

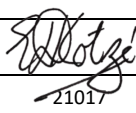


# **PROPOSED MINE INFRASTRUCTURE AND ROAD DIVERSION OF ROAD D1651, FARM MIDDELDRIFT 41-IS, BETWEEN EMALAHLENI AND KRIEL**

## **TRAFFIC IMPACT ASSESSMENT REPORT**

**MARCH 2021  
REVISION 0**



Issue/revision	Revision 0	Revision 1	Revision 2	Revision 3
Remarks	Issued for Approval			
Date	March 2021			
Prepared by	H.B. Senekal (B.Eng)			
Checked by	E.D. Kotze Pr Tech Eng			
Signature				
Project number	21017			
File reference	Z:/PROJECTS/21001- 21099/			

## EDL Engineers (Pty) Ltd

1<sup>st</sup> Floor, Block D  
The Village Office Park  
c/o Glenwood Rd & Oberon Ave,  
Faerie Glen, 0043  
Cell: +27 (0)83 564 1563  
Tel: +27 (0)87 897 5074/5/6  
Email: [eben@edlengineers.co.za](mailto:eben@edlengineers.co.za)  
Website: [www.edlengineers.co.za](http://www.edlengineers.co.za)



# CONTENTS

<b>1</b>	<b>Introduction</b>	<b>5</b>
<b>2</b>	<b>Site Location</b>	<b>6</b>
2.1	Site Location	6
<b>3</b>	<b>Surrounding Road Network and Traffic Flow</b>	<b>7</b>
3.1	Surrounding Road Network	7
3.2	Future Road Network	8
3.3	Existing Traffic Flows	8
3.4	Projected Future Traffic Flows	8
<b>4</b>	<b>Proposed Expansion and Diversion</b>	<b>9</b>
4.1	Proposed Expansion	9
4.2	Proposed Diversion of District Road D1651	9
4.3	Sight Distance	9
4.4	Access Spacing	9
4.5	Latent Rights	9
<b>5</b>	<b>Traffic Impact, Future Traffic &amp; Capacity Analyses</b>	<b>10</b>
5.1	Future Traffic Flow	10
5.2	Traffic Impact & Capacity Analysis	10
5.3	D1651 & R547	11
5.4	SIDRA Analysis Conclusions	11
<b>6</b>	<b>Road and / or Intersection Alterations</b>	<b>12</b>
6.1	Proposed Road Diversion	12
6.2	Intersection layout	12
6.3	Proposed Road Geometric Layout	12
6.4	Proposed Road Safety	12
<b>7</b>	<b>Public Transport Assessment</b>	<b>13</b>
7.1	Pedestrian Walkways & Crossings	13
7.2	Public Transport Facilities	13
<b>8</b>	<b>Conclusions &amp; Recommendations</b>	<b>14</b>
<b>9</b>	<b>Bibliography</b>	<b>15</b>

## Figures

Figure 1	Locality Plan
Figure 2	Existing 2021 Weekday Peak Hour Traffic
Figure 3	Existing 2021 + Diverted Peak Hour Traffic
Figure 4	Future 2026 Background + Diverted Background Peak Hour Traffic

## Drawings

Drawing no:	21017/KP/01 Proposed Road Diversion (Key Plan)
	21017/ID/01 Intersection Details

## Annexures

Annexure A - SIDRA Capacity Analysis Results

## Abbreviations

MDPWRT	Mpumalanga Department of Public Works, Roads and Transport
COTO	South Africa Committee of Transport Officials
TMH17	Technical Methods for Highways – South African Trip Data Manual
TMH16	Technical Methods for Highways – South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual
TIA	Traffic Impact Assessment
HV	Heavy Vehicles
LV	Light Vehicles
NMT	Non-motorised Transport
PT	Public Transport
vph	Vehicles per hour
q	Lane Utilisation Factor
Qm	Access Utilisation Factor
LOS	Level of Service

# 1 Introduction

EDL Consulting Engineers was appointed by the client on behalf of Universal Coal Development IV (Pty) Ltd to conduct a Traffic Impact Assessment for the proposed New Colliery on the farm Middeldrift 42-IS and diversion of District Road D1651.

The purpose of this traffic impact report is to investigate the expected peak hour traffic currently using District Road D1651, and to quantify, as well as evaluate the impact on the existing road network as a result of the diversion of the district road D1651 and its new intersection with the R547.

As part of the study, we have also evaluated the NMT (Non-Motorised Transport) and Public Transport facilities for the proposed expansion of the existing mine and road diversion.

As can be seen in the chapters that follow, we have undertaken peak period traffic counts at the key intersection(s), identified according to the TMH16 and analysed the key intersection(s) for possible capacity restraints and required upgrades, other than what is proposed for the diversion of District Road D1651.

Based on the Sidra™ analyses results, intersection upgrades are normally proposed, if found to be required. More information about road and / or intersection upgrades can be found within Chapter 8.

Basic road diversion alignment requirements are also discussed in Chapter 8, with the proposed road diversion of D1651 shown on the enclosed **Drawing 21017/KP/01 & 21017/ID/01**.

Printouts of the Sidra™ analyses results of the key intersections are included in **Annexure A**.



## 2 Site Location

### 2.1 Site Location

**Figure 1** shows the proposed road diversion as a result of the expansion of the existing colliery, over District Road D1651. The current intersection of District Road D1651 and the R547 is located at a distance of approximately 23,4km southeast of the R555 and R547 interchange and 8.3km northwest of the intersection of the R544 and R547. The site is located approx. 11.7km north of Kriel and approx. 21km south of eMalahleni (Witbank).

The proposed new intersection of the R547 and D1651 is proposed approx. 1.6km northwest of the existing intersection position.

**Site Location -Figure 1 (Also attached)**



## 3 Surrounding Road Network and Traffic Flow

### 3.1 Surrounding Road Network

The following roads are relevant to the study area.

**R547:** This road functions as a Regional Distributor (Class 3) and falls under the jurisdiction of Mpumalanga Department of Public Works, Roads and Transport (MDPWRT). This newly surfaced road (within the study area) is a single carriageway road with one lane per direction of about 3.7m wide. This road has gravel shoulders on both sides of 1.5m - 1.6m wide. This road has superelevation where the new intersection with the D1651 is proposed. Note that the R547 is closed to the north. Manually undertaken traffic counts indicate that this road carries traffic volumes of between 155vph and 170vph per direction during the weekday morning (AM) and afternoon (PM) peak hours.

**Photo 1: R547 where the new intersection is proposed (looking south east):**



**Photo 2: R547 where the new intersection is proposed (looking north west):**



**District Road D1651:** This road functions as a District Collector (Class 4) road and falls under the jurisdiction of Mpumalanga Department of Public Works, Roads and Transport (MDPWRT). This section of District Road D1651, links the R545 to the south west with the R547 to the north west, running past the Rietspruitdam and various coal mines. This road currently has a T-Junction intersection with the R547 with the latter having the right-of-way. The D1651 is proposed to be re-aligned (diverted) as shown on **Drawing No. 21017/KP/01** by means of a newly proposed T-junction as shown on **Drawing No. 21017/ID/01**. Traffic counts indicate that this road carries less than 50vph during the weekday peak hours in both directions.

**Photo 3: Existing D1651**



### 3.2 Future Road Network

According to information provided to EDL Engineers (Pty) Ltd, no new roads or alignment changes are planned for the study area, other than the proposed diversion of the D1651 and its new intersection with the R547, as discussed in this report.

### 3.3 Existing Traffic Flows

Given the type and extent of the proposed expansion and road diversion, the study area was defined to include one key intersection-and one link count along the R547 as required by COTO TMH and was analysed using SIDRA. Weekday Morning and Weekday Afternoon Traffic Counts were therefore carried out during the Weekday Morning (AM) and Weekday Afternoon (PM) commuter peak periods, in March of 2021, at the following identified intersection and road:

Key Intersection / road: Current intersection of the D1651 & R547

R547 (Future position of the intersection of D1651 & R547)

The existing Weekday Morning (AM) and Weekday Afternoon (PM) peak hour traffic volumes at the above-mentioned key intersection and road are summarised in **Figure 2**.

### 3.4 Projected Future Traffic Flows

It is required to determine the future 5-year horizon traffic by applying an annual growth rate to the existing traffic. As the area is slowly densifying and the growth (although lower than in previous years due to slow / negative economic factors) is expected to be positive going forward, a maximum average growth rate of 3% / annum was adopted and applied to the existing 2021 peak hour traffic counts.



## 4 Proposed Expansion and Diversion

The following sub-chapters are relevant with respect to the proposed expansion of the existing colliery and the subsequent diversion of District Road D1651.

### 4.1 Proposed Expansion

The existing Clydesdale Colliery on the farm Middeldrift 42-IS is proposed to expand to the west, and north, ultimately planning to mine where the existing portion of the D1651, in question, is situated. To allow for the expansion of the colliery, it was proposed that this portion of the D1651 be re-aligned to accommodate the expansion of the colliery.

### 4.2 Proposed Diversion of District Road D1651

As can be seen on **Drawing 21017/KP/01**, and regarding horizontal alignment, the diversion of District Road D1651 is approx. 3.4km long and is proposed to be surfaced and have lane widths of 3.7m (7.4m wide in total), gravel shoulders of 1.5m wide, minimum horizontal curves of 400m and a design speed of 80km/h. Regarding vertical alignment, the road is proposed to follow the existing topography present in the area. It is proposed to intersect the R547 by means of a T-Junction intersection, about 1.6km to the north east of where the existing intersection is situated. Please refer to **Drawing No. 21017/ID/01** for more details regarding the proposed intersection.

### 4.3 Sight Distance

As can be seen on **Drawing 21017/KP/01** the proposed diversion of the D1651 is relatively flat, with average slopes along its length of less than  $\pm 3\%$ . Where the new intersection is proposed, the R547 is also flat and straight to the north west and south east with superelevation on the large radius bend where the D1561 is proposed to intersect it. Concluding a site visit it can be said that the Shoulder and Stopping Sight Distances to either side is much more than the required 300m and is more than adequate for the purpose of this road and proposed intersection, with a speed limit of 100 km/h. It is however proposed that the trees next to where the new intersection is to be constructed, be cut off to ensure no obstruction in the available sight distance, at the new T-Junction intersection.

### 4.4 Access Spacing

On the R547, the nearest T-Junction / access, is situated about 2.7km to the south east of the proposed intersection, and 3.0km to the north west of the proposed intersection, concluding that the proposed access spacing on the R547 is acceptable for a rural class 3 road, being more than 1.6km to either side where the new intersection is proposed, as per the standards set out in the TRH26 document.

### 4.5 Latent Rights

No latent rights or latent rights upgrades were considered for the study area.

## 5 Traffic Impact, Future Traffic & Capacity Analyses

### 5.1 Future Traffic Flow

The future traffic flow was calculated with a compounding growth factor of **3.0% per annum** and was based on the background traffic from the existing 2021 counts.

**Figure 3** shows the existing 2021 peak hour traffic plus estimated diverted traffic.

**Figure 4** shows the future 2026 background peak hour traffic plus the estimated diverted traffic.

### 5.2 Traffic Impact & Capacity Analysis

To determine the expected traffic impact of the proposed re-alignment (diversion) of the D1651, capacity analyses were carried out by using SIDRA 9, a well-known traffic engineering software package. The following intersection and road were analysed:

Key Intersection / road: Current intersection of the D1651 & R547

R547 (Future position of the intersection of D1651 & R547)

The following scenarios were analysed at the above-mentioned key intersection(s), namely:

- Existing 2021 Weekday Morning (AM) and Weekday Afternoon (PM) peak hour without the diverted traffic (as per **Figure 2**).
- Existing 2021 Weekday Morning (AM) and Weekday Afternoon (PM) peak hour with diverted traffic (as per **Figure 3**).
- Future 2026 Background Weekday Morning (AM) and Weekday Afternoon (PM) peak hour with diverted traffic (as per **Figure 4**).

The next subsections illustrate the SIDRA results in a table and briefly discusses the results and key conclusion at the analysed intersection(s), with the details of Sidra Intersection Capacity Analyses appended in **Annexure A**.

### 5.3 D1651 & R547

Also see Annexures A1.1 to A1.6 have reference:

**Table 1 – Results of Sidra Analyses (worst approach only)**

Intersection		1. D1651 & R547		
Scenario		Existing 2021 (No diversion)	Exist 2021 + Diversion	Future 2026 + Diversion
Level of Service	Weekday Morning AM Peak Hour	A	A	A
	Weekday Afternoon PM Peak Hour	A	A	A
Average Delays	Weekday Morning AM Peak Hour	9.1	9.2	9.4
	Weekday Afternoon PM Peak Hour	9.2	9.3	9.3
Remarks	The Intersection shows acceptable levels of service and average delays.			

### 5.4 SIDRA Analysis Conclusions

The intersection of D1651 & R547 currently operates at a worst-case Level of Service (LOS) A with an average delay of 9.1 seconds. With the implementation of the proposed diversion and the additional estimated 5-year traffic growth, this intersection will have a worst-case Level of Service of (LOS) A, with a longer average delay of 9.4 seconds. The intersection will still operate at acceptable conditions (good Levels of Service and Avg. Delays) and it can be concluded that this intersection will operate acceptably with a geometric layout as set out within this report and shown on **Drawing No. 21017/ID/01**.

## 6 Road and / or Intersection Alterations

### 6.1 Proposed Road Diversion

Road D1651 is proposed to be re-aligned, passing the north western boundary of the expanded mining site. The diversion is proposed for road D1651 section 030+. This section is situated between the R545 and the R547 and is currently approx. 12.23km long.

### 6.2 Intersection layout

The proposed intersection is to be constructed, with details as follows:

- Lanes must be at least 3.7m wide, with 1.5m wide gravel shoulders.
- Bell-mouth radii of at least 20m.
- Acceleration and deceleration lanes of at least 87.5m long and 3.5m wide.
- A road widening to accommodate passing traffic on the northern side of the R547 of at least 295m long and 3.5m wide.
- Road signage and markings complying with the most relevant standards of the SARTSM.

Please refer to **Drawing No. 21017/ID/01** for more details.

### 6.3 Proposed Road Geometric Layout

The proposed diversion of road D1651 must adhere to the following geometric conditions for 80km/h:

- Lanes must be at least 3.7m wide.
- Curves in the horizontal alignment must have an inside radius of at least 400m.
- Vertical crest curves must have a minimum k-value of 33 and a minimum k-value for sag curves must be 25.
- Vertical curves must have a minimum length of 180m.

### 6.4 Proposed Road Safety

The proposed diversion of road D1651 must adhere to the following safety measures:

- A maximum speed of 80km/h is allowed on the proposed road diversion, therefore:
  - An 80km/h speed limit sign before the proposed diversion from its southern approach and approx. 100m from the intersection with the R547 for vehicles turning onto the D1651 from the R547.
- Rumble strips are proposed on the D1651 before the intersection to warn traffic about the intersection ahead. These rumble strips are proposed only for north eastbound traffic travelling towards the intersection. The rumble strips are proposed in decreasing intervals, from 50m to 30m near the intersection.

Please refer to **Drawing No. 21017/ID/01** for the proposed road diversion layout and required signage.

## 7 Public Transport Assessment

### 7.1 Pedestrian Walkways & Crossings

There are no existing pedestrian walkways along the D1651. With no residential or retail area in the immediate vicinity, the addition of pedestrian walkways is not proposed.

### 7.2 Public Transport Facilities

In terms of the National Land Transport Transition Act (NLTTA) 22 of 2000, Section 29, it is a requirement that an assessment of the public transport issues be included in the traffic impact assessments. The Act also requires that there be public transport facilities within 1km walking distance from a development in a built-up area.

It is recommended that the proposed development / mine must provide a Taxi/Bus facility within the proposed mine expansion development, to allow for safe drop-off and pick-up of employees. It is **not recommended** that a lay-by be constructed on the D1651, due to its remote location, the high percentage of heavy vehicles travelling on the D1651 and the dangers associated with it (**UNSAFE**), especially in adverse weather conditions.

Please refer to **Drawing 21017/ID/01**, for the layout of the proposed intersection.



## 8 Conclusions & Recommendations

Based on the content of this traffic impact report, the following key conclusions and recommendations are relevant:

- The proposed diversion of the D1651 is the result of the expansion of the colliery, situated on the Farm Middeldrift 42-IS, thereby allowing for mining operations through / over the existing alignment of road D1651.
- As shown in **Figure 1**, the proposed alignment of District Road D1651 is to run along the north western boundary of the newly expanded mining area.
- Sidra Intersection Capacity Analyses, were carried out for the Weekday Morning and Weekday Afternoon peak periods at the key intersection(s) / road, taking the existing and future scenarios into account, and good levels of service and average delays were obtained.
- The diversion of road D1651 is proposed with several geometric and safety considerations, as set out in **Chapter 8**, including an 80km/h speed limit.
- Considering the high percentage of heavy vehicles within the study area, the intersection of the D1651 and the R547, requires bell-mouth radii of 20m and rumble strips in decreasing increments, as set out within Chapter 6.3, when approaching the T-Junction.
- The road is to be surfaced (dust free) and must have road signage complying with the most recent standards of the SARTSM (South African Road Traffic Signs Manual).
- Regarding non-motorised and public transport, no pedestrian walkways are proposed along the D1651. An internal public transport drop-off and pick-up zone is proposed for the expanded mining development.

It is therefore recommended that the proposed re-alignment (diversion) is supported from a traffic engineering perspective with a speed limit of 80km/h, required minimum curve lengths and minimum radii on the D1651, as proposed in this report (and on **Drawing 21017/ID/01 & 21017/KP/01**) and to the relevant standards of the Mpumalanga Department of Public Works, Roads and Transport.

## 9 Bibliography

- TMH 17 - South African Trip Data Manual. (2013). South African Committee of Transport Officials.
- SIDRA Intersection 9. (2021). Australia: Department of Planning Transport and Infrastructure.
- TRH 26 - South African Road Classification and Access Management Manual. (2012). 1st ed. South African Committee of Transport Officials.
- TMH 16 - Traffic Impact and Site Traffic Assessment Manual. (2012). 1st ed. South African Committee of Transport Officials.

## Figures

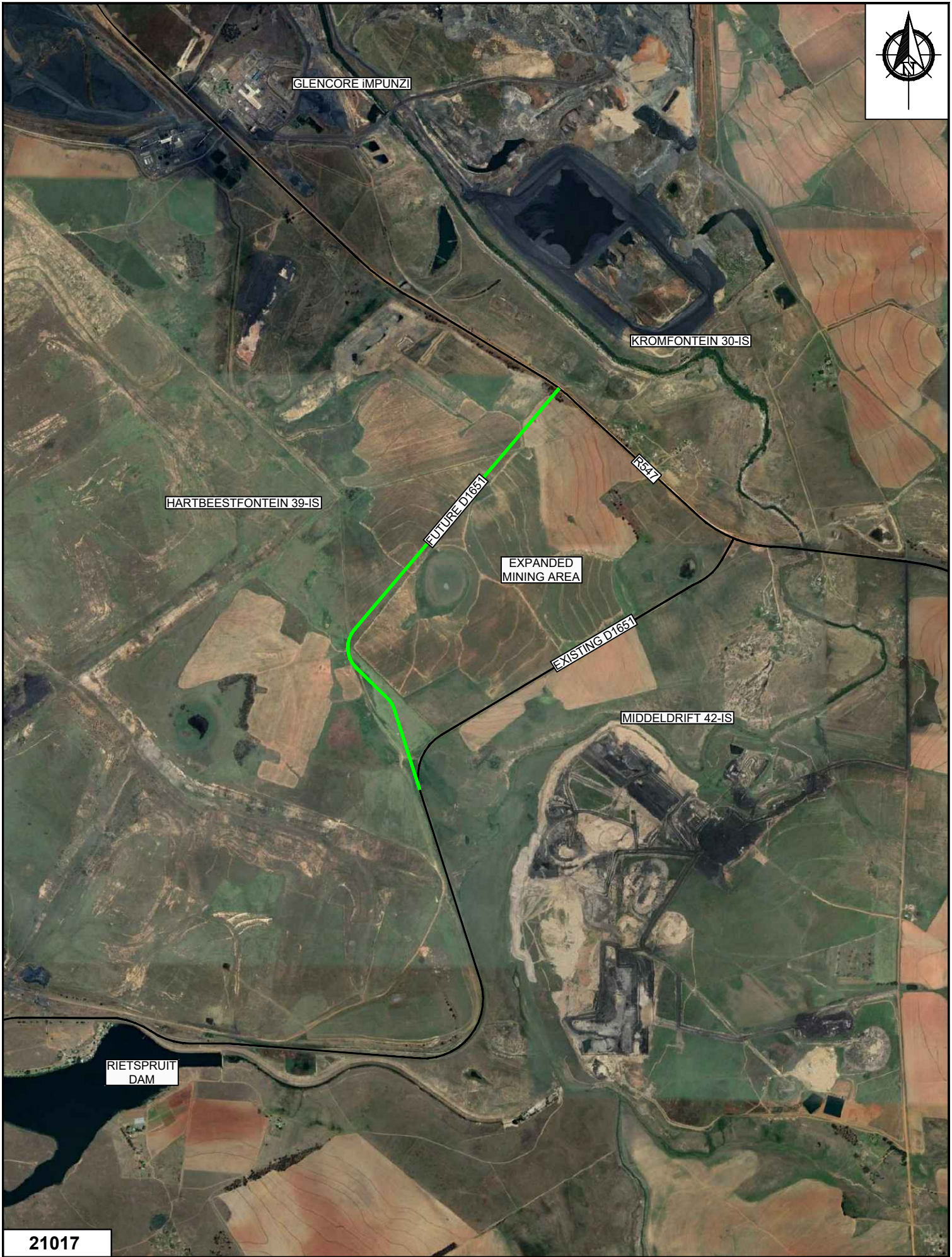
Figure 1 Locality Plan

Figure 2 Existing 2021 Weekday Peak Hour Traffic

Figure 3 Existing 2021 + Diverted Peak Hour Traffic

Figure 4 Future 2026 Background + Diverted Peak Hour Traffic





21017

SITE:  
**MIDDELDRIFT COLLIERY**

TITLE:  
**LOCALITY**

**FIG 1**



21017

SITE:

MIDDELDRIIFT COLLIERY

TITLE:

EXISTING 2021 WEEKDAY PEAK HOUR TRAFFIC

FIG 2





21017

SITE:

MIDDELDRIIFT COLLIERY

TITLE:

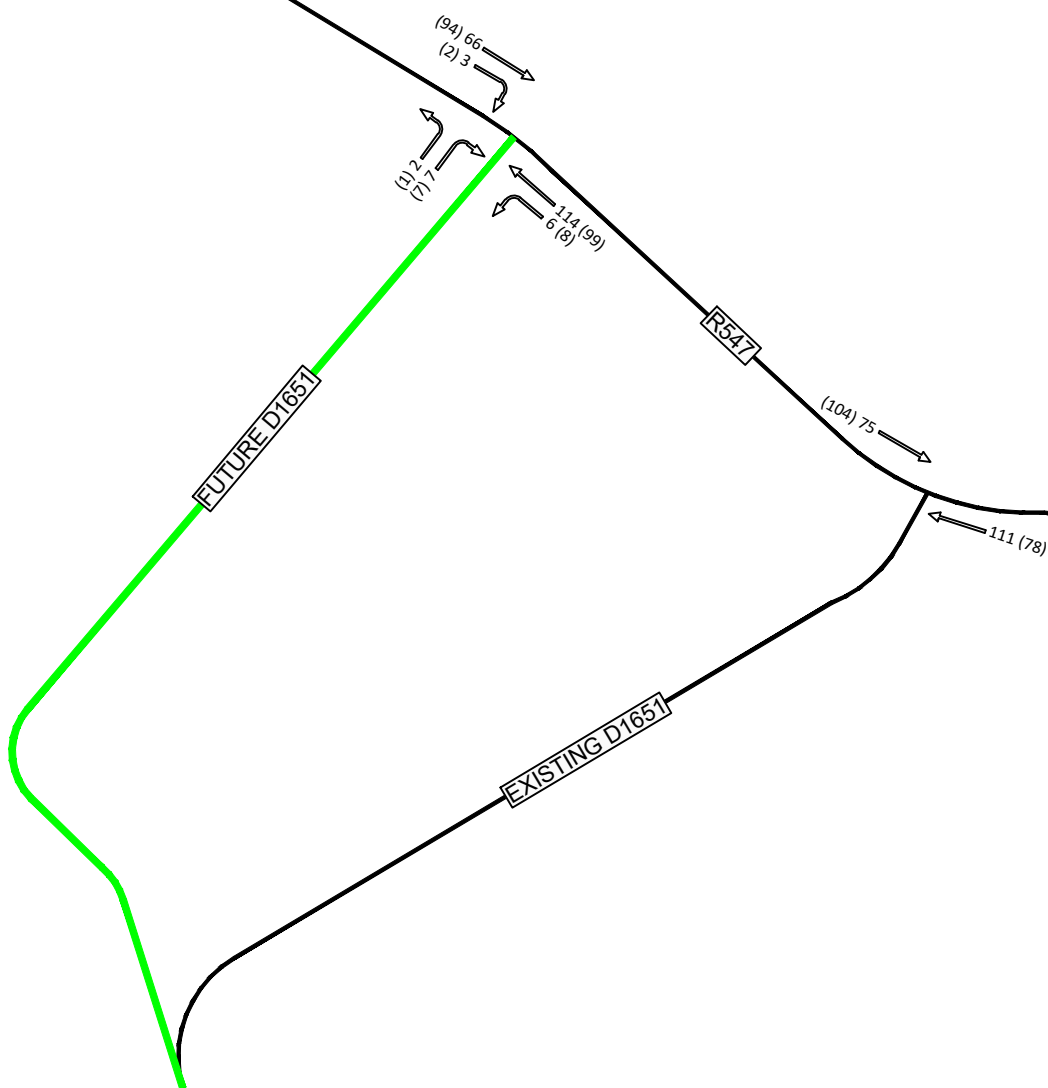
EXISTING 2021 + DIVERTED PEAK HOUR TRAFFIC

LEGEND

PEAK HOUR TRAFFIC

WEEKDAY AM / WEEKDAY (PM)

FIG 3



21017

SITE:

MIDDELDRIIFT COLLIERY

TITLE:

FUTURE 2026 BACKGROUND + DIVERTED  
PEAK HOUR TRAFFIC

LEGEND

PEAK HOUR TRAFFIC

WEEKDAY AM / WEEKDAY (PM)


FIG 4

## Drawings

Drawing no:            21017/KP/01    Proposed Road Diversion (Key Plan)  
                              21017/ID/01    Intersection Details







SITE: <b>MIDDELDRIFT COLLIERY</b>		DRAWING NO. <b>21017/KP/01</b>		PROJECT NO. <b>21017</b>	DATE. <b>MAR. '21</b>	 <b>EDL CONSULTING ENGINEERS</b> 1st Floor, Block D The Village Office Park C/O Glenwood Rd & Oberon Ave, Fearie Glen, 0043 Tel: 087 897 5074/5/6 eben@edlengineers.co.za www.edlengineers.co.za
TITLE: <b>PROPOSED ROAD DIVERSION (KEY PLAN)</b>		SCALE AT A3. <b>1:10 000</b>	DRAWN. <b>HB SENEKAL</b>	CHECKED. <b>ED KOTZE</b>	REVISION. <b>0</b>	





LEGEND	
	PROPOSED ROAD / ALIGNMENT
	EXISTING ROAD / ALIGNMENT

SITE:	MIDDELDRIIFT COLLIERY		21017/ID/01		21017	MAR '21
			DRAWING NO.		PROJECT NO.	DATE.
TITLE:	INTERSECTION DETAILS		1:1 000	HB SENEKAL	ED KOTZE	0
			SCALE AT A3.	DRAWN.	CHECKED.	REVISION.



**EDL CONSULTING ENGINEERS**  
1st Floor, Block D  
The Village Office Park  
C/O Glenwood Rd & Oberon Ave,  
Fearie Glen, 0043  
Tel: 087 897 5074/5/6  
eben@edlengineers.co.za  
www.edlengineers.co.za



## Annexure A

Relevant outputs of the SIDRA9 intersection capacity analyses at the key intersection(s)

## **Annexure A1: D1651 & R547**

- A1.1 – Existing 2021 Weekday AM Peak Hour Traffic
- A1.2 – Existing 2021 Weekday PM Peak Hour Traffic
- A1.3 – Existing 2021 Plus Diverted Weekday AM Peak Hour Traffic
- A1.4 – Existing 2021 Plus Diverted Weekday PM Peak Hour Traffic
- A1.5 – Future 2026 Background Plus Diverted Weekday AM Peak Hour Traffic
- A1.6 – Future 2026 Background Plus Diverted Weekday PM Peak Hour Traffic

## Annexure A1.1

### Sidra Output: D1651 & R547

#### Existing 2021 Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total	HV ]	[ Total	HV ]				[ Veh.	Dist ]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R547														
4	L2	5	20.0	5	20.0	0.062	5.8	LOS A	0.0	0.3	0.00	0.03	0.00	58.0
5	T1	96	20.0	101	20.0	0.062	0.0	LOS A	0.0	0.3	0.00	0.03	0.00	59.7
Approach		101	20.0	106	20.0	0.062	0.3	NA	0.0	0.3	0.00	0.03	0.00	59.6
NorthWest: R547														
11	T1	65	20.0	68	20.0	0.041	0.0	LOS A	0.0	0.1	0.02	0.02	0.02	59.8
12	R2	2	20.0	2	20.0	0.041	6.1	LOS A	0.0	0.1	0.02	0.02	0.02	56.5
Approach		67	20.0	71	20.0	0.041	0.2	NA	0.0	0.1	0.02	0.02	0.02	59.7
SouthWest: D1651														
1	L2	1	20.0	1	20.0	0.008	9.3	LOS A	0.0	0.2	0.26	0.89	0.26	51.0
3	R2	6	20.0	6	20.0	0.008	9.2	LOS A	0.0	0.2	0.26	0.89	0.26	50.5
Approach		7	20.0	7	20.0	0.008	9.2	LOS A	0.0	0.2	0.26	0.89	0.26	50.5
All Vehicles		175	20.0	184	20.0	0.062	0.6	NA	0.0	0.3	0.02	0.06	0.02	59.2

## Annexure A1.2

### Sidra Output: D1651 & R547

#### Existing 2021 Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total	HV ]	[ Total	HV ]				[ Veh.	Dist ]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R547														
4	L2	7	20.0	7	20.0	0.047	5.8	LOS A	0.0	0.4	0.00	0.05	0.00	57.7
5	T1	68	20.0	72	20.0	0.047	0.0	LOS A	0.0	0.4	0.00	0.05	0.00	59.5
Approach		75	20.0	79	20.0	0.047	0.5	NA	0.0	0.4	0.00	0.05	0.00	59.3
NorthWest: R547														
11	T1	90	20.0	95	20.0	0.056	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	59.9
12	R2	1	20.0	1	20.0	0.056	6.0	LOS A	0.0	0.1	0.00	0.01	0.00	56.6
Approach		91	20.0	96	20.0	0.056	0.1	NA	0.0	0.1	0.00	0.01	0.00	59.9
SouthWest: D1651														
1	L2	1	20.0	1	20.0	0.008	9.2	LOS A	0.0	0.2	0.25	0.90	0.25	51.0
3	R2	6	20.0	6	20.0	0.008	9.2	LOS A	0.0	0.2	0.25	0.90	0.25	50.5
Approach		7	20.0	7	20.0	0.008	9.2	LOS A	0.0	0.2	0.25	0.90	0.25	50.5
All Vehicles		173	20.0	182	20.0	0.056	0.6	NA	0.0	0.4	0.01	0.06	0.01	59.2

## Annexure A1.3

### Sidra Output: D1651 & R547

#### Existing 2021 + Diverted Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total	HV ]	[ Total	HV ]				[ Veh.	Dist ]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R547														
4	L2	5	20.0	5	20.0	0.064	5.8	LOS A	0.0	0.3	0.00	0.03	0.00	58.0
5	T1	99	20.0	104	20.0	0.064	0.0	LOS A	0.0	0.3	0.00	0.03	0.00	59.7
Approach		104	20.0	109	20.0	0.064	0.3	NA	0.0	0.3	0.00	0.03	0.00	59.6
NorthWest: R547														
11	T1	57	20.0	60	20.0	0.036	0.0	LOS A	0.0	0.1	0.02	0.02	0.02	59.7
12	R2	2	20.0	2	20.0	0.036	6.1	LOS A	0.0	0.1	0.02	0.02	0.02	56.4
Approach		59	20.0	62	20.0	0.036	0.2	NA	0.0	0.1	0.02	0.02	0.02	59.6
SouthWest: D1651														
1	L2	1	20.0	1	20.0	0.008	9.3	LOS A	0.0	0.2	0.26	0.89	0.26	51.0
3	R2	6	20.0	6	20.0	0.008	9.2	LOS A	0.0	0.2	0.26	0.89	0.26	50.5
Approach		7	20.0	7	20.0	0.008	9.2	LOS A	0.0	0.2	0.26	0.89	0.26	50.5
All Vehicles		170	20.0	179	20.0	0.064	0.6	NA	0.0	0.3	0.02	0.06	0.02	59.2



## Annexure A1.4

### Sidra Output: D1651 & R547

#### Existing 2021 + Diverted Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total	HV ]	[ Total	HV ]				[ Veh.	Dist ]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R547														
4	L2	7	20.0	7	20.0	0.058	5.8	LOS A	0.0	0.4	0.00	0.04	0.00	57.8
5	T1	86	20.0	91	20.0	0.058	0.0	LOS A	0.0	0.4	0.00	0.04	0.00	59.6
Approach		93	20.0	98	20.0	0.058	0.4	NA	0.0	0.4	0.00	0.04	0.00	59.4
NorthWest: R547														
11	T1	81	20.0	85	20.0	0.050	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.9
12	R2	1	20.0	1	20.0	0.050	6.0	LOS A	0.0	0.1	0.01	0.01	0.01	56.6
Approach		82	20.0	86	20.0	0.050	0.1	NA	0.0	0.1	0.01	0.01	0.01	59.9
SouthWest: D1651														
1	L2	1	20.0	1	20.0	0.008	9.3	LOS A	0.0	0.2	0.26	0.90	0.26	51.0
3	R2	6	20.0	6	20.0	0.008	9.3	LOS A	0.0	0.2	0.26	0.90	0.26	50.4
Approach		7	20.0	7	20.0	0.008	9.3	LOS A	0.0	0.2	0.26	0.90	0.26	50.5
All Vehicles		182	20.0	192	20.0	0.058	0.6	NA	0.0	0.4	0.01	0.06	0.01	59.2

## Annexure A1.5

### Sidra Output: D1651 & R547

#### Future 2026 Background + Diverted Weekday AM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total	HV ]	[ Total	HV ]				[ Veh.	Dist ]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R547														
4	L2	6	20.0	6	20.0	0.074	5.8	LOS A	0.0	0.3	0.00	0.03	0.00	58.0
5	T1	114	20.0	120	20.0	0.074	0.0	LOS A	0.0	0.3	0.00	0.03	0.00	59.7
Approach		120	20.0	126	20.0	0.074	0.3	NA	0.0	0.3	0.00	0.03	0.00	59.6
NorthWest: R547														
11	T1	66	20.0	69	20.0	0.043	0.0	LOS A	0.0	0.2	0.03	0.03	0.03	59.7
12	R2	3	20.0	3	20.0	0.043	6.2	LOS A	0.0	0.2	0.03	0.03	0.03	56.4
Approach		69	20.0	73	20.0	0.043	0.3	NA	0.0	0.2	0.03	0.03	0.03	59.5
SouthWest: D1651														
1	L2	2	20.0	2	20.0	0.011	9.4	LOS A	0.0	0.3	0.28	0.89	0.28	50.9
3	R2	7	20.0	7	20.0	0.011	9.4	LOS A	0.0	0.3	0.28	0.89	0.28	50.4
Approach		9	20.0	9	20.0	0.011	9.4	LOS A	0.0	0.3	0.28	0.89	0.28	50.5
All Vehicles		198	20.0	208	20.0	0.074	0.7	NA	0.0	0.3	0.02	0.07	0.02	59.1

## Annexure A1.6

### Sidra Output: D1651 & R547

#### Future 2026 Background +Diverted Weekday PM Peak Hour Traffic

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[ Total	HV ]	[ Total	HV ]				[ Veh.	Dist ]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: R547														
4	L2	8	20.0	8	20.0	0.066	5.8	LOS A	0.1	0.4	0.00	0.04	0.00	57.8
5	T1	99	20.0	104	20.0	0.066	0.0	LOS A	0.1	0.4	0.00	0.04	0.00	59.6
Approach		107	20.0	113	20.0	0.066	0.4	NA	0.1	0.4	0.00	0.04	0.00	59.4
NorthWest: R547														
11	T1	66	20.0	69	20.0	0.043	0.0	LOS A	0.0	0.2	0.02	0.03	0.02	59.7
12	R2	3	20.0	3	20.0	0.043	6.1	LOS A	0.0	0.2	0.02	0.03	0.02	56.4
Approach		69	20.0	73	20.0	0.043	0.3	NA	0.0	0.2	0.02	0.03	0.02	59.5
SouthWest: D1651														
1	L2	1	20.0	1	20.0	0.010	9.3	LOS A	0.0	0.3	0.27	0.89	0.27	51.0
3	R2	7	20.0	7	20.0	0.010	9.3	LOS A	0.0	0.3	0.27	0.89	0.27	50.4
Approach		8	20.0	8	20.0	0.010	9.3	LOS A	0.0	0.3	0.27	0.89	0.27	50.5
All Vehicles		184	20.0	194	20.0	0.066	0.8	NA	0.1	0.4	0.02	0.07	0.02	59.0