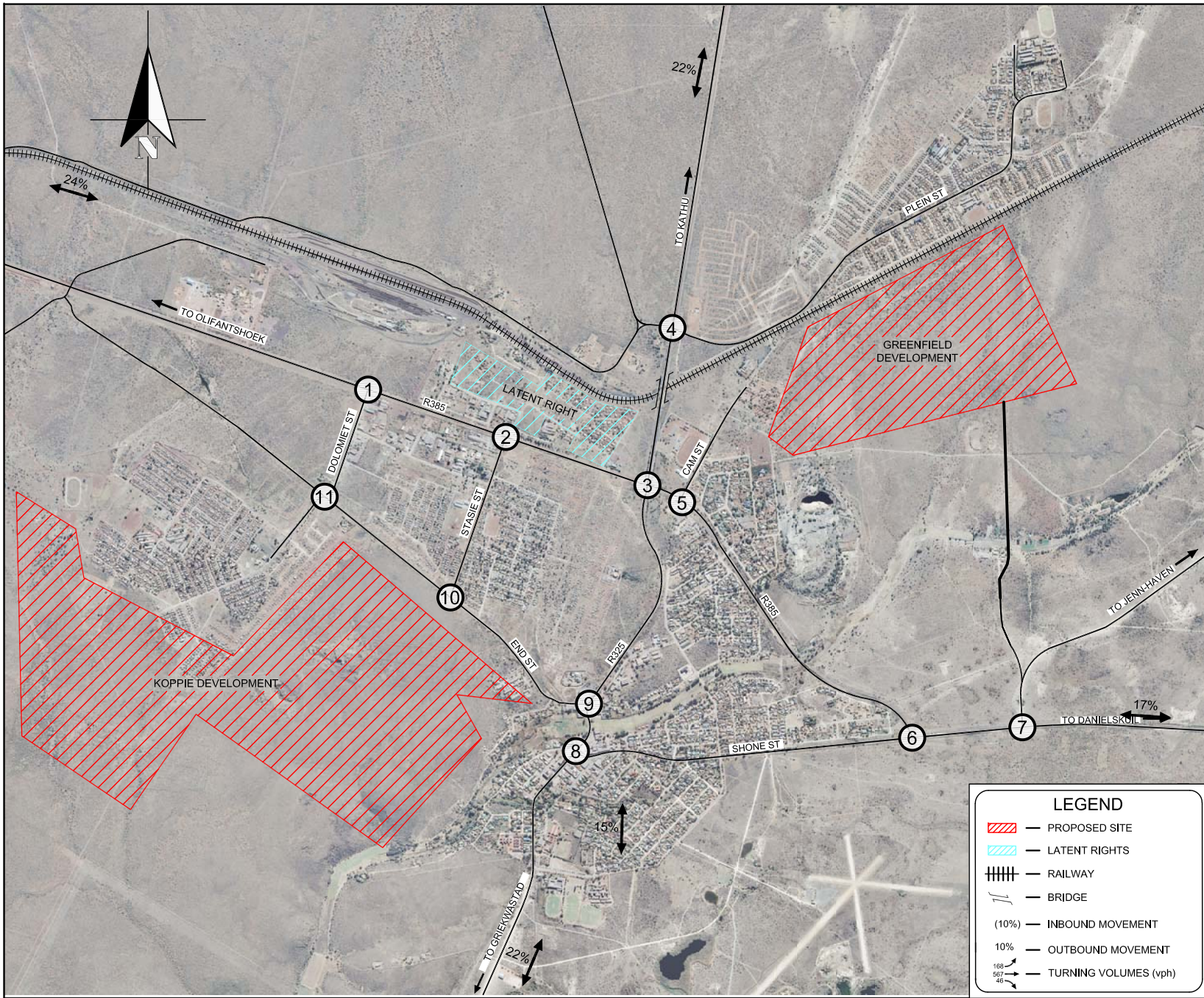


GEOMETRY AS IN FIGURE 9

SCHEMATIC







SCHMATIC



PROJECT:3719

POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS

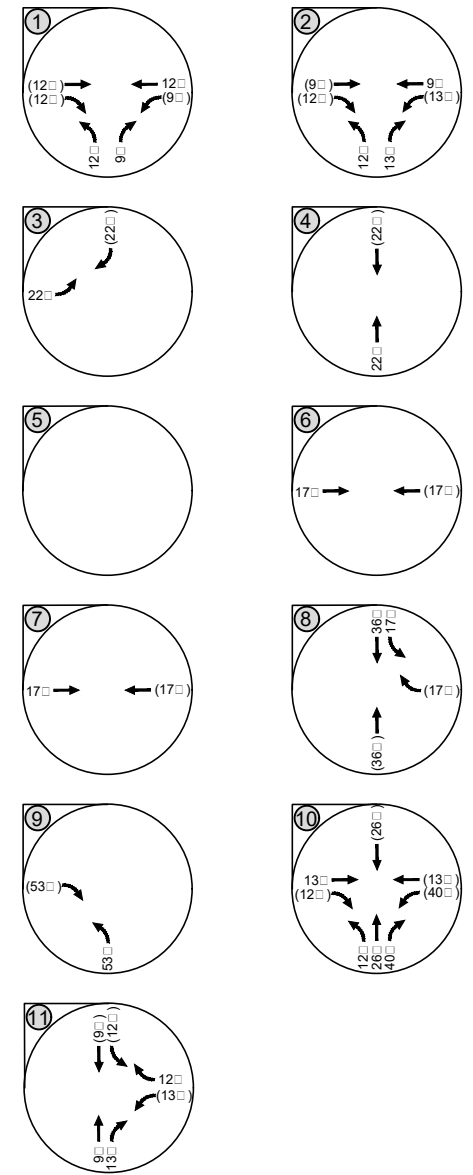
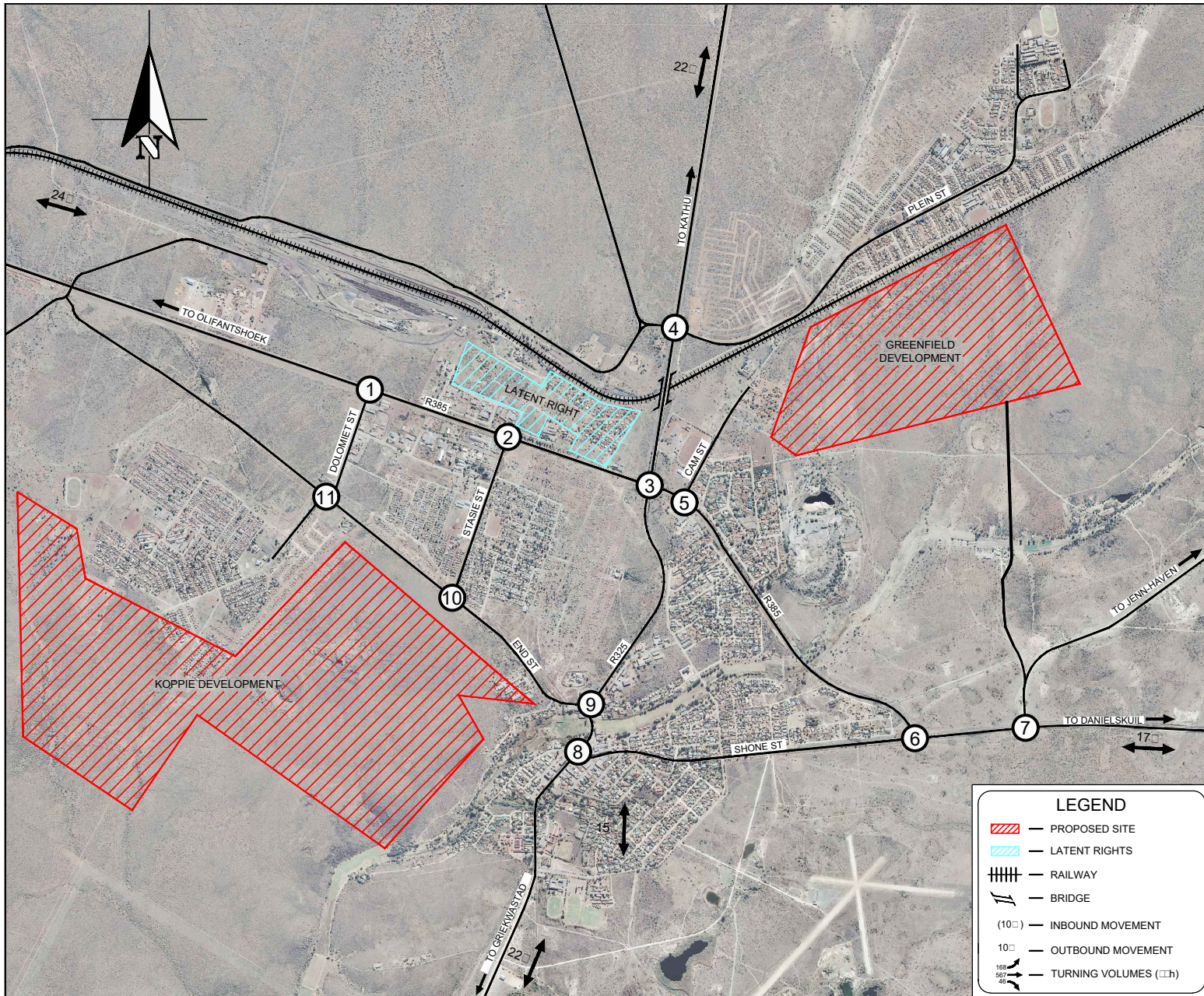
FIGURE:

TRIP DISTRIBUTION GREENFIELDS

NUMBER:

12





PROJECT:3719

POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS

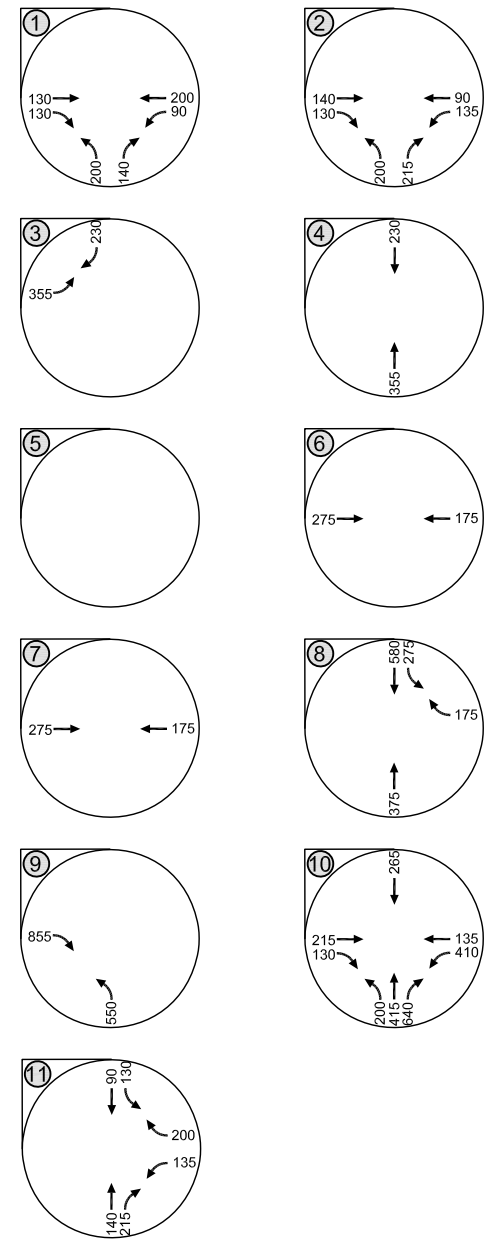
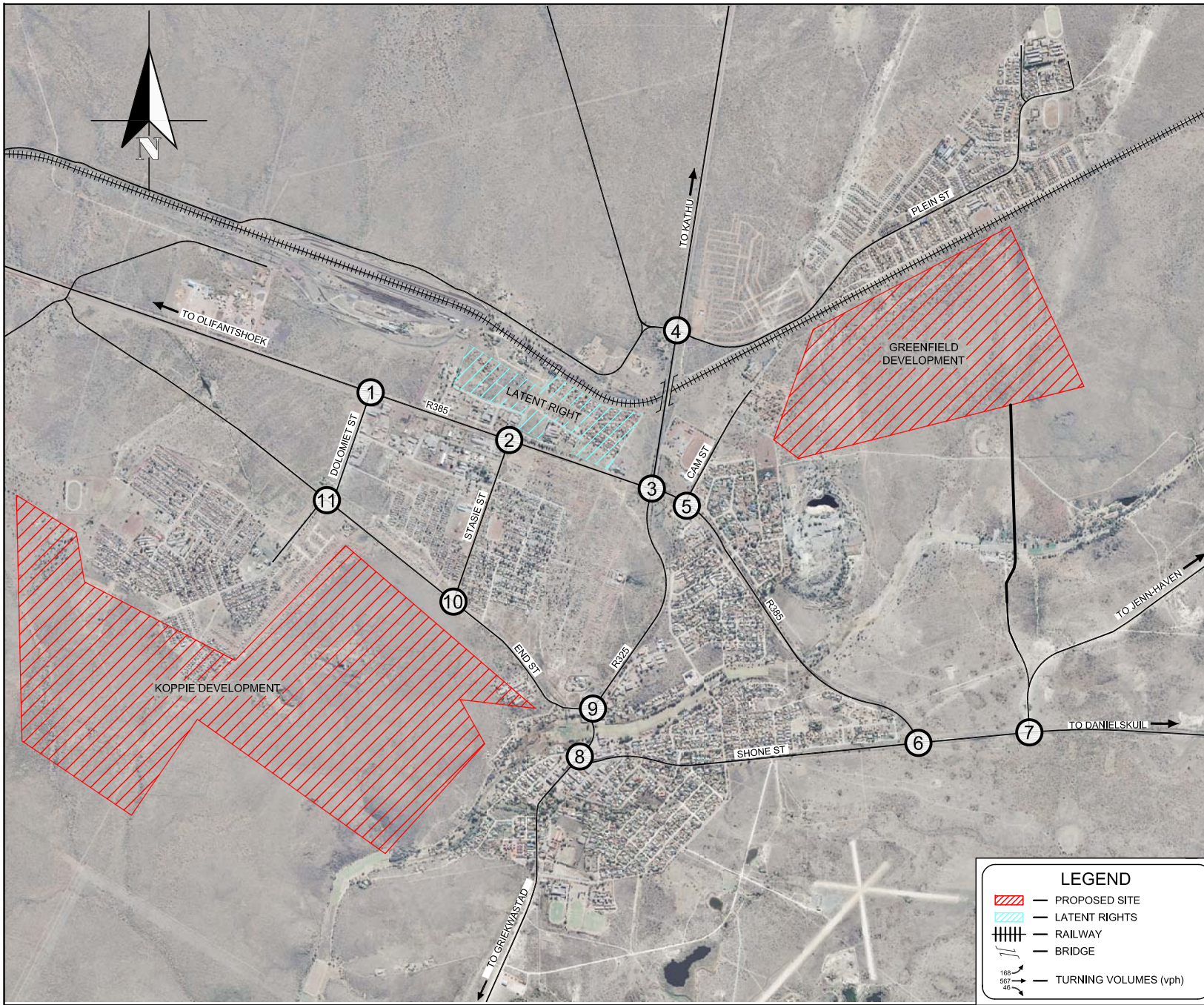
FIGURE:

TRIP DISTRIBUTION KOPPIE

NUMBER:

13





SCHMATIC



PROJECT:3719

POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS

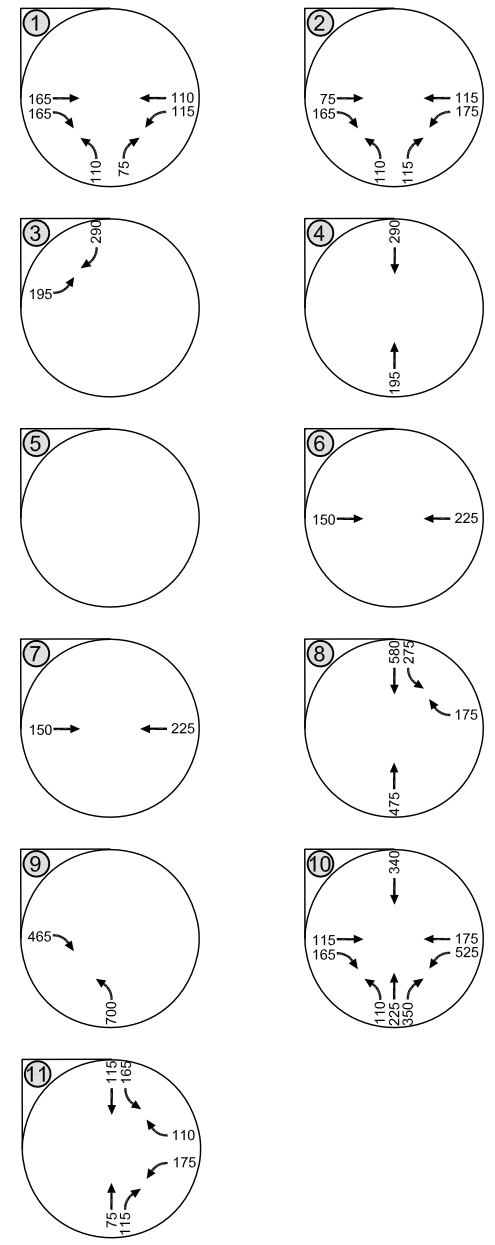
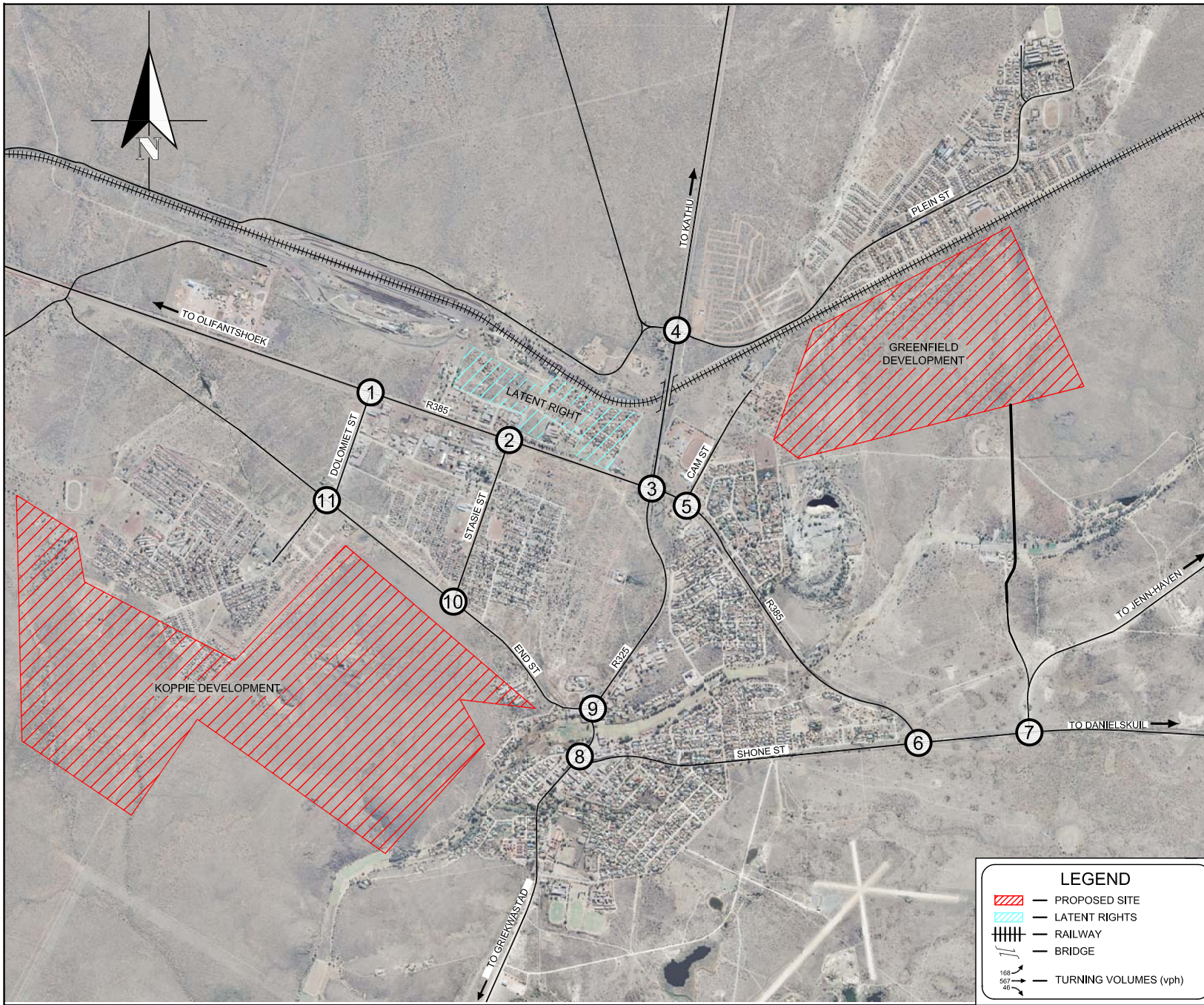
FIGURE:

AM PEAK HOUR TRIP ASSIGNMENT - KOPPIE DEVELOPMENT

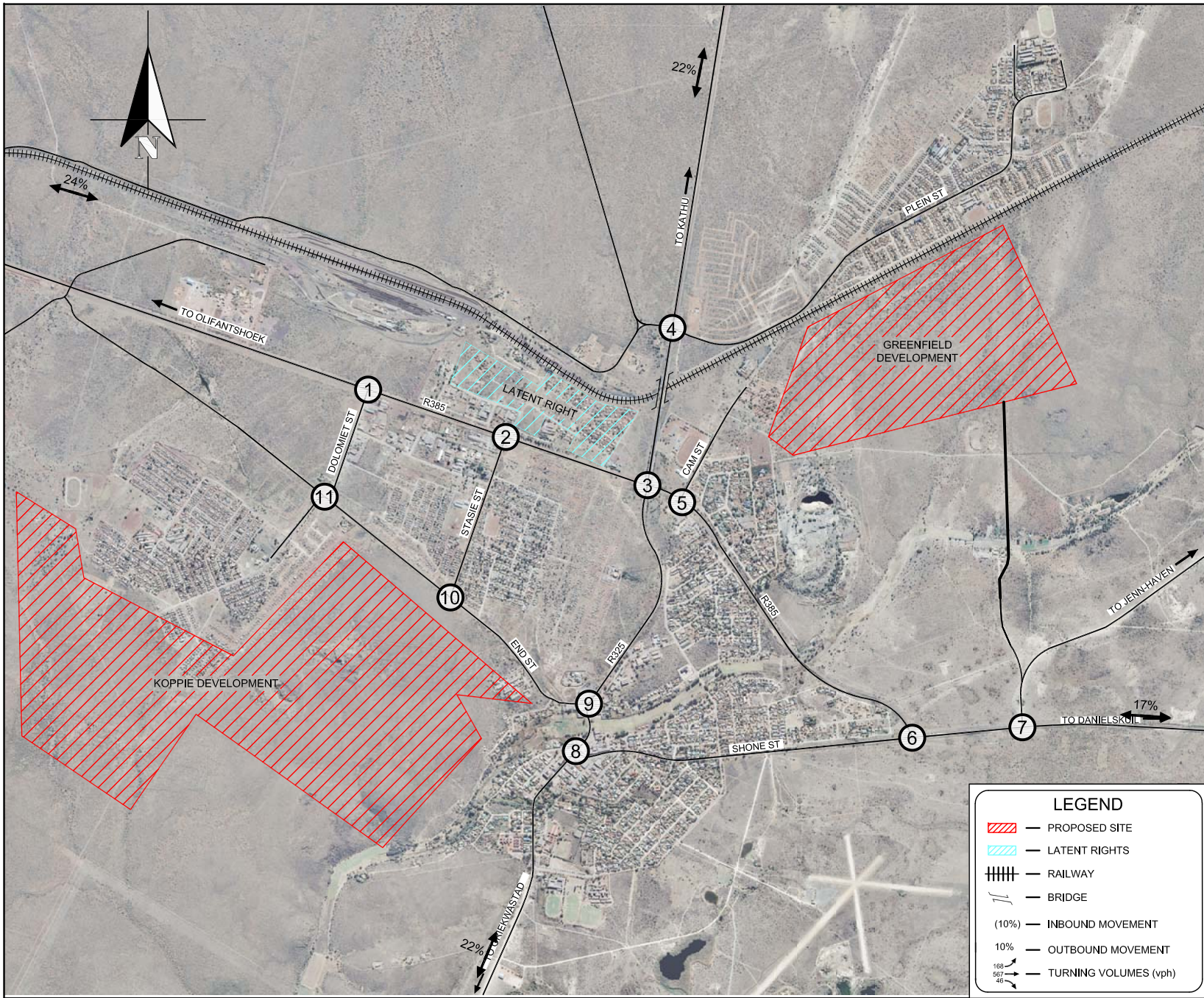
NUMBER:

14



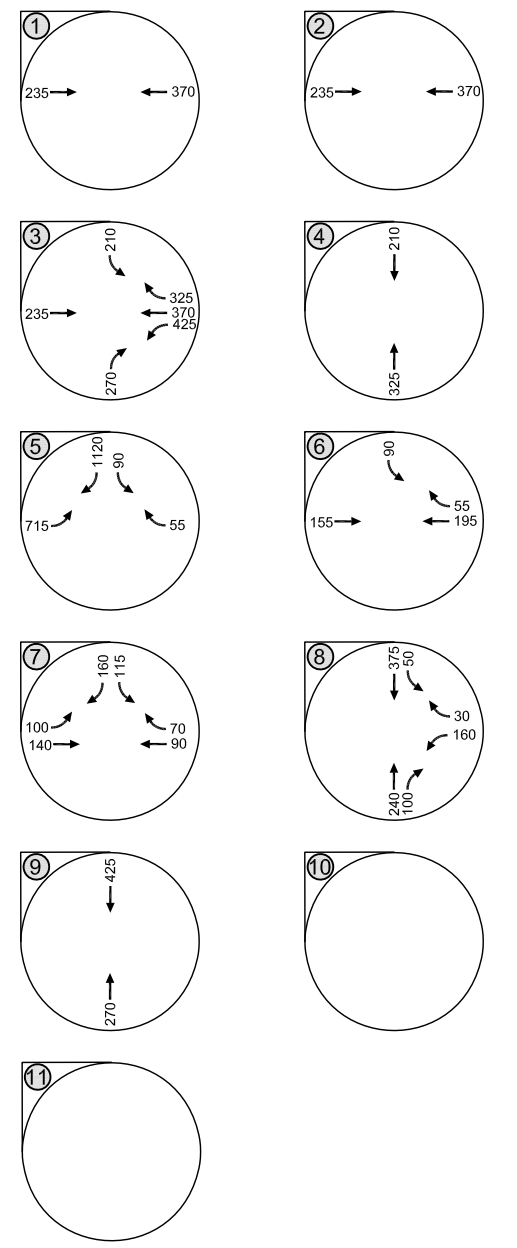






**LEGEND**

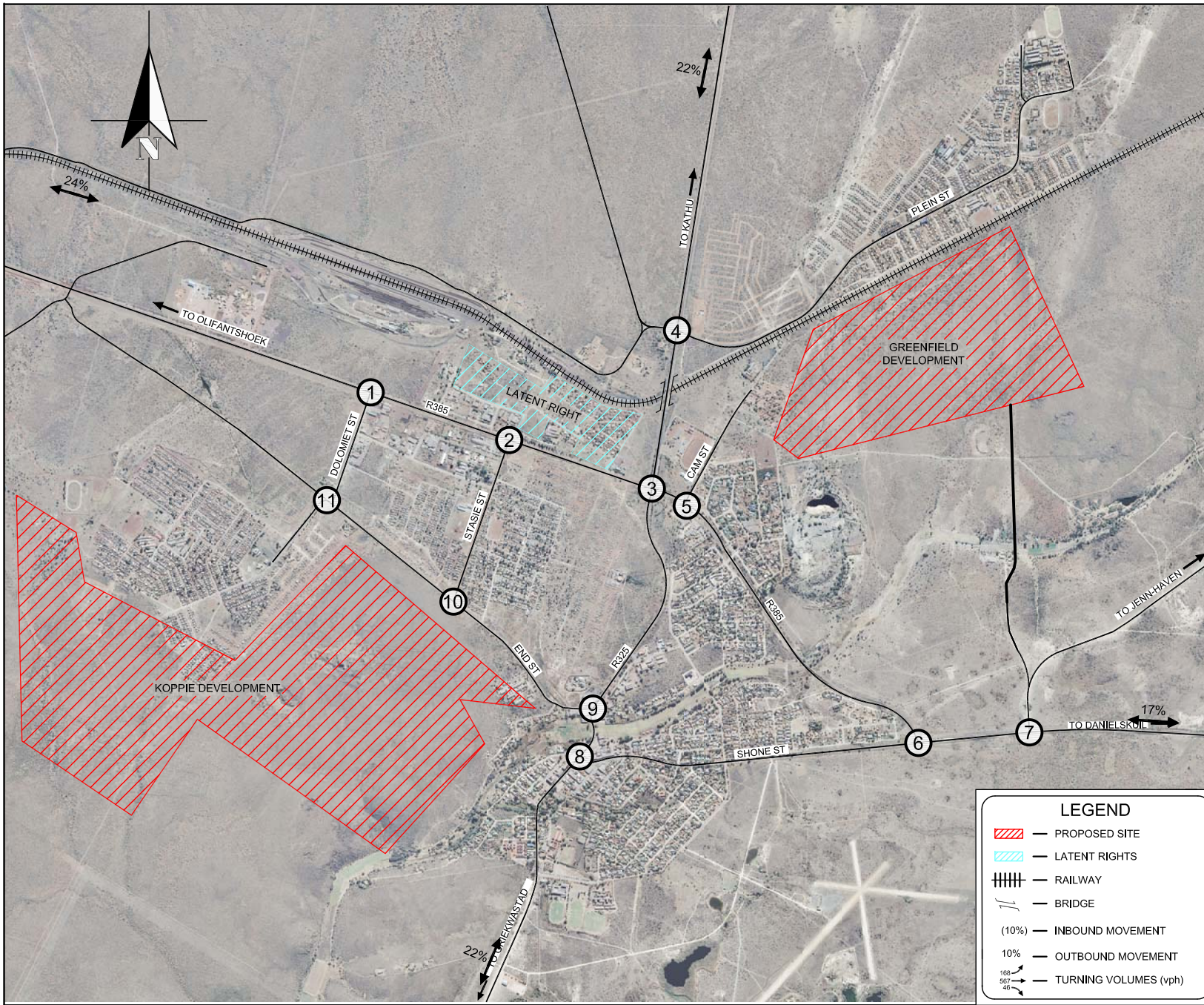
- PROPOSED SITE
- LATENT RIGHTS
- RAILWAY
- BRIDGE
- INBOUND MOVEMENT
- OUTBOUND MOVEMENT
- TURNING VOLUMES (vph)



SCHMATIC

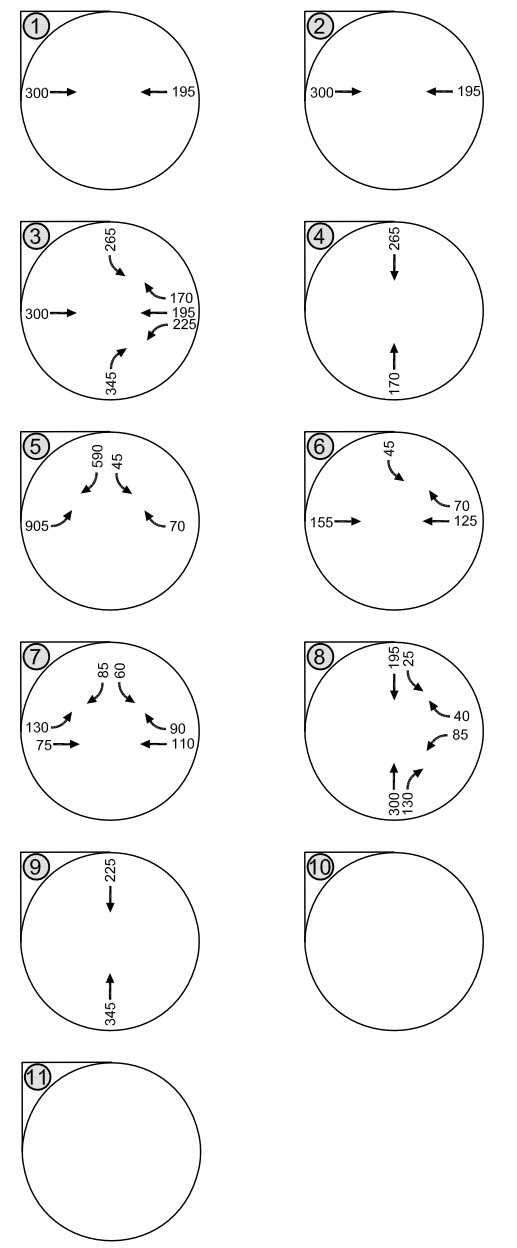






**LEGEND**

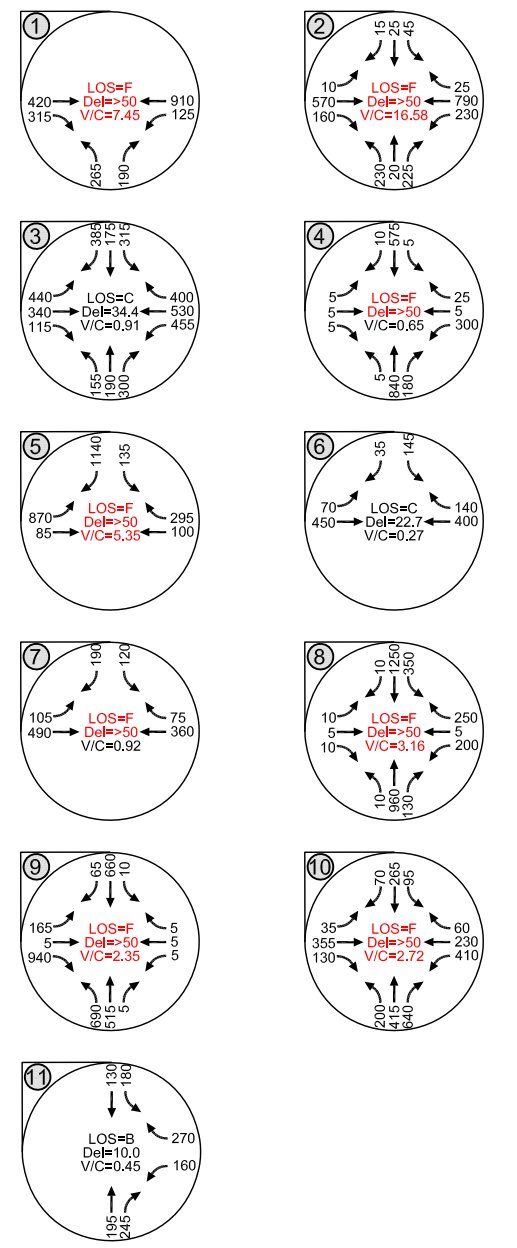
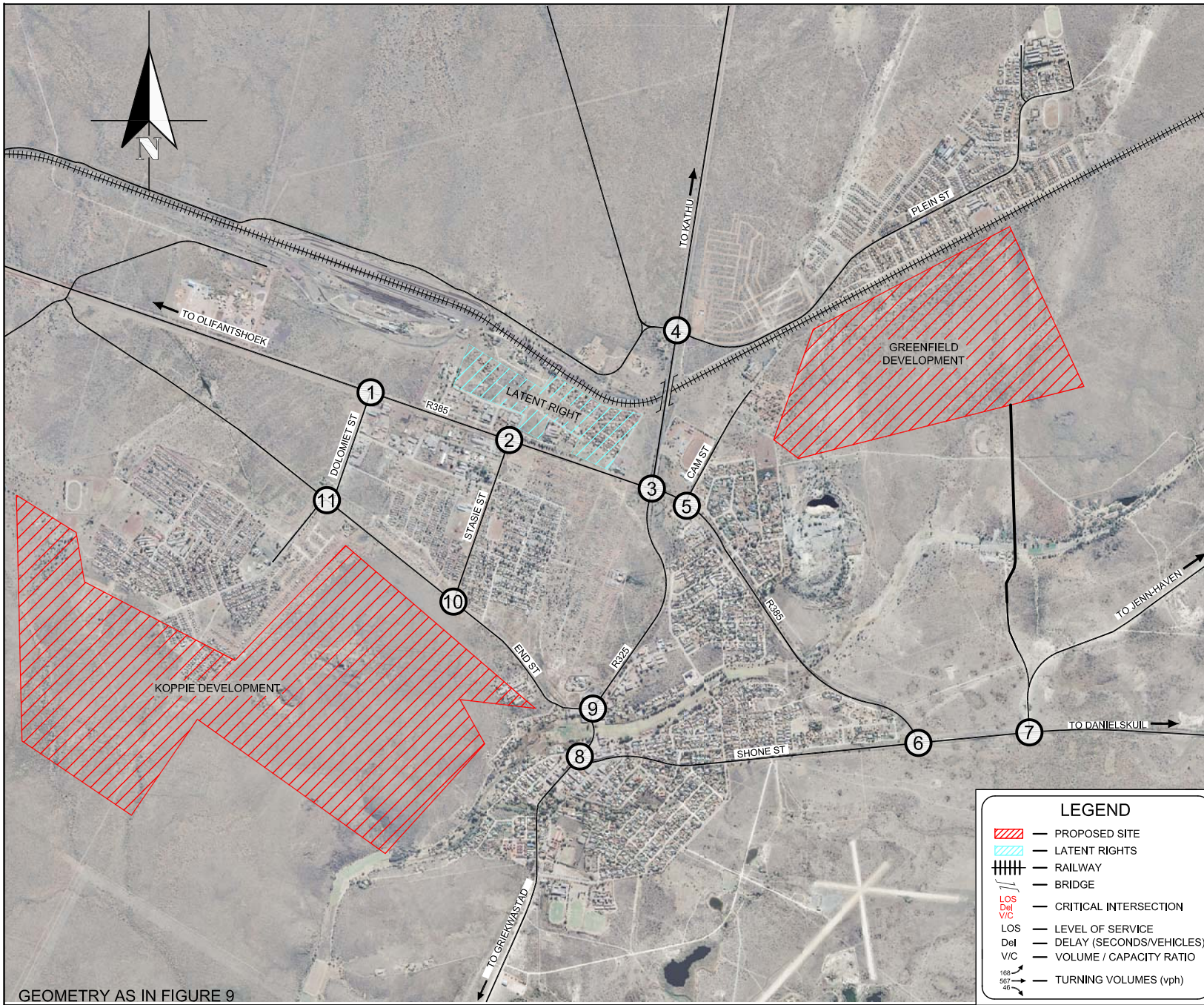
- PROPOSED SITE
- LATENT RIGHTS
- RAILWAY
- BRIDGE
- INBOUND MOVEMENT
- OUTBOUND MOVEMENT
- TURNING VOLUMES (vph)



SCHMATIC







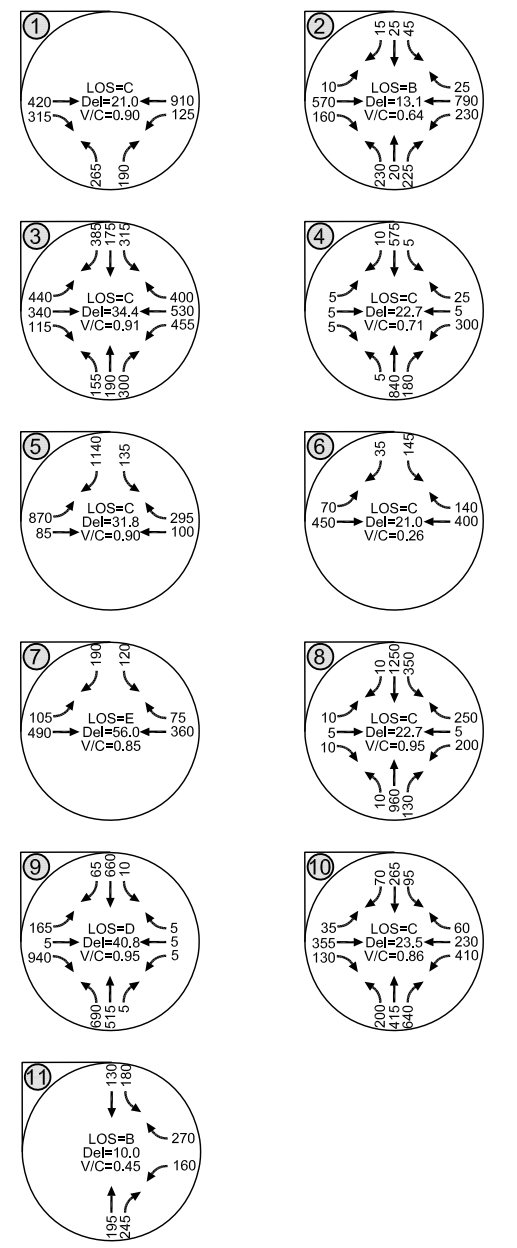
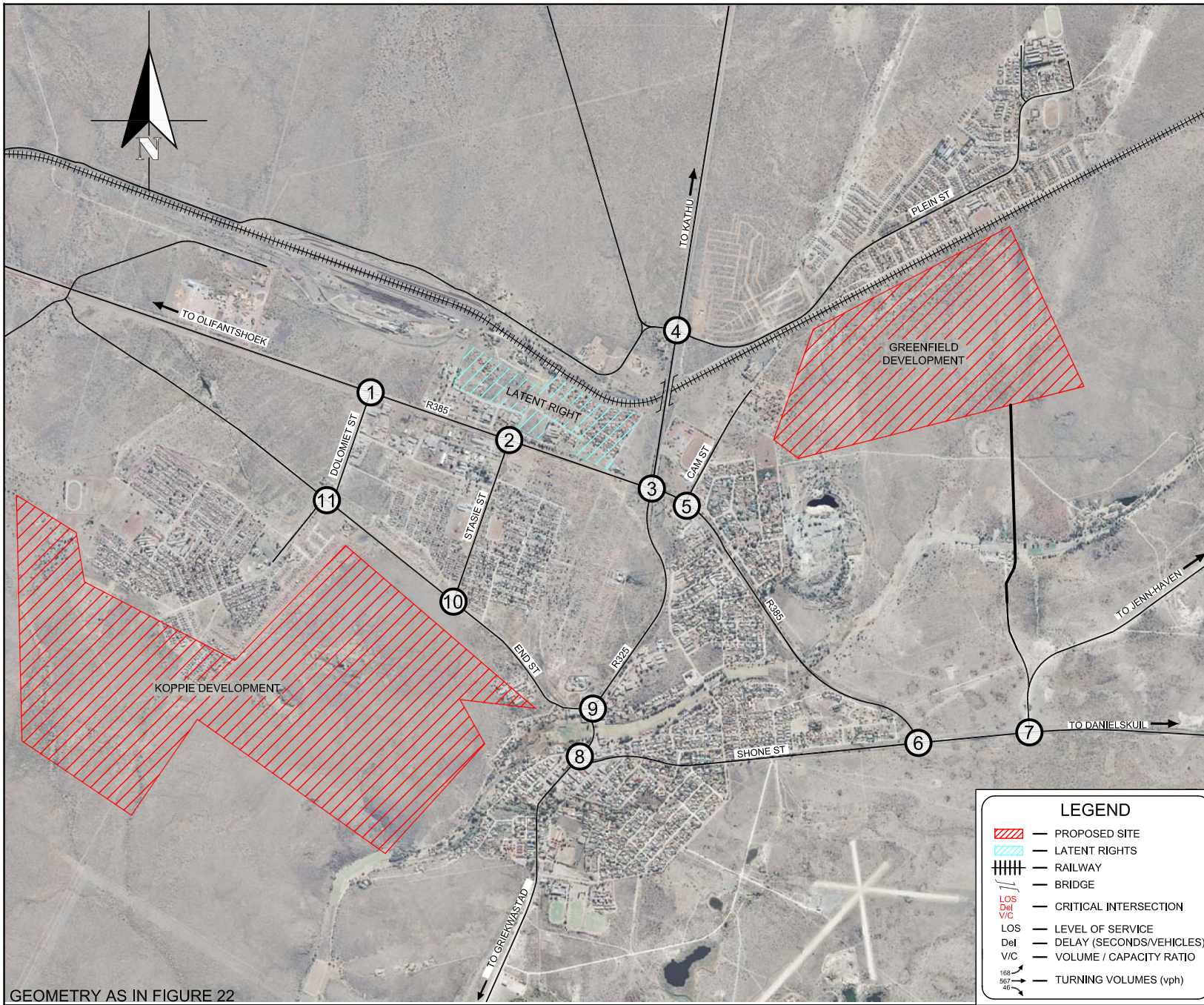
SCHMATIC

GEOMETRY AS IN FIGURE 9





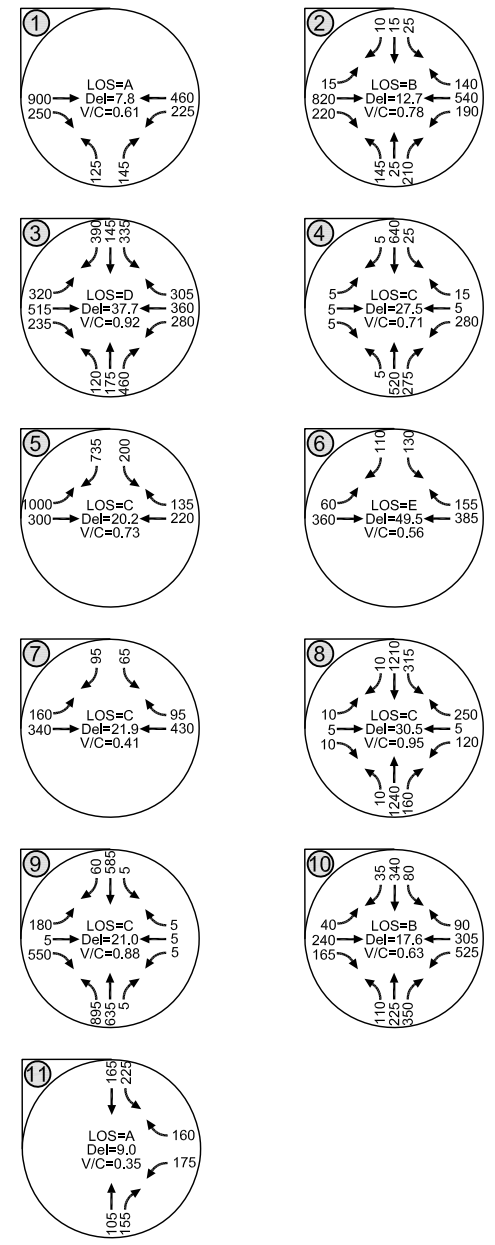
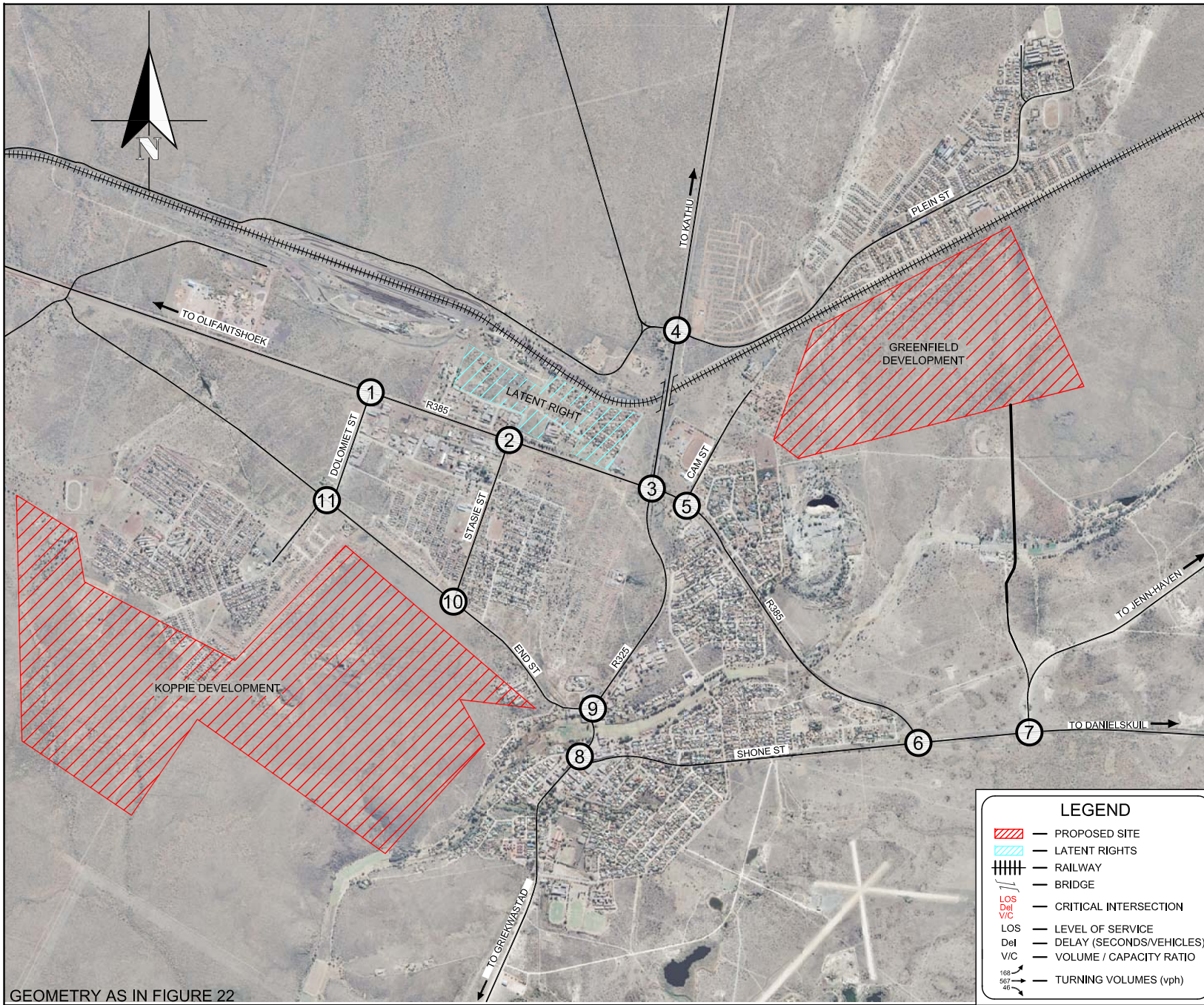




SCHMATIC

GEOMETRY AS IN FIGURE 22

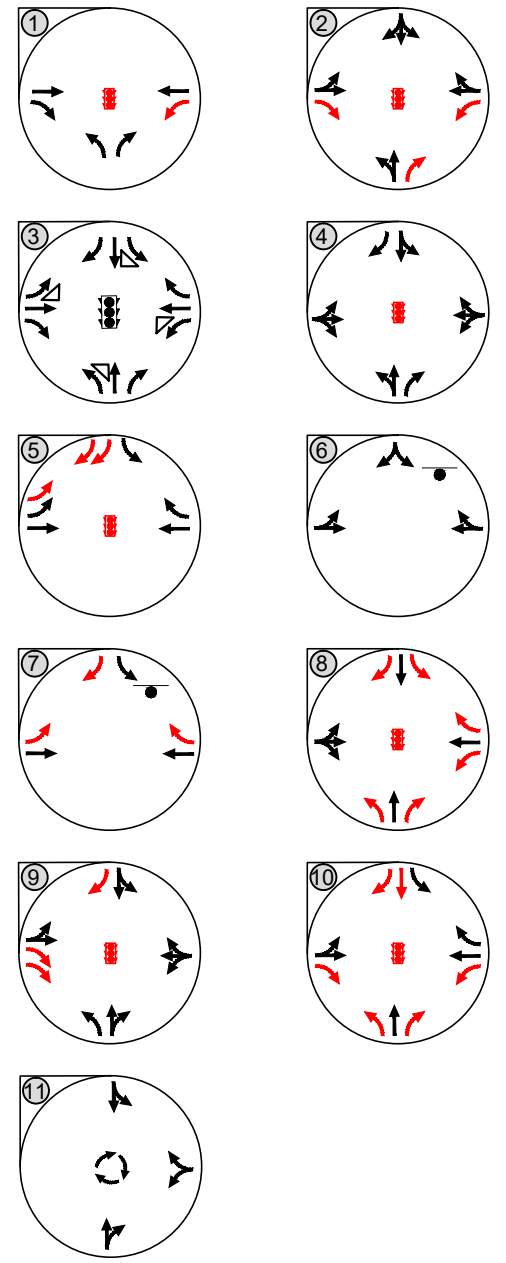
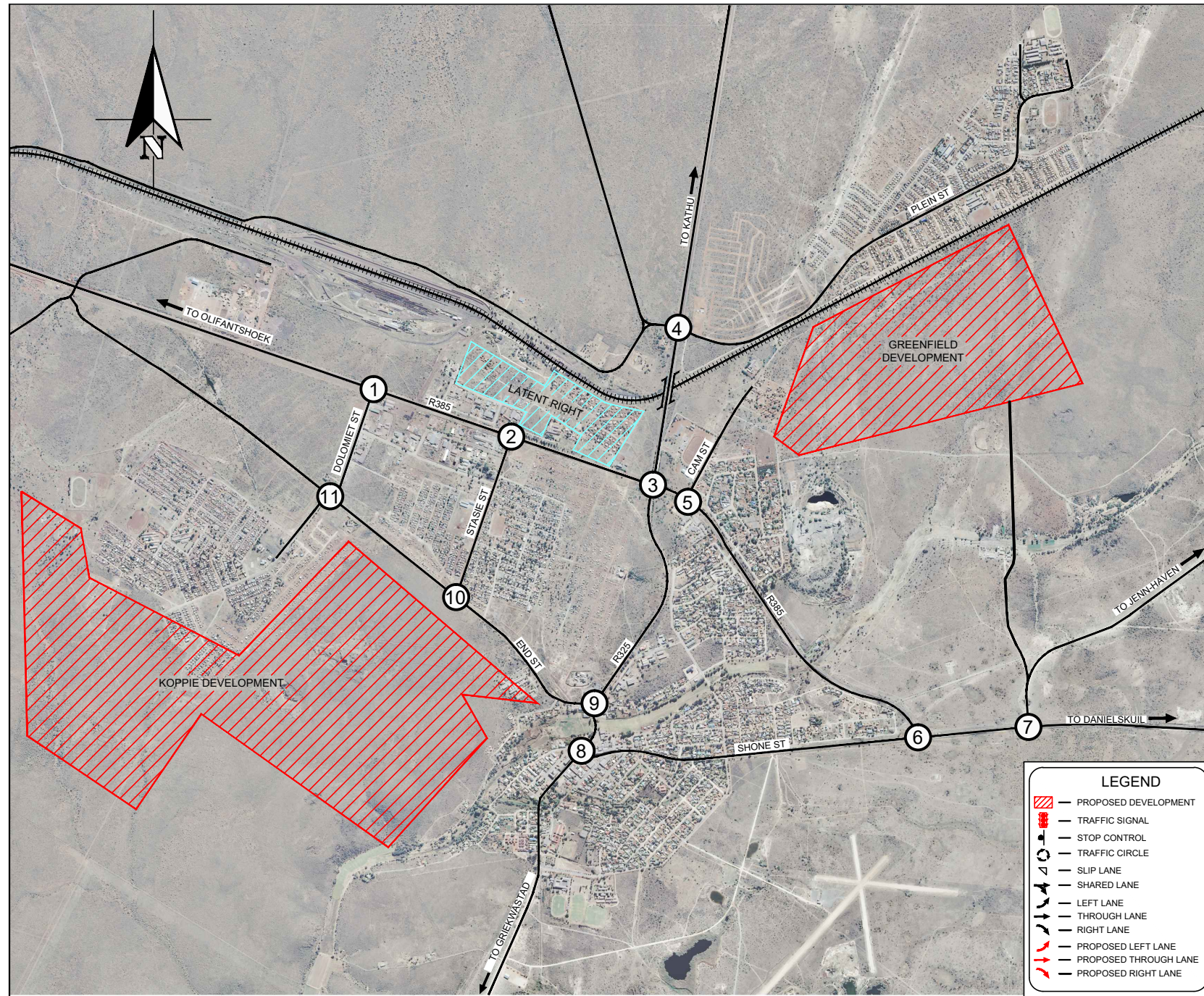




GEOMETRY AS IN FIGURE 22







**LEGEND**

- PROPOSED DEVELOPMENT
- TRAFFIC SIGNAL
- STOP CONTROL
- TRAFFIC CIRCLE
- SLIP LANE
- SHARED LANE
- LEFT LANE
- THROUGH LANE
- RIGHT LANE
- PROPOSED LEFT LANE
- PROPOSED THROUGH LANE
- PROPOSED RIGHT LANE

SCHEMATIC



PROJECT:3719  
**POSTMASBURG - GREENFIELDS AND KOPPIE DEVELOPMENTS**

FIGURE:  
**PROPOSED GEOMETRY UPGRADES TO ACCOMODATE TOTAL TRAFFIC VOLUMES**

NUMBER:  
 22