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TRAFFIC IMPACT ASSESSMENT IN RESPECT OF THE PROPOSED INCREASE IN PETROLEUM PRODUCTS STORAGE CAPACITY AT THE MOOV FUEL & LUBRICANTS FACILITY, ERF 21594, KIAAT ROAD, KRAAIFONTEIN INDUSTRIA, CAPE TOWN

MOOV FUEL (PTY) LTD

JUNE 2025

K&T PROJECT REFERENCE: 17014C

REVISION 3

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For and on behalf of **Kantey & Templer (Pty) Ltd**	
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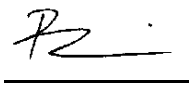
Signed: 	Signed: 
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Date: 05/06/2025	Date: 05/06/2025

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1. INTRODUCTION

This chapter discusses the purpose of the traffic impact statement, identifies the study area and criteria used to identify significant project impacts.

Kantey & Templer was appointed by MOOV Fuel (Pty) Ltd (herein referred to as "the Client") to prepare a Traffic Impact Assessment (TIA) in respect of and in conjunction with the Application for Environmental Authorisation for the proposed increase in petroleum products storage capacity at the MOOV fuel & lubricants facility situated on Erf 21594 Kraaifontein, in Kraaifontein Industria (herein referred to as "the site"). Refer to Figure 1 for the locality plan.

This TIA forms part of the Application for Environmental Authorisation to be lodged with the Western Cape Government Department of Environmental Affairs and Development Planning (DEA&DP) in terms of Regulation 16 of the EIA Regulation (GNR 326, 2017).

This TIA is prepared in accordance with standards set by the South African Committee of Transport Officials[1] (COTO) and the City of Cape Town Municipal Planning By-Law. The specific objectives of the report are to:

(i) Describe the extent of the proposed development.

(ii) Assess the existing traffic operations on the road network in the vicinity of the site.

(iii) Predict the extent of the additional traffic generated by the proposed development and estimate the distribution of that new traffic.

(iv) Evaluate the potential traffic impact of the proposed and latent developments on the surrounding road network.

(v) Evaluate public transport and non-motorised transport surrounding the site.

(vi) Determine the minimum off-street parking requirements.

(vii) Make recommendations for improvements to the existing road network affected by the additional site traffic.

[1] COTO, TMH17 Vol 1, South African Trip Data Manual, Sep 2013.

Figure 1: Site locality plan

© City Map Viewer, 2023

2. LAND USE & DEVELOPMENT PARTICULARS

MOOV Fuel is located on Erf 21594 Kraaifontein situated at 13 Kiaat Road in Kraaifontein Industria. The site is currently zoned General Industrial 2 (GI2) and measures 9747m^2 in extent.

MOOV Fuel is an Astron Energy (Western Cape Branded Marketer) supplying petroleum products to 90 Astron Energy service stations and close to 3000 commercial clients in the Western Cape region. MOOV Fuel currently operates a diesel and lubricant oil storage and distribution facility on the site.

MOOV Fuel intends to increase its on-site storage capacity of petroleum products by an additional 2,454m^3 to improve security of supply and to optimise logistics efficiency as well as allow for ad-hoc/emergency fuel requests. The project will entail the removal of two (2) existing diesel aboveground storage tanks (ASTs) with a combined capacity of 46m^3 and the installation of three (3) new ASTs with a combined capacity of 2500m^3, in the following configuration:

- 2 x 1000m^3 aboveground tanks for the storage of 50ppm diesel; and
- 1 x 500m^3 aboveground tanks for the storage of unleaded petroleum (ULP 95)

The existing diesel tanks will become obsolete, own use filling shall be taken from the new diesel storage tanks. The construction will include one main reinforced concrete bund with intermediate walls, thus allowing all tanks to be located within their own subdivision. A total number of four aboveground tanks can be accommodated within the available space, but as previously discussed, the current proposal is to install 3 ASTs with space allowance for a future AST.

Furthermore, the project will also involve the demolition of two warehouses (one of which contains a wash bay and the other containing oil drums), an out building at the front of the site, the toilet and office area in the middle of the main warehouse and two small storerooms (with firefighting equipment mounted on them) to make way for the proposal. A new wash bay will be located on the access road before the staging area where trucks will be washed in the evening when staging for overnight stay.

Refer to Appendix A for the proposed site layout plan designed by MAJ Projects.

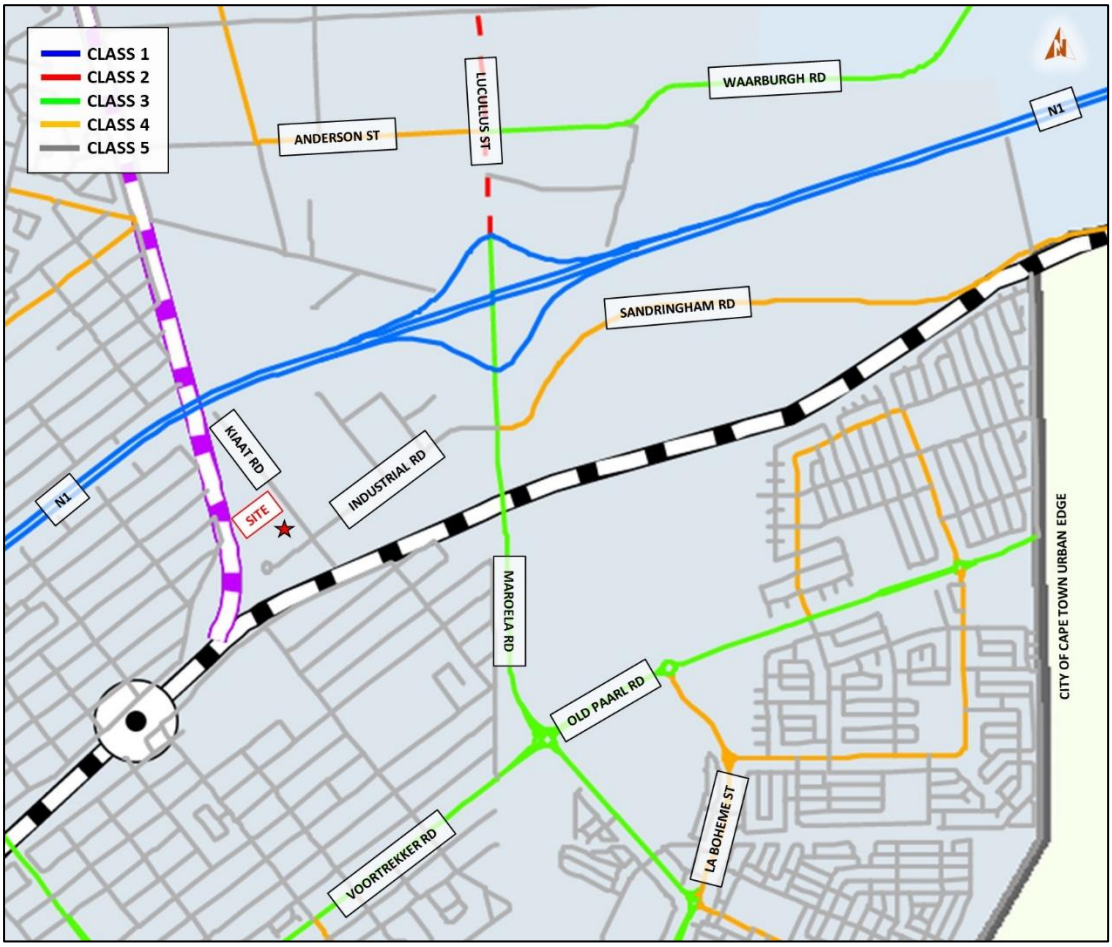
3. ROAD NETWORK

The site is well served by existing road infrastructure and is located within an intermediate (industrial) roadside development environment near the City of Cape Town urban edge. Vehicular access to the site will be located on Kiaat Road, approximately 85m from Industrial Road.

Kiaat Road, an 8m wide road, is classified as a Class 5 local (industrial) street within the City of Cape Town's road network. Access to Kiaat Road is achievable from Industrial Road also classified as a Class 5 street. However, Industrial Road, an extension of Sandringham Road, serves as a Class 4 Collector as it provides access to the other side streets and abutting driveways within Kraaifontein Industria from Maroela Road.

Maroela Road is a Class Minor Arterial which connects the N1 Freeway to Kraaifontein via the Lucullus Street/Maroela Road interchange. The surrounding road network is illustrated in Figure 2 below.

Figure 2: Surrounding Road Network



Source: City of Cape Town, Public Right Of Way, 2023

4. EXISTING TRAFFIC CONDITIONS

Existing background traffic information was obtained from traffic counts conducted on the road network on Monday, 27 May 2024. The additional traffic generated by the proposed development can be expected to influence the following key intersections:

- Key Intersection 1: Maroela Road / Sandringham Road / Industrial Road
- Key Intersection 2: Industrial Road / Kiaat Road

The key intersections were analysed in order to assess the existing traffic operations during the typical weekday peak commuter periods. 12-hour surveys at the abovementioned intersections, as well as the site (to measure the current site traffic patterns), were conducted between 06:00 – 18:00.

A summary of the traffic count data is contained in Appendix B. The existing traffic volumes are illustrated in Figures C1 & C2 contained in Appendix C.

The following peak hours at the key intersection were established:

- Key Intersection 1: AM Peak Hour: 07:00 – 08:00
  PM Peak Hour: 16:45 – 17:45
- Key Intersection 2: AM Peak Hour: 06:45 – 07:45
  PM Peak Hour: 14:45 – 15:45

5. TRIP GENERATION

The trip generation requires an estimation of the additional traffic to be generated by the proposed development typically from trip rates contained in the COTO TMH17 Trip Data Manual. However, the TMH17 does not provide trip rates for bulk fuel storage facilities. Therefore, the additional traffic was calculated using first principles and analysis of the existing operations and site traffic patterns.

5.1 EXISTING OPERATIONS

The existing operations at MOOV Fuel are divided into four main operations, namely:

1. Diesel & ULP Supply: Bridging Operations
2. Diesel & ULP Supply: Retail (Service stations)
3. Diesel & ULP Supply: Commercial (Farms & Private clients)
4. Lubricants Supply

Diesel & ULP Supply

The product supplied to customers is also loaded at other facilities other than MOOV Fuel (Kraaifontein Depot). The Depot currently acts as a truck stop/provision of overnight parking for MOOV Fuels trucks. The existing 46m^3 tanks to be removed are used for own truck fuelling and are topped up on average twice a week or when needed.

On a typical day, truck drivers will come in at 05:00 to collect a truck, go out to load and offload, and come back and park the truck overnight. The same truck may be scheduled for night shift operations. A truck may return to the site during the day for a couple of reasons, to refuel or to drop the trailer, before continuing with their trip.

1. Bridging Operations:
    - Operates on 7 trucks (HDV) with 12 drivers (±7 per shift).
    - All drivers have their own private vehicles (±7 per shift & 3-5 drivers on late shift to pre-load trucks).

2. Retail Operations:
    - Operates on 10 trucks (HDV) with 15 drivers (±10 per shift).
    - All drivers have their own private vehicles (±15 per shift & 3-5 drivers on late shift to pre-load trucks.)

3. Commercial Operations:
    - Operates on 4 trucks (HDV) with 8 drivers (±4 per shift – extended shifts – occasional night shift for pre-loads).
    - All drivers have their own private vehicles (±4 per shift and 2-3 drivers to preload in the evening)

Lubricant Supply

The current setup allows Moov to receive lubricants via HDV in their Main Warehouse and supply these to different customers and locations.

MOOV Fuel receives stock in;

- 1 HDV truck 34 ton every second day;
- LDV (6 ton) every day

The supply operation includes;

- 1 HDV truck which leaves the depot 2 – 3 times a week
- 4 LDV (2 x 4ton & 2 x 6ton) which does 1 – 2 deliveries per day
- 4 drivers with their own private vehicles

In addition, MOOV Fuel generates light vehicular traffic from their office and workshop personnel. Of the ±19 personnel in the office and workshop, 17 travel to the site with their own private vehicles.

The traffic count surveys at the site revealed that MOOV Fuel currently generates the following trips during the AM (06:15 – 07:15) and PM (16:30 – 17:30) peak hours:

Table 1: Current Trip Generation

MOOV Fuel		AM Peak Hour		PM Peak Hour	
		IN	OUT	IN	OUT
Light Vehicles (LV)	Volumes	10	1	9	12
	% Split	91%	9%	43%	57%
Equivalent Vehicle Unit (EVU) = LV*1		10	1	9	12
Trucks (HDV)	Volumes	3	6	2	6
	% Split	33%	67%	25%	75%
Equivalent Vehicle Unit (EVU) = HDV*3		9	18	6	18
Total EVU	Volumes	**19**	**19**	**15**	**30**
	% Split	**50%**	**50%**	**33%**	**67%**

It is evident from the above table that MOOV Fuel currently generates 38 EVU trips during the AM peak hour and 45 EVU trips during the PM peak hour.

5.2 FUTURE OPERATIONS

Lubricant Supply

The lubricant distribution will result in an increase in HDV to and from the site. It is anticipated that 1 additional HDV (34 ton) will deliver stock to the site every week and an additional 1 – 2 LDV truckloads outbound per day.

Diesel & ULP Supply

MOOV Fuel is seeking to acquire off-site parking to have all trucks park overnight. Therefore, having an off-site parking facility will result in less light/passenger vehicle traffic to the site. This measure will also improve road safety by allowing truck drivers to rest and recover from their long shifts on the road.

Whilst, the light vehicle traffic to the site will not increase with the proposed development, the heavy vehicle traffic is expected to increase on account of the delivery of fuel to the ASTs by HDVs and the supply to clients/customers will be via road tankers. The frequency of HDVs delivering and supplying fuel will only be calculated during the detailed design stage. Therefore, for the purpose of this TIA, it is assumed that HDV traffic will increase by >200% during the AM

and PM peak hours which also accounts for the future lubricant supply operations. The future trip generation is tabulated in Table 2.

Table 2: Future Trip Generation

MOOV Fuel		AM Peak Hour		PM Peak Hour	
		IN	OUT	IN	OUT
Light Vehicles (LV)	Volumes	10	1	9	12
	% Split	91%	9%	43%	57%
Equivalent Vehicle Unit (EVU) = LV*1		10	1	9	12
Trucks (HDV)	Volumes	10	19	7	19
	% Split	33%	67%	25%	75%
Equivalent Vehicle Unit (EVU) = HDV*3		30	57	21	57
Total EVU	Volumes	**40**	**58**	**30**	**69**
	% Split	**41%**	**59%**	**29%**	**71%**

Based on the previous table, MOOV Fuel can be expected to generate 98 and 99 EVU trips during the AM and PM peak hours in future, respectively. Therefore, the proposed development can be expected to generate an additional 60 and 54 EVU trips on the surrounding road network during the AM and PM peak hours, respectively.

6. SITE TRAFFIC DISTRIBUTION

Traffic that is expected to be generated by a development must be distributed and assigned to the road network so that the impact of the proposed project on the roadway links and intersections within the study area can be analysed.

The trip distribution is based on the anticipated travel patterns in and out of the site by analysing the traffic count data. The trip distribution patterns and site traffic assignment are illustrated in Figures C2 & C3 in Appendix C.

7. POTENTIAL IMPACT

The traffic operations were analysed using Signalised and Unsignalised Intersection Design and Research Aid software package[2] (SIDRA). The software package determines the existing and future operational Levels of Service (LOS) and expected average delays at the key intersections in the study area with the additional traffic from the proposed development.

ANALYSIS METHODOLOGY

Level of Service

Traffic operations at intersections are typically described in terms of "Level of Service" (LOS). LOS is a qualitative measure of the effect of several factors on traffic operating conditions, including speed, travel time, traffic interruptions, freedom to manoeuvre, safety, driving comfort, and convenience. It is generally measured quantitatively in terms of vehicular delay and described using a scale that ranges from LOS A to F, with LOS A representing essentially free-flow conditions and LOS F indicating over-capacity conditions with substantial congestion and delay.

Table 3 summarises the relationships between the average control delay per vehicle and LOS for signalised intersections, roundabouts and stop and yield controls.

For this study, the following scenarios were evaluated:

- ***Existing –*** Existing Conditions (2024)
- ***Future –*** Future Conditions "Five Year Horizon" (2029) – *including latent demand, excluding site traffic*
- ***Future –*** Future Conditions "Five Year Horizon" (2029) – *including site traffic*

In accordance with Table 1.1 in the TMH17 a growth rate of 2% per annum was used to estimate the increase in background traffic for the future 2029-year traffic scenarios. This is to account growth of background traffic which also affects the surrounding road network.

[2] SIDRA Version 9 Software, SidraSolutions, Australia.

Table 3: Level-of-Service definitions based on delay (HCM method)

Level of Service		Control delay per vehicle in seconds (d) (including geometric delay)	
		Signals and Roundabouts	Stop Signs and Give Way (Yield) Signs
A	Good progression, few stops, short cycle lengths	$d \leq 10$	$d \leq 10$
B	Good progression and/or short cycle lengths, more vehicle stops	$10 < d \leq 20$	$10 < d \leq 15$
C	Fair progression, significant proportion of vehicles must stop	$20 < d \leq 35$	$15 < d \leq 25$
D	Congestion becomes noticeable; longer delays, high v/c ratio	$35 < d \leq 55$	$25 < d \leq 35$
E	At or beyond acceptable delay, poor progression, long queues	$55 < d \leq 80$	$35 < d \leq 50$
F	Unacceptable to drivers. Arrival volumes greater than discharge capacity, unstable unpredictable flows	$80 < d$	$50 < d$

The traffic operations at the key intersections are summarised in Tables 4 – 7 in terms of LOS, Delay and V/C ratios (measures of effectiveness). More detailed Movement and LOS summaries are contained in Appendix D.

The findings of the SIDRA analysis indicate that the key intersections are currently operating at acceptable LOS and will continue to do so during the future 2029-year scenario even with the inclusion of the additional site traffic. Therefore, the proposed development is expected to have a low impact on the traffic operations at the key intersections.

Table 4: AM peak hour traffic operations at Maroela Rd / Sandringham Rd / Industrial Rd intersection

Approach	Movement	Intersection Type: Signalised								
		Existing 2024 Scenario			Future 2029 Scenario					
		Background traffic			Excluding new site traffic			Including new site traffic		
		v/c	Ave. Delay (seconds)	LOS	v/c	Ave. Delay (seconds)	LOS	v/c	Ave. Delay (seconds)	LOS
South: Maroela Rd	Left	0.699	20.5	LOS C	0.745	21.6	LOS C	0.749	21.7	LOS C
	Through	0.699	14.9	LOS B	0.745	16.0	LOS B	0.749	16.1	LOS B
	Right	0.045	15.7	LOS B	0.048	16.1	LOS B	0.048	16.1	LOS B
	Approach	**0.699**	**15.7**	**LOS B**	**0.745**	**16.8**	**LOS B**	**0.749**	**16.9**	**LOS B**
East: Sandringham Rd	Left	0.399	31.6	LOS C	0.380	32.4	LOS C	0.388	32.4	LOS C
	Through	0.399	25.8	LOS C	0.380	26.6	LOS C	0.388	26.6	LOS C
	Right	0.311	33.5	LOS C	0.322	35.3	LOS D	0.363	36.6	LOS D
	Approach	**0.399**	**29.8**	**LOS C**	**0.380**	**31.0**	**LOS C**	**0.388**	**31.5**	**LOS C**
North: Maroela Rd	Left	0.375	8.8	LOS A	0.420	9.5	LOS A	0.420	9.5	LOS A
	Through	0.375	3.1	LOS A	0.420	3.8	LOS A	0.420	3.8	LOS A
	Right	0.514	12.5	LOS B	0.618	14.4	LOS B	0.646	14.5	LOS B
	Approach	**0.514**	**8.1**	**LOS A**	**0.618**	**9.3**	**LOS A**	**0.646**	**9.4**	**LOS A**
West: Industrial Rd	Left	0.201	20.8	LOS C	0.217	21.3	LOS C	0.282	22.5	LOS C
	Through	0.201	14.8	LOS B	0.217	15.3	LOS B	0.282	16.5	LOS B
	Right	0.142	33.0	LOS C	0.141	33.7	LOS C	0.179	33.9	LOS C
	Approach	**0.201**	**23.0**	**LOS C**	**0.217**	**23.5**	**LOS C**	**0.282**	**24.4**	**LOS C**
All Vehicles		**0.699**	**13.7**	**LOS B**	**0.745**	**14.8**	**LOS B**	**0.749**	**15.2**	**LOS B**

Table 5: PM peak hour traffic operations at Maroela Rd / Sandringham Rd / Industrial intersection

Approach	Movement	Intersection Type: Signalised								
		Existing 2024 Scenario			Future 2029 Scenario					
		Background traffic			Excluding new site traffic			Background traffic		
		v/c	Ave. Delay (seconds)	LOS	v/c	Ave. Delay (seconds)	LOS	v/c	Ave. Delay (seconds)	LOS
South: Maroela Rd	Left	0.756	32.8	LOS C	0.851	34.3	LOS C	0.859	34.8	LOS C
	Through	0.756	27.0	LOS C	0.851	28.6	LOS C	0.859	29.0	LOS C
	Right	0.106	27.5	LOS C	0.132	30.9	LOS C	0.132	30.9	LOS C
	Approach	**0.756**	**27.7**	**LOS C**	**0.851**	**29.4**	**LOS C**	**0.859**	**29.8**	**LOS C**
East: Sandringham Rd	Left	0.213	26.7	LOS C	0.254	26.9	LOS C	0.274	27.0	LOS C
	Through	0.213	21.1	LOS C	0.254	21.3	LOS C	0.274	21.4	LOS C
	Right	0.517	37.7	LOS D	0.663	40.2	LOS D	0.718	41.4	LOS D
	Approach	**0.517**	**31.5**	**LOS C**	**0.663**	**32.8**	**LOS C**	**0.718**	**33.3**	**LOS C**
North: Maroela Rd	Left	0.703	19.9	LOS B	0.772	20.7	LOS C	0.781	20.7	LOS C
	Through	0.703	14.1	LOS B	0.772	14.9	LOS B	0.781	14.9	LOS B
	Right	0.223	20.4	LOS C	0.272	21.6	LOS C	0.292	21.8	LOS C
	Approach	**0.703**	**15.7**	**LOS B**	**0.772**	**16.5**	**LOS B**	**0.781**	**16.6**	**LOS B**
West: Industrial Rd	Left	0.453	21.4	LOS C	0.519	21.9	LOS C	0.565	22.2	LOS C
	Through	0.453	15.7	LOS B	0.519	16.2	LOS B	0.565	16.6	LOS B
	Right	0.186	29.4	LOS C	0.211	30.4	LOS C	0.229	30.6	LOS C
	Approach	**0.453**	**22.8**	**LOS C**	**0.519**	**23.4**	**LOS C**	**0.565**	**23.7**	**LOS C**
All Vehicles		**0.756**	**22.8**	**LOS C**	**0.851**	**23.9**	**LOS C**	**0.859**	**24.2**	**LOS C**

Figure 3: Existing intersection geometry of Maroela Rd / Sandringham Rd / Industrial Rd

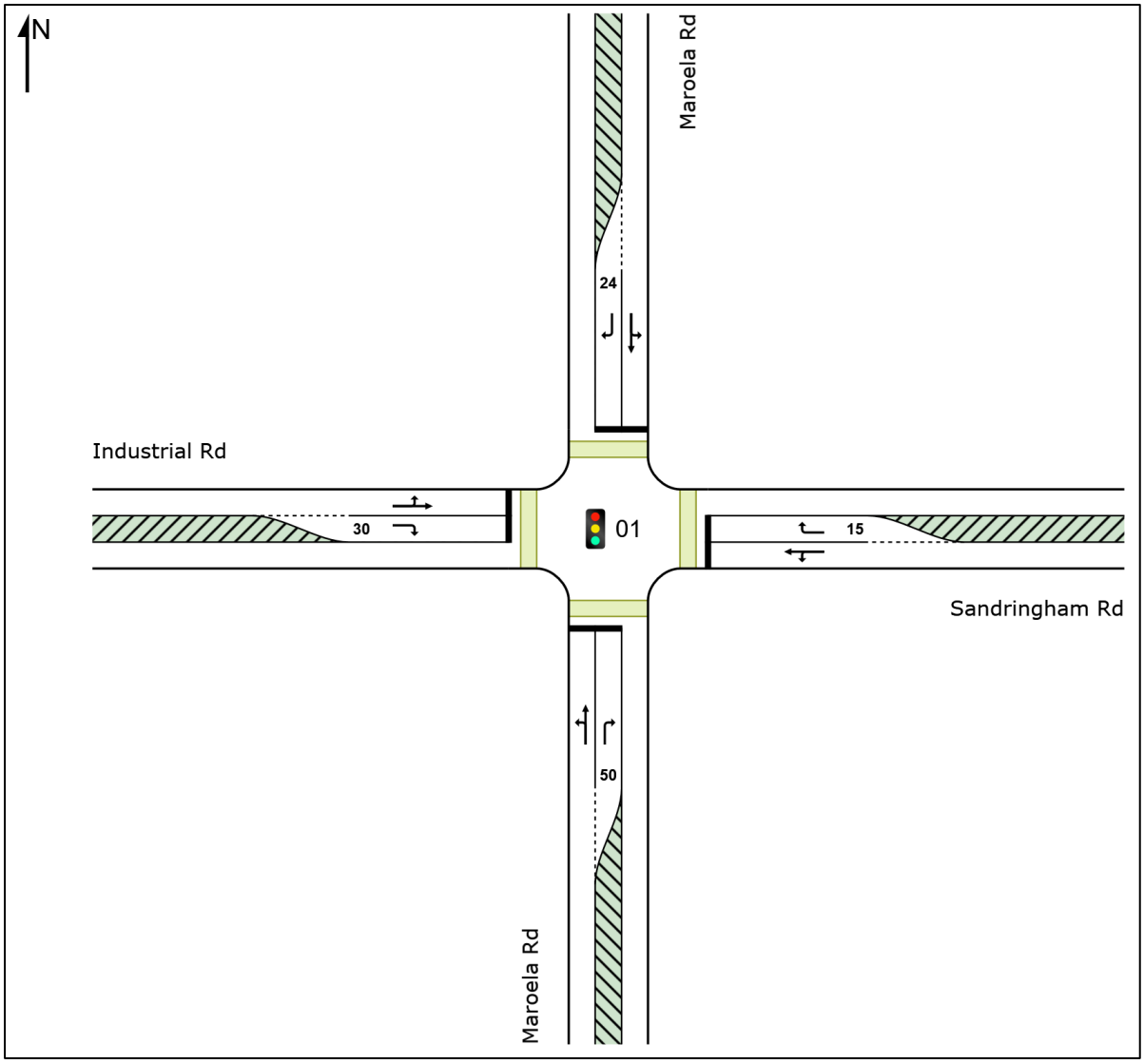


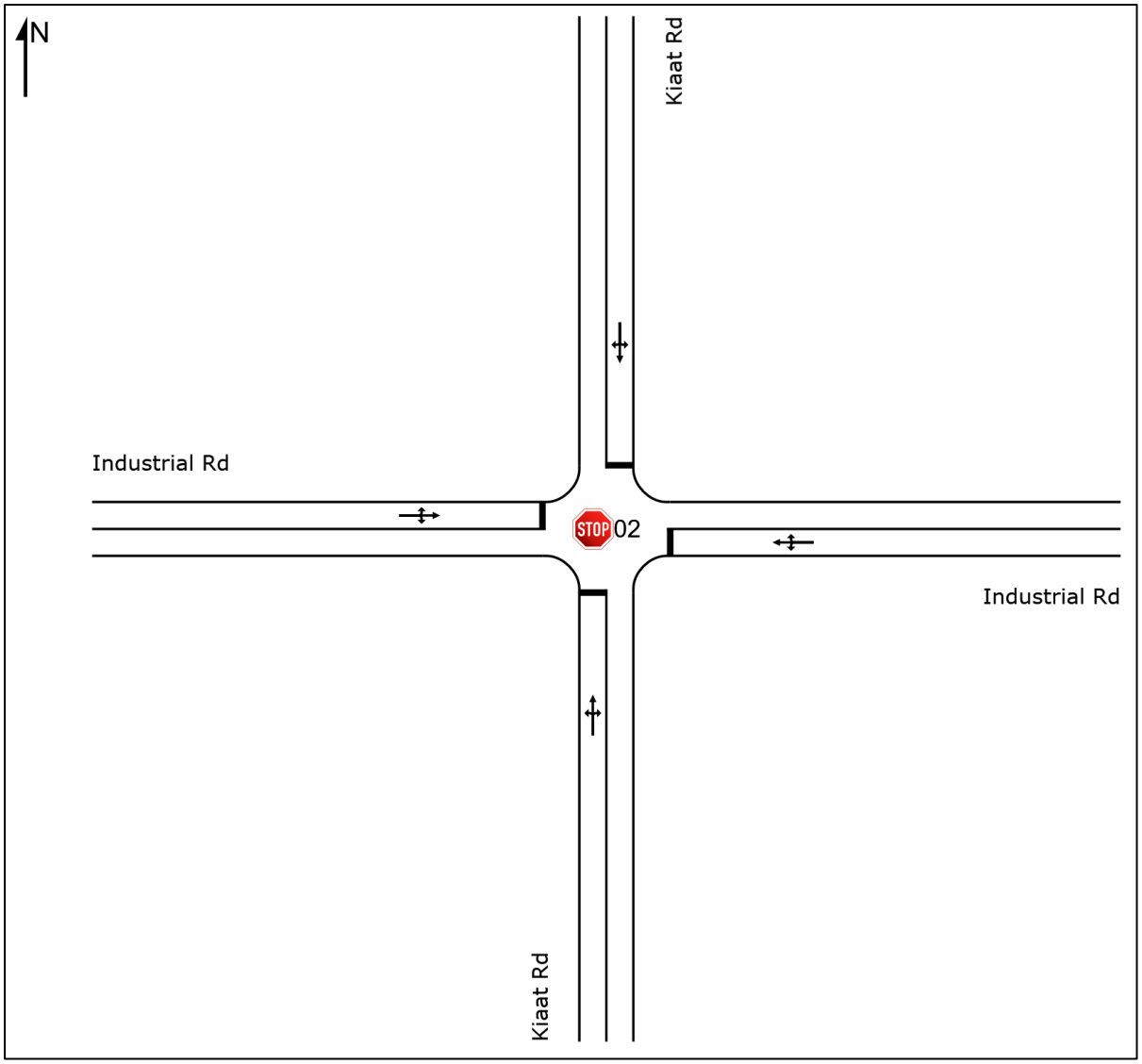
Table 6: AM peak hour traffic operations at Industrial Rd / Kiaat Rd intersection

Approach	Movement	Intersection Type: Unsignalised								
		Existing 2024 Scenario			Future 2029 Scenario					
		Background traffic			Excluding new site traffic			Background traffic		
		v/c	Ave. Delay (seconds)	LOS	v/c	Ave. Delay (seconds)	LOS	v/c	Ave. Delay (seconds)	LOS
South: Kiaat Rd	Left	0.003	8.1	LOS A	0.003	8.1	LOS A	0.003	8.1	LOS A
	Through	0.003	7.7	LOS A	0.003	7.7	LOS A	0.003	7.7	LOS A
	Right	0.003	8.3	LOS A	0.003	8.4	LOS A	0.003	8.8	LOS A
	Approach	**0.003**	**8.0**	**LOS A**	**0.003**	**8.1**	**LOS A**	**0.003**	**8.2**	**LOS A**
East: Industrial Rd	Left	0.114	8.0	LOS A	0.126	8.0	LOS A	0.152	8.0	LOS A
	Through	0.114	9.7	LOS A	0.126	9.7	LOS A	0.152	9.8	LOS A
	Right	0.114	7.8	LOS A	0.126	7.8	LOS A	0.152	7.9	LOS A
	Approach	**0.114**	**8.0**	**LOS A**	**0.126**	**8.0**	**LOS A**	**0.152**	**8.1**	**LOS A**
North: Kiaat Rd	Left	0.025	6.1	LOS A	0.027	6.1	LOS A	0.057	6.1	LOS A
	Through	0.025	4.2	LOS A	0.027	4.2	LOS A	0.057	4.2	LOS A
	Right	0.025	5.6	LOS A	0.027	5.6	LOS A	0.057	5.6	LOS A
	Approach	**0.025**	**6.0**	**LOS A**	**0.027**	**6.0**	**LOS A**	**0.057**	**6.1**	**LOS A**
West: Industrial Rd	Left	0.015	8.0	LOS A	0.017	8.0	LOS A	0.017	8.0	LOS A
	Through	0.015	11.3	LOS B	0.017	11.3	LOS B	0.017	11.3	LOS B
	Right	0.015	7.6	LOS A	0.017	7.6	LOS A	0.017	7.6	LOS A
	Approach	**0.015**	**10.8**	**LOS B**	**0.017**	**10.8**	**LOS B**	**0.017**	**10.8**	**LOS B**
All Vehicles		**0.114**	**7.8**	**LOS A**	**0.126**	**7.9**	**LOS A**	**0.152**	**7.9**	**LOS A**

Table 7: PM peak hour traffic operations at Industrial Rd / Kiaat Rd intersection

Approach	Movement	Intersection Type: Unsignalised								
		Existing 2024 Scenario			Future 2029 Scenario					
		Background traffic			Excluding new site traffic			Background traffic		
		v/c	Ave. Delay (seconds)	LOS	v/c	Ave. Delay (seconds)	LOS	v/c	Ave. Delay (seconds)	LOS
South: Kiaat Rd	Left	0.007	8.0	LOS A	0.008	8.0	LOS A	0.009	8.0	LOS A
	Through	0.007	7.7	LOS A	0.008	7.7	LOS A	0.009	7.7	LOS A
	Right	0.007	8.1	LOS A	0.008	8.2	LOS A	0.009	8.6	LOS A
	Approach	**0.007**	**8.1**	**LOS A**	**0.008**	**8.1**	**LOS A**	**0.009**	**8.4**	**LOS A**
East: Industrial Rd	Left	0.042	8.0	LOS A	0.045	8.0	LOS A	0.063	8.0	LOS A
	Through	0.042	9.1	LOS A	0.045	9.2	LOS A	0.063	9.3	LOS A
	Right	0.042	8.3	LOS A	0.045	8.3	LOS A	0.063	8.4	LOS A
	Approach	**0.042**	**8.3**	**LOS A**	**0.045**	**8.4**	**LOS A**	**0.063**	**8.5**	**LOS A**
North: Kiaat Rd	Left	0.057	5.7	LOS A	0.063	5.7	LOS A	0.088	5.7	LOS A
	Through	0.057	4.1	LOS A	0.063	4.1	LOS A	0.088	4.1	LOS A
	Right	0.057	5.5	LOS A	0.063	5.5	LOS A	0.088	5.5	LOS A
	Approach	**0.057**	**5.7**	**LOS A**	**0.063**	**5.7**	**LOS A**	**0.088**	**5.7**	**LOS A**
West: Industrial Rd	Left	0.005	8.0	LOS A	0.005	8.0	LOS A	0.005	8.0	LOS A
	Through	0.005	9.3	LOS A	0.005	9.3	LOS A	0.005	9.3	LOS A
	Right	0.005	7.5	LOS A	0.005	7.5	LOS A	0.005	7.5	LOS A
	Approach	**0.005**	**8.7**	**LOS A**	**0.005**	**8.7**	**LOS A**	**0.005**	**8.7**	**LOS A**
All Vehicles		**0.057**	**6.7**	**LOS A**	**0.063**	**6.7**	**LOS A**	**0.088**	**6.7**	**NA**

Figure 4: Existing intersection geometry of Industrial Rd / Kiaat Rd



8. PROPOSED IMPROVEMENTS

As previously discussed, the quantum of traffic generated by the facility during peak hours is fairly insignificant in relation to the background traffic network and is unlikely to have any significant impact on prevailing traffic operations. This will result in a fairly low impact on the traffic operations at the key intersections. Therefore, no geometric improvements are required to the network at any of the key intersections.

9. ACCESS TO SITE

Access to the site is currently situated on Kiaat Road via an 11m wide carriageway crossing. The two-way access serves the main on-site parking area and the fuel depot. Furthermore, access to a shaded parking area with perpendicular parking is located on Kiaat Road.

Figure 5: Existing site access

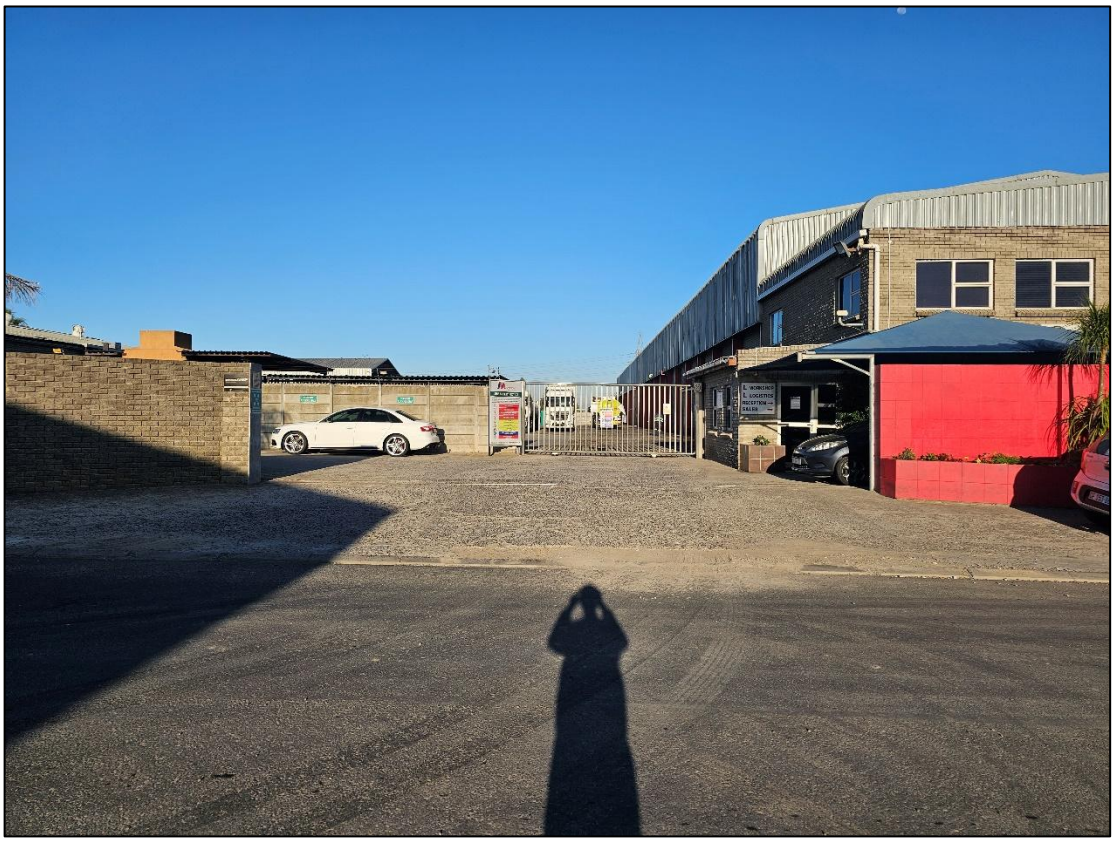


Figure 6: Shaded parking area on Kiaat Road

A new access/dedicated entrance will be created adjacent to the boundary of Erf 21596 on Kiaat Road. The existing two-way access will be used exclusively as an exit from the site. The shaded parking area will be retained. The dedicated entrance and exit will be spaced approximately 32m apart.

10. PUBLIC TRANSPORTATION

Maroela Road is a public transport corridor well served by minibus taxis and Golden Arrow buses, particularly during the AM and PM peak periods. There are dedicated bus stops on either side of Maroela north and south of Industrial Road/Sandringham Road. The bus stops are located less than 800m in walking distance from the site.

According to the traffic count data, minibus taxis and buses, respectively make up 17.5% and 5,5% of the through traffic on Maroela Road past Kraaifontein Industria.

Figure 7: Maroela Road bus embayments

11. NON-MOTORISED TRANSPORT

The non-motorised modes of transport of pedestrians need to be considered. The sidewalk on Kiaat Road adjacent to the site measures ±1,8m in width and is adequate to serve the needs of pedestrians. There are also sidewalks on both sides of Industrial Road which serves as the main pedestrian thoroughfare into Kraaifontein Industria.

12. PARKING REQUIREMENTS

The site is located in a 'Standard area' which refers to requirements that apply to areas with standard parking needs, or where public transport is not specifically promoted or available. In accordance with the City of Cape Town's Municipal Planning By-Law, the minimum off-street parking requirement for the site using the "Industry" parking ratios is calculated below:

Table 8: Minimum Off-street Parking Requirements

LAND USE	STANDARD AREAS	PT1 AREAS	PT2 AREAS
Industry	1,5 bays per 100 m² GLA for facilities up to 3000m² GLA. 1 bay per 100m² GLA for facilities larger than 3000m² GLA	0,5 bays per 100 m² GLA for facilities up to 3000m² GLA. 1 bay per 100m² GLA for facilities larger than 3000m² GLA	Nil

Standard Area:

- Existing warehouse/office buildings: 2470m^2 GLA @ 1,5 bays/100m^2 GLA = 37 bays

According to the site layout plan, provision will be made for 19 bays (down from 37 bays currently) in the front of the site and therefore, the parking provision is deemed insufficient in terms of the Municipal Planning By-Law.

However, as previously discussed MOOV Fuel is seeking to acquire off-site parking to have all trucks park overnight which should result in less light/passenger vehicle traffic to the site as truck drivers will no longer need to park on-site. Therefore, 19 bays would be sufficient to meet the parking demand of the office/workshop personnel – 17 personnel working in the office/workshop travel to the site with their own private vehicles.

An alternative could be to explore if additional parking can be provided internally along the western boundary edge of the site to make up the 18-bay shortfall.

13. CONCLUSIONS AND RECOMMENDATIONS

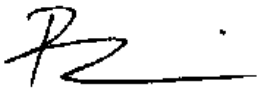
It can be concluded that:

1. MOOV Fuel, situated on Erf 21594 Kraaifontein at 13 Kiaat Road in Kraaifontein Industria intends to increase its on-site storage capacity of petroleum products by an additional 2,454m^3 to improve security of supply and to optimise logistics efficiency as well as allow for ad-hoc/emergency fuel requests. The project will entail the removal of 2 existing diesel aboveground storage tanks (ASTs) with a combined capacity of 46m^3 and the installation of 3 new ASTs with a combined capacity of 2,500m^3.
2. The project will also involve the demolition of two warehouses (one of which contains a wash bay and the other containing oil drums), an out building at the front of the site, the toilet and office area in the middle of the main warehouse and two small storerooms (with firefighting equipment mounted on them) to make way for the proposal. A new wash bay will be located on the access road before the staging area where trucks will be washed in the evening when staging for overnight stay.
3. The site is well served by existing road infrastructure and is located within an intermediate (industrial) roadside development environment near the City of Cape Town urban edge. Vehicular access to the site will be located on Kiaat Road.
4. Kiaat Road is a Class 5 local (industrial) street within the City of Cape Town's road network. Access to Kiaat Road is achievable from Industrial Road another Class 5 road which acts as a collector road providing access to the other side streets and abutting driveways within Kraaifontein Industria from Maroela Road.
5. The traffic generated by the proposed development can be expected to influence the following key intersections:
   - Key Intersection 1: Maroela Road / Sandringham Road / Industrial Road
   - Key Intersection 2: Industrial Road / Kiaat Road
6. MOOV Fuel currently generates 38 EVU trips during the AM peak hour and 45 EVU trips during the PM peak hour. The increase in the fuel storage capacity can be expected to result in an additional 60 and 54 EVU trips on the surrounding road network during the AM and PM peak hours, respectively.
7. The existing and future traffic operations at the key intersections were evaluated in terms of LOS, Delay and V/C ratios (measures of effectiveness). The findings of the SIDRA analysis indicate that the key intersections are currently operating at acceptable LOS and will continue to do so during the future 2029-year scenario even with the inclusion of the additional site traffic. Therefore, the proposed development is expected to have a low impact on the traffic operations at the key intersections.
8. Access to the site is currently situated on Kiaat Road via an 11m wide carriageway crossing. The two-way access serves the main on-site parking area and the fuel depot. Furthermore, access to a shaded parking area with perpendicular parking is located on Kiaat Road.

9. A new access/dedicated entrance will be created adjacent to the boundary of Erf 21596 on Kiaat Road. The existing two-way access will be used exclusively as an exit from the site. The shaded parking area will be retained. The dedicated entrance and exit will be spaced approximately 32m apart.
10. Maroela Road is a public transport corridor well served by minibus taxis and Golden Arrow buses, particularly during the AM and PM peak periods. There are dedicated bus stops on either side of Maroela north and south of Industrial Road/Sandringham Road. The bus stops are located less than 800m in walking distance from the site.
11. The non-motorised modes of transport of pedestrians need to be considered. The sidewalk on Kiaat Road adjacent to the site measures ±1,8m in width and is adequate to serve the needs of pedestrians. There are also sidewalks on both sides of Industrial Road which serves as the main pedestrian thoroughfare into Kraaifontein Industria.
12. The minimum off-street parking requirement for the proposed development within a Standard area is 37 bays. Provision will be made for 19 bays (down from 37 bays currently) in the front of the site and therefore, the parking provision is deemed insufficient in terms of the City of Cape Town Municipal Planning By-Law.
13. However, MOOV Fuel is seeking to acquire off-site parking to have all trucks park overnight which should result in less light/passenger vehicle traffic to the site as truck drivers will no longer need to park on-site. Therefore, 19 bays would be sufficient to meet the parking demand of the office/workshop personnel. An alternative could be to explore if additional parking can be provided internally along the western boundary edge of the site to make up the 18-bay shortfall.

We therefore recommend that:

1. The application should be approved by the Western Cape Government and the relevant Road Authority (City of Cape Town) as the proposed development was found to have a low impact on traffic operations on the surrounding road network.



H CASSOO (PR TECH ENG)
(Pr No. 2020300726)

B A PHILLIPS (PR TECH ENG)
(Pr No. 200770081)

05 June 2025

KANTEY & TEMPLER
CONSULTING ENGINEERS
ESTABLISHED 1953

CURRICULUM VITAE

HOOSAIN CASSOO

Civil Engineering Technologist

BTech(Eng)(Civil)(Urban), NDip (Eng) (Civil)

Professional Qualifications : **Pr.TechEng 2020300726**

Specialisation In Firm : **Traffic and Transportation Engineering**

CAPABILITY SUMMARY:

Function	Description of Duties
Reporting	• Preparation of Traffic Impact Assessment/Statement reports. • Preparation of reports for Access, Parking and Outdoor Signage Applications.
Design	• Parking and Ramp Layouts • Traffic Signal Design • Access Layouts • Road Markings and Signage Layouts • Arterial Management Plans
Traffic Analysis	• Trip Generation Calculations • Trip Distribution Modelling • Data Capturing (Traffic Count) • SIDRA Intersection Modelling • Wheel-tracking

EXPERIENCE TO DATE

2011 to present : Kantey & Templer (Pty) Ltd

Hoosain Cassoo joined the firm in January 2011 as a technician-in-training during his experiential training year towards his National Diploma in Civil Engineering. After an 18 month study hiatus he re-joined the firm in June 2013 in a permanent capacity as a Civil Technician. He then completed his BTech in Urban Engineering at UNISA in 2016. In March 2020, he successfully registered with the Engineering Council of South Africa as a Professional Engineering Technologist (Pr No. 2020300726). Hoosain is presently a consultant to the company working on strategic projects. To date he has been involved in over a century of traffic and transportation engineering projects of which some notable projects are listed below:

EXPERIENCE TO DATE

2011 to present : Kantey & Templer (Pty) Ltd

Transportation Planning Studies:

- R44 Safety – Somerset West to Stellenbosch
- N14 Upington – Access Management Plan
- Update of the Stellenbosch CITP

Traffic Engineering Studies:

- Mossel Bay Hospital Traffic Impact Assessment
- The Halyard Traffic Impact Assessment
- Touwsrivier Solar Plant Traffic Impact Assessment
- Beverly Hills Hotel Traffic Impact Assessment
- The Modern Traffic Impact Assessment
- Winston Park Primary Traffic Impact Assessment
- JCDecaux Outdoor Signage Traffic Impact Assessment
- Victoria Replacement Hospital Traffic Impact Assessment
- Disa Primary Traffic Management & Circulation Study
- McDonald's Sea Point Traffic Impact Assessment
- Vredekloof Primary School Traffic Impact Assessment
- MTN Cable Landing Station Traffic Impact Statement
- Sable Square Shopping Centre Traffic Impact Assessment
- Caltex V&A Waterfront Traffic Impact Assessment
- Kingswood Golf Estate Traffic Impact Assessment
- Ocean View LSEN School Traffic Impact Assessment
- Brakkefontein Sand Mine Traffic Impact Statement

Design:

- Astron Refinery: North Entrance Staff and Visitor Parking
- Victoria Replacement Hospital: Access and Parking
- Traffic Signal Intersection Design of Mispel Road and Metropolitan Health Entrance
- Traffic Signal Intersection Design of Ratanga Road and Sable Square Entrance

Construction:

- Resident Engineer for the Kylemore Public Transport Facility
- Construction monitoring for the installation of traffic signals at the intersection of Mispel Road and Metropolitan Health Entrance
- Construction monitoring for the installation of traffic signals at the intersection of Ratanga Road and Sable Square Entrance.

_____

Signature: H CASSOO

ECSA
ENGINEERING COUNCIL OF SOUTH AFRICA

PROFESSIONAL REGISTRATION CERTIFICATE

The Engineering Council of South Africa

Confirms the registration status of

Hoosein Cassoo

who is registered as a

Professional Engineering Technologist

(Civil)

in terms of the Engineering Profession Act 46 of 2000

TC Madikane Pr Eng
President

POWERED BY
PRIVYSEAL®

Dr Bridget Ssamula Pr Eng
Chief Executive Officer

Registration Number 2020300726
Date of Registration 24 March 2020

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ECSA has confirmed the above information for digital certification and sharing by PrivySeal Limited at 08:26 AM (Africa/Johannesburg) on 04 Dec 2025

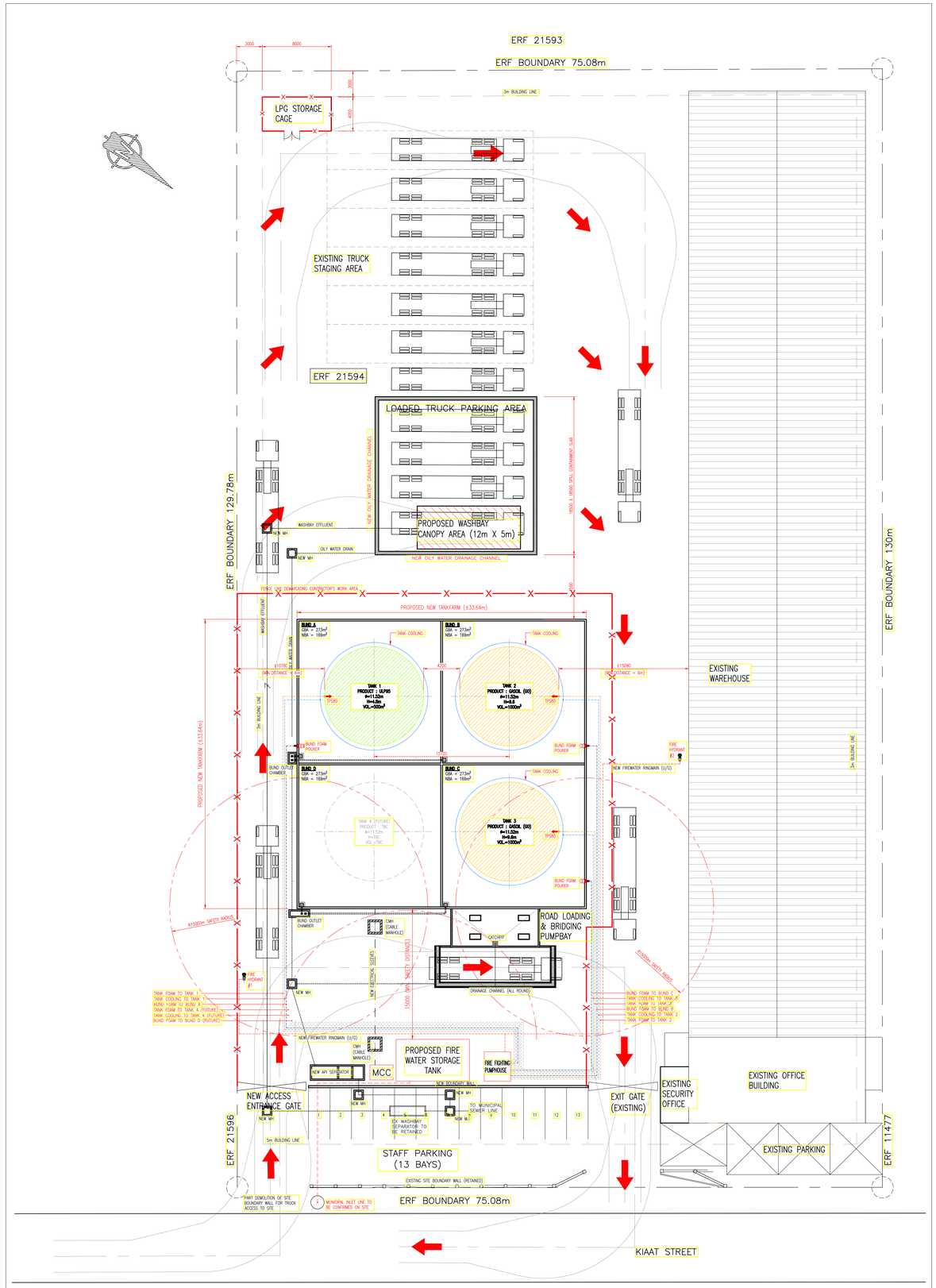
APPENDIX A

SITE LAYOUT PLAN

DO NOT SCALE-IF IN DOUBT ASK

LEGEND:

- PRODUCT GASOIL (GO)
- PRODUCT UNLEADED (ULP95)
- FIREWATER RINGMAIN (BELOWGROUND)
- TANK COOLING (ABOVEGROUND)
- TANK COOLING (BELOWGROUND)
- TANK FOAM (ABOVEGROUND)
- TANK FOAM (BELOWGROUND)
- BUND FOAM (ABOVEGROUND)
- BUND FOAM (BELOWGROUND)
- FIRE SAFETY DISTANCE
- ELECTRICAL SLEEVE
- FUTURE FIRE FIGHTING LINE
- ERF BOUNDARY LINE
- BUND FOAM POURER (BFP)
- TOP FOAM POURER (TFP)
- CABLE MANHOLE (CMH)
- FIRE HYDRANT (FH)



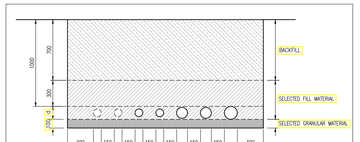
1:200 PROPOSED NEW BULK STORAGE LAYOUT

TANK TABLE

TANK No.	TANK Ø (m)	HEIGHT (m)	VOLUME (m^3)
1 (ULP95)	11.52	4.8	500
2 GASOIL (GO)	11.52	9.6	1000
3 GASOIL (GO)	11.52	9.6	1000
4 (FUTURE)	11.52	9.6	1000

LEGEND

GBA	GROSS BUND AREA
NBA	NET BUND AREA
	GASOIL (GO)
	ULP95



1:25 TYPICAL PIPE TRENCH DETAIL

REV	REVISIONS	APRV	DATE
E	DRG UPDATED, LPG CAGE & TRUCK SPILL CONTAINMENT AREA INDICATED	MJ	04/03/2025
D	WASHBAY AND OWS ADDED	MJ	23/10/2024
C	TANK 1 PRODUCT CHANGE	TJ	17/07/2024
B	DRAWING REVISED	TJ	14/11/2023
A	ISSUED WITH REPORT	MJ	30/10/2023

moov

PROJECT: KRAAIFONTEIN DEPOT NEW BULK STORAGE FACILITY

TITLE: PROPOSED SITE LAYOUT

	INITIALS	DATE	SIZE:	A0
DESIGNED:	MJ	27/10/2023	SCALE:	AS SHOWN
DRAWN:	TM	27/10/2023	SHEET:	1/1
APPROVED:	MJ	27/10/2023	VIEW:	

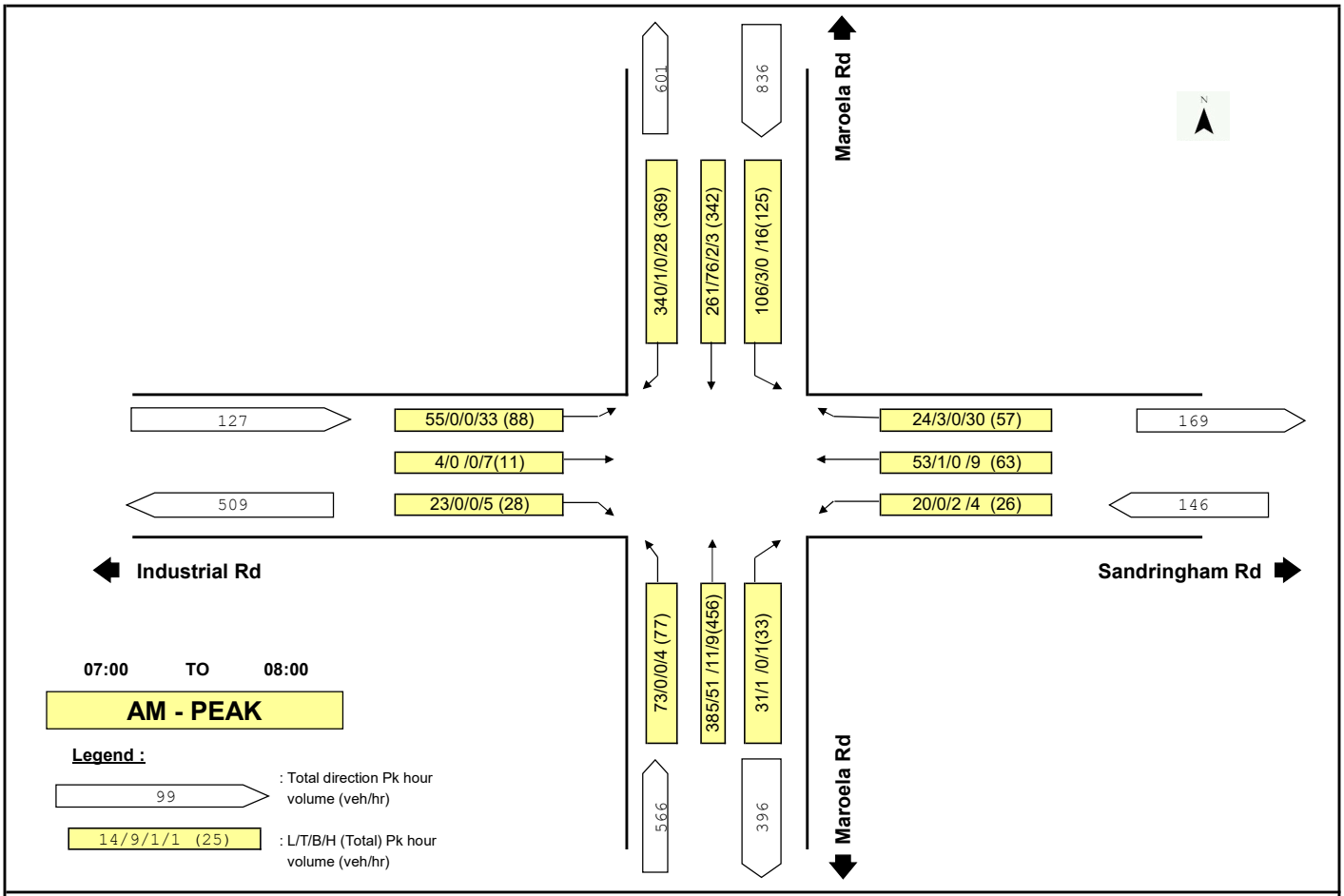
FOR APPROVAL

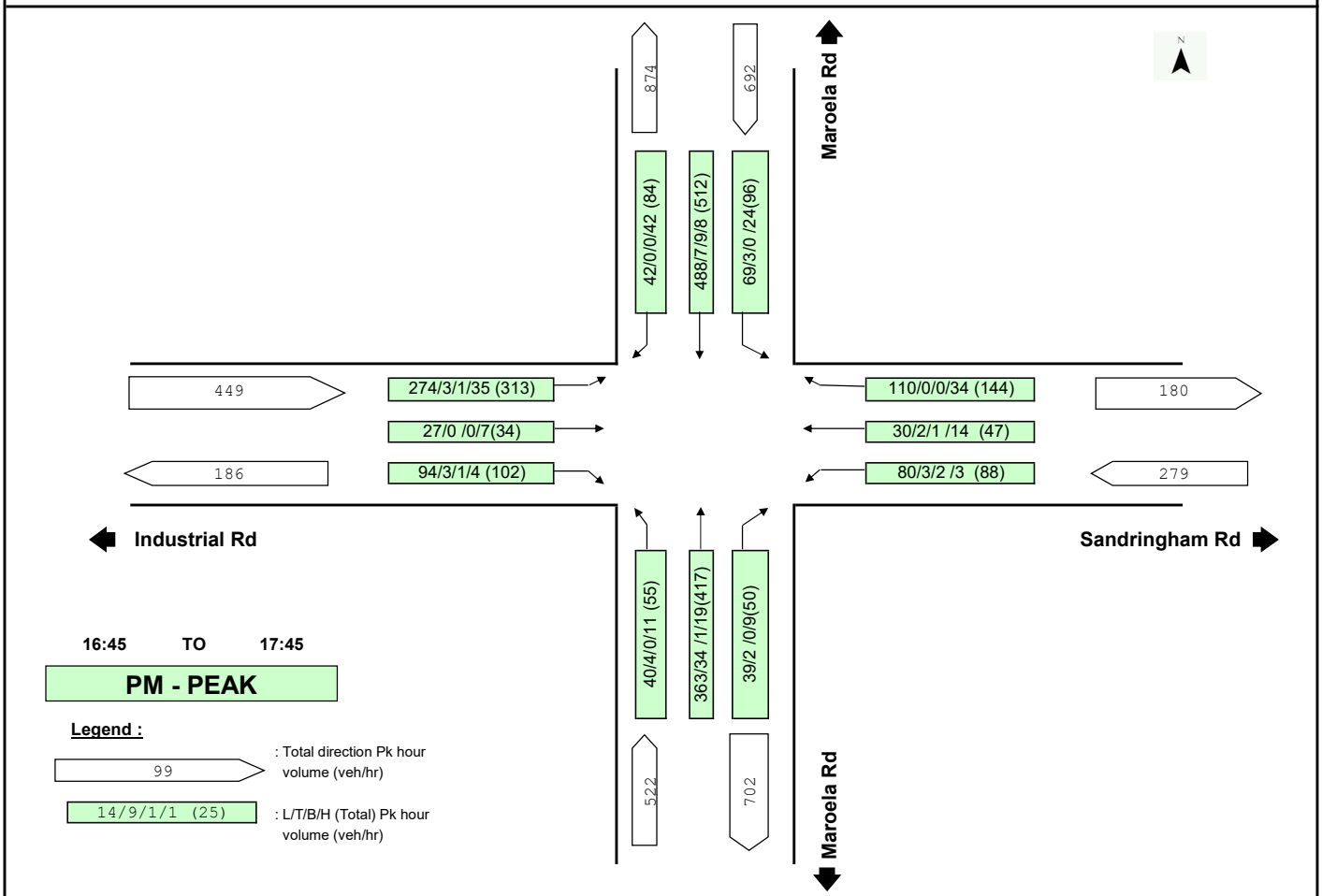
MAJ PROJECTS
ENGINEERING CONSULTANTS & PROJECT MANAGERS
P.O. BOX 6288, TYGERVALLEY, 7536
SUITE 15, BLOCK 3
OUDE WESTHOF
VILLAGE SQUARE
7530
TEL: 021-914 9335/8525
FAX: 021-914 0888
info@maj.co.za

DRAWING No.: 1739-C-100 REV.: E

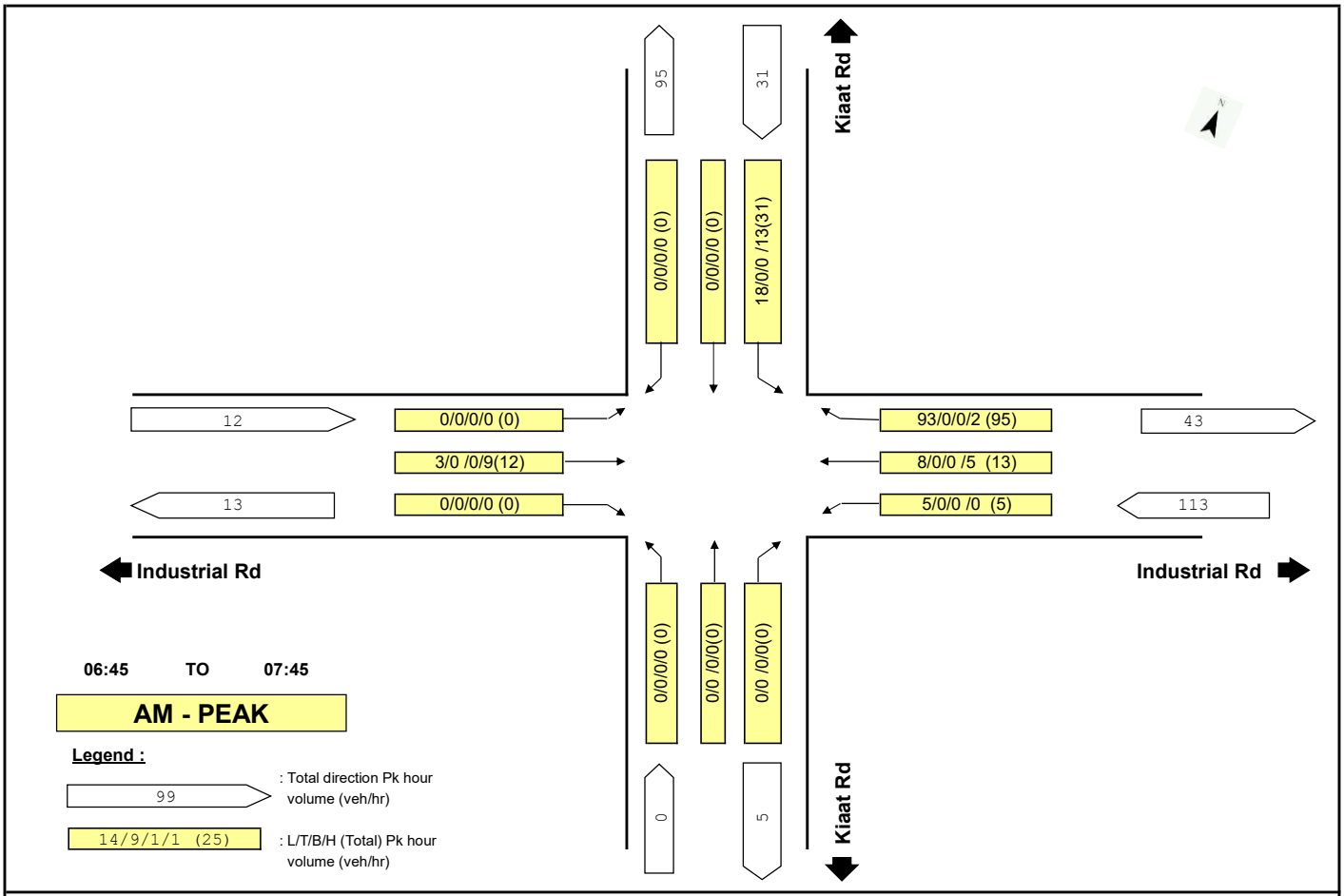
APPENDIX B

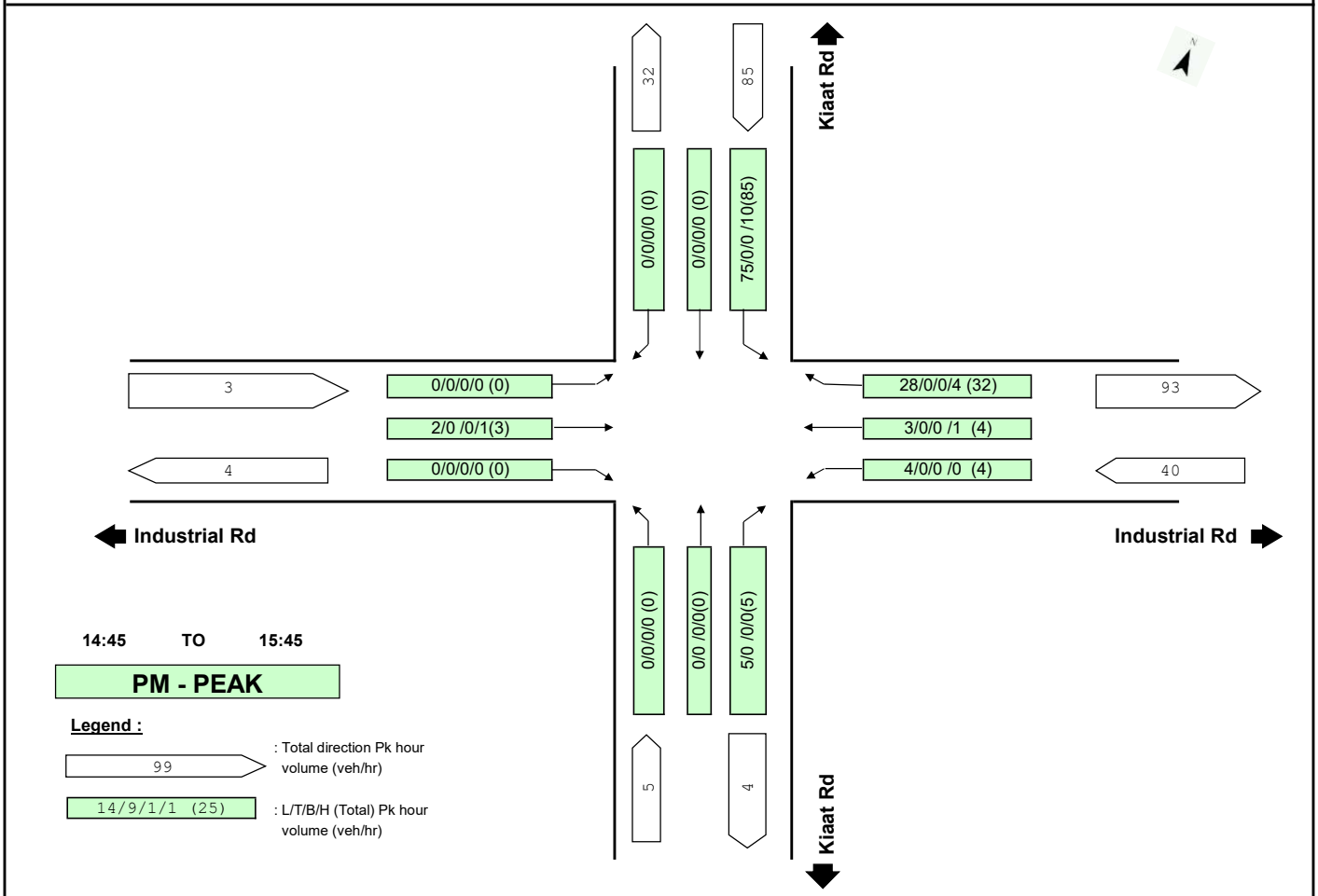
TRAFFIC COUNT DATA

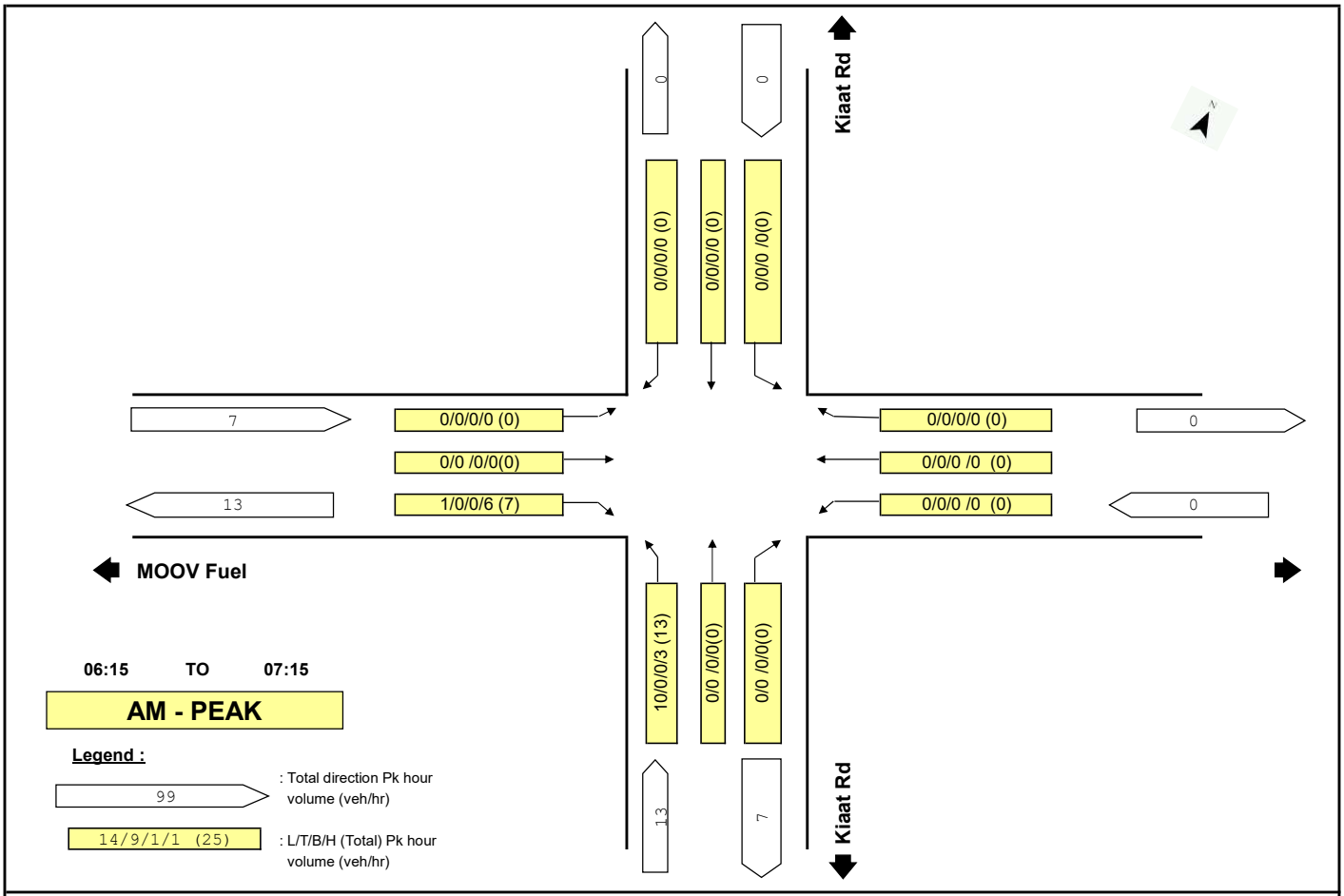




MOOV Fuel TIA	Traffic Count at Intersection of Maroela Rd / Sandringham Rd / Industrial Rd Weekday AM & PM Peak Hour Summary	1


95
31
Kiaat Rd
0/0/0/0 (0)
0/0/0/0 (0)
18/0/0 /13(31)
12
0/0/0/0 (0)
93/0/0/2 (95)
43
3/0 /0/9(12)
8/0/0 /5 (13)
13
0/0/0/0 (0)
5/0/0 /0 (5)
113
Industrial Rd
Industrial Rd
0/0/0/0 (0)
0/0 /0/0(0)
0/0 /0/0(0)
0
5
Kiaat Rd
06:45 TO 07:45
AM - PEAK
Legend :
99
: Total direction Pk hour volume (veh/hr)
14/9/1/1 (25)
: L/T/B/H (Total) Pk hour volume (veh/hr)


32
85
Kiaat Rd
0/0/0/0 (0)
0/0/0/0 (0)
75/0/0 /10(85)
3
0/0/0/0 (0)
28/0/0/4 (32)
93
2/0 /0/1(3)
3/0/0 /1 (4)
4
0/0/0/0 (0)
4/0/0 /0 (4)
40
Industrial Rd
Industrial Rd
0/0/0/0 (0)
0/0 /0/0(0)
5/0 /0/0(5)
5
4
Kiaat Rd
14:45 TO 15:45
PM - PEAK
Legend :
99
: Total direction Pk hour volume (veh/hr)
14/9/1/1 (25)
: L/T/B/H (Total) Pk hour volume (veh/hr)



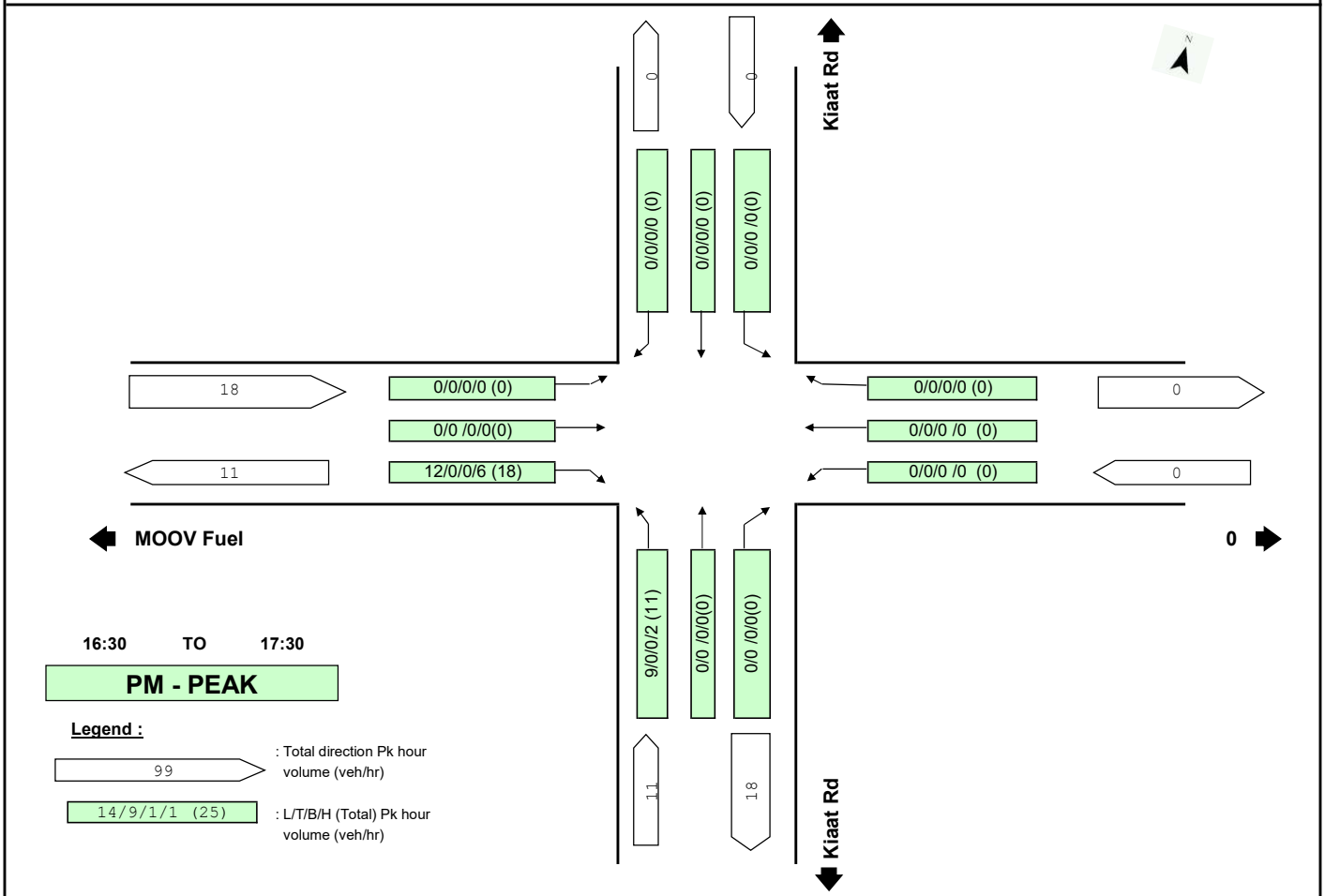
06:15 TO 07:15

AM - PEAK

Legend :

99 : Total direction Pk hour volume (veh/hr)

14/9/1/1 (25) : L/T/B/H (Total) Pk hour volume (veh/hr)



16:30 TO 17:30

PM - PEAK

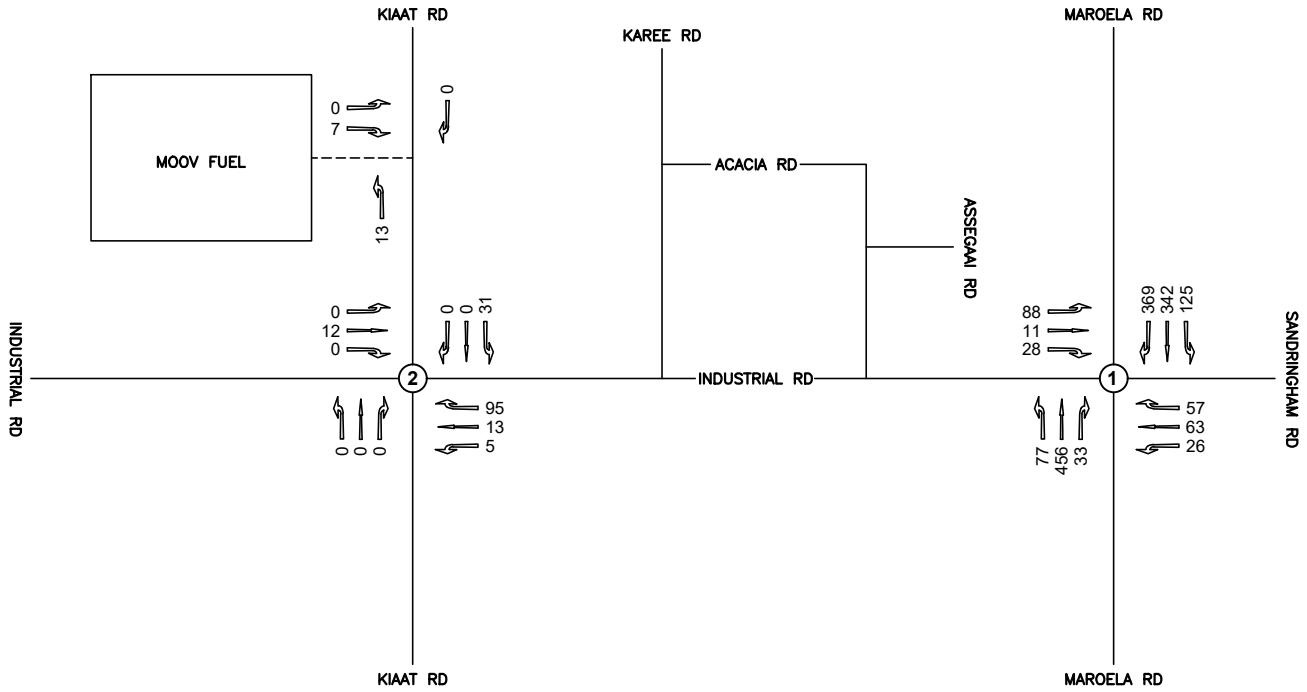
Legend :

99 : Total direction Pk hour volume (veh/hr)

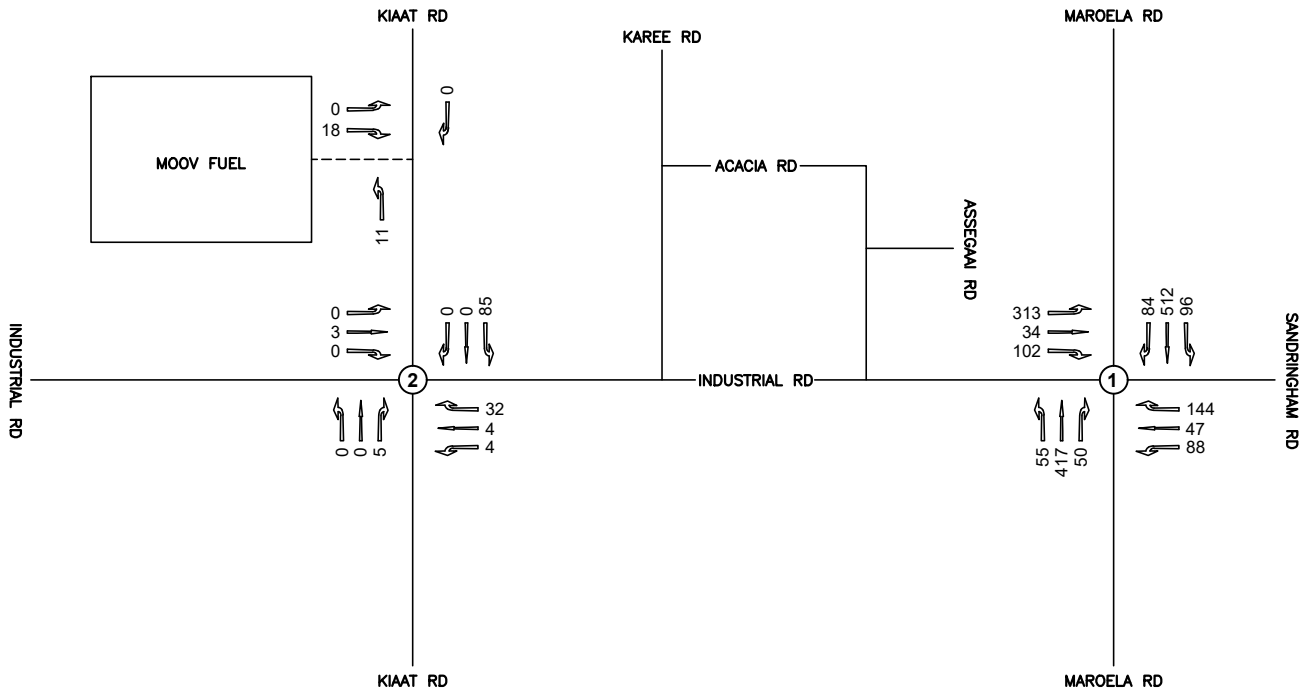
14/9/1/1 (25) : L/T/B/H (Total) Pk hour volume (veh/hr)

APPENDIX C

TRAFFIC SCHEMATIC DIAGRAMS



WEEKDAY AM PEAK HOUR
27 MAY 2024



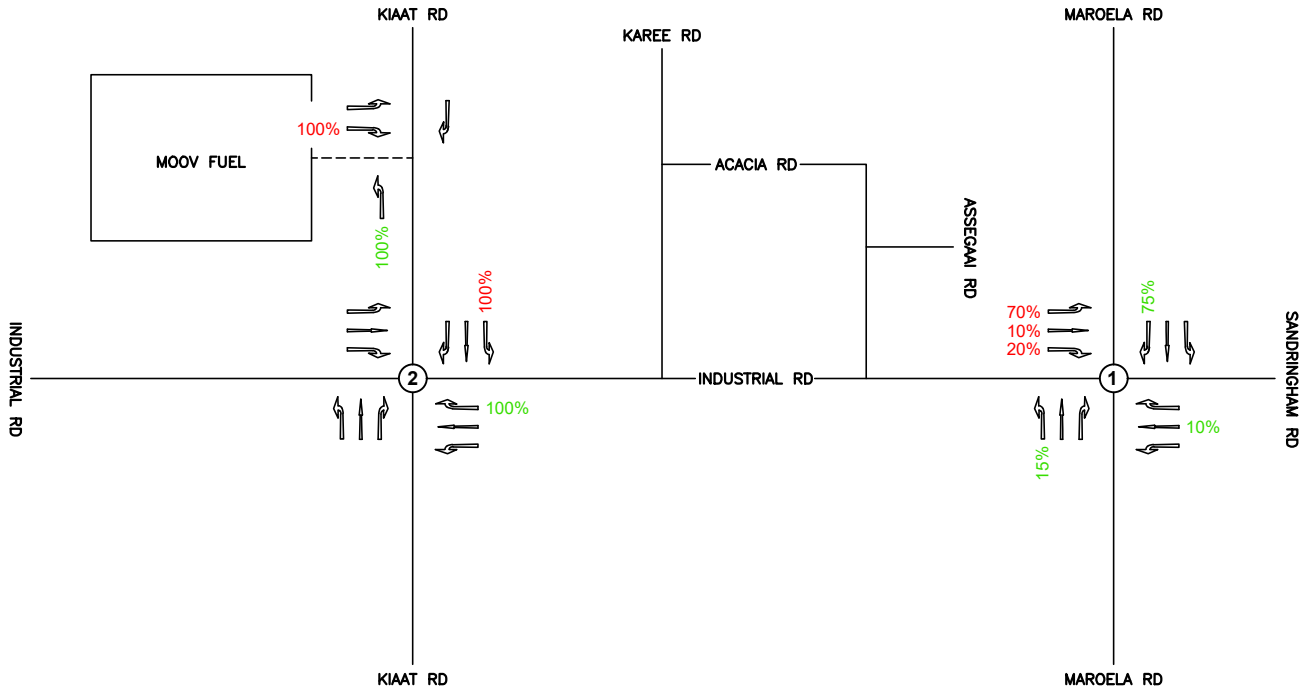
WEEKDAY PM PEAK HOUR
27 MAY 2024

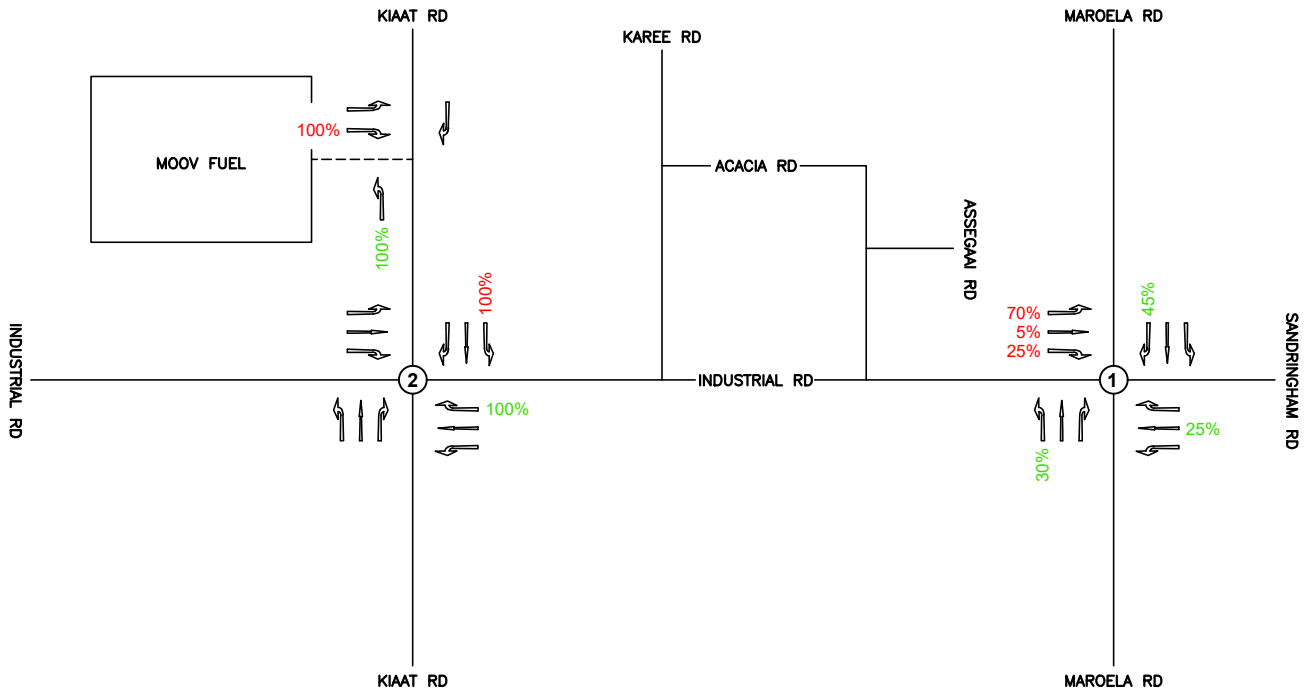
LEGEND	
10	TRAFFIC MOVEMENT
(1)	INTERSECTION NO.

KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	HC	JUN 2024	PROJECT: MOOV FUEL TIA
CHECKED	BAP	JUN 2024	TITLE: EXISTING 2024 PEAK HOUR TRAFFIC
APPROVED	PB	JUN 2024	

PROJECT NO.	SCALE	FIGURE
17014C	N.T.S	C1





LEGEND	
10	TRAFFIC MOVEMENT
(1)	INTERSECTION NO.
10% (10%)	INBOUND (OUTBOUND TRAFFIC)

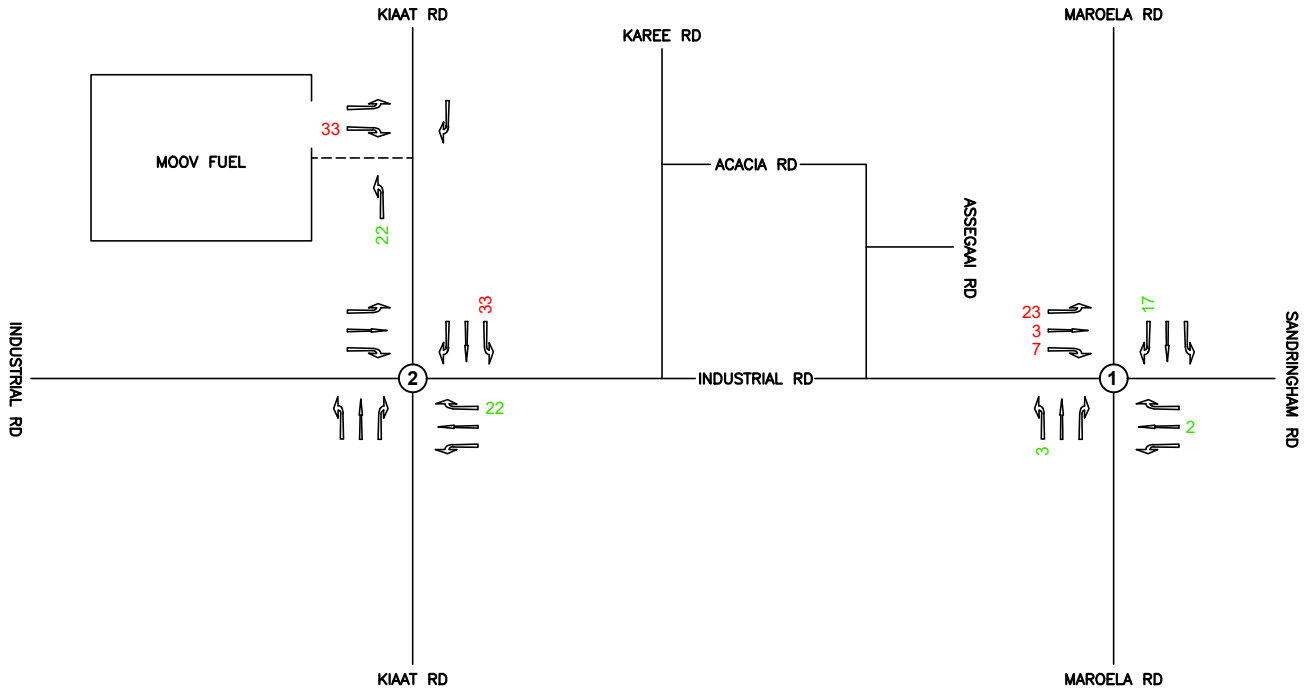
KANTEY & TEMPLER
CONSULTING ENGINEERS

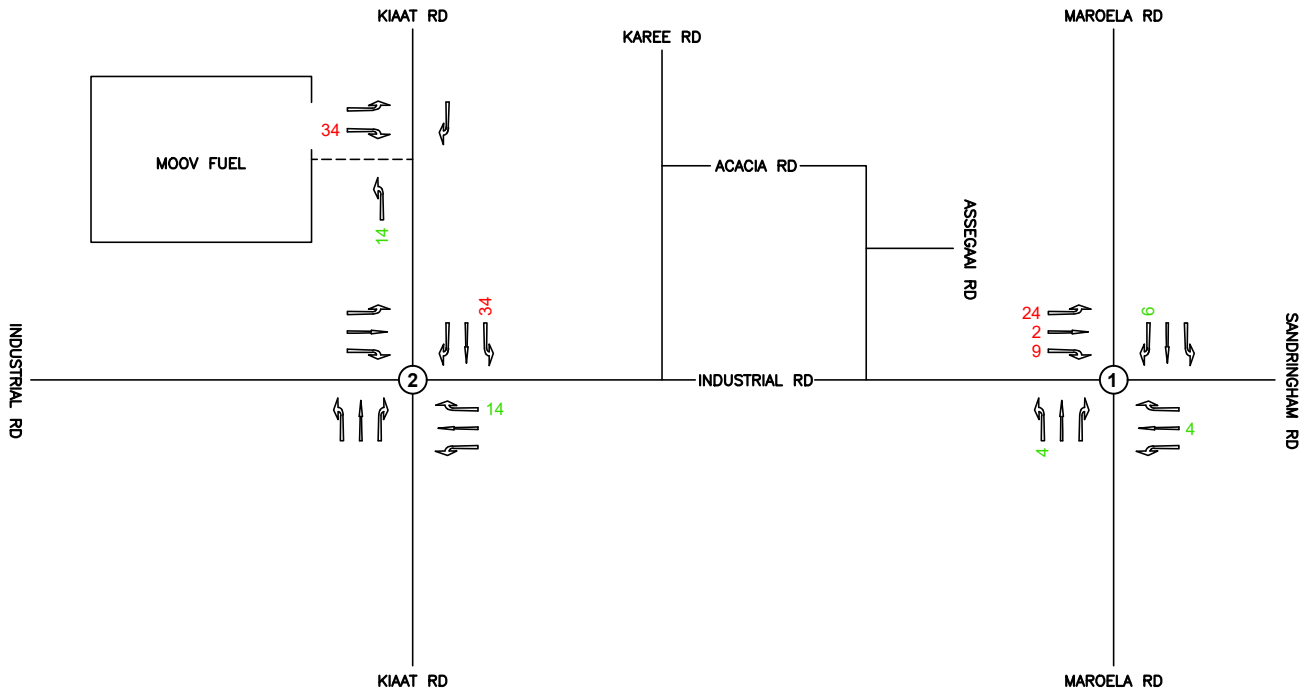
DRAWN	HC	JUN 2024	
CHECKED	BAP	JUN 2024	
APPROVED	PB	JUN 2024	

PROJECT: MOOV FUEL TIA

TITLE: PERCENTAGE DISTRIBUTION – NEW TRIPS

PROJECT NO.	SCALE	FIGURE
17014C	N.T.S	C2





LEGEND	
10	TRAFFIC MOVEMENT
(1)	INTERSECTION NO.
10 (10)	INBOUND (OUTBOUND TRAFFIC)

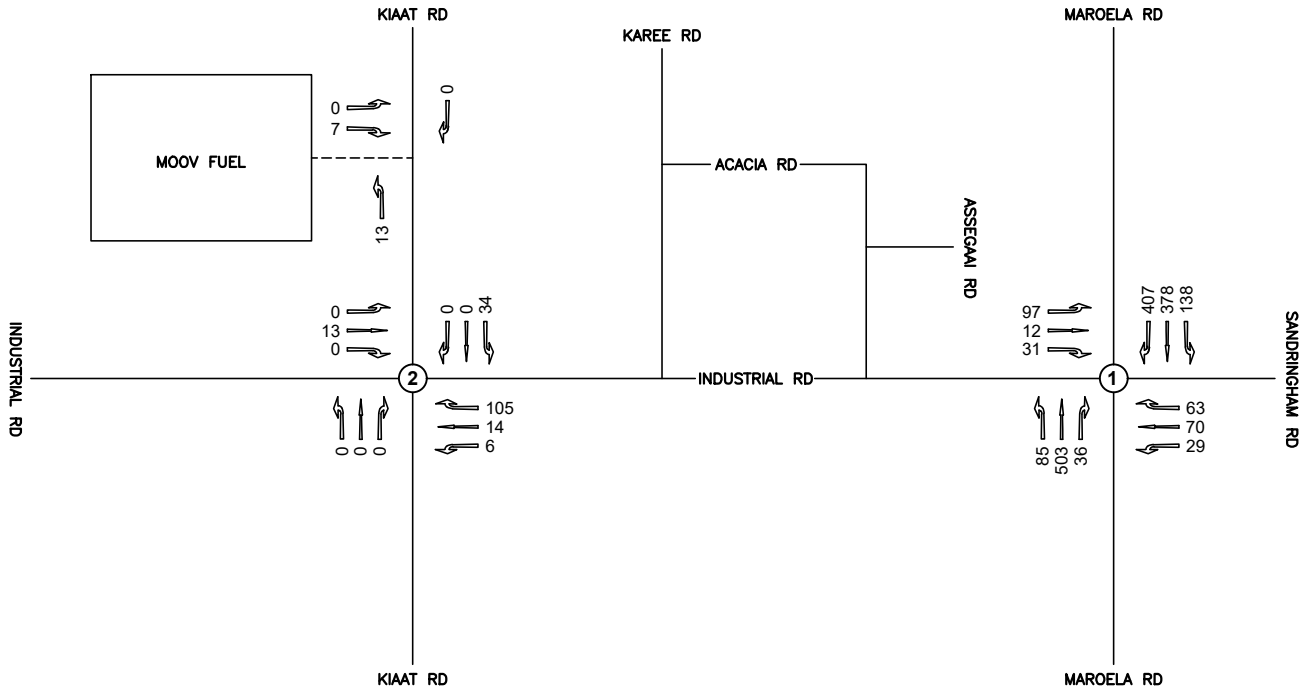
KANTEY & TEMPLER
CONSULTING ENGINEERS

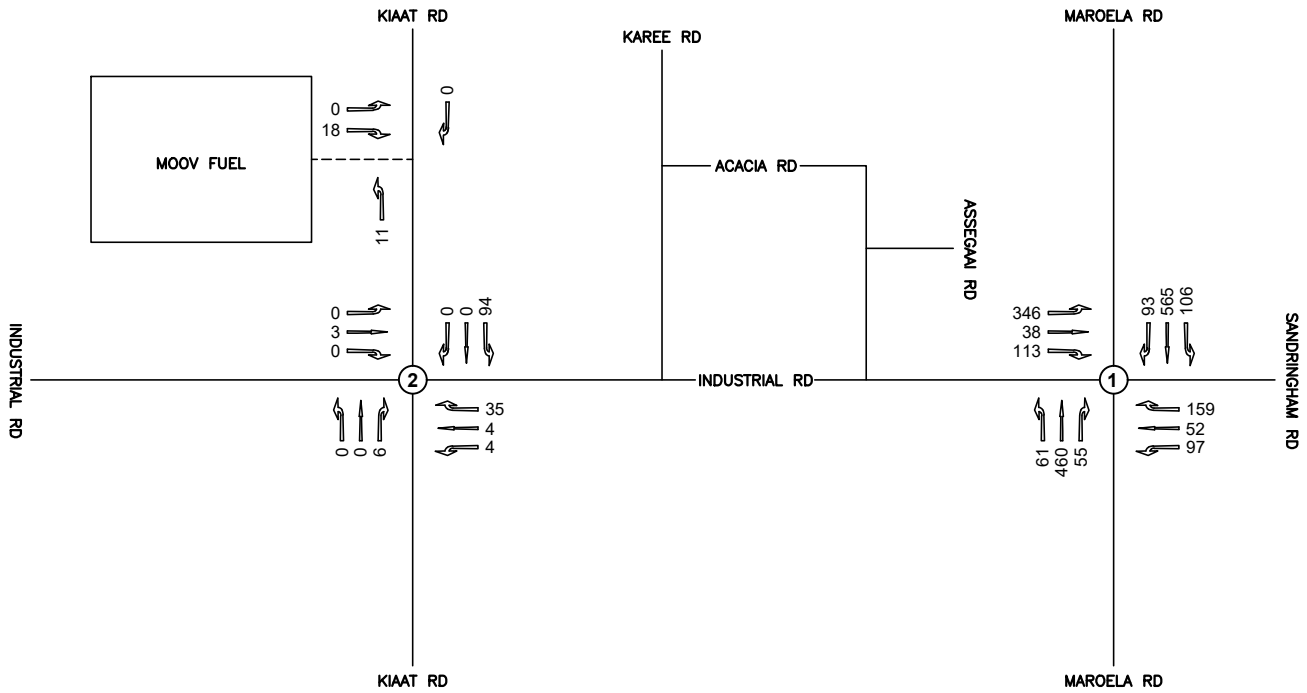
DRAWN	HC	JUN 2024	
CHECKED	BAP	JUN 2024	
APPROVED	PB	JUN 2024	

PROJECT: MOOV FUEL TIA

TITLE: SITE TRAFFIC ASSIGNMENT – NEW TRIPS

PROJECT NO.	SCALE	FIGURE
17014C	N.T.S	C3



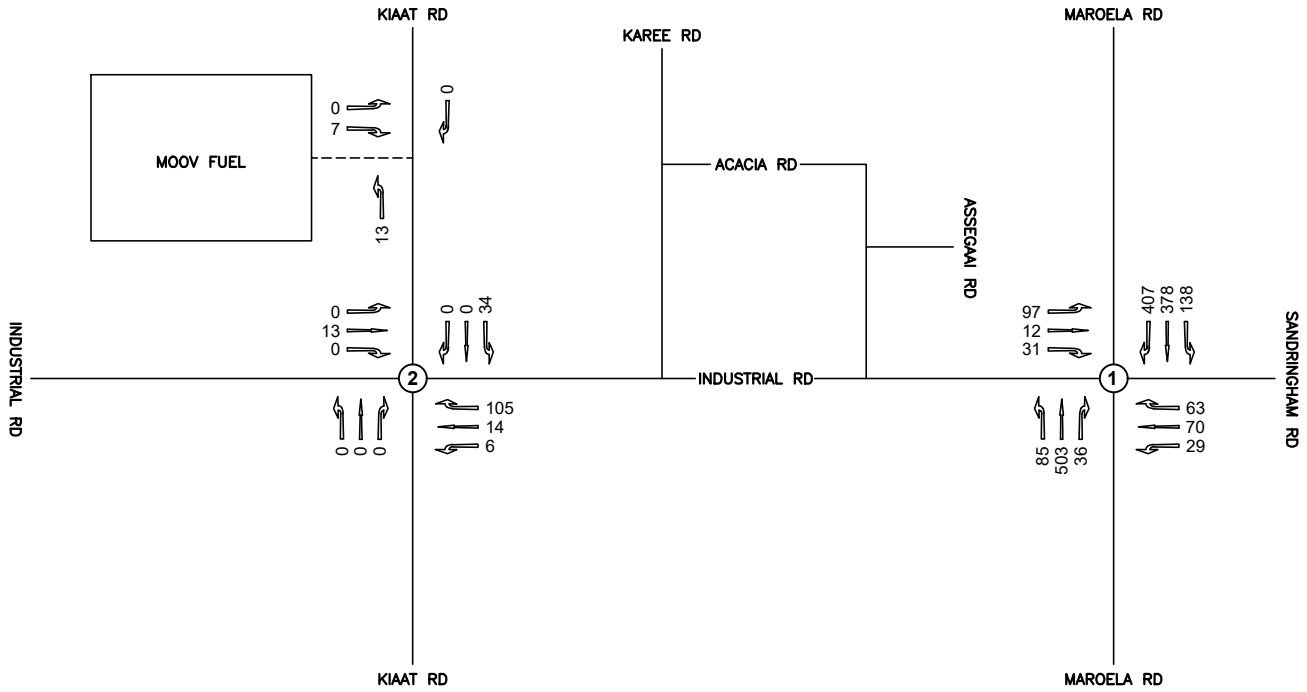


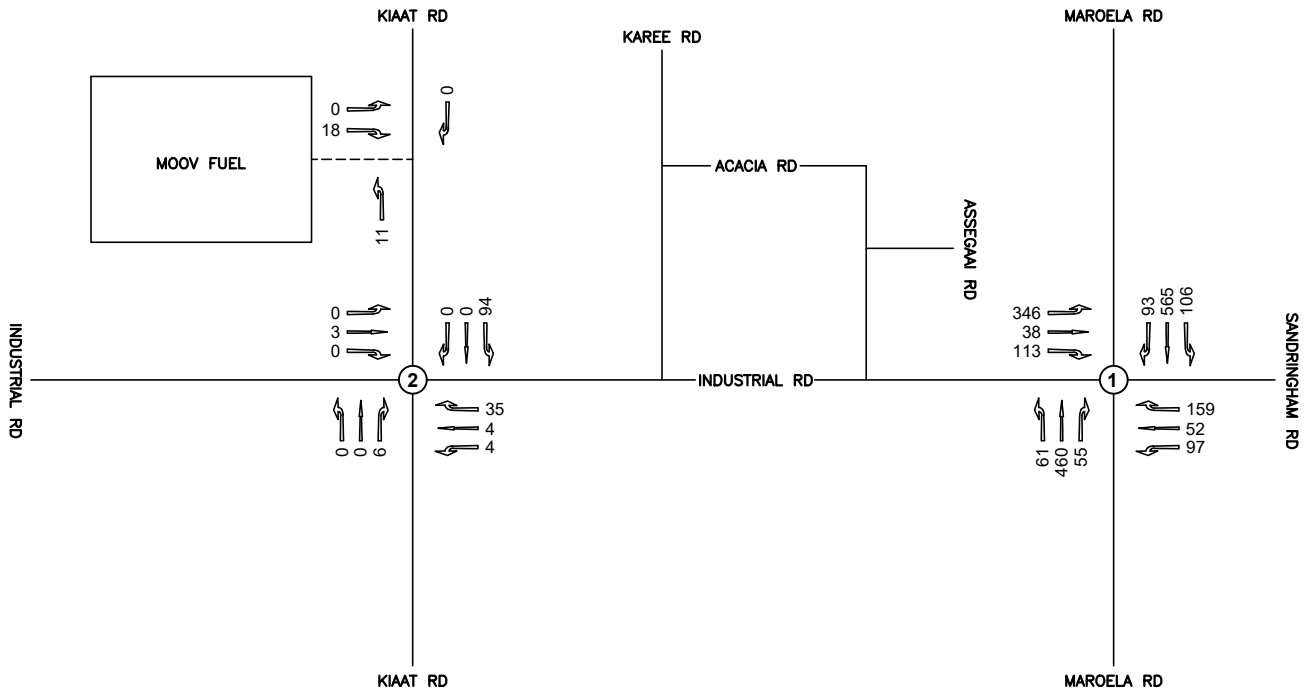
LEGEND	
10	TRAFFIC MOVEMENT
1	INTERSECTION NO.

KANTEY & TEMPLER CONSULTING ENGINEERS

DRAWN	HC	JUN 2024	PROJECT: MOOV FUEL TIA
CHECKED	BAP	JUN 2024	TITLE: FUTURE 2029 TRAFFIC – EXCL. SITE TRAFFIC
APPROVED	PB	JUN 2024	

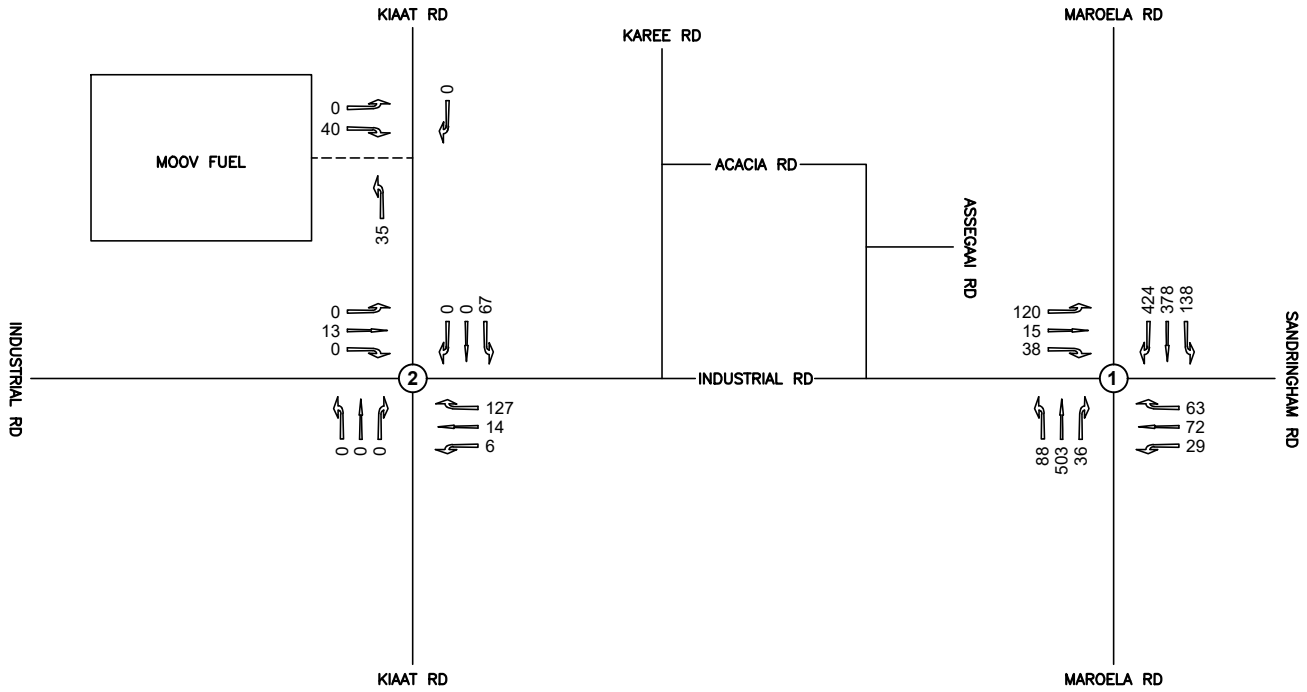
PROJECT NO.	SCALE	FIGURE
17014C	N.T.S	C4

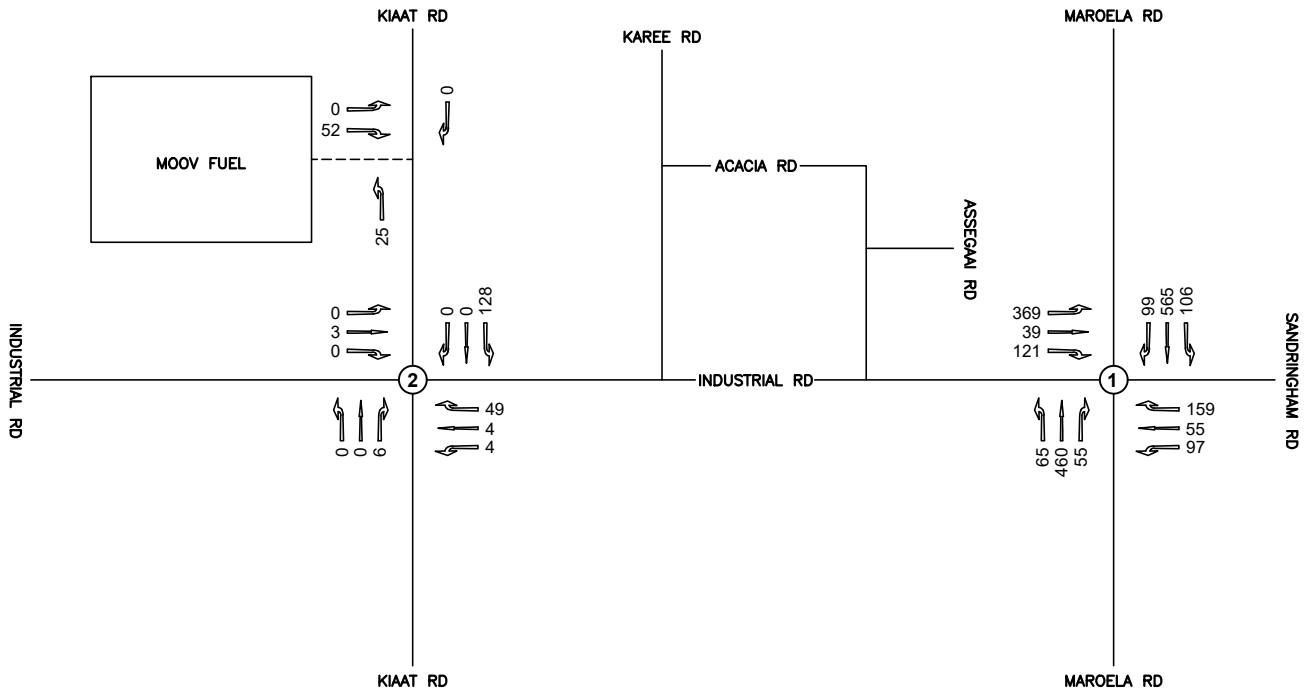




LEGEND	
10	TRAFFIC MOVEMENT
1	INTERSECTION NO.

KANTEY & TEMPLER CONSULTING ENGINEERS	DRAWN	HC	JUN 2024	PROJECT: MOOV FUEL TIA	PROJECT NO.	SCALE	FIGURE
	CHECKED	BAP	JUN 2024	TITLE: FUTURE 2029 TRAFFIC – EXCL. NEW SITE TRAFFIC	17014C	N.T.S	C4
	APPROVED	PB	JUN 2024				





LEGEND	
10	TRAFFIC MOVEMENT
(1)	INTERSECTION NO.

KANTEY & TEMPLER
CONSULTING ENGINEERS

DRAWN	HC	JUN 2024	
CHECKED	BAP	JUN 2024	
APPROVED	PB	JUN 2024	

PROJECT: MOOV FUEL TIA

TITLE: FUTURE 2029 TRAFFIC – INCL. NEW SITE TRAFFIC

PROJECT NO.	SCALE	FIGURE
17014C	N.T.S	C5

APPENDIX D

SIDRA MOVEMENT SUMMARIES

MOVEMENT SUMMARY

Site: 01 [01am2024existing (Site Folder: Existing 2024)]

Maroela Rd / Sandringham Rd / Industrial Rd
AM Peak Hour
2024
Site Category: Signalised
Signals - Actuated Isolated Cycle Time = 57 seconds (Site Optimum Maximum Green Settings - Minimum Delay)
Maximum Green Settings are found at Parameter Scale = 60.0 %

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Maroela Rd														
1	L2	77	5.2	77	5.2	0.699	20.5	LOS C	12.3	76.8	0.85	0.76	0.85	46.5
2	T1	456	4.4	456	4.4	* 0.699	14.9	LOS B	12.3	76.8	0.85	0.76	0.85	47.7
3	R2	33	3.0	33	3.0	0.045	15.7	LOS B	0.5	3.2	0.58	0.68	0.58	46.4
Approach		566	4.4	566	4.4	0.699	15.7	LOS B	12.3	76.8	0.83	0.76	0.83	47.5
East: Sandringham Rd														
4	L2	26	23.0	26	23.0	0.399	31.6	LOS C	2.4	16.6	0.92	0.73	0.92	40.1
5	T1	63	14.3	63	14.3	* 0.399	25.8	LOS C	2.4	16.6	0.92	0.73	0.92	41.4
6	R2	57	52.6	57	52.6	0.311	33.5	LOS C	1.6	14.0	0.93	0.74	0.93	37.0
Approach		146	30.8	146	30.8	0.399	29.8	LOS C	2.4	16.6	0.92	0.74	0.92	39.3
North: Maroela Rd														
7	L2	125	12.8	125	12.8	0.375	8.8	LOS A	4.7	32.1	0.38	0.44	0.38	53.8
8	T1	342	14.6	342	14.6	0.375	3.1	LOS A	4.7	32.1	0.38	0.44	0.38	55.8
9	R2	369	7.6	369	7.6	* 0.514	12.5	LOS B	4.1	26.5	0.75	0.79	0.75	48.2
Approach		836	11.2	836	11.2	0.514	8.1	LOS A	4.7	32.1	0.55	0.59	0.55	51.9
West: Industrial Rd														
10	L2	88	37.5	88	37.5	0.201	20.8	LOS C	2.0	16.3	0.71	0.72	0.71	43.2
11	T1	11	63.6	11	63.6	0.201	14.8	LOS B	2.0	16.3	0.71	0.72	0.71	45.2
12	R2	28	17.8	28	17.8	0.142	33.0	LOS C	0.8	5.3	0.92	0.70	0.92	37.8
Approach		127	35.4	127	35.4	0.201	23.0	LOS C	2.0	16.3	0.76	0.71	0.76	42.0
All Vehicles		1675	12.5	1675	12.5	0.699	13.7	LOS B	12.3	76.8	0.69	0.67	0.69	48.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maroela Rd												
P1	Full	50	53	22.9	LOS C	0.1	0.1	0.90	0.90	185.9	211.9	1.14
East: Sandringham Rd												
P2	Full	50	53	22.9	LOS C	0.1	0.1	0.90	0.90	185.9	211.9	1.14

North: Maroela Rd											
P3 Full	50	53	22.9	LOS C	0.1	0.1	0.90	0.90	185.9	211.9	1.14
West: Industrial Rd											
P4 Full	50	53	22.9	LOS C	0.1	0.1	0.90	0.90	185.9	211.9	1.14
All Pedestrians	200	211	22.9	LOS C	0.1	0.1	0.90	0.90	185.9	211.9	1.14

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 01 [01am2029future - excl new site traffic (Site Folder: Future 2029 - excl new site traffic)]

Maroela Rd / Sandringham Rd / Industrial Rd
AM Peak Hour
2029
Site Category: Signalised
Signals - Actuated Isolated Cycle Time = 62 seconds (Site Optimum Maximum Green Settings - Minimum Delay)
Maximum Green Settings are found at Parameter Scale = 60.0 %

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Maroela Rd														
1	L2	85	5.2	85	5.2	0.745	21.6	LOS C	15.0	93.5	0.87	0.78	0.87	45.8
2	T1	503	4.4	503	4.4	*0.745	16.0	LOS B	15.0	93.5	0.87	0.78	0.87	47.0
3	R2	36	3.0	36	3.0	0.048	16.1	LOS B	0.6	3.8	0.57	0.68	0.57	46.1
Approach		624	4.4	624	4.4	0.745	16.8	LOS B	15.0	93.5	0.85	0.78	0.85	46.8
East: Sandringham Rd														
4	L2	29	23.0	29	23.0	0.380	32.4	LOS C	2.8	19.5	0.90	0.73	0.90	39.7
5	T1	70	14.3	70	14.3	*0.380	26.6	LOS C	2.8	19.5	0.90	0.73	0.90	41.1
6	R2	63	52.6	63	52.6	0.322	35.3	LOS D	1.9	16.6	0.92	0.75	0.92	36.3
Approach		162	30.8	162	30.8	0.380	31.0	LOS C	2.8	19.5	0.91	0.74	0.91	38.8
North: Maroela Rd														
7	L2	138	12.8	138	12.8	0.420	9.5	LOS A	6.2	41.8	0.42	0.46	0.42	53.3
8	T1	378	14.6	378	14.6	0.420	3.8	LOS A	6.2	41.8	0.42	0.46	0.42	55.2
9	R2	407	7.6	407	7.6	*0.618	14.4	LOS B	5.5	35.4	0.83	0.81	0.83	47.1
Approach		923	11.2	923	11.2	0.618	9.3	LOS A	6.2	41.8	0.60	0.62	0.60	51.0
West: Industrial Rd														
10	L2	97	37.5	97	37.5	0.217	21.3	LOS C	2.3	19.1	0.70	0.72	0.70	42.9
11	T1	12	63.6	12	63.6	0.217	15.3	LOS B	2.3	19.1	0.70	0.72	0.70	44.9
12	R2	31	17.8	31	17.8	0.141	33.7	LOS C	0.9	6.1	0.90	0.71	0.90	37.5
Approach		140	35.4	140	35.4	0.217	23.5	LOS C	2.3	19.1	0.74	0.72	0.74	41.8
All Vehicles		1849	12.5	1849	12.5	0.745	14.8	LOS B	15.0	93.5	0.72	0.69	0.72	47.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maroela Rd												
P1	Full	50	53	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13
East: Sandringham Rd												

P2	Full	50	53	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13
North: Maroela Rd												
P3	Full	50	53	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13
West: Industrial Rd												
P4	Full	50	53	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13
All Pedestrians		200	211	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 01 [01am2029future - incl new site traffic (Site Folder: Future 2029 - incl new site traffic)]

Maroela Rd / Sandringham Rd / Industrial Rd
AM Peak Hour
2029
Site Category: Signalised
Signals - Actuated Isolated Cycle Time = 62 seconds (Site Optimum Maximum Green Settings - Minimum Delay)
Maximum Green Settings are found at Parameter Scale = 60.0 %

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Maroela Rd														
1	L2	88	5.2	88	5.2	0.749	21.7	LOS C	15.1	94.2	0.87	0.79	0.87	45.8
2	T1	503	4.4	503	4.4	* 0.749	16.1	LOS B	15.1	94.2	0.87	0.79	0.87	46.9
3	R2	36	3.0	36	3.0	0.048	16.1	LOS B	0.6	3.8	0.57	0.68	0.57	46.1
Approach		627	4.4	627	4.4	0.749	16.9	LOS B	15.1	94.2	0.85	0.78	0.85	46.7
East: Sandringham Rd														
4	L2	29	23.0	29	23.0	0.388	32.4	LOS C	2.9	19.9	0.90	0.73	0.90	39.7
5	T1	72	14.3	72	14.3	* 0.388	26.6	LOS C	2.9	19.9	0.90	0.73	0.90	41.1
6	R2	63	52.6	63	52.6	0.363	36.6	LOS D	1.9	17.0	0.94	0.75	0.94	35.8
Approach		164	30.6	164	30.6	0.388	31.5	LOS C	2.9	19.9	0.92	0.74	0.92	38.7
North: Maroela Rd														
7	L2	138	12.8	138	12.8	0.420	9.5	LOS A	6.2	41.8	0.42	0.46	0.42	53.3
8	T1	378	14.6	378	14.6	0.420	3.8	LOS A	6.2	41.8	0.42	0.46	0.42	55.2
9	R2	423	7.6	423	7.6	* 0.646	14.5	LOS B	5.8	37.4	0.84	0.81	0.84	47.0
Approach		939	11.2	939	11.2	0.646	9.4	LOS A	6.2	41.8	0.61	0.62	0.61	50.9
West: Industrial Rd														
10	L2	124	37.5	124	37.5	0.282	22.5	LOS C	3.1	25.7	0.74	0.74	0.74	42.4
11	T1	16	63.6	16	63.6	0.282	16.5	LOS B	3.1	25.7	0.74	0.74	0.74	44.3
12	R2	39	17.8	39	17.8	0.179	33.9	LOS C	1.1	7.8	0.90	0.72	0.90	37.4
Approach		179	35.5	179	35.5	0.282	24.4	LOS C	3.1	25.7	0.77	0.73	0.77	41.3
All Vehicles		1909	12.9	1909	12.9	0.749	15.2	LOS B	15.1	94.2	0.73	0.69	0.73	47.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maroela Rd												
P1	Full	50	53	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13
East: Sandringham Rd												

P2	Full	50	53	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13
North: Maroela Rd												
P3	Full	50	53	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13
West: Industrial Rd												
P4	Full	50	53	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13
All Pedestrians		200	211	25.3	LOS C	0.1	0.1	0.91	0.91	188.3	211.9	1.13

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 01 [01pm2024existing (Site Folder: Existing 2024)]

Maroela Rd / Sandringham Rd / Industrial Rd
PM Peak Hour
2024
Site Category: Signalised
Signals - Actuated Isolated Cycle Time = 87 seconds (Site Optimum Maximum Green Settings - Minimum Delay)
Maximum Green Settings are found at Parameter Scale = 60.0 %

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Maroela Rd														
1	L2	55	20.0	55	20.0	0.756	32.8	LOS C	17.6	111.7	0.91	0.80	0.91	40.0
2	T1	417	4.8	417	4.8	* 0.756	27.0	LOS C	17.6	111.7	0.91	0.80	0.91	41.3
3	R2	50	18.0	50	18.0	0.106	27.5	LOS C	1.5	10.2	0.69	0.72	0.69	40.1
Approach		522	7.7	522	7.7	0.756	27.7	LOS C	17.6	111.7	0.89	0.79	0.89	41.0
East: Sandringham Rd														
4	L2	88	5.7	88	5.7	0.213	26.7	LOS C	3.9	24.7	0.70	0.69	0.70	41.7
5	T1	47	3.2	47	3.2	0.213	21.1	LOS C	3.9	24.7	0.70	0.69	0.70	42.7
6	R2	144	23.6	144	23.6	* 0.517	37.7	LOS D	5.3	38.7	0.86	0.78	0.86	35.9
Approach		279	14.5	279	14.5	0.517	31.5	LOS C	5.3	38.7	0.79	0.74	0.79	38.6
North: Maroela Rd														
7	L2	96	25.0	96	25.0	0.703	19.9	LOS B	17.1	108.8	0.70	0.66	0.70	46.4
8	T1	512	3.3	512	3.3	0.703	14.1	LOS B	17.1	108.8	0.70	0.66	0.70	48.3
9	R2	84	50.0	84	50.0	* 0.223	20.4	LOS C	1.8	15.4	0.77	0.74	0.77	42.7
Approach		692	12.0	692	12.0	0.703	15.7	LOS B	17.1	108.8	0.71	0.67	0.71	47.2
West: Industrial Rd														
10	L2	313	11.5	313	11.5	0.453	21.4	LOS C	9.4	62.9	0.67	0.75	0.67	43.5
11	T1	34	20.6	34	20.6	0.453	15.7	LOS B	9.4	62.9	0.67	0.75	0.67	44.7
12	R2	102	4.9	102	4.9	0.186	29.4	LOS C	3.1	19.7	0.74	0.74	0.74	39.4
Approach		449	10.7	449	10.7	0.453	22.8	LOS C	9.4	62.9	0.68	0.75	0.68	42.6
All Vehicles		1942	10.9	1942	10.9	0.756	22.8	LOS C	17.6	111.7	0.76	0.73	0.76	43.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maroela Rd												
P1	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
East: Sandringham Rd												
P2	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06

North: Maroela Rd											
P3	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
West: Industrial Rd											
P4	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
All Pedestrians		200	211	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 01 [01pm2029future - excl new site traffic (Site Folder: Future 2029 - excl new site traffic)]

Maroela Rd / Sandringham Rd / Industrial Rd
PM Peak Hour
2029
Site Category: Signalised
Signals - Actuated Isolated Cycle Time = 87 seconds (Site Optimum Maximum Green Settings - Minimum Delay)
Maximum Green Settings are found at Parameter Scale = 60.0 %

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Maroela Rd														
1	L2	61	20.0	61	20.0	0.851	34.3	LOS C	20.4	129.8	0.95	0.85	0.96	39.3
2	T1	460	4.8	460	4.8	* 0.851	28.6	LOS C	20.4	129.8	0.95	0.85	0.96	40.6
3	R2	55	18.0	55	18.0	0.132	30.9	LOS C	1.7	12.1	0.74	0.73	0.74	38.6
Approach		576	7.7	576	7.7	0.851	29.4	LOS C	20.4	129.8	0.93	0.84	0.94	40.2
East: Sandringham Rd														
4	L2	97	5.7	97	5.7	0.254	26.9	LOS C	4.4	27.5	0.71	0.69	0.71	41.6
5	T1	52	3.2	52	3.2	0.254	21.3	LOS C	4.4	27.5	0.71	0.69	0.71	42.6
6	R2	159	23.6	159	23.6	* 0.663	40.2	LOS D	6.1	44.7	0.90	0.79	0.90	35.1
Approach		308	14.5	308	14.5	0.663	32.8	LOS C	6.1	44.7	0.81	0.74	0.81	38.1
North: Maroela Rd														
7	L2	106	25.0	106	25.0	0.772	20.7	LOS C	19.9	127.0	0.74	0.69	0.74	45.9
8	T1	565	3.3	565	3.3	0.772	14.9	LOS B	19.9	127.0	0.74	0.69	0.74	47.7
9	R2	93	50.0	93	50.0	* 0.272	21.6	LOS C	2.0	17.2	0.81	0.75	0.81	42.1
Approach		764	12.0	764	12.0	0.772	16.5	LOS B	19.9	127.0	0.75	0.70	0.75	46.7
West: Industrial Rd														
10	L2	346	11.5	346	11.5	0.519	21.9	LOS C	10.7	71.7	0.69	0.76	0.69	43.2
11	T1	38	20.6	38	20.6	0.519	16.2	LOS B	10.7	71.7	0.69	0.76	0.69	44.5
12	R2	113	4.9	113	4.9	0.211	30.4	LOS C	3.6	22.4	0.75	0.75	0.75	39.0
Approach		497	10.7	497	10.7	0.519	23.4	LOS C	10.7	71.7	0.70	0.76	0.70	42.3
All Vehicles		2145	10.9	2145	10.9	0.851	23.9	LOS C	20.4	129.8	0.80	0.76	0.80	42.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maroela Rd												
P1	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
East: Sandringham Rd												

P2	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
North: Maroela Rd												
P3	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
West: Industrial Rd												
P4	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
All Pedestrians		200	211	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 01 [01pm2029future - incl new site traffic (Site Folder: Future 2029 - incl new site traffic)]

Maroela Rd / Sandringham Rd / Industrial Rd
PM Peak Hour
2029
Site Category: Signalised
Signals - Actuated Isolated Cycle Time = 87 seconds (Site Optimum Maximum Green Settings - Minimum Delay)
Maximum Green Settings are found at Parameter Scale = 60.0 %

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Maroela Rd														
1	L2	65	20.0	65	20.0	0.859	34.8	LOS C	20.8	132.3	0.95	0.86	0.97	39.2
2	T1	460	4.8	460	4.8	*0.859	29.0	LOS C	20.8	132.3	0.95	0.86	0.97	40.4
3	R2	55	18.0	55	18.0	0.132	30.9	LOS C	1.7	12.1	0.74	0.73	0.74	38.6
Approach		580	7.8	580	7.8	0.859	29.8	LOS C	20.8	132.3	0.93	0.84	0.95	40.1
East: Sandringham Rd														
4	L2	97	5.7	97	5.7	0.274	27.0	LOS C	4.5	28.3	0.71	0.69	0.71	41.6
5	T1	56	3.2	56	3.2	0.274	21.4	LOS C	4.5	28.3	0.71	0.69	0.71	42.6
6	R2	159	23.6	159	23.6	*0.718	41.4	LOS D	6.2	45.6	0.92	0.80	0.92	34.7
Approach		312	14.4	312	14.4	0.718	33.3	LOS C	6.2	45.6	0.82	0.74	0.82	37.9
North: Maroela Rd														
7	L2	106	25.0	106	25.0	0.781	20.7	LOS C	19.9	127.0	0.74	0.69	0.74	45.9
8	T1	565	3.3	565	3.3	0.781	14.9	LOS B	19.9	127.0	0.74	0.69	0.74	47.7
9	R2	99	50.0	99	50.0	*0.292	21.8	LOS C	2.1	18.4	0.82	0.76	0.82	42.0
Approach		770	12.3	770	12.3	0.781	16.6	LOS B	19.9	127.0	0.75	0.70	0.75	46.7
West: Industrial Rd														
10	L2	373	11.5	373	11.5	0.565	22.2	LOS C	11.8	78.5	0.70	0.77	0.70	43.1
11	T1	39	20.6	39	20.6	0.565	16.6	LOS B	11.8	78.5	0.70	0.77	0.70	44.3
12	R2	122	4.9	122	4.9	0.229	30.6	LOS C	3.9	24.3	0.76	0.76	0.76	39.0
Approach		534	10.7	534	10.7	0.565	23.7	LOS C	11.8	78.5	0.72	0.77	0.72	42.1
All Vehicles		2196	11.0	2196	11.0	0.859	24.2	LOS C	20.8	132.3	0.80	0.76	0.80	42.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maroela Rd												
P1	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
East: Sandringham Rd												

P2	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
North: Maroela Rd												
P3	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
West: Industrial Rd												
P4	Full	50	53	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06
All Pedestrians		200	211	37.8	LOS D	0.1	0.1	0.93	0.93	200.8	211.9	1.06

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 02 [02am2024existing (Site Folder: Existing 2024)]

Industrial Rd / Kiaat Rd
AM Peak Hour
2024
Site Category: Unsignalised
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kiaat Rd														
1	L2	1	0.0	1	0.0	0.003	8.1	LOS A	0.0	0.1	0.06	0.99	0.06	38.0
2	T1	1	0.0	1	0.0	0.003	7.7	LOS A	0.0	0.1	0.06	0.99	0.06	44.6
3	R2	1	0.0	1	0.0	0.003	8.3	LOS A	0.0	0.1	0.06	0.99	0.06	46.9
Approach		3	0.0	3	0.0	0.003	8.0	LOS A	0.0	0.1	0.06	0.99	0.06	44.0
East: Industrial Rd														
4	L2	5	0.0	5	0.0	0.114	8.0	LOS A	0.4	2.6	0.05	1.00	0.05	46.9
5	T1	13	38.5	13	38.5	0.114	9.7	LOS A	0.4	2.6	0.05	1.00	0.05	45.2
6	R2	95	2.1	95	2.1	0.114	7.8	LOS A	0.4	2.6	0.05	1.00	0.05	50.4
Approach		113	6.2	113	6.2	0.114	8.0	LOS A	0.4	2.6	0.05	1.00	0.05	49.7
North: Kiaat Rd														
7	L2	31	41.9	31	41.9	0.025	6.1	LOS A	0.1	0.8	0.07	0.54	0.07	50.7
8	T1	1	0.0	1	0.0	0.025	4.2	LOS A	0.1	0.8	0.07	0.54	0.07	48.0
9	R2	1	0.0	1	0.0	0.025	5.6	LOS A	0.1	0.8	0.07	0.54	0.07	48.1
Approach		33	39.4	33	39.4	0.025	6.0	LOS A	0.1	0.8	0.07	0.54	0.07	50.6
West: Industrial Rd														
10	L2	1	0.0	1	0.0	0.015	8.0	LOS A	0.1	0.5	0.02	1.24	0.02	46.6
11	T1	12	75.0	12	75.0	0.015	11.3	LOS B	0.1	0.5	0.02	1.24	0.02	44.7
12	R2	1	0.0	1	0.0	0.015	7.6	LOS A	0.1	0.5	0.02	1.24	0.02	36.5
Approach		14	64.3	14	64.3	0.015	10.8	LOS B	0.1	0.5	0.02	1.24	0.02	44.5
All Vehicles		163	17.8	163	17.8	0.114	7.8	NA	0.4	2.6	0.05	0.92	0.05	49.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02am2029future - excl new site traffic (Site Folder: Future 2029 - excl new site traffic)]

Industrial Rd / Kiaat Rd
AM Peak Hour
2029
Site Category: Unsignalised
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kiaat Rd														
1	L2	1	0.0	1	0.0	0.003	8.1	LOS A	0.0	0.1	0.06	0.98	0.06	38.0
2	T1	1	0.0	1	0.0	0.003	7.7	LOS A	0.0	0.1	0.06	0.98	0.06	44.6
3	R2	1	0.0	1	0.0	0.003	8.4	LOS A	0.0	0.1	0.06	0.98	0.06	46.8
Approach		3	0.0	3	0.0	0.003	8.1	LOS A	0.0	0.1	0.06	0.98	0.06	44.0
East: Industrial Rd														
4	L2	6	0.0	6	0.0	0.126	8.0	LOS A	0.5	2.9	0.05	1.00	0.05	46.9
5	T1	14	38.5	14	38.5	0.126	9.7	LOS A	0.5	2.9	0.05	1.00	0.05	45.1
6	R2	105	2.1	105	2.1	0.126	7.8	LOS A	0.5	2.9	0.05	1.00	0.05	50.3
Approach		125	6.1	125	6.1	0.126	8.0	LOS A	0.5	2.9	0.05	1.00	0.05	49.7
North: Kiaat Rd														
7	L2	34	41.9	34	41.9	0.027	6.1	LOS A	0.1	0.9	0.07	0.54	0.07	50.7
8	T1	1	0.0	1	0.0	0.027	4.2	LOS A	0.1	0.9	0.07	0.54	0.07	48.0
9	R2	1	0.0	1	0.0	0.027	5.6	LOS A	0.1	0.9	0.07	0.54	0.07	48.1
Approach		36	39.6	36	39.6	0.027	6.0	LOS A	0.1	0.9	0.07	0.54	0.07	50.6
West: Industrial Rd														
10	L2	1	0.0	1	0.0	0.017	8.0	LOS A	0.1	0.6	0.02	1.25	0.02	46.6
11	T1	13	75.0	13	75.0	0.017	11.3	LOS B	0.1	0.6	0.02	1.25	0.02	44.7
12	R2	1	0.0	1	0.0	0.017	7.6	LOS A	0.1	0.6	0.02	1.25	0.02	36.5
Approach		15	65.0	15	65.0	0.017	10.8	LOS B	0.1	0.6	0.02	1.25	0.02	44.5
All Vehicles		179	17.6	179	17.6	0.126	7.9	NA	0.5	2.9	0.05	0.93	0.05	49.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02am2029future - incl new site traffic (Site Folder: Future 2029 - incl new site traffic)]

Industrial Rd / Kiaat Rd
AM Peak Hour
2029
Site Category: Unsignalised
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kiaat Rd														
1	L2	1	0.0	1	0.0	0.003	8.1	LOS A	0.0	0.1	0.06	0.99	0.06	37.7
2	T1	1	0.0	1	0.0	0.003	7.7	LOS A	0.0	0.1	0.06	0.99	0.06	44.4
3	R2	1	0.0	1	0.0	0.003	8.8	LOS A	0.0	0.1	0.06	0.99	0.06	46.7
Approach		3	0.0	3	0.0	0.003	8.2	LOS A	0.0	0.1	0.06	0.99	0.06	43.8
East: Industrial Rd														
4	L2	6	0.0	6	0.0	0.152	8.0	LOS A	0.6	3.6	0.05	0.99	0.05	46.7
5	T1	14	38.5	14	38.5	0.152	9.9	LOS A	0.6	3.6	0.05	0.99	0.05	45.0
6	R2	126	2.1	126	2.1	0.152	7.9	LOS A	0.6	3.6	0.05	0.99	0.05	50.2
Approach		146	5.5	146	5.5	0.152	8.1	LOS A	0.6	3.6	0.05	0.99	0.05	49.7
North: Kiaat Rd														
7	L2	73	41.9	73	41.9	0.057	6.1	LOS A	0.2	1.9	0.08	0.54	0.08	50.6
8	T1	1	0.0	1	0.0	0.057	4.2	LOS A	0.2	1.9	0.08	0.54	0.08	48.0
9	R2	1	0.0	1	0.0	0.057	5.6	LOS A	0.2	1.9	0.08	0.54	0.08	48.1
Approach		75	40.8	75	40.8	0.057	6.1	LOS A	0.2	1.9	0.08	0.54	0.08	50.6
West: Industrial Rd														
10	L2	1	0.0	1	0.0	0.017	8.0	LOS A	0.1	0.6	0.02	1.25	0.02	46.6
11	T1	13	75.0	13	75.0	0.017	11.3	LOS B	0.1	0.6	0.02	1.25	0.02	44.7
12	R2	1	0.0	1	0.0	0.017	7.6	LOS A	0.1	0.6	0.02	1.25	0.02	36.5
Approach		15	65.0	15	65.0	0.017	10.8	LOS B	0.1	0.6	0.02	1.25	0.02	44.5
All Vehicles		239	20.2	239	20.2	0.152	7.7	NA	0.6	3.6	0.06	0.87	0.06	49.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02pm2024existing (Site Folder: Existing 2024)]

Industrial Rd / Kiaat Rd
PM Peak Hour
2024
Site Category: Unsignalised
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kiaat Rd														
1	L2	1	0.0	1	0.0	0.007	8.0	LOS A	0.0	0.1	0.04	0.99	0.04	37.9
2	T1	1	0.0	1	0.0	0.007	7.7	LOS A	0.0	0.1	0.04	0.99	0.04	44.5
3	R2	5	0.0	5	0.0	0.007	8.1	LOS A	0.0	0.1	0.04	0.99	0.04	46.8
Approach		7	0.0	7	0.0	0.007	8.1	LOS A	0.0	0.1	0.04	0.99	0.04	45.7
East: Industrial Rd														
4	L2	4	0.0	4	0.0	0.042	8.0	LOS A	0.1	0.9	0.03	1.02	0.03	46.8
5	T1	4	25.0	4	25.0	0.042	9.1	LOS A	0.1	0.9	0.03	1.02	0.03	46.1
6	R2	32	12.5	32	12.5	0.042	8.3	LOS A	0.1	0.9	0.03	1.02	0.03	49.8
Approach		40	12.5	40	12.5	0.042	8.3	LOS A	0.1	0.9	0.03	1.02	0.03	49.2
North: Kiaat Rd														
7	L2	85	11.8	85	11.8	0.057	5.7	LOS A	0.2	1.6	0.03	0.56	0.03	52.2
8	T1	1	0.0	1	0.0	0.057	4.1	LOS A	0.2	1.6	0.03	0.56	0.03	48.2
9	R2	1	0.0	1	0.0	0.057	5.5	LOS A	0.2	1.6	0.03	0.56	0.03	48.3
Approach		87	11.5	87	11.5	0.057	5.7	LOS A	0.2	1.6	0.03	0.56	0.03	52.1
West: Industrial Rd														
10	L2	1	0.0	1	0.0	0.005	8.0	LOS A	0.0	0.1	0.01	1.11	0.01	46.6
11	T1	3	33.3	3	33.3	0.005	9.3	LOS A	0.0	0.1	0.01	1.11	0.01	46.7
12	R2	1	0.0	1	0.0	0.005	7.5	LOS A	0.0	0.1	0.01	1.11	0.01	36.5
Approach		5	20.0	5	20.0	0.005	8.7	LOS A	0.0	0.1	0.01	1.11	0.01	45.4
All Vehicles		139	11.5	139	11.5	0.057	6.7	NA	0.2	1.6	0.03	0.73	0.03	50.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02pm2029future - excl new site traffic (Site Folder: Future 2029 - excl new site traffic)]

Industrial Rd / Kiaat Rd
PM Peak Hour
2029
Site Category: Unsignalised
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kiaat Rd														
1	L2	1	0.0	1	0.0	0.008	8.0	LOS A	0.0	0.2	0.04	0.99	0.04	37.8
2	T1	1	0.0	1	0.0	0.008	7.7	LOS A	0.0	0.2	0.04	0.99	0.04	44.4
3	R2	6	0.0	6	0.0	0.008	8.2	LOS A	0.0	0.2	0.04	0.99	0.04	46.7
Approach		8	0.0	8	0.0	0.008	8.1	LOS A	0.0	0.2	0.04	0.99	0.04	45.8
East: Industrial Rd														
4	L2	4	0.0	4	0.0	0.045	8.0	LOS A	0.2	1.0	0.03	1.02	0.03	46.7
5	T1	4	25.0	4	25.0	0.045	9.2	LOS A	0.2	1.0	0.03	1.02	0.03	46.1
6	R2	35	12.5	35	12.5	0.045	8.3	LOS A	0.2	1.0	0.03	1.02	0.03	49.7
Approach		43	12.5	43	12.5	0.045	8.4	LOS A	0.2	1.0	0.03	1.02	0.03	49.2
North: Kiaat Rd														
7	L2	94	11.8	94	11.8	0.063	5.7	LOS A	0.3	1.7	0.03	0.56	0.03	52.2
8	T1	1	0.0	1	0.0	0.063	4.1	LOS A	0.3	1.7	0.03	0.56	0.03	48.2
9	R2	1	0.0	1	0.0	0.063	5.5	LOS A	0.3	1.7	0.03	0.56	0.03	48.3
Approach		96	11.6	96	11.6	0.063	5.7	LOS A	0.3	1.7	0.03	0.56	0.03	52.1
West: Industrial Rd														
10	L2	1	0.0	1	0.0	0.005	8.0	LOS A	0.0	0.1	0.01	1.11	0.01	46.6
11	T1	3	33.3	3	33.3	0.005	9.3	LOS A	0.0	0.1	0.01	1.11	0.01	46.7
12	R2	1	0.0	1	0.0	0.005	7.5	LOS A	0.0	0.1	0.01	1.11	0.01	36.5
Approach		5	20.0	5	20.0	0.005	8.7	LOS A	0.0	0.1	0.01	1.11	0.01	45.4
All Vehicles		152	11.5	152	11.5	0.063	6.7	NA	0.3	1.7	0.03	0.73	0.03	50.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 02 [02pm2029future - incl new site traffic (Site Folder: Future 2029 - incl new site traffic)]

Industrial Rd / Kiaat Rd
PM Peak Hour
2029
Site Category: Unsignalised
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kiaat Rd														
1	L2	1	0.0	1	0.0	0.009	8.0	LOS A	0.0	0.2	0.04	0.99	0.04	37.4
2	T1	1	0.0	1	0.0	0.009	7.7	LOS A	0.0	0.2	0.04	0.99	0.04	44.1
3	R2	6	0.0	6	0.0	0.009	8.6	LOS A	0.0	0.2	0.04	0.99	0.04	46.4
Approach		8	0.0	8	0.0	0.009	8.4	LOS A	0.0	0.2	0.04	0.99	0.04	45.5
East: Industrial Rd														
4	L2	4	0.0	4	0.0	0.063	8.0	LOS A	0.2	1.5	0.03	1.01	0.03	46.6
5	T1	4	25.0	4	25.0	0.063	9.3	LOS A	0.2	1.5	0.03	1.01	0.03	46.0
6	R2	50	12.5	50	12.5	0.063	8.4	LOS A	0.2	1.5	0.03	1.01	0.03	49.7
Approach		58	12.5	58	12.5	0.063	8.5	LOS A	0.2	1.5	0.03	1.01	0.03	49.3
North: Kiaat Rd														
7	L2	133	11.8	133	11.8	0.088	5.7	LOS A	0.4	2.5	0.03	0.56	0.03	52.2
8	T1	1	0.0	1	0.0	0.088	4.1	LOS A	0.4	2.5	0.03	0.56	0.03	48.2
9	R2	1	0.0	1	0.0	0.088	5.5	LOS A	0.4	2.5	0.03	0.56	0.03	48.3
Approach		135	11.6	135	11.6	0.088	5.7	LOS A	0.4	2.5	0.03	0.56	0.03	52.1
West: Industrial Rd														
10	L2	1	0.0	1	0.0	0.005	8.0	LOS A	0.0	0.1	0.01	1.11	0.01	46.6
11	T1	3	33.3	3	33.3	0.005	9.3	LOS A	0.0	0.1	0.01	1.11	0.01	46.7
12	R2	1	0.0	1	0.0	0.005	7.5	LOS A	0.0	0.1	0.01	1.11	0.01	36.5
Approach		5	20.0	5	20.0	0.005	8.7	LOS A	0.0	0.1	0.01	1.11	0.01	45.4
All Vehicles		206	11.6	206	11.6	0.088	6.6	NA	0.4	2.5	0.03	0.72	0.03	51.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.