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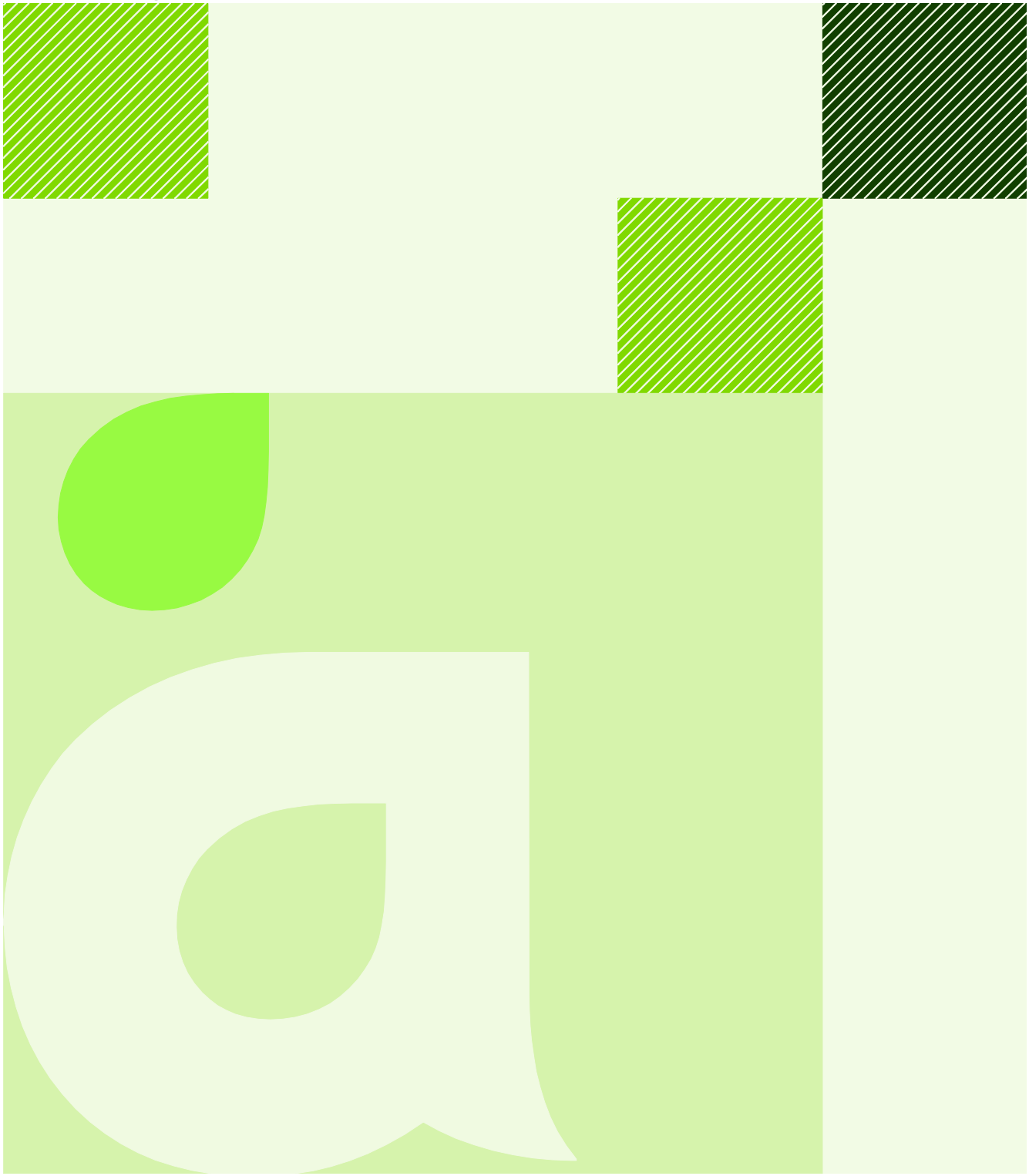

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KRIEL POWER STATION ASH DAM COMPLEX EXTENSION

Traffic Impact Statement

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Glossary of Terms

EIA	Environmental Impact Assessment
TIA	Traffic Impact Assessment
LOS	Level of Service
p.a.	Per annum
TRAFFIX	Intersection analysis software – isolated intersections (stops, roundabouts, yields and signalised)
HCM	Highway capacity manual
V/C	Volume over capacity ratio

Applicable Source Documents

UTG 1	National Urban Transport Guidelines: Geometric Design of Urban Arterials (NDOT, 1986)
NGTC	National Guidelines for Traffic Calming (NDOT, 1996)
DOT Guideline	Guideline for Traffic Impact Studies (NDOT, 1995)

Declaration

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Executive summary

Project Overview

Eskom Holdings SOC Limited (Eskom) is proposing to expand the existing Ash Disposal Facilities at the Kriel Power Station, Mpumalanga, for the disposal of coarse and fine ash produced by the burning coal for the generation of electricity. The additional ash disposal facility would fulfil ash disposal requirements for the remainder of the power station's operational life, i.e. until 2043, plus a five-year contingency. During this period approximately 111.18 million m3 of ash will be produced.

In 2010, Aurecon was commissioned to undertake an Environmental Impact Assessment (EIA) for the extension of the existing ash dam complex at the Kriel Power Station. A Traffic Impact Assessment (TIA) was compiled, which formed part of the EIA, to determine the impact of vehicular traffic associated with the proposed extension of the ash dam complex. The previous TIA was carried out to determine the impacts of the proposed Ash Dam Sites, Site 10 and Site 16N. Eskom has reached a decision to only apply for Site 10. To this end, this report provides an update of the previous TIA associated with Site 10 only.

The project is expected to generate additional traffic on the existing road network during construction, operations and decommissioning stages of the project. The purpose of this specialist traffic and transportation study is therefore to estimate the additional traffic that the proposed project is likely to generate and assess the impact of this additional traffic on the surrounding road network and make recommendations for mitigation or improvements.

The objectives of the study include the following:

- Assess the current road network and traffic conditions in the vicinity of the proposed development site;
- Recalculate the expected trips to be generated by Ash Dam Site 10;
- Assess the impact of new additional vehicle trips on the existing road network and recommend road upgrades required or mitigation measures for any traffic impacts;
- Update comments relevant to Non-Motorised Transport (NMT) and public transport in the vicinity of the site; and
- Update traffic impact in terms of environmental impact criteria.

Approach and methodology

The broad methodology used for this specialist study is as follows:

1. Literature review.
2. Data collection.
3. Trip generation.
4. Intersection capacity analysis.
5. Access evaluation.
6. Environmental impact assessment.

Existing Conditions

The site is currently accessible by a paved single-carriageway local road off R545, a regional road that connect the site to major regional and national routes, R555, N12 and N4.

The existing site conditions indicate that the R547, at the R545/R547 (to Kriel town) intersection, experiences the heaviest traffic volumes per hour (vph), with 995 westbound and 234 eastbound traffic

in the AM peak. The opposite applies for the PM peak, with respect to traffic proportions. This is followed closely by the R545, with northbound traffic ranging from 112 to 1032 vph in the AM peak and 99 to 416 vph for the southbound traffic. The R547 (intersecting with both the R545 and P132-1) and the P132-1 experience the third and fourth highest traffic volumes, respectively. Westbound traffic in the R547 ranges from 214 to 625 vph in the AM peak, while eastbound traffic ranges from 116 to 229 vph. The P132-1 experiences about 428 vph northbound traffic in the AM peak and 129 vph southbound traffic. For both roads, the opposite applies for the PM peak, with respect to traffic proportions. The Farm Access intersecting with the R545 experiences the least traffic volumes (2 vph westbound and 5 vph eastbound in the AM peak).

Minibus taxis and buses were the only mode of transport of public transport observed travelling along the public roads, which include the R545 and R547. No public transport lay-bys or stopping facilities were observed in the vicinity of the site. Relative to the roads in close proximity to the site, a lot more pedestrians were observed along public roads such as the R545 and the R547. No paved sidewalks or any form of pedestrian facilities were observed along these roads.

Intersection capacity analysis results indicate that, overall, all intersections in the study area are operating at an acceptable Level of Service with the exception of R545 and R547 in intersection 2, where the level of service for the western approach during the PM peak is F and the delay is significantly higher than that of other approaches in the same intersection by approximately over 140 seconds.

Trip Generation

During the construction phase, construction teams (maximum three teams per site) would consist of an excavator, two trucks, a compactor and loader with an associated labour force. The vehicle trips that will be generated during peak hours as a result the construction activities are expected to be less than 50 trips day.

The trips expected to be generated once the Ash Dam is constructed and operational will be related to daily maintenance of the Ash Dam, approximately one vehicle, two to three times per day.

Traffic Impact Analysis

In accordance with the Technical Methods for Highways (TMH) 16 South African Traffic Impact and Site Traffic Assessment Manual (2012), developments that generate over 50 vehicles per hour, in peak hours, require a full Traffic Impact Assessment (TIA), while those generating less than 50 vehicles per hour only require a Traffic Impact Statement (TIS). The Ash Dam site is expected to generate less than 10 additional vehicle trips during, both, the construction phase and operational phase. That said, a detailed analysis of these traffic volumes on the surrounding road network is not required for this study as the impact is expected to be negligible. However, for the purposes of this TIS an intersection capacity analysis was carried out for the 2016 traffic scenario, as already stated under the Existing Conditions subtitle.

Non-Motorised Transport and Public Transport Assessment

Public transport plays a major role in the general transportation of people in the area. Within the study area, no public transport facilities are provided on the road network such as taxi and bus lay-bys. It is, however, considered that the nature of the proposed ash dams will not generate additional public transport trips.

Environmental Assessment

An assessment of the traffic impact associated with the proposed development based on environmental criteria revealed that the Ash Dam Site will have relatively greater impact during the operation phase, mainly due to the irreversible nature of the impacts. With regards to the construction phase, the traffic

impact is considered reversible because of its temporary nature, whereas that of the operation phase is considered irreversible as it is a permanent (long term) operation. However, this does not mean that the impact of both the construction and operations traffic (e.g. wear and tear of roads) would not be able to be mitigated

Conclusion and Recommendations

From the analysis it has been demonstrated that the immediate road network has adequate capacity to accommodate the existing traffic and the proposed Ash dam development traffic. Provided that the above comments and recommendations are adhered to, the project is therefore supported from traffic engineering and transport planning perspectives.

1 Introduction

1.1 Background

Eskom Holdings SOC Limited (Eskom) is proposing to expand the existing Ash Disposal Facility at the Kriel Power Station, Mpumalanga, for the disposal for coarse and fine ash produced by the burning coal for the generation of electricity, for the remaining operational life of the power station. The Kriel Power has been in operation for 38 years. When its operation started in 1979, it was the largest coal-fired power station in the southern hemisphere, with a full load capacity of 3,000MW of electricity. Anglo Kriel Colliery supplies Eskom's Kriel Power Station exclusively with coal under a 40-year contract to be reviewed in 2019. Eskom, however, requested a 10-year extension in 2002 and an additional 10-year extension in 2010. Therefore, the contract was extended to 60-years to be reviewed in 2043 plus a five-year contingency.

The power station produces coarse and fine ash from the process of burning coal for the generation of electricity. At full capacity, each of the existing six boilers can produce up to 740 000 tonnes/year of coarse ash/ boiler bottom ash (approximately 20% of total ash produced) ash and 2 960 000 tonnes/year of fly ash/ precipitator fly ash (approximately 80% of total ash produced). Coarse ash is crushed at the power station and transferred to sumps from where it is pumped to the ash dams together with the fine ash. The fine ash is also transported separately to the existing ash dams via a conveyor belt, while the coarse ashfly ash mixture is pumped as slurry through a pipeline to the ash dams. Recently two of the three ash dams have reached their capacity, whereas the third ash dam would be reaching its capacity by 2021.

Eskom is thus proposing to construct an additional ash facility that would fulfil ash disposal requirements for the remainder of the power station's operational life, during which approximately 111.18 million m^3 of ash will be produced. The fourth ash dam will be developed sequentially in three phases to distribute large immediate capital expenditure cost. Dam 4.2 will be developed first in 2021 after which Dam 4.1 will be commissioned in 2023, and subsequently Dam 4.3 in 2025

Aurecon was commissioned to undertake an Environmental Impact Assessment (EIA) for the extension of the existing ash dam complex at the Kriel Power Station. A Traffic Impact Assessment (TIA) was compiled, which formed part of the EIA, to determine the impact of vehicular traffic associated with the proposed extension of the ash dam complex. The previous TIA was carried out to determine the impacts of the proposed Ash Dam Sites, Site 10 and Site 16N. It is now understood that Eskom is only applying for Site 10. To this end, this report provides an update of the previous TIA associated with Site 10 only.

Given the extent of the proposed extension and low level of expected trip generation, less than 50 trips during the peak period, a full TIA is not required to identify the traffic impact of the development. A Traffic Impact Statement (TIS) Report will be required as a planning and traffic and transport requirement.

1.2 Locality

The Kriel Power Station is located in the eMalahleni Municipal area. The Power Station lies west to the town of Kriel along the R545 to Bethal. The area is mainly mine orientated with the Matla Colliery and the Kriel Colliery within close vicinity of the Power Station. **Figure 1.1** provides an illustration of the Kriel Power Station location as well as the surrounding mines and other points of interest which include the two Ash Dam sites which were previously identified as being potentially suitable for the proposed ash disposal facility:

- Site 10 adjacent to the existing ash dam complex of the Kriel Power Station; and
- Site 16N to the northeast of the Kriel Power Station.

The nearest towns to the Kriel Power Station are given below (line of sight distances):

- Kriel: 10 km South-East
- Ogies: 35 km North
- Bethal: 40 km South
- Kinross: 25 km South-West

Ash Dam Site 10, overlies a backfilled open cast mine pit (Pit 1) and is bordered by the backfilled Kriel Colliery open cast mine pit, Pit 1, to the east. The Provincial Road R547 (Evander-Kriel) is located to the south, Matla Power Station to the west and the Kriel Power Station to the north.

Figure 1.1: Locality Map of Kriel Power Station and Proposed Ash Dam Sites

1.3 Objectives of the Study

The following are the objectives of this study:

- Assess the current road network and traffic conditions in the vicinity of the proposed development site;
- Recalculate the expected trips to be generated by Ash Dam Site 10;
- Assess the impact of new additional vehicle trips on the existing road network and recommend road upgrades required or mitigation measures for any traffic impacts;
- Update comments relevant to Non-Motorised Transport (NMT) and public transport in the vicinity of the site; and
- Update traffic impact in terms of environmental impact criteria.

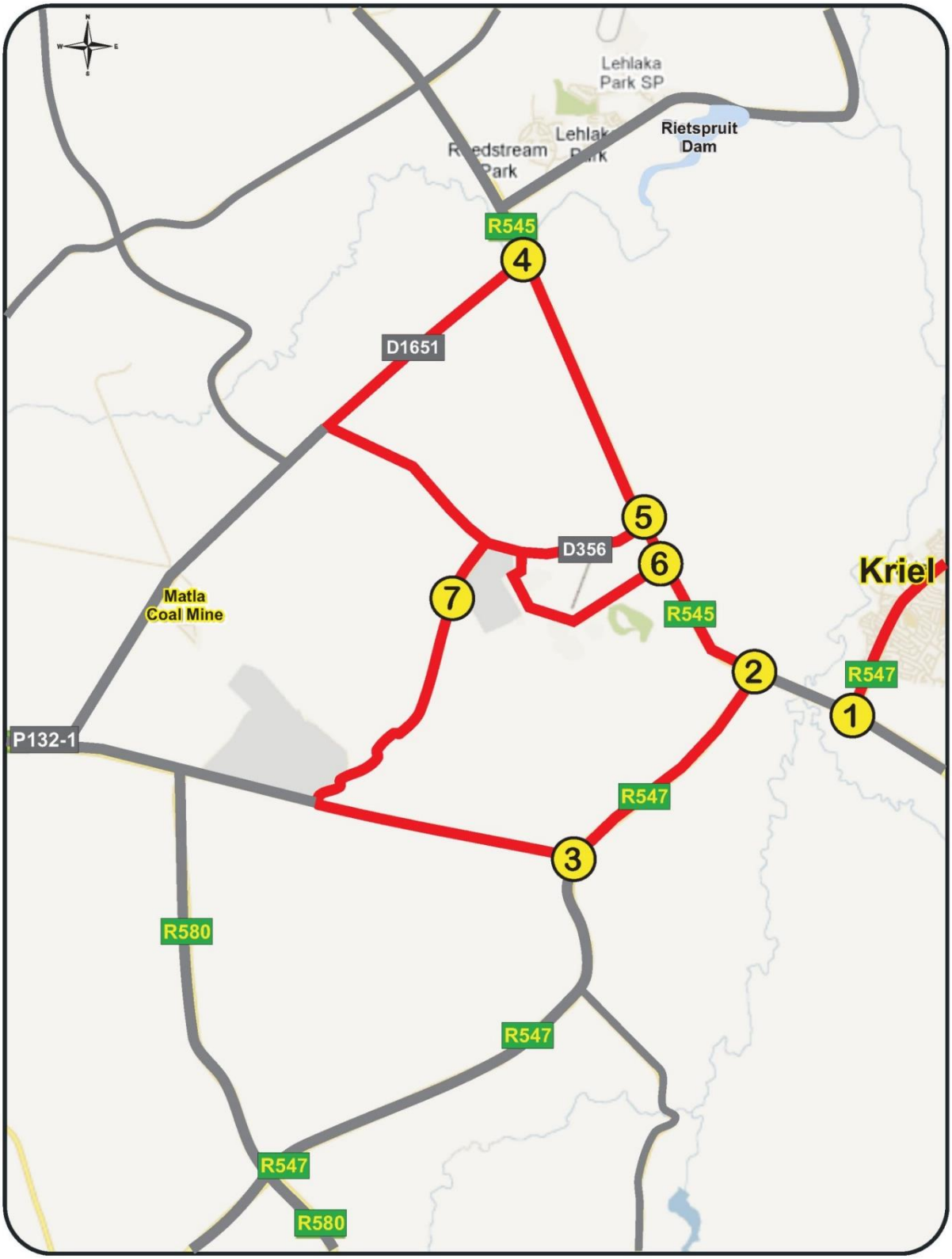
2 Extent of the Study Area

The study area was determined based on the expected traffic distribution of the traffic generated by the proposed activities**.** Error! Reference source not found. shows the study area road network. Roads of note are the R545, R547 and roads surrounding the Kriel Power Station, such as D356. In 2010 and 2011 traffic counts were conducted at seven intersections relevant for the study. These intersections are detailed in **Table 2.1** and illustrated **in** Error! Reference source not found..

Table 2.1: Elements of Road Network Investigated

Nr	Element of Road Network	Intersection Type	Existing/Planned
1	To Kriel Town- R547/R545	3-Way Stop	Existing Intersection
2	R545/R547	3-Way Stop	Existing Intersection
3	R547/P132-1	T-junction	Existing Intersection
4	R545/D1651	T-junction	Existing Intersection
5	R545/D356	T-junction	Existing Intersection
6	Entrance to Kriel Colliery	4-Way Stop	Existing Entrance
7	Entrance to North-West Shaft of Kriel Colliery	T-junction	Existing Entrance

Figure 2.1: Traffic Impact Study Area and Traffic Count Locations



3 Existing Conditions

3.1 Site Visit

A site visit was conducted on 18 October 2016 to assess road geometric layout, intersection layout, available public and non-motorised transport modes, traffic safety aspects, road condition, and traffic flow and land use.

3.2 Existing Transportation Network

The site is currently accessible by a paved single-carriageway local road off R545, a regional road that connects the site to major regional and national routes: R555, N12 and N4. With the exception of the local access road and R545 intersection, the following regional roads and intersections are expected to be impacted the most by the traffic generated by Ash Dam Site activities:

- **R545 and R547** at intersection 1 are paved single-carriageway roads which form an intersection situated southeast of the Ash Dam Site 10. The R547 runs in a north east direction from its intersection with the R545 and functions as a collector/distributor road serving mainly two communities, Kriel and Thubelihle.
- **R545 and R547** at intersection 2 are also paved single-carriageway roads in the immediate vicinity of the Ash Dam Site in the northeast. Both roads function as collector/distributor roads serving mining and industrial activities.

Appendix B provides intersection layout assessments of all seven intersections with regards to geometry and safety observations.

3.3 Existing Traffic Conditions

A thirteen-hour manual traffic count survey was conducted for the previous TIA on the 16th of March 2010 at the seven intersections indicated in Appendix B (**Figure 8.1 and Table 8.1**), and additional counts conducted on the 11th May 2011 and on the 24th May 2011.

For the purpose of this Traffic Impact Statement (TIS), a traffic count survey was not conducted as TIS do not require capacity analysis. However, to get an indication of existing traffic volumes in the study area, a growth rate of 3.5% was applied to the 2011 traffic count data to forecast traffic volumes to 2016. **Appendix A** shows the existing (2016) traffic volumes for the AM and PM peak periods. **Table 3.1** provides an indication of the traffic volumes in each traffic direction of the roads involved in the analysis.

Table 3.1: Traffic volumes per hour along the road included in the analysis

Intersection Road	Traffic Direction	Traffic Volumes (vph)	
		AM Peak	PM Peak
R545	Northbound	112 – 1032	50 – 426
	Southbound	99 – 416	78 – 911
R547 (from intersection 01)	Westbound	995	310
	Eastbound	234	806
R547 (from intersection 02 and 03)	Westbound	214 – 625	181 – 376
	Eastbound	116 – 229	266 – 435
P132-1	Northbound	428	208
	Southbound	129	181
Farm Access	Westbound	2	4
	Eastbound	5	2
Access to Kriel Colliery	Westbound	179	34

	Eastbound	49	152
D356	Westbound	265	50
	Eastbound	51	413
D1651	Westbound	172	80
	Eastbound	81	226
Entrance to North-West Shaft of Kriel Colliery (from intersection 07)	Northbound	48	11
	Southbound	11	67

Table 3.1 shows that R547, at intersection 01, experiences the heaviest traffic volumes per hour, followed closely by R545. As seen in the table, traffic along the R545 during the AM peak northbound direction ranges from as little as 112 vehicles per hour (vph) to 1032 vph. The heaviest traffic along this direction of the road, during the AM peak period, is experienced in the section of the R545 that is between intersections 01 and 02, where it intersects with the R547. In contrast, the heaviest southbound traffic along the R545 is along the leg of the R545 intersecting with the D1651 (intersection 04) – although relatively lower than the northbound traffic. A vice-versa observation of the traffic volumes applies to the PM peak period. The R547 (from intersections 02 and 03) and the P132-1 experience the third and fourth highest traffic volumes, respectively. The Farm Access, at intersection 06, experience the least traffic volumes, followed closely by the entrance to the North-West Shaft of the Kriel Colliery, at intersection 07.

3.4 Existing Public Transport and NMT

Minibus taxis and buses were the only mode of public transport observed travelling along the R545 and R547. No public transport lay-bys or stopping facilities were observed.

Relative to the roads, in close proximity to the site, a notable number of pedestrians were observed along public roads such as the R545 and the R547. No paved sidewalks or any form of pedestrian facilities were observed along these roads.

3.5 Planned New Roads

The Mpumalanga Province is in the process of rolling out planned road rehabilitation on roads adjacent to the study area. However, details are not known at this stage.

3.6 Existing Traffic Capacity Analysis

Intersection capacity analysis in the study area was undertaken using SIDRA software. The purpose of the analysis was to determine existing volume/capacity (v/c) ratios, delay (sec) and LOS for different years of assessment and the associated traffic impact of the development proposal.

The performance criteria used to determine an intersection's level of service (LOS), is provided in **Table 3.2** below. The LOS and delay measurements are defined in accordance with the Highway Capacity Manual (HCM2010) methodology.

Table 3.2: Level of Service Criteria

Level of Service	Traffic Signal / Roundabout Controlled	Stop / Give Way (Yield) Controlled
	Measure – Average Control Delay (seconds per vehicle)	
A	d ≤ 10	d ≤ 10
B	10 < d ≤ 20	10 < d ≤ 15
C	20 < d ≤ 35	15 < d ≤ 25
D	35 < d ≤ 55	25 < d ≤ 35
E	55 < d ≤ 80	35 < d ≤ 50
F	d > 80	d ≥ 50

As illustrated in **Table 3.2**, LOS A to F are used, with LOS A indicating the best operating conditions and LOS F the worst. The LOS A to D was taken as acceptable for the purpose of this traffic impact assessment.

Table 3.3 shows the analysis results the existing conditions

Table 3.3: 2016 traffic scenario

Intersection	Type of Intersection	Movement	AM			PM		
			LOS	V/C	Delay (s)	LOS	V/C	Delay (s)
01_R545 & R547	All-way Stop	South	C	0.347	20.4	B	0.04	10.9
		East	C	0.86	15.1	B	0.387	12.6
		North	A	0.103	6.1	A	0.454	5.8
		West	-	-	-	-	-	-
		ALL	**B**	**0.86**	**14.1**	**A**	**0.454**	**7.8**
02_ R545 & R547	All-way Stop	South	A	0.323	7	A	0.224	9.6
		East	-	-	-	-	-	-
		North	C	0.405	17.3	B	0.472	12.5
		West	D	0.709	26.7	F	1.133	156.8
		ALL	**B**	**0.709**	**11.4**	**F**	**1.133**	**55.6**
03_R547 & P132-1	Priority Control	South	-	-	-	-	-	-
		East	A	0.26	3.8	A	0.155	3
		North	A	0.143	9.6	A	0.189	9.7
		West	A	0.063	0.1	A	0.144	0.1
		ALL	**A**	**0.26**	**4.1**	**A**	**0.189**	**3.5**
04_R545 & D1651	Priority Control	South	A	0.092	0.1	A	0.115	0.1
		East	-	-	-	-	-	-
		North	A	0.171	2.2	A	0.103	1.6
		West	A	0.076	8.9	A	0.212	9.2
		ALL	**A**	**0.171**	**2.5**	**A**	**0.212**	**3.6**
05_R545 & D356	Priority Control	South	A	0.16	2.4	A	0.192	0.6
		East	-	-	-	-	-	-
		North	A	0.103	3	A	0.077	0.4
		West	B	0.074	10.4	C	0.764	21.4
		ALL	**A**	**0.16**	**3.4**	**A**	**0.764**	**9.5**

Intersection	Type of Intersection	Movement	AM			PM		
			LOS	V/C	Delay (s)	LOS	V/C	Delay (s)
06_R545 & Entrance to Kriel Colliery	Priority Control	South	NA	0.354	1.5	NA	0.099	1
		East	B	0.007	11.1	B	0.007	11.8
		North	NA	0.076	0.7	NA	0.27	0.1
		West	B	0.128	14.4	C	0.36	15.4
		ALL	**NA**	**0.354**	**2.2**	**NA**	**0.36**	**3.1**
07_Entrance to North-West Shaft of Kriel Colliery	Priority Control	South	-	-	-	-	-	-
		East	NA	0.054	2.5	NA	0.026	1.3
		North	A	0.009	8.1	A	0.055	8.3
		West	NA	0.024	0.5	NA	0.048	0.1
		ALL	**NA**	**0.054**	**2.3**	**NA**	**0.055**	**3.1**

The results of the analysis presented in **Table 3.3** indicate that the overall operation of all intersections in the study area are acceptable with the exception of R545 and R547 intersection where the level of service for the western approach during the PM peak is F and the delay is significantly higher than other approaches in the same intersection by approximately over 140 seconds. This is mainly as a result of significant number of vehicles, approximately 400 vehicles per hour, turning right. It is worth noting that the traffic analysis results presented in **Table 3.3** only represent 2016 background traffic, it excludes traffic generated by the proposed Ash Dam Site 10. **It is important to note that his intersection is failing in 2017, without proposed Ash Dam traffic. Additionally, this intersection will not be used for access to the site thus the proposed Ash Dam traffic is expected to have negligible to no impact at all at this intersection.**

4 Trip generation, trip distribution and trip assignment

4.1 Trip Generation

Traditionally, development traffic is estimated by applying trip generation rates from the South African Trip Generation Rates manual (SATGR) (DoT, 1995) or the Committee of Transport Officials (COTO) (September 2012) South African Trip Data manual. However, neither the SATGR manual nor COTO manual have recommended trip rates for proposed mines. As an alternative it was considered appropriate to estimate the mines trip generation from first principle using the numbers of employees per year of analysis and the total commodities and final products to be transported in and out of the mine during construction and operations. This data was supplied by the project applicant.

During the construction phase, construction teams (maximum three teams per site) would consist of an excavator, two trucks, a compactor and loader with an associated labour force. The vehicle trips that will be generated as a result of the construction activities are expected to be less than 50 trips day.

The trips expected to be generated once the Ash Dam is constructed and operational will be related to daily maintenance of the Ash Dam, approximately one vehicle, two to three times per day.

4.2 Trip distribution and assignment

To determine the impact of the proposed development traffic on the road network, the generated trips are usually distributed on to the existing road network. The process is normally based on existing travel patterns and land use locations. It is expected that the additional trips will be distributed on to the network based on the current proportions.

5 Traffic Impact Analysis

In accordance with the Technical Methods for Highways (TMH) 16 South African Traffic Impact and Site Traffic Assessment Manual (2012), developments that generate over 50 vehicles per hour, in peak hours, require a full Traffic Impact Assessment (TIA), while those generating less than 50 vehicles per hour only require a Traffic Impact Statement (TIS). The difference between these two assessments is that the TIA must contain recent traffic counts and the analysis of both existing and future traffic flows, whereas in a TIS, little or no analysis is required, instead the Traffic Engineer's professional opinion is given more emphasis based on his or her observations and experience.

As stated earlier, the Ash Dam site is expected to generate less than 50 additional vehicle trips per day during, both, the construction phase and operational phase. That said, a detailed analysis of these traffic volumes on the surrounding road network is not required for this study as the impact is expected to be negligible.

Access to Ash Dam Site 10 is proposed through the existing entrance to the Power Station at intersection 6 (R545/Entrance to Kriel Colliery), as seen in **Figure 2.1**. The intersection is currently operating at acceptable level of service. Based on the assumed maximum number of additional traffic generated by the site, it expected that the proposed Ash Dam will increase current volumes, during construction and operation, by a negligible amount. Thus, the intersection is expected to accommodate the additional traffic to be generated as a result of the proposed Ash Dam.

6 NMT and Public Transport Assessment

6.1 Non-Motorised transport

Given the rural nature of the area as well as the predominant mining presence, non-motorised transport plays an important role in local communities. It has been deduced that the nature of the proposed ash dams will not generate high pedestrian traffic.

However, taking into consideration the lifespan of operations at the Kriel Power Station, it is recommended that Eskom engage with local authorities with regards to investigating the current and future demand of non-motorised transport and the provision of non-motorised transport facilities.

6.2 Public transport

Public transport plays a major role in the general transportation of people in the area. Within the study area, no public transport facilities are provided on the road network, such as taxi and bus lay-bys. It is, however, considered that the nature of the proposed ash dams will not generate additional public transport trips.

Given the lifespan of operations at the Kriel Power Station it is recommended that Eskom engage with local authorities with regards to investigating the current and future demand of public transport and the provision of associated facilities.

7 Environmental Assessment

The following section provides an updated assessment of potential environmental impacts as a result of the proposed development from a traffic impact perspective in order to assist with the Environment Impact Assessment Report (EIAR).

7.1 Criteria for environmental considerations

For each impact at the Ash Dam Site 10, the EXTENT (spatial scale), MAGNITUDE and DURATION (time scale) would be defined. Subsequently, these criteria would be used to ascertain the SIGNIFICANCE of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place.

The following table (**Table 7.1**) shows the scale used to assess the criteria, and defines each of the rating categories.

Table 7.1: Assessment criteria for the evaluation of impacts

Criteria	Category	Description
EXTENT (Spatial influence of impact)	Regional	Beyond a 10 km radius of the candidate site.
	Local	Between 100m and10 km radius of the candidate site.
	Site specific	On site or within 100 m of the candidate site.
MAGNITUDE of impact (at the indicated spatial scale)	High	Natural and/ or social functions and/ or processes are severely altered
	Medium	Natural and/ or social functions and/ or processes are notably altered
	Low	Natural and/ or social functions and/ or processes are slightly altered
	Very Low	Natural and/ or social functions and/ or processes are negligibly altered
	Zero	Natural and/ or social functions and/ or processes remain unaltered
DURATION of impact (temporal)	Construction period	From commencement up to 2 years of construction
	Short Term	Between 2and 5 years after construction
	Medium Term	Between 5 and15 years after construction
	Long Term	More than 15 years after construction

The SIGNIFICANCE of an impact is derived by taking into account the temporal and spatial scales and magnitude. **Table 7.2** below explains the means of arriving at the different significance ratings.

Table 7.2: Definition of significance ratings

Significance ratings	Level of criteria required
High	• High magnitude with a regional extent and long term duration • High magnitude with either a regional extent and medium term duration or a local extent and long term duration • Medium magnitude with a regional extent and long term duration
Medium	• High magnitude with a local extent and medium term duration • High magnitude with a regional extent and construction period or a site specific extent and long term duration • High magnitude with either a local extent and construction period duration or a site specific extent and medium term duration • Medium magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Low magnitude with a regional extent and long term duration
Low	• High magnitude with a site specific extent and construction period duration • Medium magnitude with a site specific extent and construction period duration • Low magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Very low magnitude with a regional extent and long term duration
Very low	• Low magnitude with a site specific extent and construction period duration • Very low magnitude with any combination of extent and construction or short term duration
Neutral	• Zero magnitude with any combination of extent and duration

Once the significance of an impact has been determined, the PROBABILITY of this impact occurring as well as the CONFIDENCE in the assessment of the impact, would be determined using the rating systems outlined in **Table 7.3 and Table 7.4**, respectively. It is important to note that the significance of an impact should always be considered in concert with the probability of that impact occurring. Lastly, the REVERSIBILITY of the impact is estimated using the rating system outlined in **Table 7.5.**

Table 7.3: Definition of probability ratings

Probability ratings	Criteria
Definite	Estimated greater than 95 % chance of the impact occurring.
Probable	Estimated 5 to 95 % chance of the impact occurring.
Unlikely	Estimated less than 5 % chance of the impact occurring.

Table 7.4: Definition of confidence ratings

Confidence ratings	Criteria
Certain	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
Sure	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
Unsure	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

Table 7.5: Definition of reversibility ratings

Reversibility ratings	Criteria
Irreversible	The activity will lead to an impact that is in all practical terms permanent.
Reversible	The impact is reversible within 2 years after the cause or stress is removed.

7.2 Impact assessment

As mentioned earlier in this report, the construction, operations are expected to generate additional private vehicle, public transport and pedestrian traffic on the existing road within the study area as a result of workers travelling to and from work; and the transportation of construction materials. During the two stages of the project (i.e. construction, operations), the additional traffic is expected to have direct or indirect impacts on the following:

- Increase in traffic volumes and vehicle delays;
- Increase in delays for cyclists and pedestrians as result of the additional traffic on the network
- Road safety conditions could be impacted negatively by an increase in heavy vehicles; and
- Impact on road surface conditions of the local road network as a result of an increase in heavy vehicles.

7.2.1 Impact on traffic condition and driver delays

The proposed construction and operational phases of the Ash Dam extension will mainly generate additional traffic along regional roads R545 and R547. Whilst there will be an increase in traffic flows along these roads, these increases are very low and the road network capacity can easily accommodate the additional volumes due to the relatively moderate existing traffic flows on these roads compared to their capacity.

With the exception of the PM peak of intersection 2 (R545/R547), drivers are expected to experience a negligible increase in delays of not more than 15 seconds closer to Ash Dam Site 10 and 5 seconds at intersections slightly further away from the site.

7.2.2 Impact on pedestrians and cyclists

There is minimal pedestrian activity in the immediate vicinity of the site, with most of it being along the R545. The proposed ash dam is expected to generate negligible pedestrian volumes. Notwithstanding, the verges on either side of the roads are wide enough to accommodate pedestrian activity without affecting the flow of traffic. Therefore, no NMT infrastructure provision measures will be required.

7.2.3 Impact on road safety conditions

Considering the pre-existing mine operations, the increase in traffic generated by the proposed Ash Dam Site activities is not expected to have a major impact on the prevailing road safety conditions on the surrounding network.

During both the construction and operation phase the proposed Ash Dam is expected to generate a negligible increase of heavy vehicles. However to promote safety in the vicinity of the site, it is recommended that the drivers of all heavy vehicles be required to attend a specialised road safety and driving course that sensitises them to the impact that they have on driving conditions for other vehicles on these roads.

7.2.4 Impact on road conditions

The road conditions in the vicinity of the site were observed to be in fair condition. It is however important to note that the region has extensive mining operations which means the road network has a high percentage of heavy vehicles which result in deteriorating road conditions. With few heavy vehicle trips

expected per hour to be generated by the proposed extension, the deterioration of these roads is expected to be minimal and certainly not noticeably.

7.3 Assessment of traffic impact in terms of environmental assessment criteria

Based on the environmental assessment results in **Table 7.6**, it is clear that the Ash Dam Site will have insignificant impact during both the construction and operation phases. With regards to the construction phase, the traffic impact is considered reversible because of its temporary nature, whereas that of the operation phase is considered irreversible as it is a permanent (long term) operation.

Table 7.6: Traffic impact assessment in terms of environmental impact criteria

Traffic Impact Associated with the Proposed Development	Pre-Mitigation		Post-Mitigation	
	Construction of Ash Dam Site 10	Operation of Ash Dam Site 10	Construction of Ash Dam Site 10	Operation of Ash Dam Site 10
Extent	Local	Local	Local	Local
Magnitude	Very Low	Low	Very Low	Very low
Duration	Construction Period	Long Term	Construction Period	Long Term
Significance	Very Low	Low	Very Low	Very low
Probability	Definite	Definite	Definite	Definite
Confidence	Sure	Sure	Sure	Sure
Reversibility	Reversible	Irreversible	Reversible	Irreversible

8 Conclusion and Recommendations

The aim of this TIS study was to assess the impact of the additional traffic expected to be generated by proposed Ash Dam activities for all stages of the project including: construction and operation.

From the analysis performed, all the relevant intersections within the current road network are operating at acceptable levels of service with the exception intersection 02 (R545/R547 intersection) where the level of service for the western approach during the PM peak is F and the delay is significantly higher than that of other approaches at the same intersection by approximately over 140 seconds. This is mainly due to a significant number of vehicle turning right towards the south leg of R545. It is important to note that his intersection is failing in 2017, without proposed Ash Dam traffic. Additionally, this intersection will not be used for access to the site thus the Ash Dam traffic is expected to have negligible to no impact at all.

The proposed Ash Dam activities during both construction and operation are expected to generate less than 50 vehicle trips per day and the impact is expected to be insignificant considering much of the road network is operating well below capacity. The increase in heavy vehicles during both construction and operation phases is also expected to be low, consequently the deterioration of the road condition is expected to be only slightly and certainly not noticeably.

The significance of the cumulative traffic impacts associated with the proposed project activities during construction and operations are considered negligible to minor. Although no traffic impact is foreseen as a result of the proposed Ash Dam Complex, due consideration should be given to road safety with regards to the current road network. It is recommended that drivers of heavy vehicles be required to attend a specialised road safety and driving course that sensitises them to the impact that they have on driving conditions for other vehicles and NMT users on these roads.

From the analysis it has been demonstrated that the immediate road network has adequate capacity to accommodate the existing traffic and the proposed Ash dam development traffic. Provided that the above comments and recommendations are adhered to, the project is therefore supported from traffic engineering and transport planning perspectives.

APPENDICES

Appendix A:
2016 Background Traffic Analysis Diagrams

Appendix B:
2012 Traffic Impact Analsyis Appendices

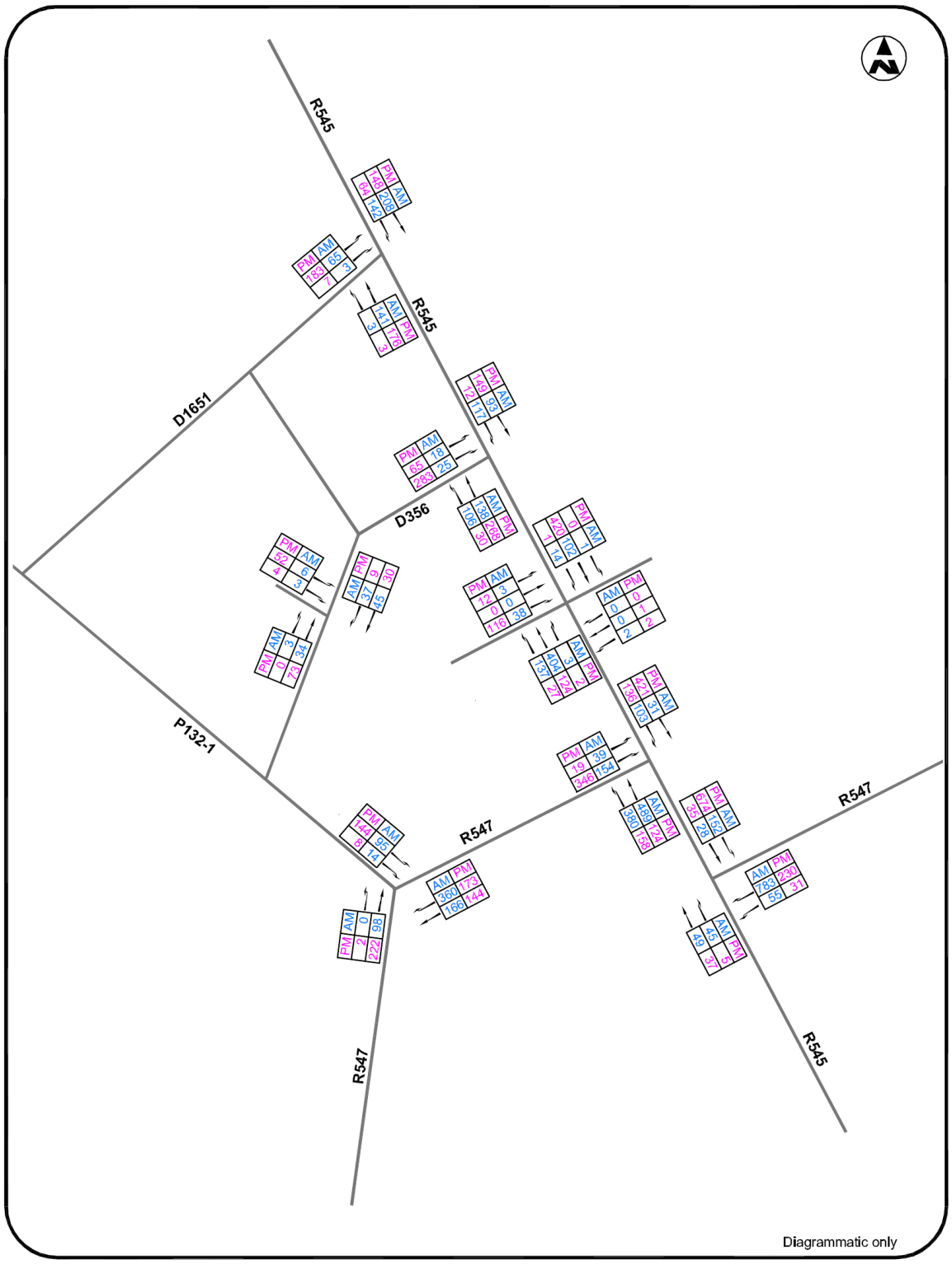
I. Previous TIA Traffic Assessment Parameters

Table 8.1: 2012 TIA traffic assessment parameters

Element	Information	Selection
Assessment year(s)	Years for which assessment has been undertaken	Base Year: 2012
Analysis peak hour(s)	Peak hour(s) for which impact were assessed	AM (all): 06:15-07:15 PM (all): 15:30-16:30
Peak hour factor(s)	Peak hour factor(s) used in assessment	AM and PM: As determined per intersection (0.95)

II. Traffic Count AM and PM Volumes (based on 2010 and 2011 traffic counts)

Figure 8.1: AM and PM traffic volumes based on 2010 and 2011 traffic counts

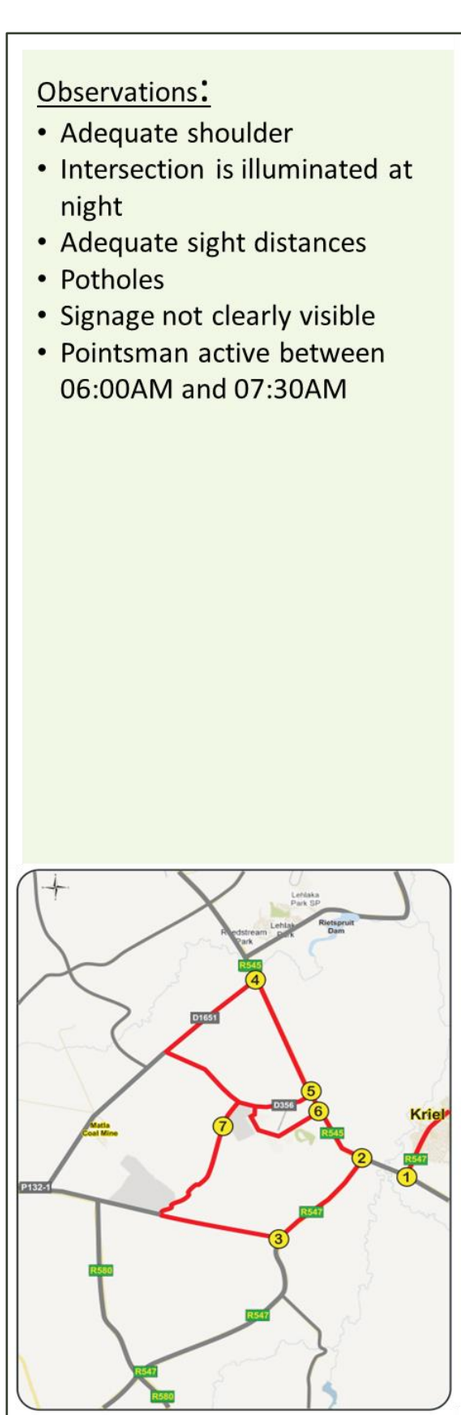


III. Intersection layout assessments of all seven intersections with regards to geometry and safety observations

Figure 8.2: Intersection 1 – R545 and R547 (to Kriel)

Observations:

- Adequate shoulder
- Intersection is illuminated at night
- Adequate sight distances
- Potholes
- Signage not clearly visible
- Pointsman active between 06:00AM and 07:30AM



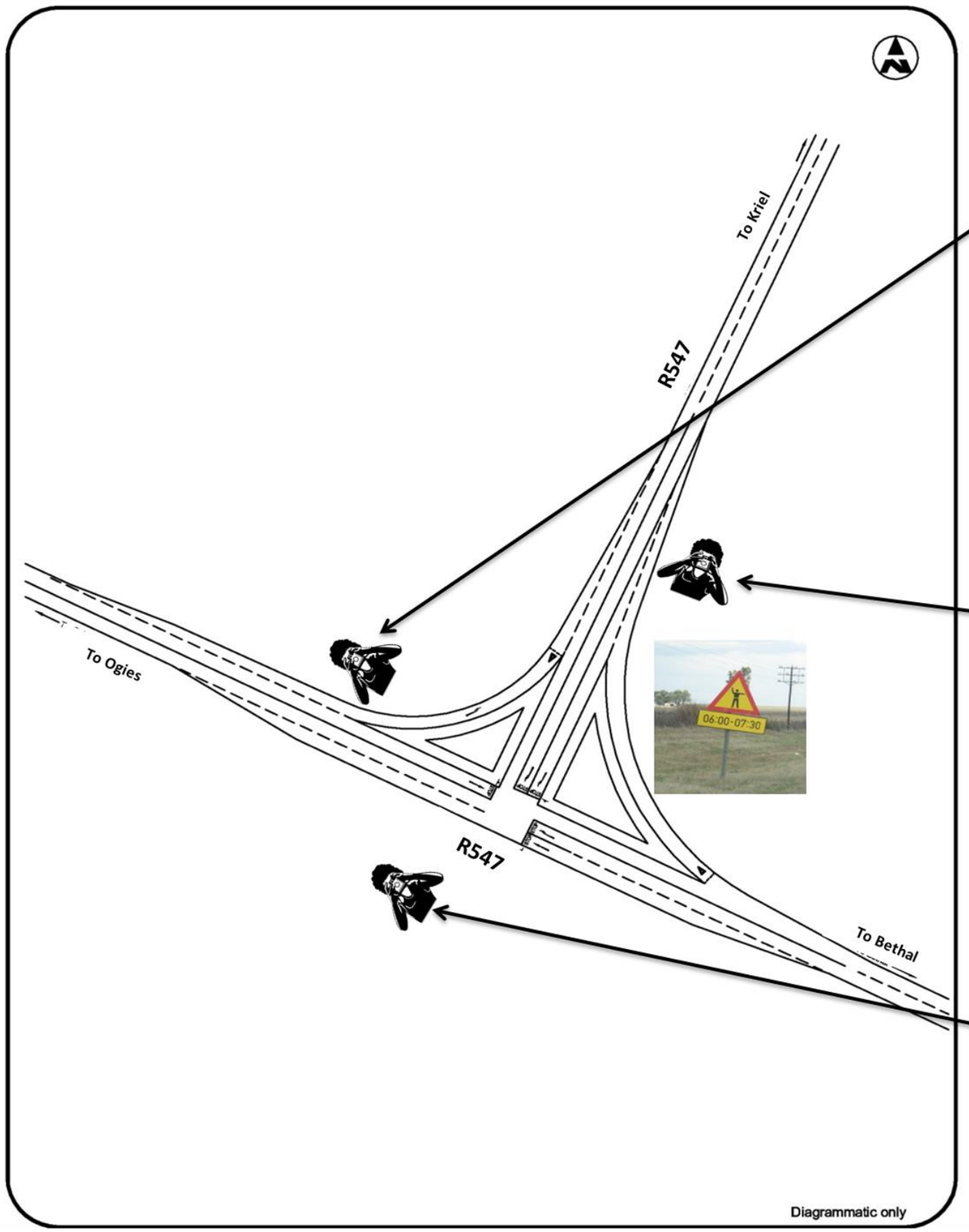
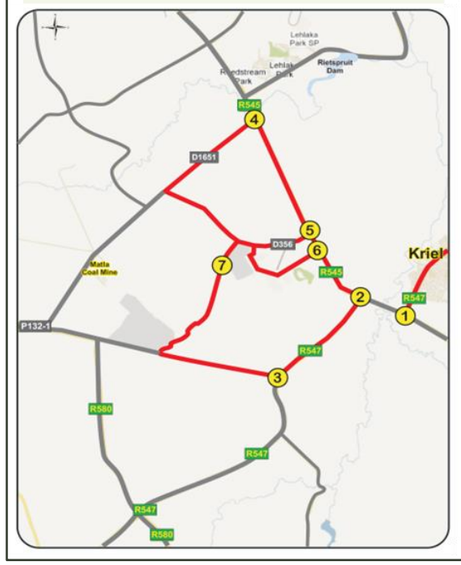


Figure 8.3: Intersection – R545 and R547 (to Kinross)

Observations:

- Adequate shoulder
- Intersection is illuminated at night
- Clear sight distances
- Road Markings not clearly visible



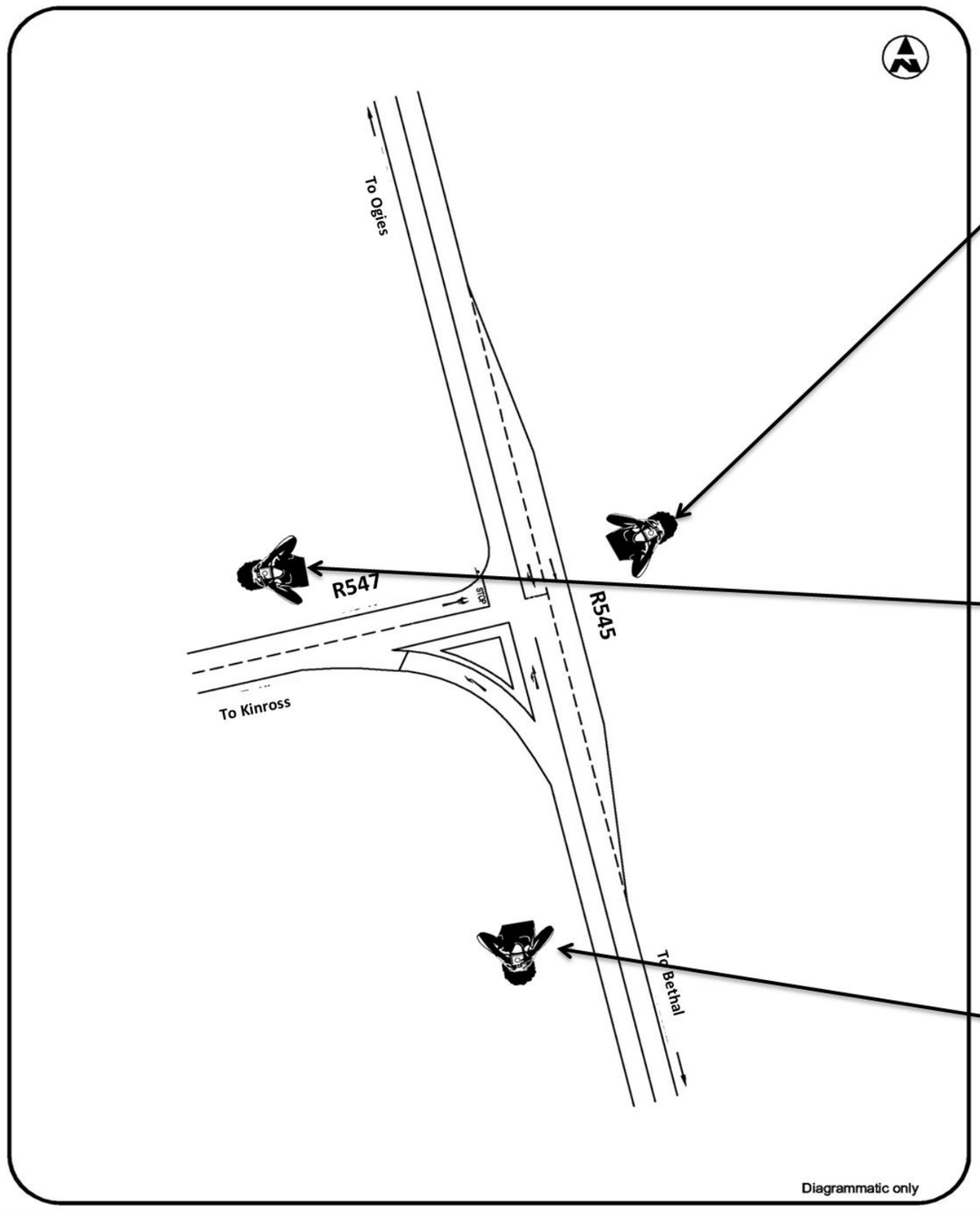
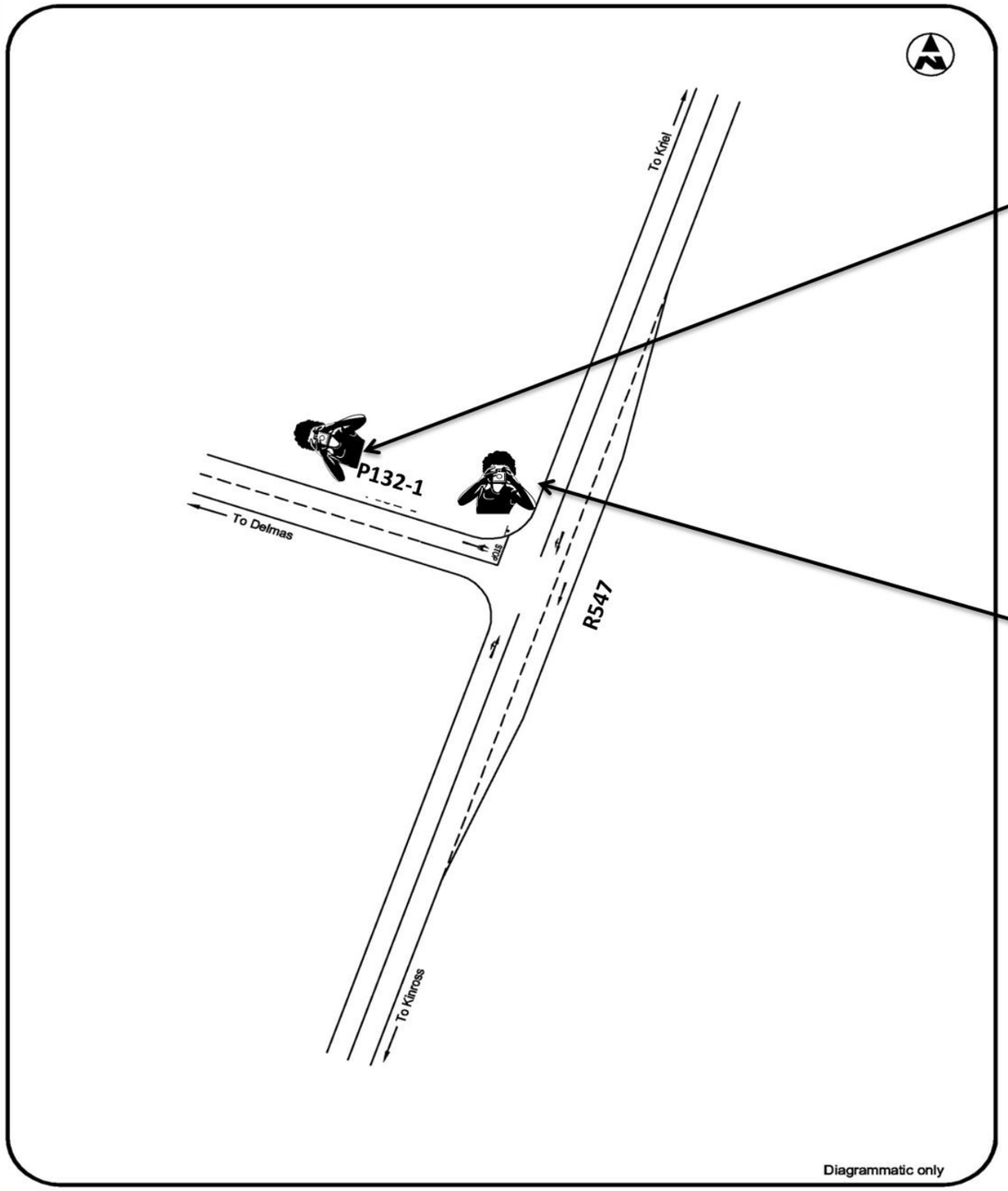


Figure 8.4: Intersection 3 – R547 and P132-1

Observations:

- Intersection is not illuminated at night
- Adequate sight distances
- Potholes
- Signage not clearly visible
- Warning signs of potholes



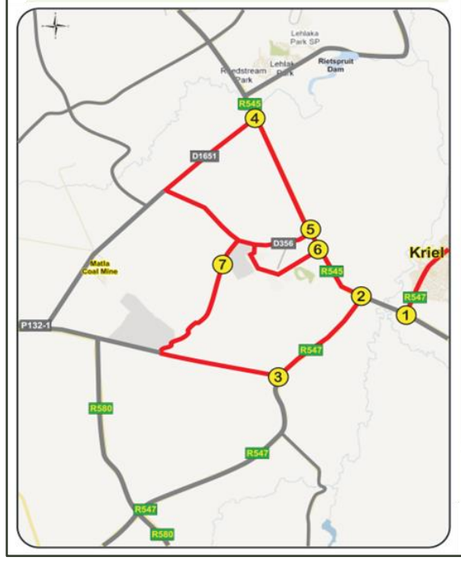
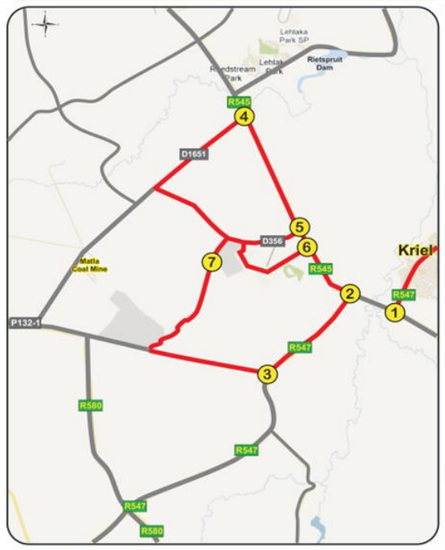


Figure 8.5: Intersection 6 – R545 and D1651

Observations:

- Inadequate shoulder
- Intersection is not illuminated at night
- Adequate sight distances
- Road wearing course is severely degraded and requires resurfacing



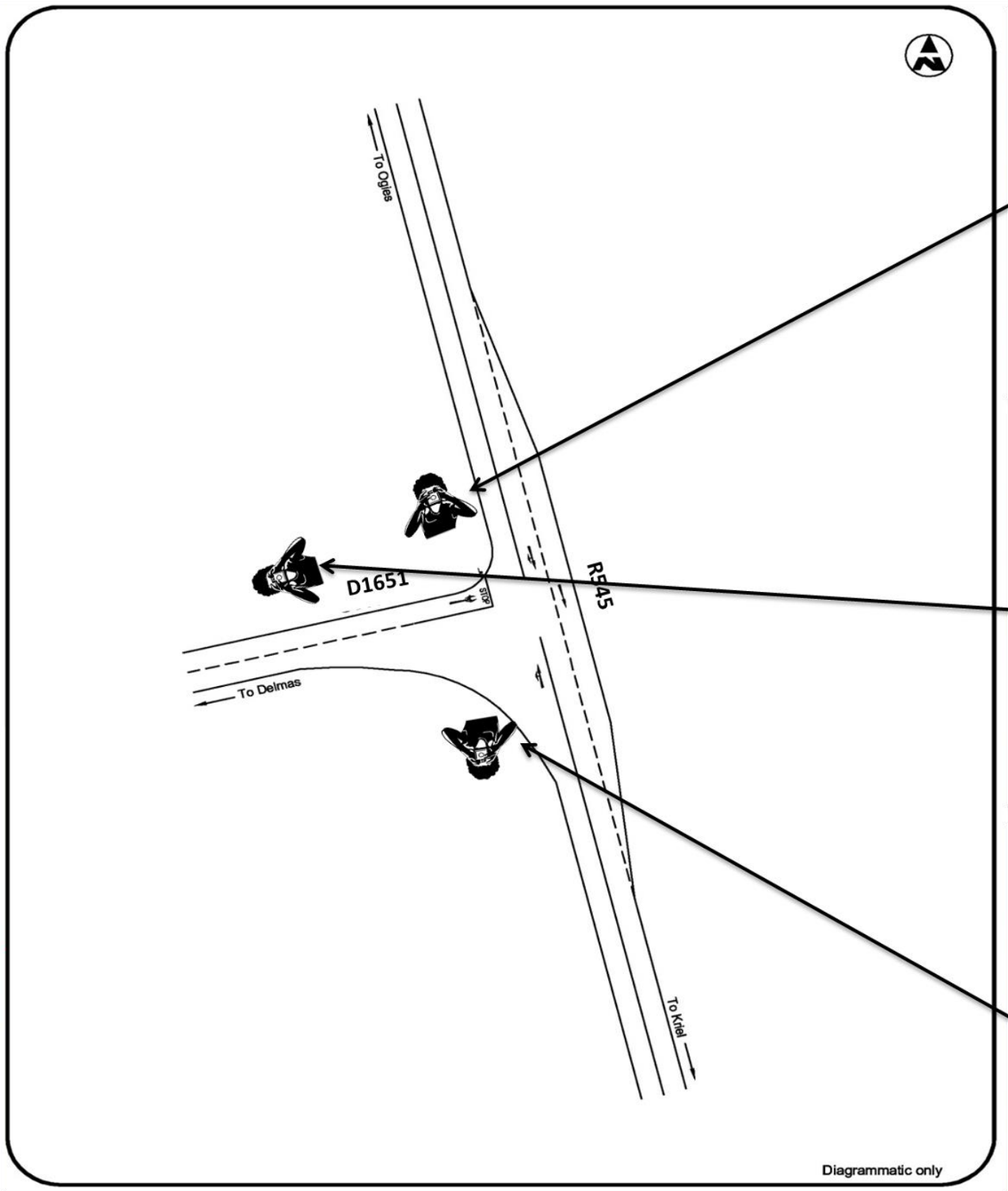
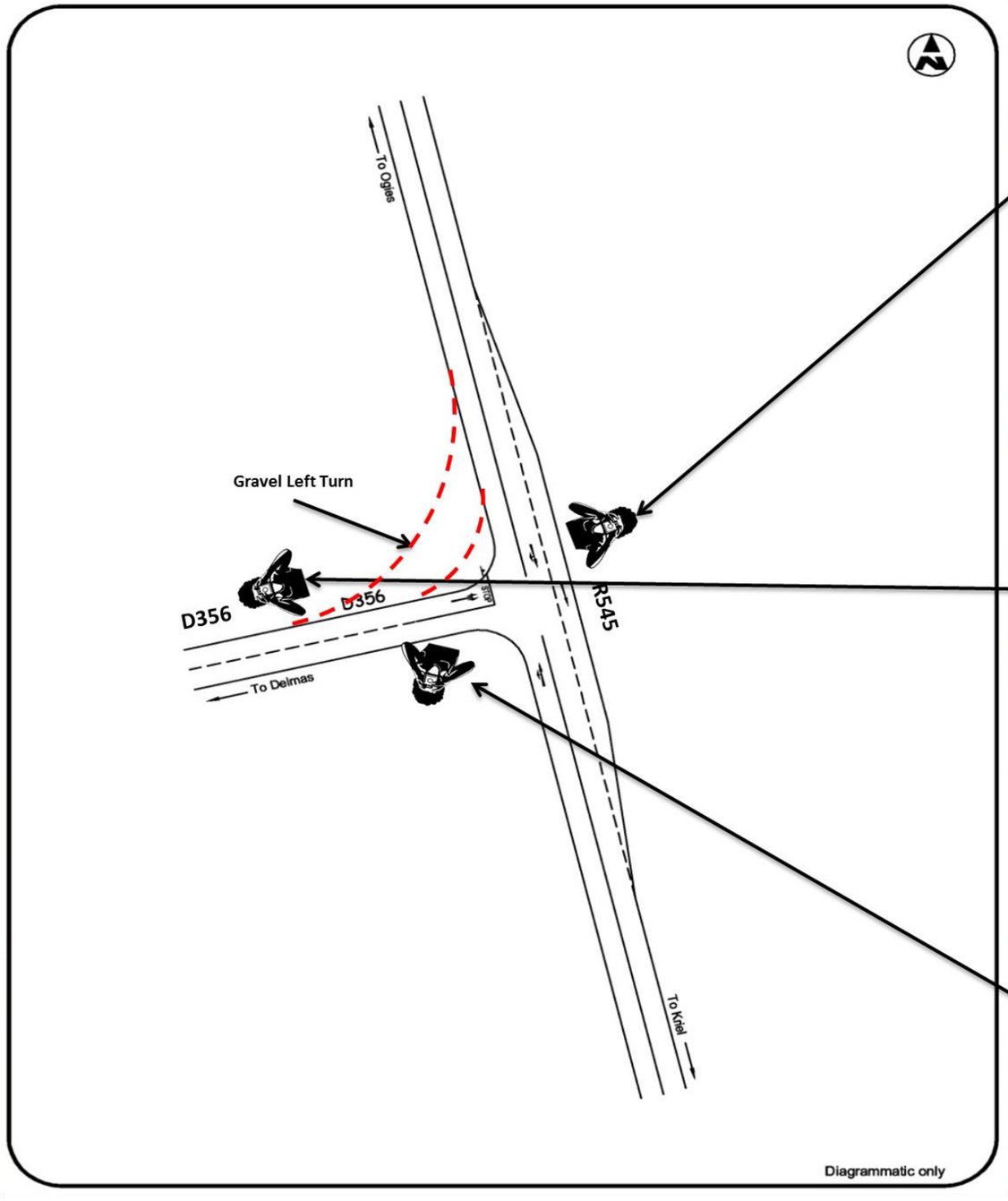


Figure 8.6: Intersection 5 – R545 and D356

Observations:

- Adequate shoulder
- Intersection is not illuminated at night
- Adequate sight distances
- Potholes
- Road is badly rutted
- A Gravel Left Turn cut-in has appeared from continuous illegal turning



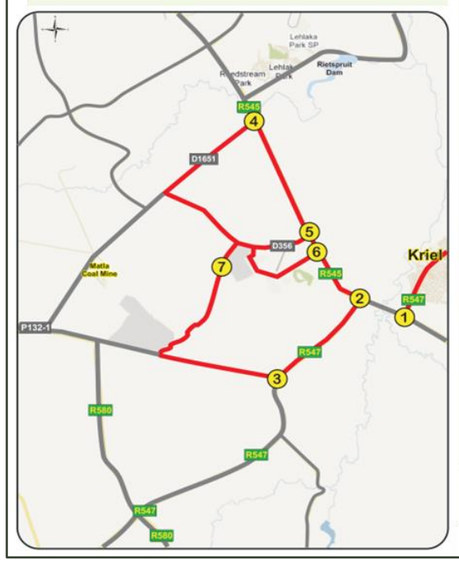
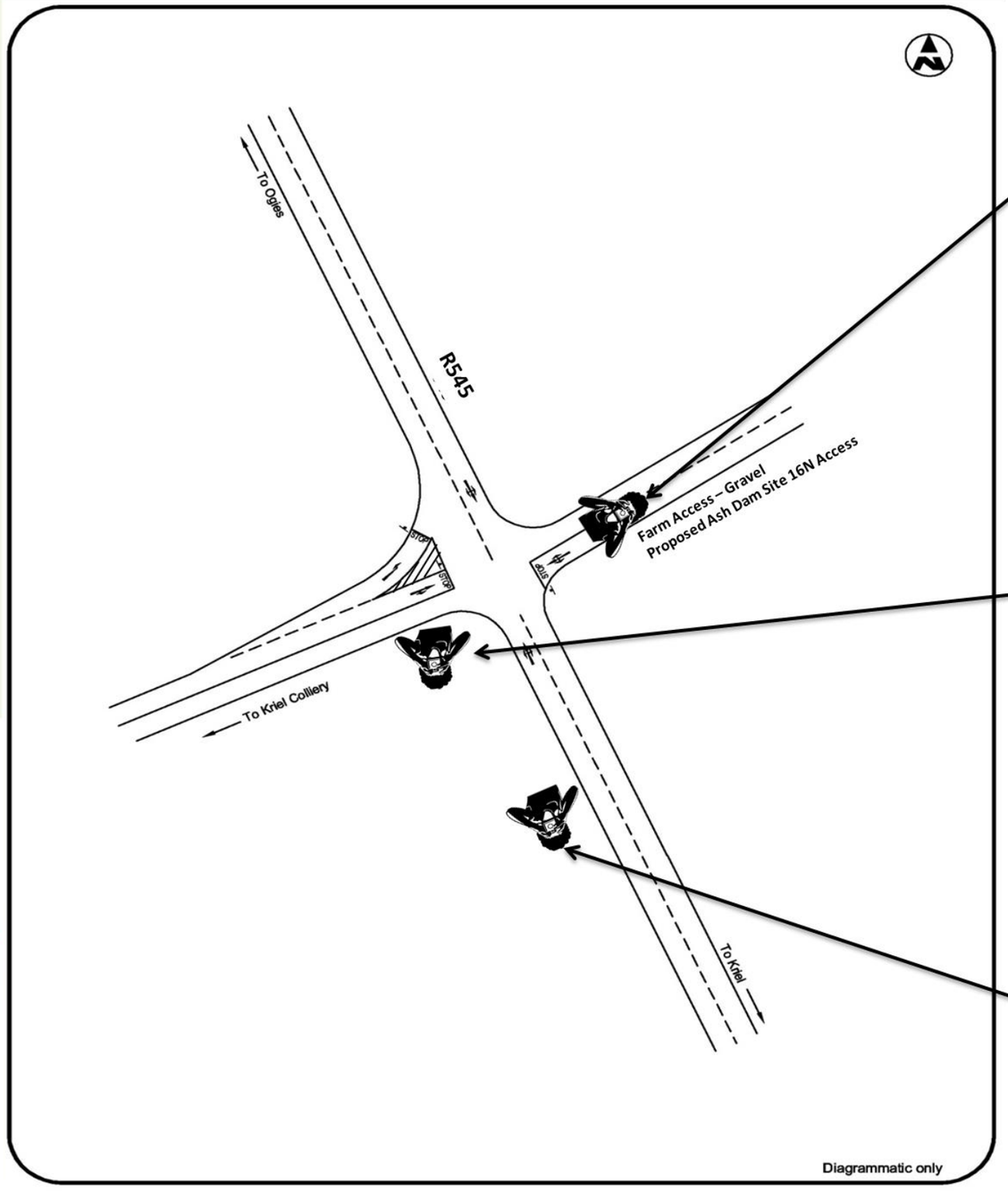


Figure 8.7: Intersection 6 – R545 and Entrance to Kriel Power Station

Observations:

- Adequate shoulder
- Intersection is illuminated at night
- Adequate sight distances
- Entrance road is in an acceptable condition
- Northeastern leg of intersection is not paved



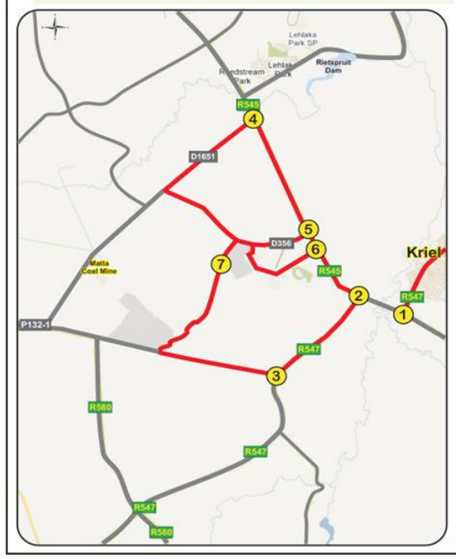
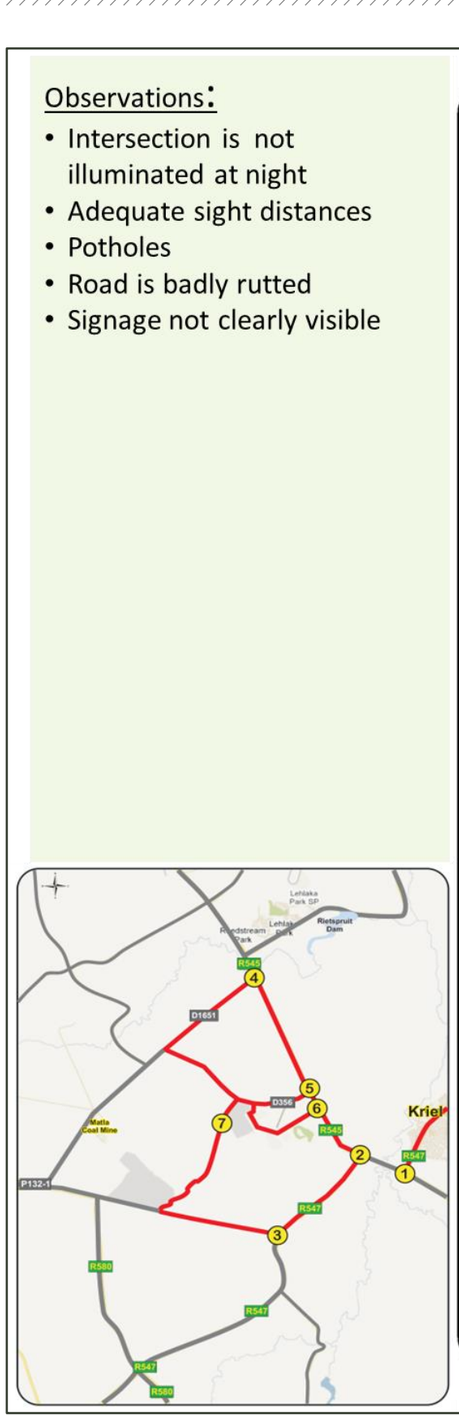
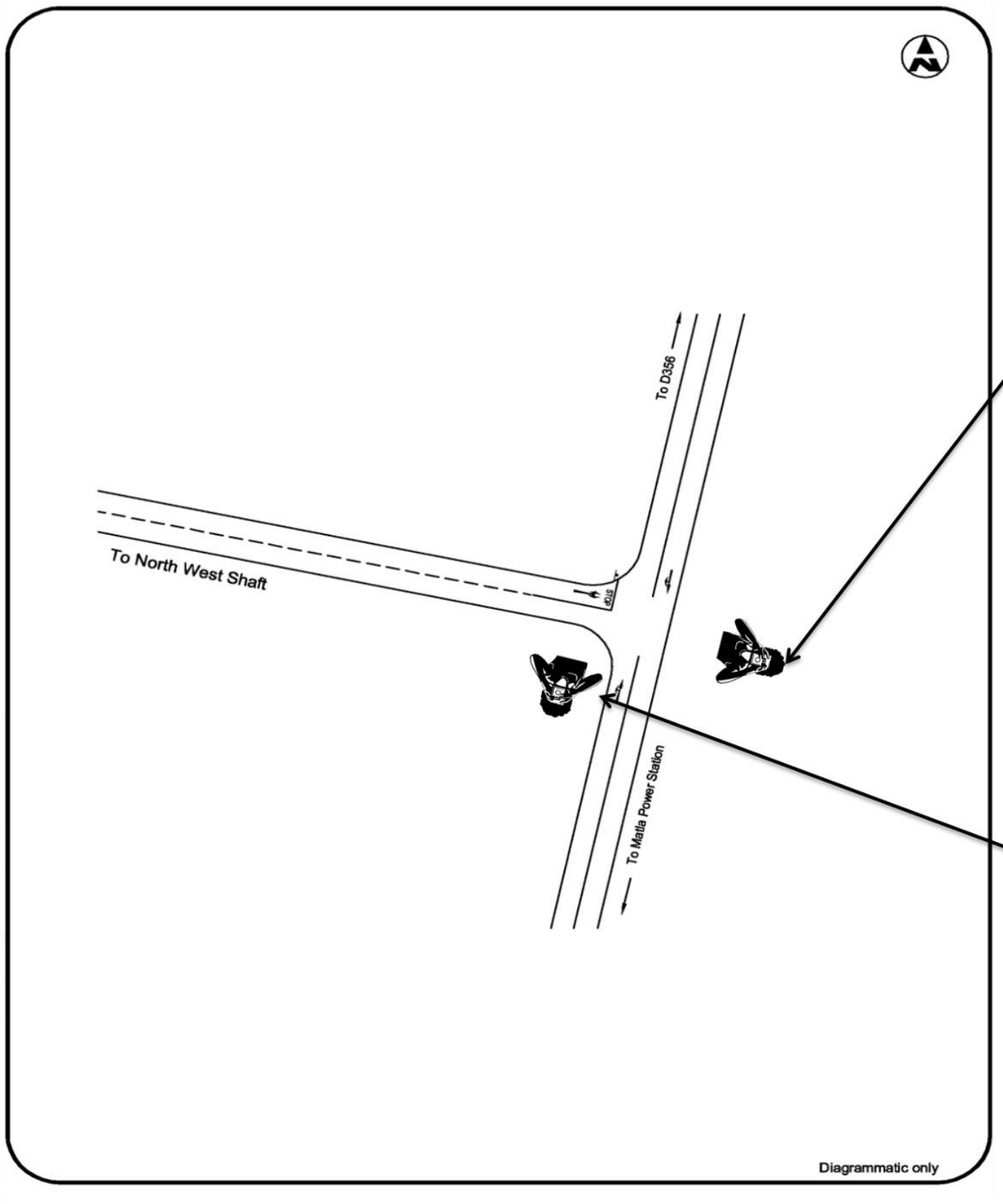


Figure 8.8: Intersection 7 – D1651 and Entrance to Kriel Colliery North-West Shaft

Observations:

- Intersection is not illuminated at night
- Adequate sight distances
- Potholes
- Road is badly rutted
- Signage not clearly visible





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Project title	Kriel Ash TIS	Job number	
To Cc	Dirk Pretorius	File reference	
Prepared by	Andrew Mukanyima Pr Tech Eng	Date	17 July 2017
Subject	Kriel Ash TIS | Peer Review		

1 Introduction

Arup Transport Planning has been appointed by Aurecon to undertake a peer review of Aurecon report titled Kriel Power Station and Ash Dam Complex extension dated June 2017 and discussed below are our comments/feedback. Our peer review is based on the guidelines for traffic impact assessments and in line with the request from Aurecon governed by the National Environmental Management Act (no 107 of 1998) and the Environmental Impact Assessment Regulations (2014).

2 Arup review

Trip generation

Although the COTO guideline does not provide for a trip generation for the proposed land-use, there is no clear built-up/basis of how the less than 50 peak hour trips conclusion has been arrived at. Although we are also of the view the land-use is a low trip generator there is a need to provide clarity especially for an external reviewer. Ideally the trip generation assumptions should be based on the listed operational activities, number of employees and must indicate modal splits in numbers (private vehicles, public vehicles e.g. buses or taxis). The trip generation is a key assumption which will inform the rest of the report and the fact that at the moment it is stated as low traffic (less than 50) without substantiating it prejudices the reader from contextualising the traffic impact of the proposed activity.

Traffic growth rates

Although no recent detailed counts were undertaken and the report makes use of 2011 volumes grown over a five year base with a year on year growth of 3.5%. An alternate approach could have been to count a sample (one or two) key intersections in 2017 so as to get a realistic growth rate on which to apply on the balance of intersection volumes. However we are of the view that a 3.5% growth rate is fairly robust and could be applicable to the study area.

Technical Note 01 | Kriel Ash TIS

17 July 2017

Study area

The extent of the study area is wide and robust enough to inform the road network capacity around the development.

Capacity analysis and upgrades

The 2017 capacity analysis of the surrounding network indicates that the surrounding network operates at acceptable LoS except for the R545 and R547, however the report notes that site traffic will not be routed through this intersection.

The impact of the development traffic was not tested explicitly as it is pointed out that the volumes are low and less than 50 peak hour trips. This thinking is in line with the TIS guidelines which suggests an analysis only at an intersection were the development adds at least 75 trips to the critical movement. However, it is still our opinion that a layout/drawing with the network and trip distribution would assist in portraying the complete picture.

No upgrades have been identified or recommended for the proposed development as the volumes are described as low and the capacity analysis does not identify any capacity constraints as a result of the development which will require mitigation. It is our opinion that this can be only be confirmed once quantified numbers for the trip generation are done and clearly shown distributed on the network.

Access

The site will gain access to the Ash Dam off an existing entrance to the Power Station at the R545 and Kriel Colliery entrance intersection. The 2017 analysis indicates spare capacity at this junction with an acceptable LoS and it is expected that the development will have little impact on existing access operations and can be accommodated. However, it is our opinion that without a complete view of the development traffic and the modal splits we cannot conclusively state the same.

Safety

An intersection review of sight distance, road conditions, and road furniture (signs and markings) has been done.

Non-motorised transport and public transport

Section 6 points out that there will be little requirement for pedestrian traffic and no additional public transport trips will be generated. However, in Section 7.2 the report points out that the activities will generate additional private vehicles, public transport, pedestrian traffic as well as delays for cyclists. In this regard some degree of clarity on employees' numbers with modal splits on public and private vehicle use will be key to inform these two sections. The wording in these sections should also be better aligned and the recommendation should follow from the relevant requirements.

Traffic loading and environmental impact

The proposed number of heavy vehicles to be generated are expected to be low in comparison to existing heavy vehicles as per the existing mining operations. It is expected that the impact of the development on the road deterioration will be minimal. As a result of the low volumes it is expected that from a traffic perspective that the environmental impact will be insignificant for the construction and operation phases. Also no road construction is proposed and this is expected to reduce the environmental disruption from the proposed activity.

3 Summary

In summary the report provides high-level traffic impact assessment of the Kriel Ash dam as per the requirements of a Traffic Impact Statement. The methodology and approach to the report is deemed acceptable, however as discussed in preceding sections above further work can be done to augment some of the arguments and discussions so as to provide clarity to a reader/report assessor.

Compiled by:

Andrew Mukanyima Pr Tech Eng
Senior Engineer | Transport

Curriculum Vitae

Contact: 071 689 7629
andrewmukanyima@gmail.com

1.	**Current Position**	**Senior Engineer**
2.	**Name of Firm:**	**Arup (Pty) Ltd, South Africa**
3.	**Name of Staff:**	**Andrew MUKANYIMA**
4.	**Date of Birth:**	7 May 1983 SA ID: 8305076281182
5.	**Education:**	Master's in Business Administration (MBA), 2017, Wits Business School Masters of Science in Engineering (Civil), 2012, University of the Witwatersrand Graduate Diploma in Engineering (Civil), 2010, University of the Witwatersrand Bachelor of Science Honors in Engineering (Civil), 2006, University of Zimbabwe
6.	**Membership of Professional Associations:**	Pr Tech Eng. ECSA (201370187) Member of the Engineering Council of South Africa Professional Member of the Zimbabwe Institute of Engineers
7.	**Other:**	2017, 2016, 2015, 2014 and 2013 External Examiner for the University of the Witwatersrand, School of Civil and Engineering (Post graduate Civil Engineering modules) Published author on evaluation of small contractor development within the Ekurhuleni Vukuphile Learnership programme
8.	**Countries of Work Experience:**	South Africa, Zimbabwe, Kenya, Botswana, Zambia, Mauritius, Tanzania

9. Employment Record

From:	2014 (January)	To:	Present
Employer:	Arup (Pty) Ltd, South Africa		
Positions Held:	**Senior Engineer**		
From:	January 2009	To:	2013 (December)
Employer:	Gauteng Department of Roads and Transport		
Positions Held:	**Deputy Chief Engineer**		
From:	January 2008	To:	2008 December
Employer:	Doka SA (Pty) Ltd		
Positions Held:	**Civil Engineer**		
From:	April 2006	To:	2007 December
Employer:	Africom (Pty) Ltd		
Positions Held:	**Civil Engineer**		

10. Detailed tasks assigned

Responsible for day-to day transport related projects at Arup South Africa. Oversee various aspects of projects, including both **technical and financial** review and reporting on all traffic engineering, transport and development planning, traffic signal projects and support geometric design, and multi-disciplinary projects.

I am a registered professional engineer with ten years civil engineering experience from both the public and private sector having been involved in various civil, traffic and structural engineering projects in contracting and consulting services covering traffic engineering and transportation planning, project management, feasibility studies, engineering design, project reports, construction supervision

Project Experience

Project:	Day to day
Year:	Jan 2014 – current
Location:	Gauteng, South Africa
Client:	Arup
Main Project Features:	Traffic Engineering and Transport planning services; Logistics
Positions Held:	**Senior Engineer**
Activities Performed:	My responsibilities included : • Technical delivery of Traffic Engineering Projects as well as significant work packages within larger projects. • Development and sign off traffic signal designs, review of concepts of access, parking layouts, road markings and signage. • Undertake project management and lead technical projects • Team leader and mentoring of junior staff, ensuring skills transfer. • Manage and monitor the successful financial performance of Projects. • Undertaking development studies and masterplanning projects • Lead on the development of technical proposals as well as bids • Execute responsibilities in support of the team's quality management system • Developing strong client relationships for continued and sustained work • and designing transport planning and engineering projects • Concept understanding of multi-modal transport, road safety, BRT designs, road geometry and road safety • Logistics studies

Project	North South Corridor (NSC) Railway Prefeasibility Study
Year:	2017-ongoing
Location:	South Africa, Botswana, Swaziland, Zimbabwe, Zambia, DRC
Client:	NEPAD Business Foundation
Main Project Features:	The purpose of this study is to undertake a rail infrastructure and logistics study for the rehabilitation and upgrade of rail equipment and infrastructure on the NSC (Durban to Kolwezi). The study output will be used as a blueprint to grow the freight and passenger volumes transported on the corridor and to reduce the cost of rail transportation through better price and service strategies
Positions Held:	**Project Manager/Supply Chain Specialist**
Activities Performed	My responsibilities included : • Planning of project scope • Customer needs assessment – market assessments • Manage sub-consultants • Implementation strategy formulation • Management of project budget • Project management

Project	Transnet, Automotive Supply Chain Study,
Year:	2016
Location:	South Africa
Client:	Transnet
Main Project Features:	Supply chain specialist in the market demand study as well operational review for Automotive port and rail study. The project involved market research on OEMs and various stakeholder needs & perceptions and strategy formulation to assist Transnet in their Automotive business for imports and exports.
Positions Held:	**Supply Chain Specialist/Project Manager**
Activities Performed	My responsibilities included : • Planning of project scope • Customer needs assessment • Liaison with OEMs, client and team

	• Automotive supply chain strategy formulation • Manage budget • Project management
Project	Garden City Business Park Traffic Assessment
Year:	2015
Location:	Garden Estate, Nairobi, Kenya
Client:	Actis
Main Project Features:	The project entailed traffic and transport planning input for the development of the Mixed-use development (Hospital, residential and offices) in Garden Estate, Nairobi. The development area has dense traffic and the onus was on Arup Traffic Consulting to provide a sustainable traffic solution for the development as well the road network.
Positions Held:	**Lead Engineer/Project Manager**
Activities Performed	My responsibilities included : • Planning of project scope • Conduct a technical feasible of the project from a traffic engineering point of view • the development's transport planning in line with the Nairobi County Council (NCC) and Kenya National Highways Agency (KeNHA) requirements • undertaking of a traffic impact assessment for development • Liaison with KeNHA and local county government • Manage traffic engineering budget • Project management
Project	AVIC Transport Planning and Traffic Assessment
Year:	2015
Location:	Westlands, Nairobi, Kenya
Client:	AVIC
Main Project Features:	The project entailed traffic and transport planning input for the development of the Mixed-use development (Hotel, retail, residential and offices) in Westlands, Nairobi. The development area has dense traffic and the onus was on Arup Traffic Consulting to provide a sustainable traffic solution for the development as well the road network.
Positions Held:	**Lead Engineer/Project Manager**
Activities Performed:	My responsibilities included : • Planning of project scope • Conduct a technical feasible of the project from a traffic engineering point of view • the development's transport planning in line with the Nairobi County Council (NCC) and Kenya Urban Roads Agency (KURA) requirements • undertaking of a traffic impact assessment for development • Liaison with KURA and local county government • Manage traffic engineering budget • Project management
Project	Gabcon, Road to Rail Strategy,
Year:	2015
Location:	Gaborone, Botswana
Client:	Gabcon
Main Project Features:	Engineer in the market demand study as well operational review for Gabcon inland ports i.e. Gabcon; Palcon and Francon. The project involved market research on client needs & perceptions and strategy formulation to assist Gabcon with a Road to Rail strategy.
Positions Held:	**Inland Terminal Engineer/Project Manager**
Activities Performed	My responsibilities included : • Planning of project scope • Customer needs assessment • Liaison with client and team • Road to rail strategy formulation • Manage budget • Project management

Project	Tshwane Auto-City Logistics planning
Year:	2015
Location:	Tshwane, South Africa
Client:	City of Tshwane
Main Project Features:	The project Involved in the development of a status quo report for freight assessment for the proposed Tshwane Auto-City. The development is meant to be one of a kind self-sustaining Automotive City first of its kind on the African continent. The status quo report looked on existing freight infrastructure and demand. It also considered future demand analysis, the network review focused on rail, road, air and pipelines.
Positions Held:	**Senior Engineer/Project Manager**
Activities Performed:	My responsibilities included : • Planning of project scope • the network review focused on rail, road, air and pipelines (freight movements) • review of existing freight infrastructure and demand • future demand analysis • Liaison with client and team • Manage budget • Project management

Project	Kileleshwa Transport Planning and Traffic Assessment
Year:	2014
Location:	Nairobi, Kenya
Client:	Acorn Group
Main Project Features:	The project entailed traffic and transport planning input for the development of the Mixed-use development (Hotel, retail, residential and offices) in Kileleshwa, Nairobi. The development area has dense traffic and the onus was on Arup Traffic Consulting to provide a sustainable traffic solution for the development as well the road network.
Positions Held:	**Lead Engineer/Project Manager**
Activities Performed:	My responsibilities included : • Planning of project scope • Conduct a technical feasible of the project from a traffic engineering point of view • the development's transport planning in line with the Kenya Urban Roads Agency (KURA) requirements • undertaking of a traffic impact assessment for development • Liaison with KURA and local county government • Manage traffic engineering budget • Project management

Project:	eThekwini BRT, Durban, KZN, South Africa
Year:	2014
Location:	South Africa
Client:	eThekwini BRT
Main Project Features:	Design and optimisation of traffic signals for the 1C BRT corridor in Durban.
Positions Held:	**Lead Engineer**
Activities Performed:	My responsibilities included : • Planning of project scope • Project management • Design and optimisation of traffic signals • Geometric review of BRT intersection

Project	Kazerne Intermodal Facility, Gauteng, South Africa
Year:	2014
Location:	South Africa
Client:	Johannesburg Development Agency (JDA)

Main Project Features:	The project entailed transport planning and engineering input in the design/construction of a public transport intermodal facility for the JDA an agent of the City of Johannesburg.
Positions Held:	**Lead Engineer**
Activities Performed:	My responsibilities included : • Planning of project scope • Traffic input into design of the intermodal facility • Conduct Traffic impact assessment • Review site development plan and circulation • Model traffic demand and circulation signal

Project	Sandton Transport Framework, Gauteng, South Africa
Year:	2014
Location:	South Africa
Client:	JRA
Main Project Features:	The project entailed developing a balanced transport master plan for Sandton that sets out a vision and context defining how to manage transport in the urban environment and keep Sandton accessible and the place of choice for economic and social activity
Positions Held:	**Lead Engineer**
Activities Performed:	My responsibilities included : • Planning of project scope • Traffic signal designs and co-ordination • Investigate intelligent transport system (its) implementation.

Project:	Ingersoll Road Safety Audit
Year:	2014
Location:	South Africa
Client:	City of Tshwane
Main Project Features:	The project entailed a stage 5 (pre-opening) road safety audit on a recently constructed road. The audit sought to mitigate road safety hazards and to ensure that the geometry, road markings, road furniture, drainage were in line with appropriate standards.
Positions Held:	**Audit Team Member**
Activities Performed:	My responsibilities included : • Planning of project scope • Conducting detailed road investigations • Carry out road safety audits and provide engineering recommendations for improved road safety.

Project:	Day to day
Year:	2009 - 2013
Location:	Gauteng, South Africa
Client:	Gauteng Department of Roads and Transport
Main Project Features:	Provide Traffic Engineering expertise
Positions Held:	**Deputy Chief Engineer**
Activities Performed:	My responsibilities included : • Design and assessment of new road signs and markings on provincial roads. • Review of all road signs and markings layout plans for provincial roads. • Inspection of erected road signs and markings • Investigation of new signs posting on provincial roads. • Interim chair of the local directional and tourism sign committee, responsible for approving new signage on provincial roads • Planning and designing transport planning and engineering projects • Design and assessment of new traffic signal applications • To carry out traffic impact assessments for infrastructure development. This includes assessing traffic impact studies for new developments. • Carry out road safety audits and provide engineering recommendations for improved road safety. • Promote and facilitate the use of technology to enhance Integrated Transportation Systems (ITS)

- Evaluation of existing technical manuals, standards drawings and procedures to incorporate new technology
- MATSIM Traffic Modelling
- Member of the Infrastructure Protection Technical committee responsible for the review of technical drawings submitted for wayleave applications
- Manage and control projects budget and expenditure

Project:	Identification and Prioritisation of intersections with capacity Constraints on Gauteng Provincial Road Network
Year:	2010 – 2012
Location:	South Africa
Client:	Gauteng Department of Roads and Transport
Main Project Features:	The project sought to optimise capacity and increase service levels on constrained intersections with the Gauteng network. It was a proactive approach to road safety as well as to increased traffic flow on the network.
Positions Held:	**Project Manager/Traffic Engineer**
Activities Performed:	My responsibilities included :

- Planning of project scope
- Conducting detailed investigations on network status quo
- Design and assessment of new traffic signal applications were required
- Signal optimisation of existing signals
- Carry out road safety audits and provide engineering recommendations for improved road safety.
- Promote and facilitate the use of technology to enhance Integrated Transportation Systems (ITS)

Project:	Day to day
Year:	2011
Location:	Gauteng, South Africa
Client:	Gauteng Department of Roads and Transport
Main Project Features:	The project scope was to upgrade the K29 to a dual road, I was involved in the construction and project management of the project
Positions Held:	**Construction/Project Manager**
Activities Performed:	My responsibilities included:

- Site inspections
- Liaison with all role players on the project
- Status report writing
- Verifying and adjudicating claims from the contractor
- Ensuring compliance of milestones to project timeframes
- Engaging with municipal and other service providers in terms of service relocations
- Assistance to the Community Liaison Officer
- Participating in Project Steering Committee issues
- Ensuring compliance to contract stipulations (labour targets, EPWP contractor development) specifications etc.) and compliance to any other issue stated in the contract data, returnable's, BOQ etc.
- Ensuring compliance with project specifications and drawing

Project:	Day to day
Year:	2013
Location:	Gauteng, South Africa
Client:	Gauteng Department of Roads and Transport
Main Project Features:	Review of all road marking layouts as part of the wayleave application process on provincial network
Positions Held:	**Road Markings Engineer**
Activities Performed:	My responsibilities included :

- Design and assessment of new road signs and markings on provincial roads.
- Review of all road signs and markings layout plans for provincial roads.
- Inspection of erected road signs and markings
- Investigation of new signs posting on provincial roads.
- Interim chair of the local directional and tourism sign committee, responsible for approving new signage on provincial roads

Project:	Gautrain Sandton Parking
Year:	2008
Location:	Gauteng, South Africa
Client:	Bombela JV
Main Project Features:	Doka SA was appointed to provide Detailed design of formwork covering parking slabs, shear walls, tunnels, precast column and beam
Positions Held:	**Civil Engineer**
Activities Performed:	My responsibilities included: • Formwork design and site supervision • Preliminary Designs and Cost Estimates • Final Designs with Drawings • Project Management and Supervision • Progress reports and projects auditing

Project:	Construction of Harare-Ruwa Fibre link
Year:	2007
Location:	Harare, Zimbabwe
Client:	Africom
Main Project Features:	Planning, mobilising and managing a 25km fibre network backbone link from Harare to Ruwa for Africom (Pvt) Ltd. The project logistics encompassed personnel on site, plant as well as funding
Positions Held:	**Civil Engineer**
Activities Performed:	My responsibilities included : • Carrying out site surveys for optic fibre cable and wireless links so as to aid in solution implementation • Design of client network access solutions based on spatial location • Administering and management of network service projects • Planning, supervision and mobilising of civil works personnel and plant • Monitoring quality control of work on site • Advising management on strategic engineering projects • Producing detailed cost estimation for civil projects

Project:	IFMIS Zambia
Year:	2006
Location:	Lusaka, Zambia
Client:	Zambia Government
Main Project Features:	Providing detailed cost estimates for civil works in the Zambian's Government fibre link project funded by the World Bank.
Positions Held:	**Civil Engineer**
Activities Performed:	My responsibilities included : • Carrying out site surveys for optic fibre cable and wireless links so as to aid in solution implementation • Design of client network access solutions based on spatial location • Administering and management of network service projects • Planning, supervision and mobilising of civil works personnel and plant • Monitoring quality control of work on site • Advising management on strategic engineering projects • Producing detailed cost estimation for civil projects

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/ or 12/9/11/L
NEAS Reference Number:	DEA/EIA
Date Received:	

Application for integrated environmental authorisation and waste management licence in terms of the-

(1) National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2014; and

(2) National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) and Government Notice 921, 2013

PROJECT TITLE

INTEGRATED ENVIRONMENTAL IMPACT ASSESSMENT:
PROPOSED EXPANSION OF ASH DISPOSAL FACILITY, KRIEL POWER STATION, MPUMALANGA

Specialist:	Dr Werner Heyns		
Contact person:	" " "		
Postal address:	Aurecon Centre, Lynnwood Bridge, 4 Daventry St		
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Professional affiliation(s) (if any)	JGIP, CILT, CIHT, SACPLAN		

Project Consultant:	Aurecon South Africa (Pty) ltd		
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Telephone:	021 526 6022	Fax:	086 723 1750
E-mail:	Franci.gresse@aurecongroup.com		

4.2 The specialist appointed in terms of the Regulations_

I, Dr Werner Heyns , declare that --

General declaration:

I act as the independent specialist in this application;
I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
I declare that there are no circumstances that may compromise my objectivity in performing such work;
I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
I will comply with the Act, Regulations and all other applicable legislation;
I have no, and will not engage in, conflicting interests in the undertaking of the activity;
I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
all the particulars furnished by me in this form are true and correct; and
I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Aurecon South Africa (Pty) Ltd
Name of company (if applicable):

2017-08-07
Date: