

George Municipality

TRAFFIC IMPACT ASSESSMENT FOR THE PROPOSED GEORGE CAMPUS

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1. DEVELOPMENT PARTICULARS

SMEC South Africa (Pty) Ltd was appointed by George Municipality to conduct a Traffic Impact Assessment for the proposed George Campus Development, in support of the Proposed Zoning and Subdivision Application of Erf 464 George. The site is bound by the Garden Route Dam to the north and Madiba Drive to the south. Refer to Figure 1.



Figure 1: Locality Plan (source: Google)

The site measures approximately 118 hectares in extent. The anticipated composition of the development is a Campus catering for 8 000 students, a Waterfront commercial development of 129 300 square metres Gross Lettable Area (GLA), and a Hotel of 34 500 square metres GLA (assumed to be 345 rooms). The Campus component will include residential units for 303 lecturers and 3 009 students.

For the purpose of this TIA it was assumed that the development will be 50% implemented over 5 years by 2024, and 100% within 10 years by 2029.

2. STUDY AREA

The study area is an area from which transportation elements are selected for the TIA. Such transport elements are selected as follows:

- Site accesses;
- Minimum of two intersections on the road where access is proposed; and
- All roads in sensitive areas.

Taking the above into consideration, the following primary study area and associated transportation elements have been selected for assessment (Refer to Figure 2):

- Stander Street & Site Access 1 (opposite Arthur Bleksley Street);
- Saasveld Road (West) & Site Access 2; and
- Saasveld Road & Site Access 3, opposite Road 1.

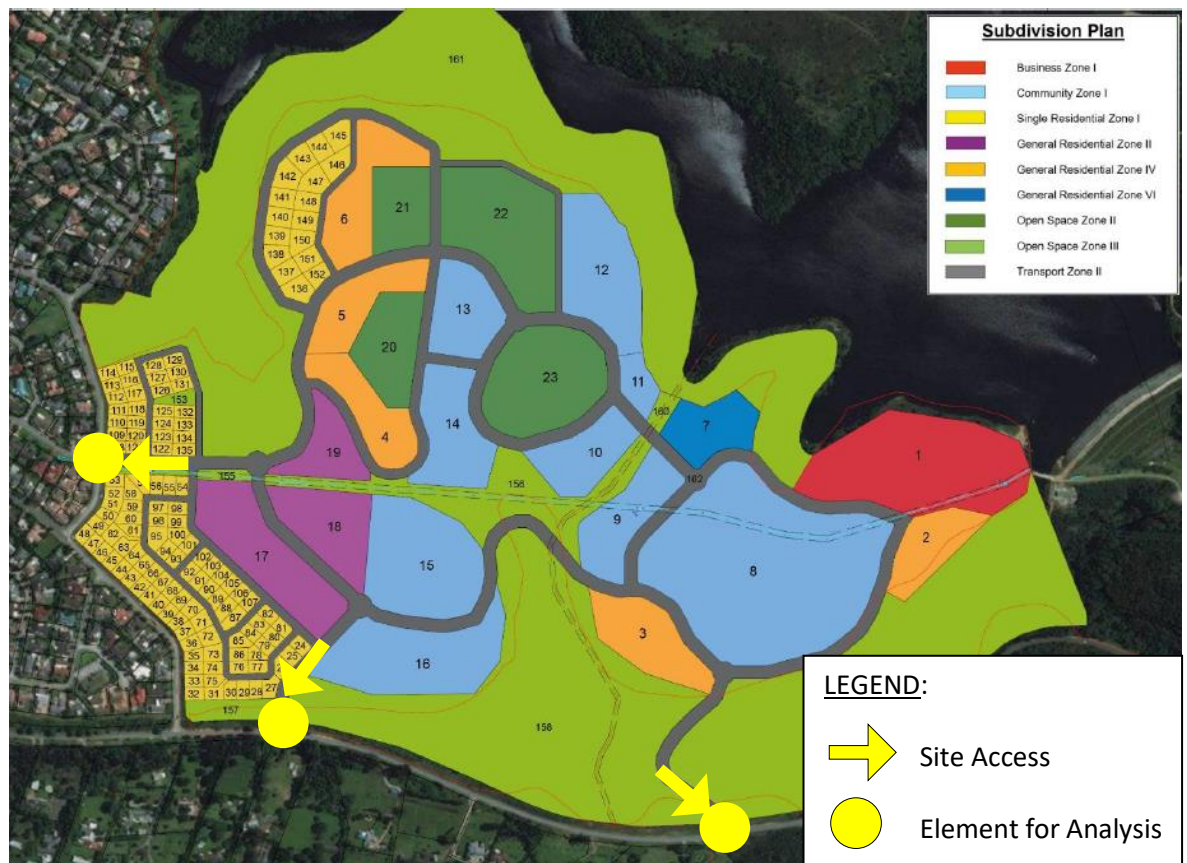


Figure 2: Primary Study Area (source: Aurecon)

Based on the type and extent of development, the following secondary study area and associated transportation elements have been selected for assessment (Refer to Figure 3):

- N9 Knysna Street & Saasveld Road intersection;
- N9 Knysna Street & Road 1; and
- Saasveld Road & Meyer Street.

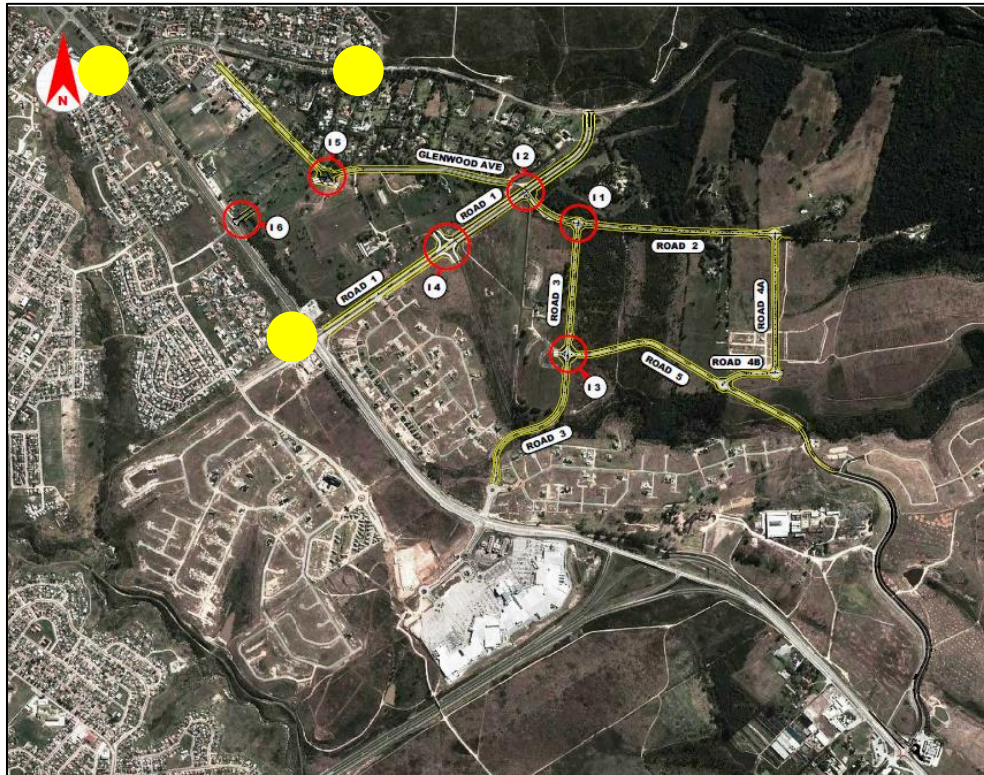


Figure 3: Secondary Study Area (source: Google)

3. BACKGROUND INFORMATION

3.1 Existing Roads

National Route N9 is a Class 2 Major Arterial under the jurisdiction of the South African National Road Agency Limited. In the vicinity of Saasveld Road it comprises of two lanes per direction. It experiences moderate traffic flows during peak hours, and operates at an acceptable Level of Service.

Saasveld Road is a Class 3 Minor Arterial, extending from Loerie Park to the north of Wilderness and Hoekwil. The road comprises of one lane per direction in the vicinity of the subject site. It experiences low traffic flows during peak hours, and operates at an acceptable Level of Service.

Meyer Street is a Class 4 Urban Collector, serving the suburb of Loerie Park. The road comprises of one lane per direction in the vicinity of the subject site. It experiences low traffic flows during peak hours, and operates at an acceptable Level of Service.

Kraaibosch Way is a Class 4 Urban Collector, designed to predominantly serve the Kraaibosch development. The road comprises of one lane per direction. It experiences low traffic flows during peak hours, and operates at an acceptable Level of Service.

3.2 Public Transport Facilities

George is currently served by three phases of the George Integrated Public Transport Network (George IPTN). As Kraaibosch and George Campus is rolled out, it is anticipated that these developments will be well served by the George IPTN. Refer to Figure 4.

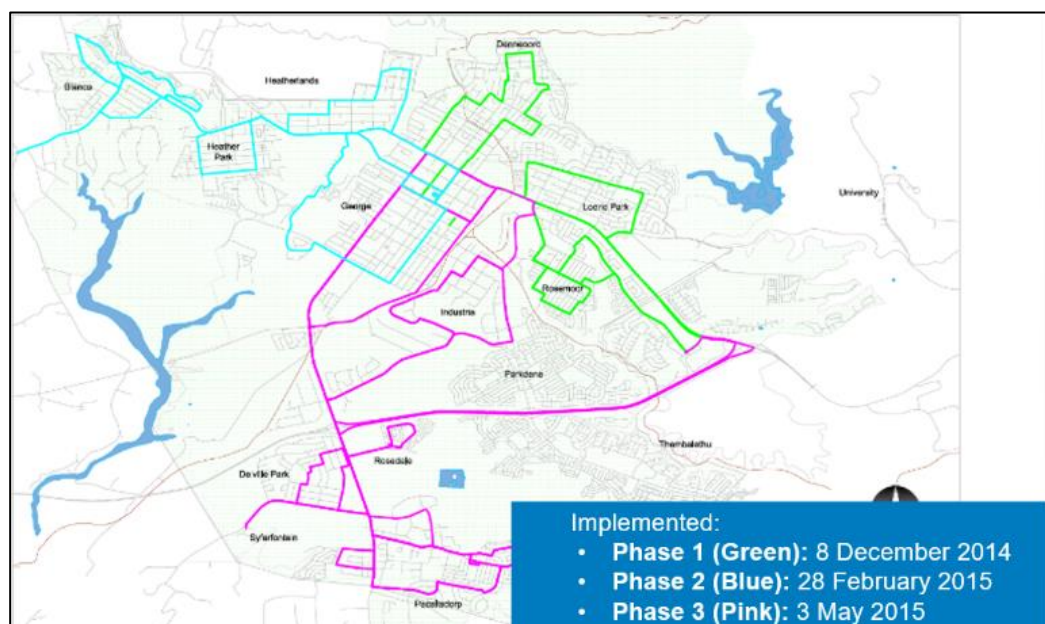


Figure 4: Public Transport Facilities (source: George Municipality)

3.3 Non-Motorized Transport Facilities

The George Campus design focuses on pedestrian accessibility and mobility, providing green corridors linking all components of the development. Refer to Figure 5.

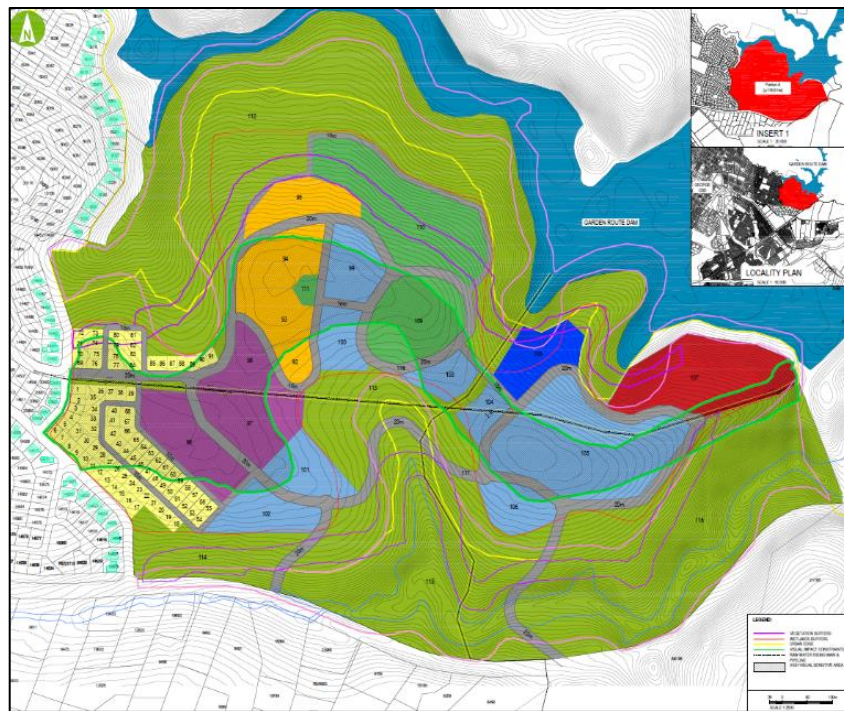


Figure 5: NMT Facilities (source: Aurecon)

The George CIP (Iliso 2014/15) makes reference to planned NMT infrastructure projects within George. These include the implementation of kerb drops for pedestrians along Knysna Road. The planned NMT Network is shown in Figure 6. It is recommended that the George NMT Network be revisited as and when the proposed development is approved.

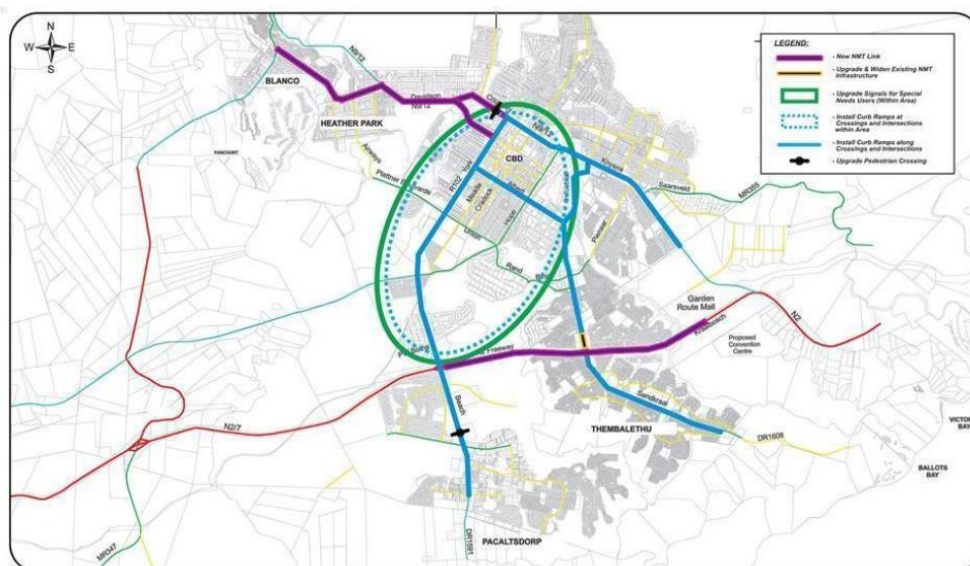


Figure 6 Planned NMT Infrastructure Projects (Iliso)

3.4 Planned Changes to Transportation Facilities

It is proposed that the George Campus be served by an extended George IPTN, with the provision of bus stops within the Campus grounds. The GIPTN Unit was consulted regarding this proposal, with the following inputs being provided:

- *Based on the information provided regarding the proposal, there are two routes that fall within the vicinity of the accesses to the proposed development:*
 - a) *Route 24 (CBD – Loerie Park – Garden Route Mall) – refer to attached KMZ (Phase 1 Routes), and*
 - b) *Proposed Route: NMU – CBD that forms part of Phase 6 of the GIPTN project that has not yet been rolled out. (refer to Figure 7)*
- *Route 24 runs via Van Kervel Street the closest to the proposed Access 1 referred to in the application (approximately 560m distance) with Stops 194 and 193 located near the intersection of Van Kervel and Meyer St being the closest bus stops of Route 24 and approximately 520m from the proposed NMU-CBD Route and proposed bus stops 202 and 203 located at the intersection of Saasveld Rd and Meyer Street intersection. Access 2 is proposed approximately 170m from this intersection. Access 3 is further East about 800m from the proposed stop 202 (no bus stops are proposed by the GIPTN at this stage near the vicinity of Access 3).*
- *It is important to note that the abovementioned routes were never intended to cater for the development in question. In order for the GIPTN to plan services to the development proposed, it is important that the number of anticipated public transport trips are provided. Furthermore, information on roads proposed and earmarked specifically for public transport, needs to be provided for further assessment and comment.*



Figure 7: Planned George IPTN Phase 6 (source: Aurecon)

Taking into consideration the inputs provided by the GIPTN Unit, it is recommended that a revised Phase 6 of the George IPTN be used to service the needs of the George Campus.

3.5 Site Access

The site will be served by three accesses, as follows:

- Access 1 along Stander Street (opposite Arthur Bleksley Street);
- Access 2 along Saasveld Road (between Meyer Street & Access 3); and
- Access 3 along Saasveld Road (opposite Road 1).

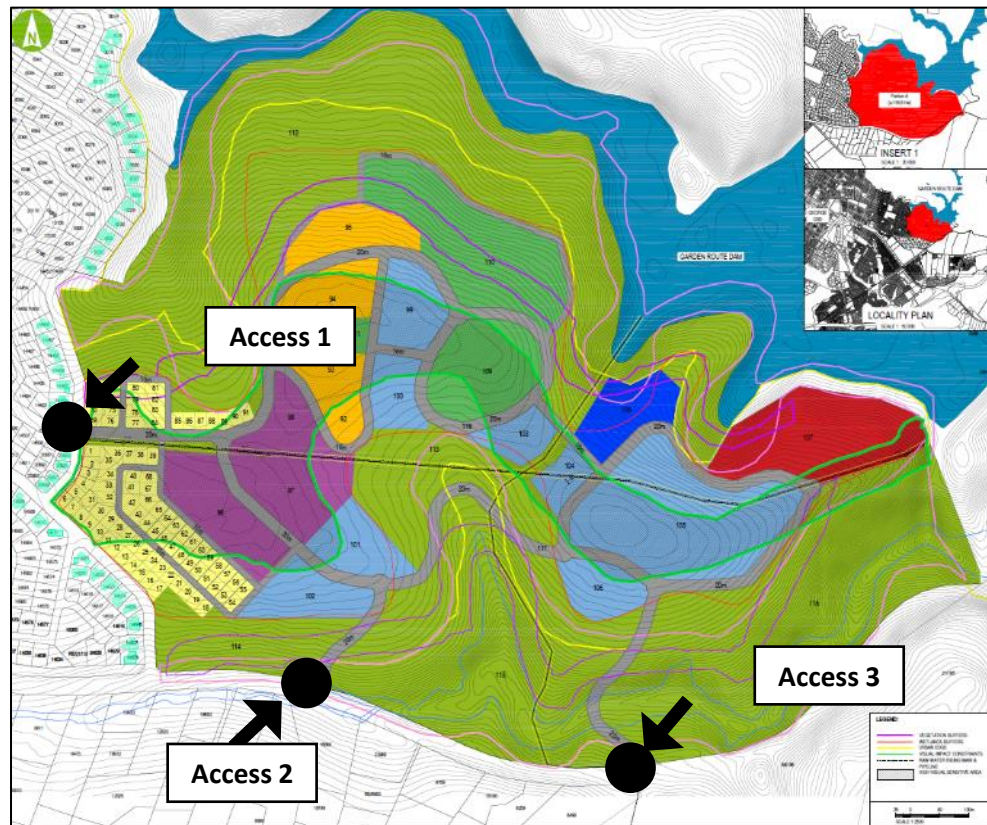


Figure 8: Site Access (source: Aurecon)

The access spacing requirements were derived from the WCG Access Management Guidelines (2020). This requires a 260-metre spacing between two uncontrolled full intersections along Class 3 roads within a semi-rural area.

Access 1 is situated at an existing intersection, and is therefore not evaluated.

Access 2 along Saasveld Road is situated 300 metres to the east of Meyer Street. Access 3 along Saasveld Road is situated 600 metres to the east of Access 2. Both accesses therefore comply with the access spacing requirements.

4. OTHER PLANNING AUTHORITIES

Saasveld Road falls under the jurisdiction of the Western Cape Department of Transport. As such, they would need to be included in the approval process.

5. TRAFFIC DEMAND ESTIMATION

5.1 Assessment Year

The traffic assessment will be undertaken for a 2024 and 2029 design year. A linear build-out of the development has been assumed, as set out in Table 1.

Table 1: Development Phasing (Cumulative)

Phase	Year	Assumed Build-Out	University (students)	Housing (units)	Commercial (sqm GLA)	Hotel (rooms)
Phase 1	2024	50%	4 000	1 652	64 650	173
Phase 1+2	2029	100%	8 000	3 303	129 300	345

5.2 Assessment Hour

The traffic assessment must be undertaken for the hours during which the combined effect of background and development traffic will result in the highest traffic demand. Taking into consideration the planned mixed-use development, it is deemed appropriate for the Weekday AM and PM Peak Hours to be analysed.

5.3 Background Traffic Demand Estimation

5.3.1 Traffic Counts

Manual classified intersection traffic counts were undertaken as part of this project assignment. Details of the traffic survey are provided below:

- Date counted July 2019
- Day Normal Weekdays
- Congestion levels Low
- Enumerator SMEC

5.4 Peak Hour

A common peak hour was identified for the intersections under discussion, as follows:

- Weekday AM Peak Hour 07h00 - 08h00
- Weekday PM Peak Hour 16h15 – 17h15

5.5 Traffic Growth

A traffic growth rate is applied to background traffic in order to determine the anticipated increase in Base Year traffic by a predefined Design Year.

The COTO TMH 17 South African Trip Data Manual dated September 2012 provides typical growth rates to be used for growth areas based on the existing/anticipated rate of growth. Refer to Table 2.

Table 2: Typical Growth Rates

DEVELOPMENT AREA	GROWTH RATE
Low Growth Areas	0% - 3%
Average Growth Areas	3% - 4%
Above Average Growth Areas	4% - 6%
Fast Growing Ares	6% - 8%
Exceptionally High Growth Areas	> 8%

Taking into consideration the location of the subject site, a compounded traffic growth rate of 2.0% was applied to the 2019 Base Year Traffic in order to derive 2024 and 2029 Design Year traffic flows.

Taking into consideration the close proximity of the other development parcels forming part of the Kraaibosch development, it was deemed appropriate to only apply a growth rate to N9 Knysna Street traffic.

5.6 Existing exercised land-use rights

Where a development has existing land-use rights that have been exercised and where a growth rate is applied, the trip generation of the exercised rights must be estimated and subtracted from the traffic counts before any growth is applied.

No existing exercised land-use rights apply to this development.

5.7 Trip Generation by Other Developments

Other developments as well as future potential development in the area must be taken into account in the estimation of future background traffic. The following developments have been noted:

5.7.1 Kraaibosch Development

The Roads Master Plan for the Kraaibosch Development dated September 2018 includes several land parcels and development land therein. The location of each development is shown in Figure 9.

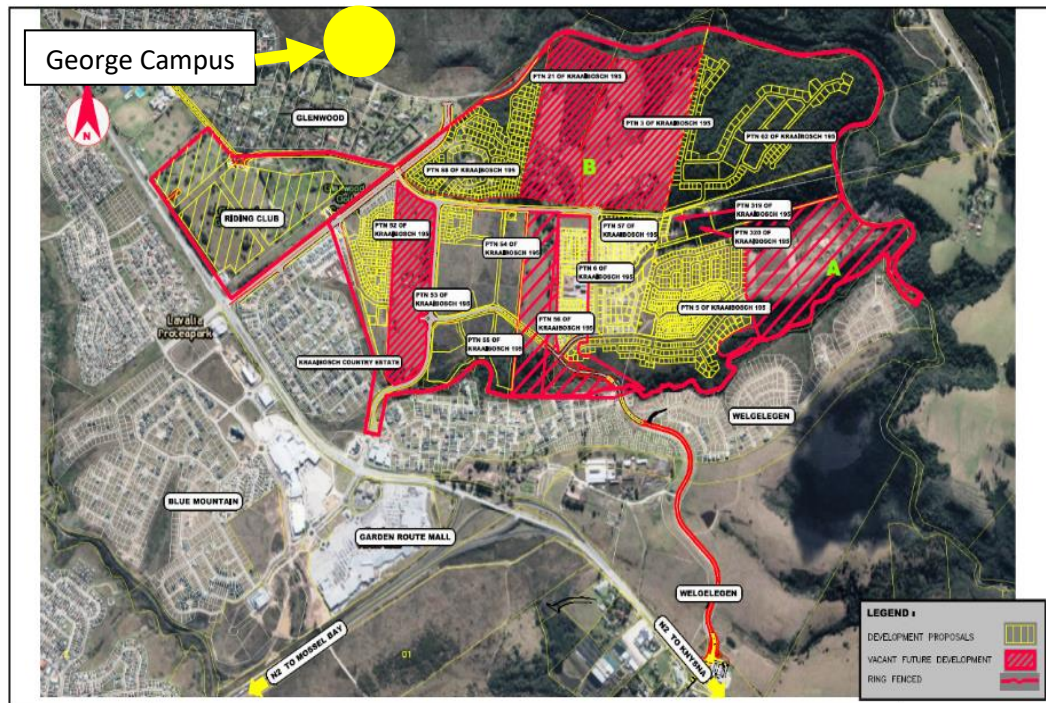


Figure 9: Other Developments (source SMEC)

The trip generation potential of the other developments is set out in Table 3.

The anticipated trip generation for the other developments total 7 738 private vehicle trips during the Weekday AM Peak Hour.

With reference to the Kraaibosch Roads Master Plan and Cost Apportionment (Revision 4) dated September 2018, it is not feasible to analyse the operational analysis of the infrastructure until the site development plans have reached a certain level of finality. As such, this development impact is not considered as part of the current project assignment.

Taking into consideration the trip generation potential of the Kraaibosch area in close proximity to the Campus development, it would be advantageous to assess the combined impact of these developments on the greater transport network, preferably with the use of a regional travel demand model. This would ensure that the required public transport services and transport infrastructure are put in place to serve the future travel demand at appropriate levels of service.

Table 3: Other Development Trip Generation

PORTION	PROPOSED DEVELOPMENT	TRIP RATE	IN / OUT SPLIT		TRIPS GENERATED		TOTAL
			IN	OUT	IN	OUT	
195/62	43 High Income Units	1.5	25%	75%	37	110	146
	5.2 ha Group Housing Units @ 55 du/ha	1.1	25%	75%	78	234	312
195/3	30.5 ha Retirement Units @ 20du/ha	0.15	25%	75%	23	69	92
195/88	144 Group Housing Units	1.1	25%	75%	40	119	159
	124 High Income Units	1.5	25%	75%	46	140	186
195/21	20 ha High Income Units @ 15du/ha	1.5	25%	75%	112	338	450
195/54 & 55	8.76 ha Retirement @ 35 du/ha	0.15	35%	65%	16	30	46
	2.27 ha Group Housing units @ 55 du/ha	1.1	25%	75%	35	104	138
	1.60 ha Flats @ 55du/ha	1.1	25%	75%	24	73	97
	2.76 ha Suburban Medical Centre	7/100m ²	55%	45%	1061	868	1929
	6.05 ha Private Hospital (50% coverage)	2.4/100m ²	55%	45%	399	327	726
	1.54 ha Shopping Centre	224.5 GLA ^{0.34} / 100m ²	50%	50%	653	653	1306
195/52	171 Retirement Units	0.15	35%	65%	9	17	26
	13 Retirement Units	0.15	35%	65%	1	1	2
	1.43 ha Group Housing Units @ 15 du/ha	1.1	25%	75%	6	18	24
	0.36 ha Sport/Recreation	40/ha	50%	50%	7	7	14
195/5	156 Group Housing Units	1.1	25%	75%	43	129	172
	0.75 ha Community Orientated Uses	40/ha	50%	50%	15	15	30
	289 Retirement Units	0.15	25%	75%	11	32	43
	40 High Income Units	1.5	25%	75%	15	45	60
195/6 & 57	343 Retirement Units	0.15	25%	75%	13	39	52
195/1	124 Group Housing units	1.1	25%	75%	34	102	136
195/56	14.00 ha Vacant land @ 15 du/ha	1.1	25%	75%	58	173	231
195/53	13.60 ha Vacant land @ 15du/ha	1.1	25%	75%	56	168	224
Riding Club	6.04 ha Sport/Recreation/Education	40/ha	50%	50%	121	121	242
	7.75 ha Community Orientated Uses	40/ha	50%	50%	155	155	310
	9.86 ha Group Housing @ 15 du/ha	1.1	25%	75%	41	122	163
195/319	5 High Income units	1.5	25%	75%	2	6	8
	0.74 ha Group Housing @ 60du/ha	1.1	25%	75%	12	37	49
195/320	5 High Income units	1.5	25%	75%	2	6	8
	0.75 ha Group Housing @ 60du/ha	1.1	25%	75%	13	38	50
Section A	18.60 ha Vacant land @ 15du/ha	1.1	25%	75%	77	230	307
						TOTAL	7738

5.8 Trip Generation

Trip generation rates are measured in units of trip ends, with either an origin or a destination at the development. It is the sum of traffic to or from a development.

The Trip Generation Rates for the planned land use types were obtained from the COTO TMH 17 South African Trip Data Manual dated September 2012.

The trip generation potential of Phase 1 of the George Campus is shown in Table 4.

Table 4: Trip Generation – Phase 1

Land Use	Unit	Trip Generation Rate		Total Trips			
				AM		PM	
		AM	PM	In	Out	In	Out
Hotel (rooms)	173	0.5	0.5	52	35	48	39
University (students)	4 000	0.2	0.2	640	160	240	560
Shopping Centre (sqm GLA)	64 650	0.6	3.0	330	178	1438	1438
Total				1 022	372	1 725	2 037
				1 394		3 762	

Based on the size of the Phase 1 retail component, a site-specific size adjustment factor of 1.308 applies.

The trip generation potential of Phase 1+2 of the George Campus is shown in Table 5.

Table 5: Trip Generation – Phase 1+2

Land Use	Unit	Trip Generation Rate		Total Trips			
				AM		PM	
		AM	PM	In	Out	In	Out
Hotel (rooms)	345	0.5	0.5	104	69	95	78
University (students)	8 000	0.2	0.2	1 280	320	480	1 120
Shopping Centre (sqm GLA)	129 300	0.6	3.0	584	314	2 546	2 546
Total				1 968	703	3 121	3 743
				2 671		6 864	

Based on the size of the Phase 1+2 retail component, a site-specific size adjustment factor of 1.158 applies. Refer to COTO TMH 17.

It is anticipated that Phase 1 of the planned development would generate 1 394 and 3 762 new vehicular trips during the Weekday AM and PM Peak Hours respectively, and with Phase 1+2 it would generate a total of 2 671 and 6 864 new vehicular trips during the Weekday AM and PM Peak Hours respectively.

Taking the above onto consideration, it would be essential that the GIPTN planning take cognisance of the high public transport demand to be generated by the proposed development. It would be opportune to implement the required public transport services before the demand materialize, in order to ensure that the transport network is able to accommodate the anticipated travel demand.

5.9 Trip Reduction Factors

For the purpose of this study, the below trip reduction factors from the George Campus were applied, subject to approval by George Municipality.

Particular note should be taken of the Retail component, which is specifically designed for the needs of the Campus, as specified in the Proposed Zoning and Subdivision Application of Erf 464 George. As such, it was deemed appropriate to assess this component of the development serving very low car ownership.

The trip generation rates for a University already account for walk trips between accommodation and lecture rooms on campus, therefore no further trip reductions were applied for internal walk trips relating thereto. Trip reduction factors for transit and mixed use were applied to all the development components. Refer to Table 6.

Table 6: Trip Reduction Factor

Land Use	Adjustment				
	Mixed Use	Car Ownership		Transit Corridors	Factor
		Low	Very Low		
University	20%			15%	0.68
Hotel, Residential	20%			15%	0.68
Shopping Centre	10%		60%	15%	0.31

Taking into consideration the trip reduction factors being applied, the revised vehicular trip generation potential for Phase 1 is shown in Table 7.

Table 7: Revised Vehicular Trip Generation – Phase 1

Land Use	Unit	Trip Generation Rate		Total Trips			
				AM		PM	
		AM	PM	In	Out	In	Out
Hotel (rooms)	173	0.5	0.5	35	24	32	26
University (students)	4 000	0.2	0.2	435	109	163	381
Shopping Centre (sqm GLA)	64 650	0.6	3.0	101	54	440	440
Total				571	187	635	847
				758		1 483	

Similarly the revised vehicular trip generation potential for Phase 1+2 is shown in Table 8.

Table 8: Revised Vehicular Trip Generation – Phase 1+2

Land Use	Unit	Trip Generation Rate		Total Trips			
				AM		PM	
		AM	PM	In	Out	In	Out
Hotel (rooms)	345	0.5	0.5	70	47	65	53
University (students)	8 000	0.2	0.2	870	218	326	762
Shopping Centre (sqm GLA)	129 300	0.6	3.0	179	96	779	779
Total				1 119	361	1 170	1 593
				1 480		2 763	

It is anticipated that Phase 1 of the planned development would generate 758 and 1 483 new vehicular trips during the Weekday AM and PM Peak Hours respectively, and with Phase 1+2 it would generate a total of 1 480 and 2 763 new vehicular trips during the Weekday AM and PM Peak Hours respectively.

The trip reduction factors associated with the proximity of a public transport corridor in relation to the planned development, provides an indication of the potential public transport mode share. As such, the anticipate transit demand associated with the planned development is shown in Table 9.

Table 9: Public Transport Demand – Phase 1+2

Land Use	Total PT Trips			
	AM		PM	
	In	Out	In	Out
Hotel (rooms)	16	10	14	12
University (students)	192	48	72	168
Shopping Centre (sqm GLA)	88	47	382	382
Total (vehicle trips)	295	106	468	561
Total (person trips)	443	158	702	842

Taking into consideration a vehicle occupancy of 1.50, it is our submission that Phase 1+2 of the planned development could potentially generate 443 and 842 peak direction public transport person trips during the Weekday AM and PM Peak Hours respectively.

As a result of the size and extent of the Retail component forming part of the development, it would be advantageous for measures to be implemented to ensure that the Waterfront commercial area serves predominantly students as planned, and not the general public.

5.10 Trip Types

For the purpose of this study, it is assumed that all trips associated with the proposed development are classified as primary trips, therefore new trips on the surrounding road network.

The Retail component is specifically designed for the needs of the Campus, therefore no trips relating thereto were classified as pass-by or diverted trips.

6. TRIP DISTRIBUTION AND ASSIGNMENT

6.1 Trip Distribution – Site Access

The location and extent of individual land use parcels within the development will define the access to be used in serving those components. With this in mind, the anticipated trip distribution is shown in Table 10.

Table 10: Trip Distribution: Site Access

Component	Access 1	Access 2	Access 3
University	40%	30%	30%
Hotel		100%	
Retail	10%	40%	50%

6.2 Trip Distribution – External

External trip distribution was estimated manually, based on the principles of the gravity model and with knowledge of local conditions. Refer to Table 11.

Table 11: Trip Distribution: External

Direction	Destination	Route	Distribution
SW	George CBD	N9 Knysna Street	40%
W	George CBD	Stander Street	10%
W	George Bodorp	Stander Street	20%
S	Rosemore	Kraaibosch Way	20%
E	N2	N9 Knysna Street	10%

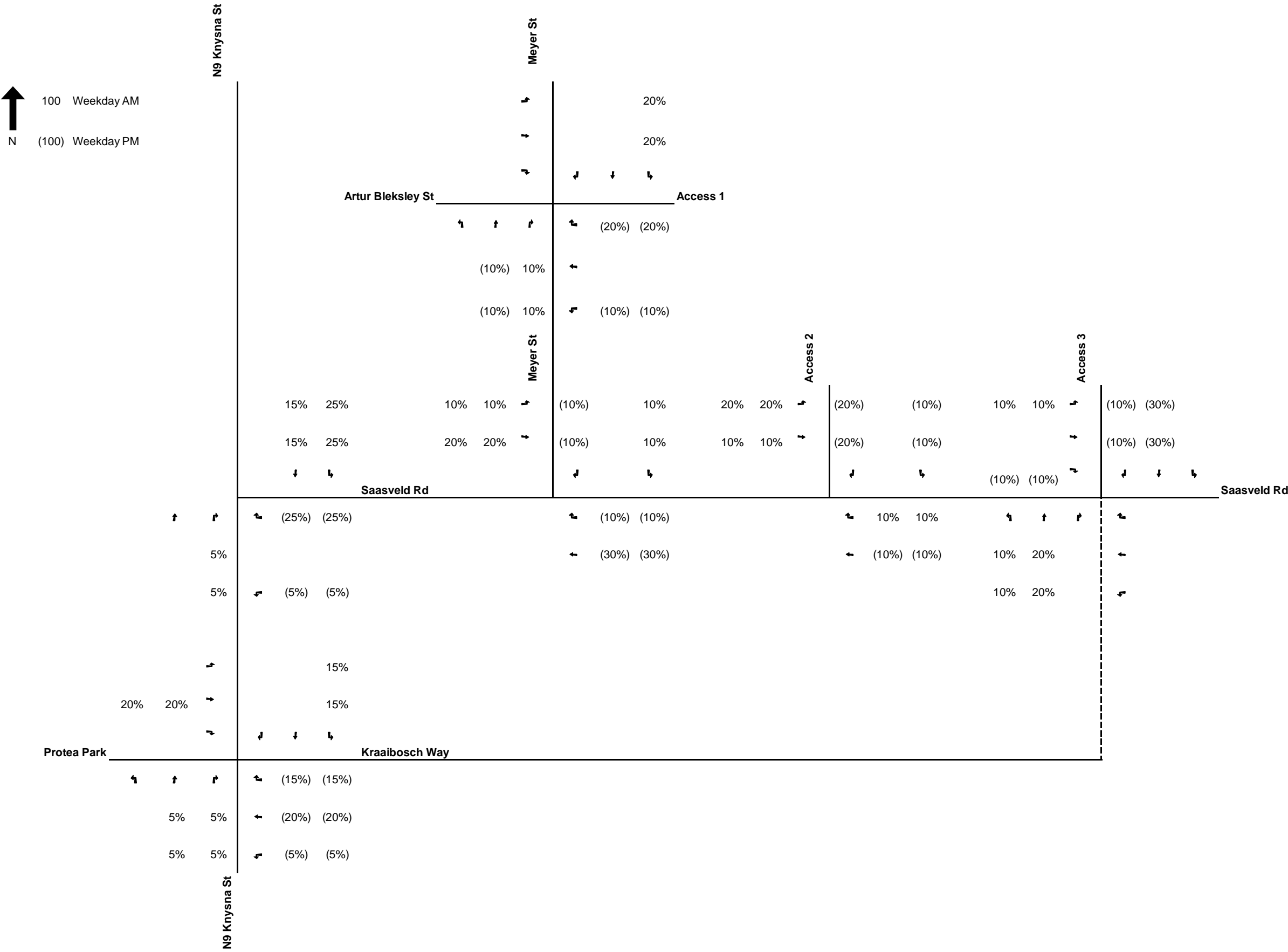
Based on the trip generation potential of the subject site, development trip distribution summary is set out in Table 12.

Table 12: Development Trip Distribution

Direction	Route	Percent	AM In	AM Out	PM In	PM Out
SW	N9 Knysna Street	40%	448	144	468	637
W	Stander Street	30%	336	108	351	478
S	Kraaibosch Way	20%	224	72	234	319
E	N9 Knysna Street	10%	112	36	117	159
Total		100%	1119	361	1170	1593

6.3 Traffic Assignment

Traffic assignment involves determining the percentage of traffic that will use specific routes in the network. The traffic assignment is made with consideration to logical routings, available roadway capacity, right-turn movements, travel times and other factors. Refer to Figure 10.



7. TOTAL TRAFFIC DEMAND

7.1 Figures

The following information on traffic demand is provided for each horizon year and peak hour that is assessed:

- Figure 11 2019 Base Year Traffic;
- Figure 12 Phase 1 Development Trips;
- Figure 13 Phase 1+2 Development Trips;
- Figure 14 2024 Design Year + Phase 1 Development Trips: and
- Figure 15 2029 Planning Year + Phase 1+2 Development Trips.

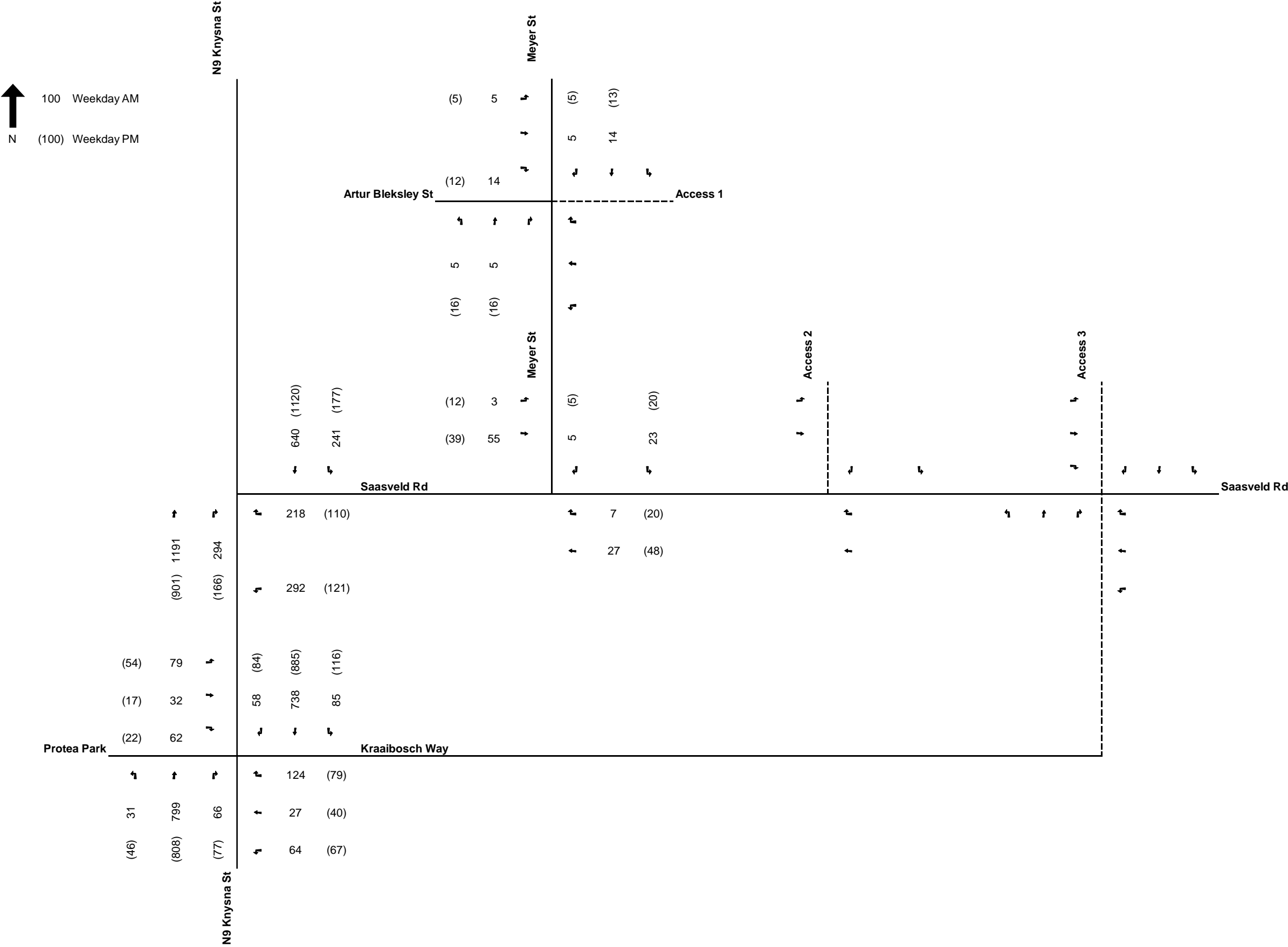
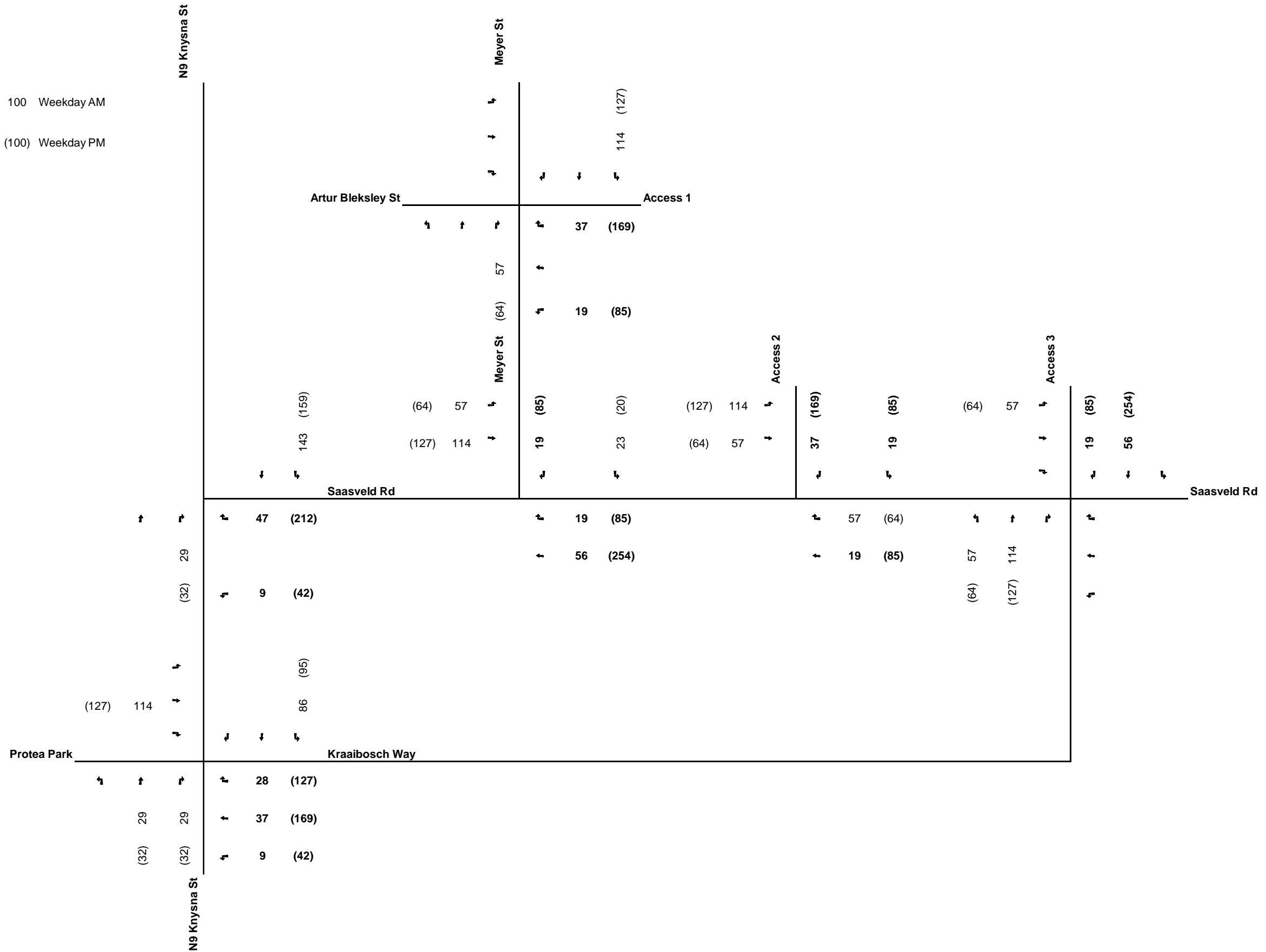



Figure 11: 2018 Base Year Traffic



 100 Weekday AM
N (100) Weekday PM

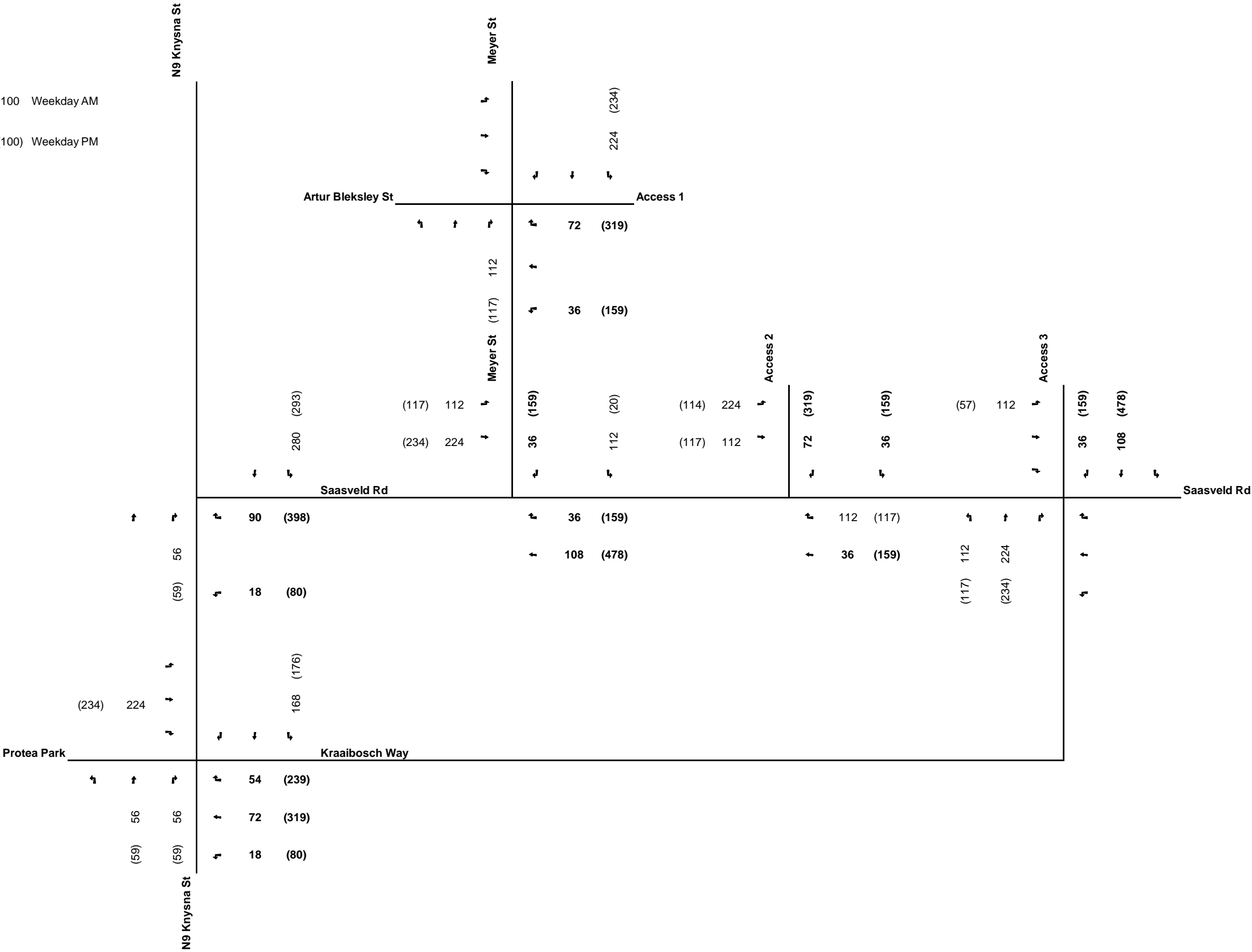


Figure 13: Phase 1+2 Development Trips

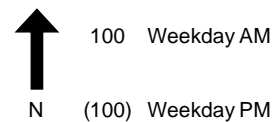
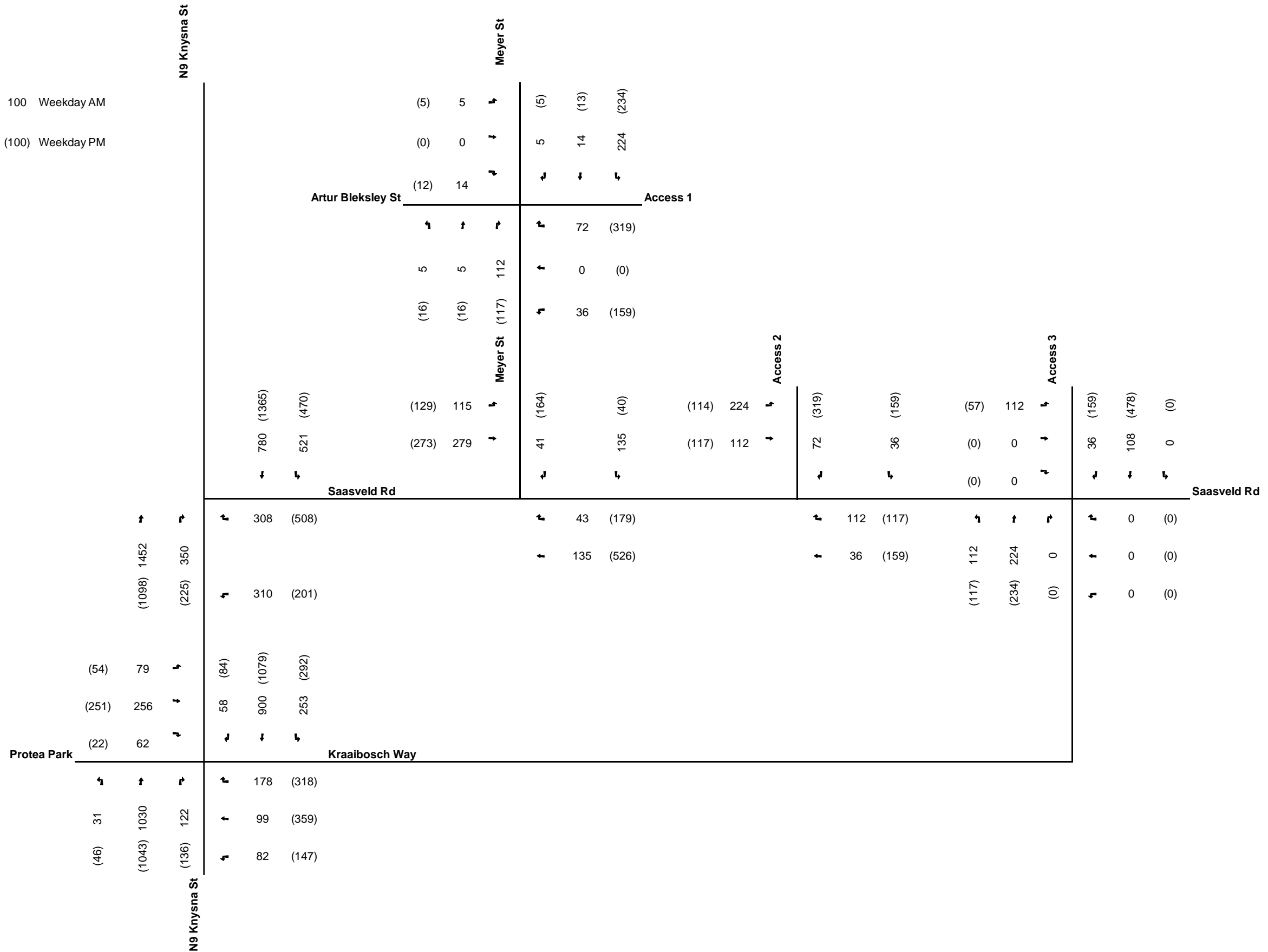


Figure 14: 2025 Design Year + Phase 1 Development Trips



8. TRAFFIC IMPACT ASSESSMENT SCENARIOS

The following scenarios were analysed as part of the Traffic Impact Assessment:

- 2019 Base Year Traffic;
- 2024 Design Year + Phase 1 Development Trips;
- 2029 Planning Year + Phase 1+2 Development Trips; and
- 2029 Planning Year + Phase 1+2 Development Trips + Other Development Trips.

The following sub-sections set out the analysis findings.

8.1 Intersection of N9 Knysna Street and Saasveld Road

The intersection of N9 Knysna Street and Saasveld Road is a signalised T-junction. The north approach has a short left-turn slip-lane plus two through lanes, the east approach has a left-turn lane plus a right-turn lane, and the south approach has two through lanes plus a short right-turn lane. Refer to Figure 16.

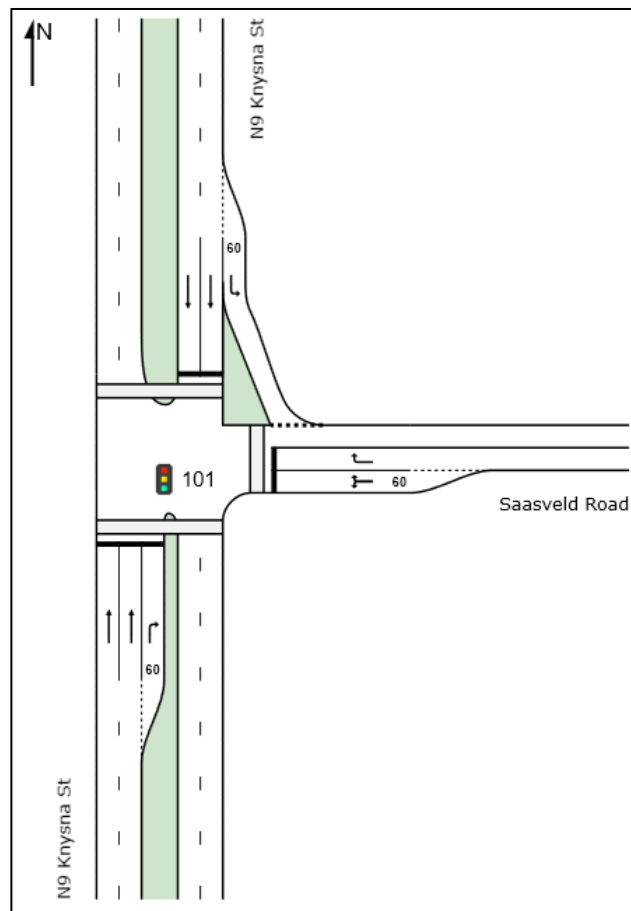


Figure 16: Layout: N9 Knysna Street & Saasveld Road

2019 Base Year Traffic

Taking into consideration the 2019 Base Year traffic flows, the intersection currently operates at Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 12 seconds.

2024 Design Year + Phase 1 Development Trips

Taking into consideration the 2024 Design Year plus Phase 1 Development traffic flows, the intersection will continue to operate at Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 13 seconds.

2029 Planning Year + Phase 1+2 Development Trips

Taking into consideration the 2029 Design Year plus Phase 1+2 Development traffic flows, the intersection will operate at Level of Service B and C during the Weekday AM and PM Peak Hours, with an average delay of approximately 13 and 22 seconds respectively.

It is concluded that the existing intersection configuration would be suitable to accommodate the anticipated Phase 1+2 Development traffic flows at an acceptable Level of Service by a 2029 Planning Year.

2029 Planning Year + Phase 1+2 Development Trips + Other Development Trips

It is recommended that further intersection analysis be undertaken with consideration of the intersection capacity requirements of the full Kraaibosch Development.

8.2 Intersection of N9 Knysna Street and Kraaibosch Road

The intersection of N9 Knysna Street and Kraaibosch Road is a signalised four-leg intersection. The north approach has a short left-turn slip-lane plus two through lanes plus two short right-turn lanes, the east approach has a short left-turn slip-lane plus two through lanes plus a right-turn lane, the south approach has a short left-turn slip-lane plus two through lanes plus two short right-turn lanes, and the west approach has a short left-turn slip-lane plus two through lanes plus a right-turn lane. Refer to Figure 17.

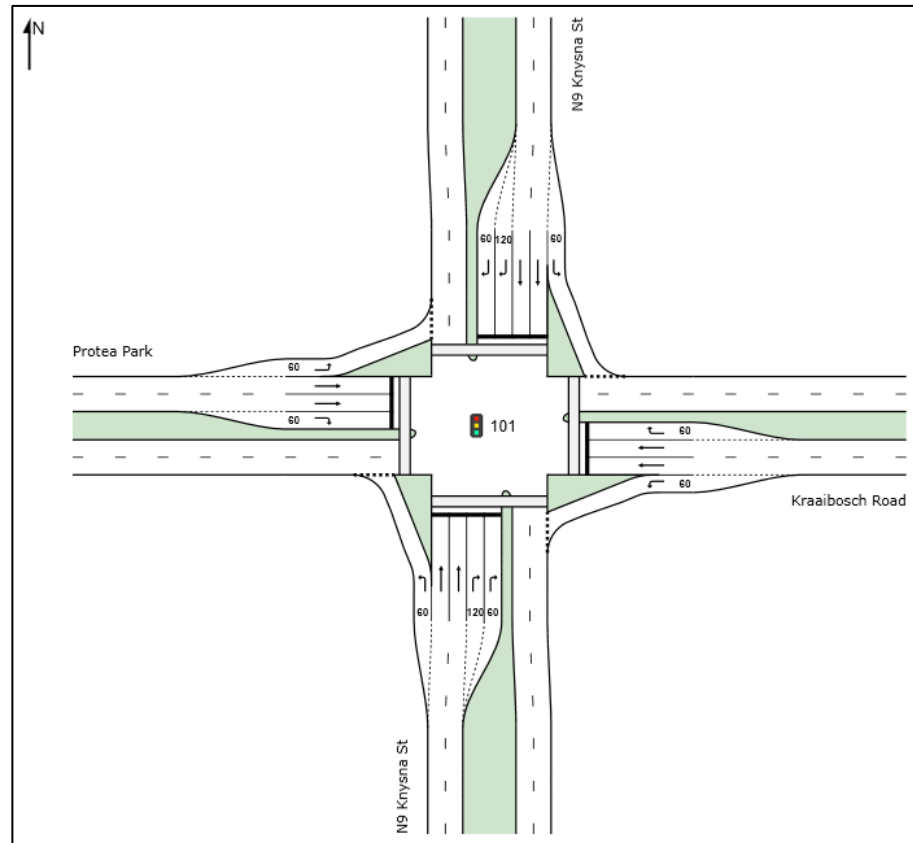


Figure 17: Layout: N9 Knysna Street & Kraaibosch Road

2019 Base Year Traffic

Taking into consideration the 2019 Base Year traffic flows, the intersection currently operates at Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 19 seconds.

2024 Design Year + Phase 1 Development Trips

Taking into consideration the 2024 Design Year plus Phase 1 Development traffic flows, the intersection will operate at Level of Service B and C during the Weekday AM and PM Peak Hours, with an average delay of approximately 19 and 23 seconds respectively.

2029 Planning Year + Phase 1+2 Development Trips

Taking into consideration the 2029 Design Year plus Phase 1+2 Development traffic flows, the intersection will operate at Level of Service C during both the Weekday AM and PM Peak Hours, with an average delay of approximately 29 seconds.

It is concluded that the existing intersection configuration would be suitable to accommodate the anticipated Phase 1+2 Development traffic flows at an acceptable Level of Service by a 2029 Planning Year.

2029 Planning Year + Phase 1+2 Development Trips + Other Development Trips

It is recommended that further intersection analysis be undertaken with consideration of the intersection capacity requirements of the full Kraaibosch Development.

8.3 Intersection of Saasveld Road and Meyer Road

The intersection of Saasveld Road and Meyer Road is a priority-controlled T-junction, with Meyer Road being under stop control. The north approach has one lane serving left- and right-turn movements, the east approach has a single lane serving through and right-turn movements, and the west approach has a single lane serving left-turn and through movements. Refer to Figure 18.

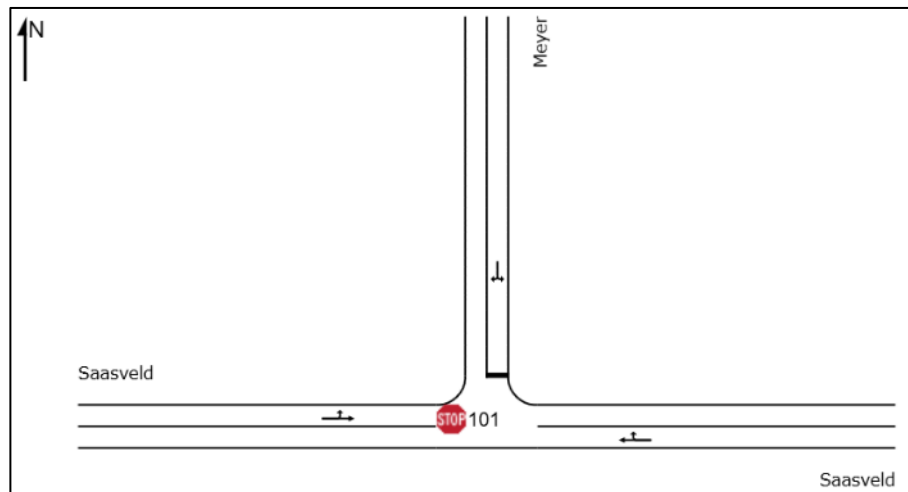


Figure 18: Layout: Saasveld Road & Meyer Road

2019 Base Year Traffic

Taking into consideration the 2019 Base Year traffic flows, the critical movements under stop control currently operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 8 seconds.

2024 Design Year + Phase 1 Development Trips

Taking into consideration the 2024 Design Year plus Phase 1 Development traffic flows, the critical movements under stop control will continue to operate at Level of Service A during both the Weekday AM and PM Peak Hours, with an average delay of approximately 9 seconds.

2029 Planning Year + Phase 1+2 Development Trips

Taking into consideration the 2029 Design Year plus Phase 1+2 Development traffic flows, the intersection will operate at Level of Service F during both the Weekday AM and PM Peak Hours, with significant delays being experienced.

It is our submission that intersection upgrades would be required at this point in time, in order to accommodate the anticipated Phase 1+2 Development traffic flows at an acceptable Level of Service. It is proposed to convert the intersection into a roundabout with one circulation lane. Refer to Figure 19.

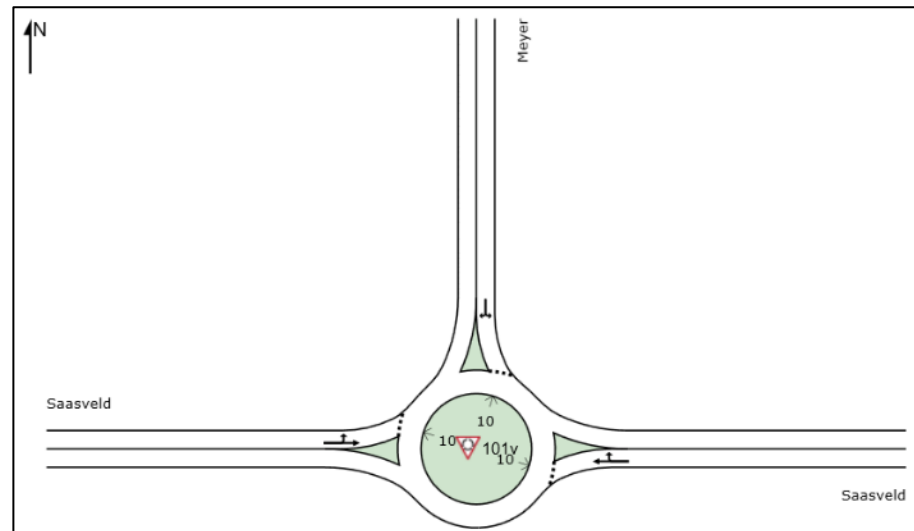


Figure 19: Proposed Layout: Saasveld Road & Meyer Road

Taking into consideration the conversion of the intersection to a roundabout, the critical movements under yield control will operate at Level of Service B during both the Weekday AM and PM Peak Hours, with an average delay of approximately 10 seconds

It is concluded that the proposed intersection configuration would be suitable to accommodate the anticipated Phase 1+2 Development traffic flows at an acceptable Level of Service by a 2029 Planning Year.

8.4 Access 1 and Meyer Road

Access 1 and Meyer Road is planned as a roundabout with one circulating lane. Refer to Figure 20.

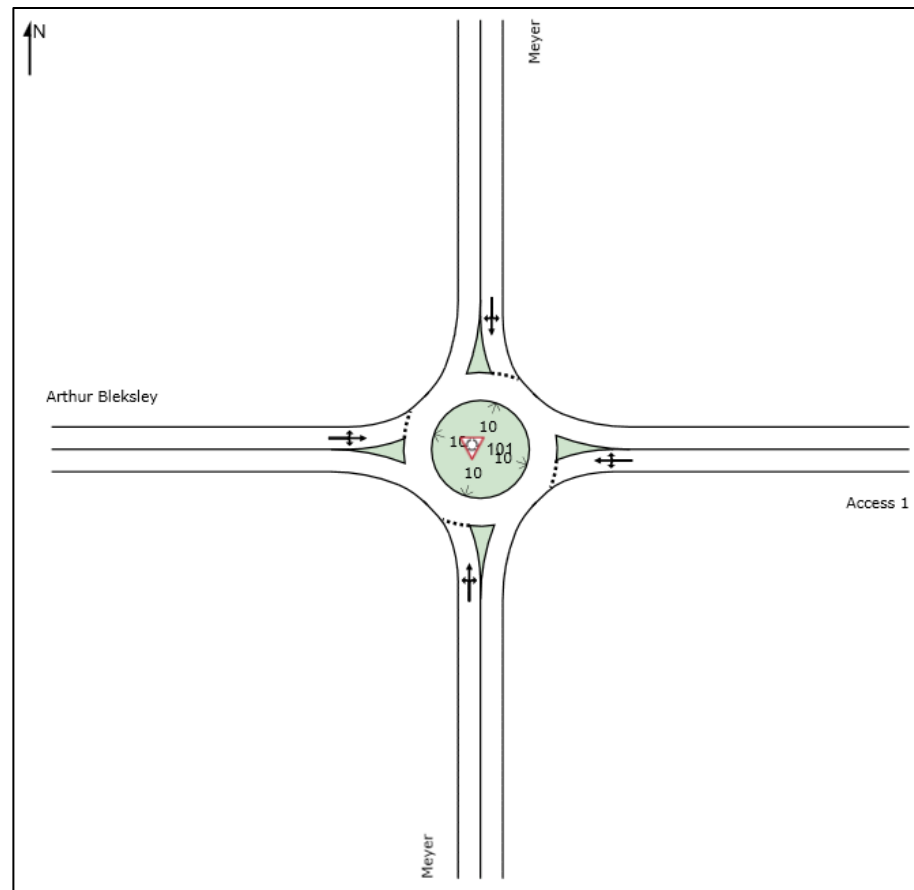


Figure 20: Layout: Access 1 & Meyer Road

2029 Planning Year + Phase 1+2 Development Trips

Taking into consideration the 2029 Design Year plus Phase 1+2 Development traffic flows, the intersection will operate at Level of Service A and B during the Weekday AM and PM Peak Hours, with an average delay of 9 and 10 seconds respectively.

It is concluded that the proposed access configuration would be suitable to accommodate the anticipated Phase 1+2 Development traffic flows at an acceptable Level of Service by a 2029 Planning Year.

8.5 Access 2 and Saasveld Road

Access 2 and Saasveld Road is planned as a roundabout with one circulating lane. Refer to Figure 21.

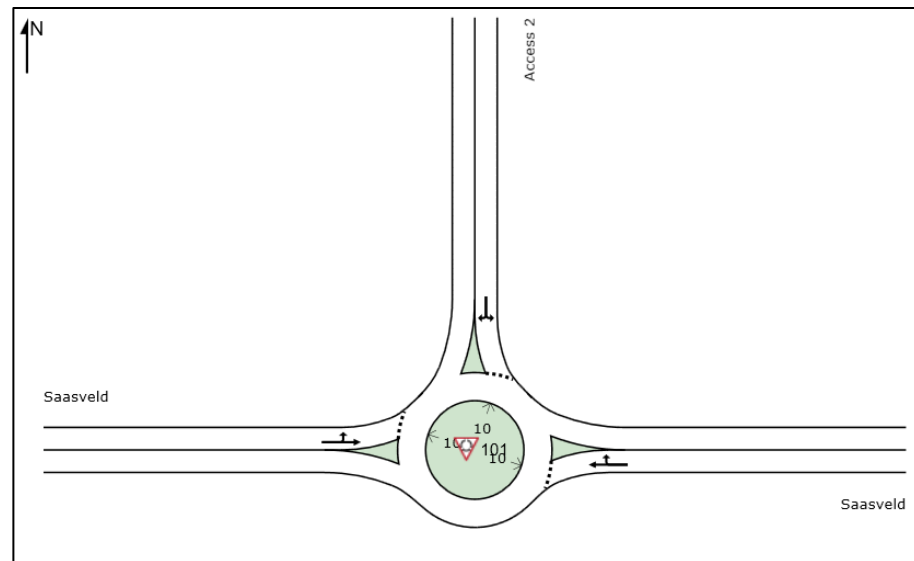


Figure 21: Layout: Access 2 & Saasveld Road

2029 Planning Year + Phase 1+2 Development Trips

Taking into consideration the 2029 Design Year plus Phase 1+2 Development traffic flows, the intersection will operate at Level of Service A and B during the Weekday AM and PM Peak Hours, with an average delay of 9 and 10 seconds respectively.

It is concluded that the proposed access configuration would be suitable to accommodate the anticipated Phase 1+2 Development traffic flows at an acceptable Level of Service by a 2029 Planning Year.

8.6 Access 3 and Saasveld Road / Kraaibosch Road

Access 3 and Saasveld Road / Kraaibosch Road is planned as a roundabout with one circulating lane. Refer to Figure 22.

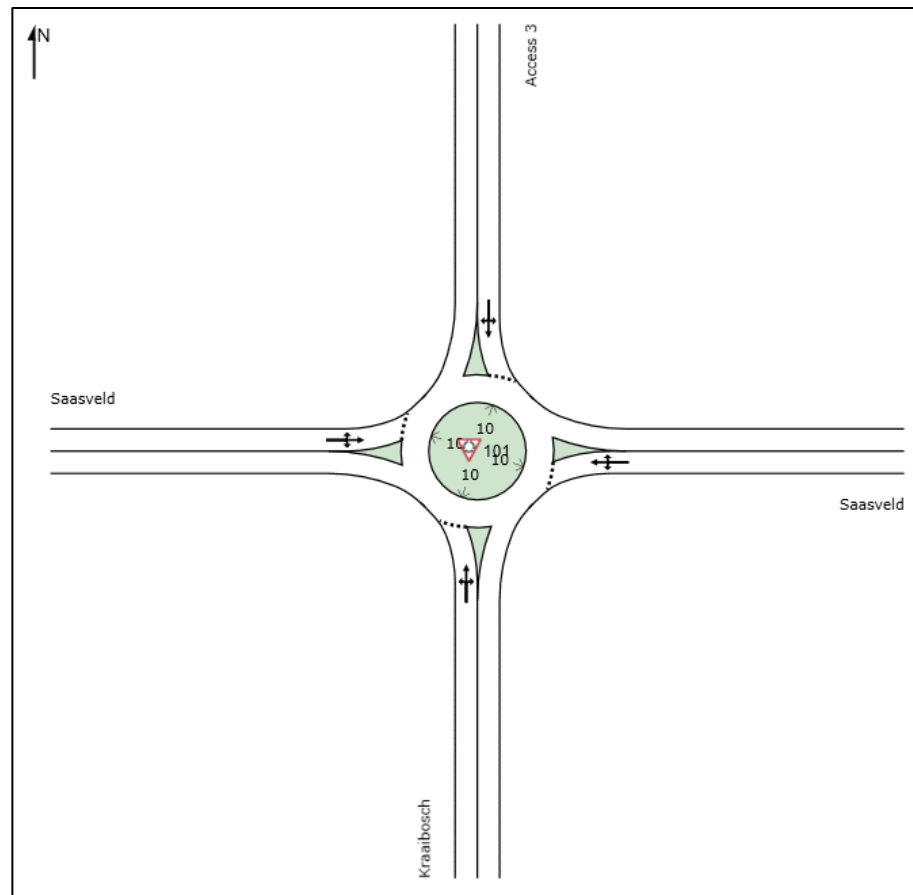


Figure 22: Layout: Access 1 & Meyer Road

2029 Planning Year + Phase 1+2 Development Trips

Taking into consideration the 2029 Design Year plus Phase 1+2 Development traffic flows, the intersection will operate at Level of Service A and B during the Weekday AM and PM Peak Hours, with an average delay of 9 and 12 seconds respectively.

It is concluded that the proposed access configuration would be suitable to accommodate the anticipated Phase 1+2 Development traffic flows at an acceptable Level of Service by a 2029 Planning Year.

8.7 Analysis Summary

A summary of the analysis outputs is provided in Table 13.

Table 13: Analysis Summary (AM / PM)

Scenario	2019 Base Year	2024 Design Year + Phase 1	2029 Design Year + Phase 1+2	2029 Design Year + Phase 1+2 With Upgrades
N9 Knysna Street & Saasveld Road	B / B	B / B	B / C	-
N9 Knysna Street & Kraaibosch Road	B / B	B / C	C / C	-
Saasveld Road & Meyer Road	A / A	A / A	F / F	B / B
Access 1 & Meyer Road	-	-	-	A / B
Access 2 & Saasveld Road	-	-	-	A / B
Access 3 & Saasveld Road / Kraaibosch Road	-	-	-	A / B

9. PROPOSED IMPROVEMENTS

The following transport improvements are proposed as part of the planned development:

2024 Design Year:

- Phase 6 (revised) of the George IPTN to serve the proposed development.

2029 Planning Year:

- Phase 6 (revised) of the George IPTN to serve the proposed development; and
- Convert the Saasveld Road & Meyer Road intersection to a roundabout with one circulating lane.

Note should be taken that the above road improvements are based on the land use type and function. Particular focus is drawn to the Retail component, which would predominantly serve students, and not the general public. Should the focus of the retail development change, this TIA and its recommendations would no longer apply.

10. SITE TRAFFIC ASSESSMENT

A Site Traffic Assessment did not form part of this project assignment. As and when the TIA is approved and a Site Development Plan has been developed, the Site Traffic Assessment will address on-site operations including internal road layout, parking, etc.

11. CONCLUSIONS AND RECOMMENDATIONS

SMEC South Africa (Pty) Ltd was appointed by George Municipality to conduct a Traffic Impact Assessment for the proposed George Campus Development. The site is bound by the Garden Route Dam to the north and Madiba Drive to the south. Refer to Figure 1.

The site measures approximately 118 hectares in extent. The anticipated composition of the development is a Campus catering for 8 000 students, a Waterfront commercial development of 129 300 square metres Gross Lettable Area (GLA), and a Hotel of 34 500 square metres GLA (assumed to be 345 rooms). The Campus component will include residential units for 303 lecturers and 3 009 students.

For the purpose of this TIA it was assumed that the development will be 50% implemented over 5 years by 2024, and 100% within 10 years by 2029. It is anticipated that the development will be 100% implemented over 20 years by 2035, with 80% being built out within 10 years by 2025.

George is currently served by three phases of the George Integrated Public Transport Network (George IPTN). As Kraaibosch and George Campus is rolled out, it is anticipated that these developments will be well served by the George IPTN.

It would be essential that the GIPTN planning take cognisance of the high public transport demand to be generated by the proposed development. It would be opportune to implement the required public transport services before the demand materialize, in order to ensure that the transport network is able to accommodate the anticipated travel demand. Taking into consideration the inputs provided by the GIPTN Unit, it is recommended that a revised Phase 6 of the George IPTN be used to service the needs of the George Campus.

It is recommended that the George NMT Network be revisited as and when the proposed development is approved.

The site will be served by three accesses, as follows:

- Access 1 along Stander Street (opposite Arthur Bleksley Street);
- Access 2 along Saasveld Road (300 metres east of Meyer Street); and
- Access 3 along Saasveld Road (600 metres east of Access 2, and opposite Road 1).

The George Campus design focuses on pedestrian accessibility and mobility, providing green corridors linking all components of the development.

It is anticipated that Phase 1 of the planned development would generate 758 and 1 483 new vehicular trips during the Weekday AM and PM Peak Hours respectively, and with Phase 2 it would generate a total of 1 480 and 2 763 new vehicular trips during the Weekday AM and PM Peak Hours respectively.

As a result of the size and extent of the Retail component forming part of the development, it would be advantageous for measures to be implemented to ensure that

the Waterfront commercial area serves predominantly students as planned, and not the general public.

The following transport improvements are proposed as part of the planned development:

2024 Design Year:

- Phase 6 (revised) of the George IPTN to serve the proposed development.

2029 Planning Year:

- Phase 6 (revised) of the George IPTN to serve the proposed development; and
- Convert the Saasveld Road & Meyer Road intersection to a roundabout with one circulating lane.

Note should be taken that the above road improvements are based on the land use type and function. Particular focus is drawn to the Retail component, which would predominantly serve students, and not the general public. Should the focus of the retail development change, this TIA and its recommendations would no longer apply.

Taking into consideration the trip generation potential of the Kraaibosch area in close proximity to the Campus development, it would be advantageous to assess the combined impact of these developments on the greater transport network, preferably with the use of a regional travel demand model. This would ensure that the required public transport services and transport infrastructure are put in place to serve the future travel demand at appropriate levels of service.

ANNEXURE A: TRAFFIC SURVEY DATA

N9 Knysna & Saasveld														2019			
Weekday Counts																	
AM Peak						Off Peak						PM Peak					
		218		292				67		75				110		121	
241	↗	↖	↘	↙		156	↗	↖	↘	↙		177	↗	↖	↘	↙	
640	↗			↙	294	1058	↗			↙	119	1120	↗			↙	166
	↘			↖	1191		↘			↖	1018		↘			↖	901
	↖	↗	↘	↙			↖	↗	↘	↙			↖	↗	↘	↙	
Time		Volume per Movement															
From	To	South			East			North			West			Hourly			
		1	2	3	4	5	6	7	8	9	10	11	12				
05:00	05:15																
05:15	05:30																
05:30	05:45																
05:45	06:00																
06:00	06:15	0	0	0	0	25	2	5	0	5	5	17	0			59	
06:15	06:30	0	0	0	0	40	4	6	0	3	0	23	0			135	
06:30	06:45	0	0	0	0	63	5	13	0	11	11	57	0			295	
06:45	07:00	0	0	0	0	163	63	21	0	44	50	78	0			714	
07:00	07:15	0	0	0	0	473	158	82	0	69	112	121	0			1 670	
07:15	07:30	0	0	0	0	243	50	81	0	20	54	125	0			2 167	
07:30	07:45	0	0	0	0	268	47	73	0	85	39	193	0			2 712	
07:45	08:00	0	0	0	0	207	39	56	0	44	36	201	0			2 876	
08:00	08:15	0	0	0	0	234	37	39	0	36	34	159	0			2 400	
08:15	08:30	0	0	0	0	155	37	26	0	18	23	178	0			2 264	
08:30	08:45	0	0	0	0	148	16	19	0	31	33	148	0			1 954	
08:45	09:00	0	0	0	0	175	16	12	0	21	14	160	0			1 769	
09:00	09:15	0	0	0	0	171	22	27	0	11	22	136	0			1 619	
09:15	09:30	0	0	0	0	173	14	14	0	13	14	221	0			1 631	
09:30	09:45	0	0	0	0	223	17	17	0	9	26	181	0			1 709	
09:45	10:00	0	0	0	0	175	20	14	0	15	24	195	0			1 754	
10:00	10:15	0	0	0	0	198	15	20	0	35	42	263	0			1 938	
10:15	10:30	0	0	0	0	196	17	11	0	17	24	247	0			2 001	
10:30	10:45	0	0	0	0	235	16	31	0	5	13	189	0			2 017	
10:45	11:00	0	0	0	0	215	22	19	0	16	15	216	0			2 077	
11:00	11:15	0	0	0	0	226	19	26	0	18	43	400	0			2 236	
11:15	11:30	0	0	0	0	252	20	15	0	8	8	25	0			2 052	
11:30	11:45	0	0	0	0	241	23	17	0	22	57	366	0			2 289	
11:45	12:00	0	0	0	0	238	24	12	0	15	22	199	0			2 296	
12:00	12:15	0	0	0	0	265	24	18	0	3	29	222	0			2 125	
12:15	12:30	0	0	0	0	274	48	28	0	27	48	271	0			2 493	
12:30	12:45	0	0	0	0	245	24	42	0	13	35	194	0			2 320	
12:45	13:00	0	0	0	0	276	42	35	0	20	38	251	0			2 472	
13:00	13:15	0	0	0	0	229	35	29	0	23	34	198	0			2 459	
13:15	13:30	0	0	0	0	262	55	6	0	24	50	275	0			2 435	
13:30	13:45	0	0	0	0	135	27	42	0	64	50	229	0			2 429	
13:45	14:00	0	0	0	0	323	57	18	0	6	50	196	0			2 417	
14:00	14:15	0	0	0	0	254	41	72	0	63	37	214	0			2 550	
14:15	14:30	0	0	0	0	230	25	39	0	34	42	259	0			2 507	
14:30	14:45	0	0	0	0	220	35	49	0	31	52	275	0			2 622	
14:45	15:00	0	0	0	0	250	43	26	0	23	50	307	0			2 671	
15:00	15:15	0	0	0	0	257	28	48	0	27	34	200	0			2 584	
15:15	15:30	0	0	0	0	177	22	16	0	5	29	262	0			2 466	
15:30	15:45	0	0	0	0	188	30	33	0	47	39	185	0			2 326	
15:45	16:00	0	0	0	0	252	43	45	0	44	37	243	0			2 291	
16:00	16:15	0	0	0	0	291	27	47	0	35	24	156	0			2 277	
16:15	16:30	0	0	0	0	196	27	21	0	39	62	328	0			2 439	
16:30	16:45	0	0	0	0	221	44	37	0	23	39	240	0			2 521	
16:45	17:00	0	0	0	0	248	45	40	0	27	43	283	0			2 543	
17:00	17:15	0	0	0	0	236	50	23	0	21	33	269	0			2 595	
17:15	17:30	0	0	0	0	242	41	31	0	40	49	269	0			2 594	
17:30	17:45	0	0	0	0	227	34	41	0	44	44	159	0			2 539	
17:45	18:00	0	0	0	0	158	35	20	0	35	33	168	0			2 302	
18:00	18:15																1 670
18:15	18:30																998

Saasveld & Meyer												2019			
Weekday Counts															
AM Peak					Off Peak						PM Peak				
		5		23			2		12			5		20	
3	↑	↓	↓	↓	5	↑	↓	↓	↓	12	↑	↓	↓	↓	
55	↓			↑	29	↓			↑	39	↓			↑	20
	↓			↓		↓			↓		↓			↓	48
	↓	↑	↓	↓		↓	↑	↓	↓		↓	↑	↓	↓	
Time		Volume per Movement													
From	To	South			East			North			West			Hourly	
		1	2	3	4	5	6	7	8	9	10	11	12		
05:00	05:15														
05:15	05:30														
05:30	05:45														
05:45	06:00														
06:00	06:15	0	0	0	0	2	1	0	0	1	0	0	0	4	
06:15	06:30	0	0	0	0	1	0	0	0	0	0	1	0	6	
06:30	06:45	0	0	0	0	3	1	1	0	1	0	2	0	14	
06:45	07:00	0	0	0	0	5	2	3	0	3	0	7	0	34	
07:00	07:15	0	0	0	0	11	3	7	0	3	2	13	0	69	
07:15	07:30	0	0	0	0	6	2	5	0	1	0	6	0	87	
07:30	07:45	0	0	0	0	3	2	5	0	0	0	18	0	107	
07:45	08:00	0	0	0	0	5	1	7	0	1	1	16	0	118	
08:00	08:15	0	0	0	0	13	2	6	0	3	2	15	0	120	
08:15	08:30	0	0	0	0	9	3	3	0	1	0	3	0	119	
08:30	08:45	0	0	0	0	6	1	3	0	2	0	11	0	114	
08:45	09:00	0	0	0	0	2	0	4	0	2	1	9	0	101	
09:00	09:15	0	0	0	0	2	4	4	0	1	1	0	0	72	
09:15	09:30	0	0	0	0	8	2	1	0	0	1	1	0	66	
09:30	09:45	0	0	0	0	5	1	2	0	0	1	2	0	54	
09:45	10:00	0	0	0	0	6	0	3	0	0	1	5	0	51	
10:00	10:15	0	0	0	0	2	2	7	0	0	1	11	0	62	
10:15	10:30	0	0	0	0	5	4	1	0	0	0	3	0	62	
10:30	10:45	0	0	0	0	2	0	4	0	0	0	6	0	63	
10:45	11:00	0	0	0	0	2	2	4	0	0	0	5	0	61	
11:00	11:15	0	0	0	0	3	4	3	0	1	0	3	0	52	
11:15	11:30	0	0	0	0	6	2	3	0	2	0	7	0	59	
11:30	11:45	0	0	0	0	6	2	5	0	0	1	4	0	65	
11:45	12:00	0	0	0	0	0	3	1	0	0	0	2	0	58	
12:00	12:15	0	0	0	0	1	2	7	0	1	0	2	0	57	
12:15	12:30	0	0	0	0	3	0	1	0	1	2	4	0	48	
12:30	12:45	0	0	0	0	1	3	2	0	2	1	3	0	42	
12:45	13:00	0	0	0	0	5	4	4	0	0	1	3	0	53	
13:00	13:15	0	0	0	0	3	2	2	0	0	1	4	0	52	
13:15	13:30	0	0	0	0	4	1	4	0	0	1	7	0	58	
13:30	13:45	0	0	0	0	4	1	2	0	1	3	6	0	63	
13:45	14:00	0	0	0	0	7	1	4	0	1	0	12	0	71	
14:00	14:15	0	0	0	0	7	6	4	0	2	3	6	0	87	
14:15	14:30	0	0	0	0	4	3	3	0	0	1	11	0	92	
14:30	14:45	0	0	0	0	2	0	1	0	4	1	4	0	87	
14:45	15:00	0	0	0	0	2	2	4	0	1	1	5	0	77	
15:00	15:15	0	0	0	0	7	2	4	0	3	3	4	0	72	
15:15	15:30	0	0	0	0	4	3	2	0	2	2	4	0	67	
15:30	15:45	0	0	0	0	4	3	5	0	2	1	6	0	76	
15:45	16:00	0	0	0	0	7	2	5	0	0	1	11	0	87	
16:00	16:15	0	0	0	0	8	2	3	0	0	5	6	0	88	
16:15	16:30	0	0	0	0	19	7	6	0	1	2	9	0	115	
16:30	16:45	0	0	0	0	10	3	5	0	2	3	7	0	124	
16:45	17:00	0	0	0	0	11	8	6	0	2	2	17	0	144	
17:00	17:15	0	0	0	0	5	0	5	0	3	3	5	0	141	
17:15	17:30	0	0	0	0	6	6	2	0	1	0	5	0	117	
17:30	17:45	0	0	0	0	3	1	8	0	0	0	13	0	112	
17:45	18:00	0	0	0	0	0	2	1	0	0	1	4	0	74	
18:00	18:15													53	
18:15	18:30													33	

N9 Knysna & Kraaibosch														2019				
Weekday Counts																		
AM Peak						Off Peak						PM Peak						
			124	27	64				65	20	62				79	40	67	
85	↗		↖	↘	↗		132	↗	↖	↘	↗		116	↗	↖	↘	↗	
738	↗				↗	66	944	↗			↗	87	885	↗			↗	77
58	↘				↘	799	100	↘			↘	914	84	↘			↘	808
	↖	↗	↘	↖	↖	31		↖	↗	↘	↖	41		↖	↗	↘	↖	46
	79	32	62				64	35	30				54	17	22			
Time		Volume per Movement																
From	To	South			East			North			West			Hourly				
		1	2	3	4	5	6	7	8	9	10	11	12					
05:00	05:15																	
05:15	05:30																	
05:30	05:45																	
05:45	06:00																	
06:00	06:15	1	0	1	3	17	4	2	0	2	2	19	0				51	
06:15	06:30	1	2	14	2	45	5	6	5	5	2	28	3				169	
06:30	06:45	6	5	12	6	65	9	4	3	10	6	42	2				339	
06:45	07:00	33	9	9	8	135	11	3	6	30	6	75	10				674	
07:00	07:15	22	9	15	6	238	13	16	10	37	7	131	10				1 137	
07:15	07:30	20	6	21	10	226	9	16	5	46	23	191	12				1 604	
07:30	07:45	18	8	17	6	187	19	14	7	21	38	237	20				2 026	
07:45	08:00	19	9	9	9	148	25	18	5	20	17	179	16				2 165	
08:00	08:15	11	6	6	5	155	14	11	5	23	17	166	17				2 087	
08:15	08:30	17	6	11	6	170	14	11	2	29	15	170	12				1 965	
08:30	08:45	12	3	12	6	132	11	18	8	30	29	162	11				1 807	
08:45	09:00	5	5	4	5	100	5	6	7	18	22	145	19				1 674	
09:00	09:15	13	3	14	6	136	13	11	4	14	14	157	20				1 643	
09:15	09:30	19	6	6	4	128	13	10	9	20	14	154	20				1 583	
09:30	09:45	13	6	7	6	152	16	11	5	26	19	185	19				1 614	
09:45	10:00	20	5	5	3	171	25	22	5	23	38	229	34				1 853	
10:00	10:15	9	1	11	3	144	16	22	1	14	19	175	15				1 878	
10:15	10:30	8	5	11	9	203	13	19	8	28	24	207	34				2 044	
10:30	10:45	14	8	10	13	192	13	15	9	28	19	217	23				2 140	
10:45	11:00	31	6	8	12	263	25	31	11	42	43	229	31				2 292	
11:00	11:15	8	2	1	3	132	13	11	1	6	15	109	10				2 173	
11:15	11:30	8	3	3	9	119	8	15	6	9	22	115	16				1 937	
11:30	11:45	16	7	7	3	145	16	9	1	11	13	125	6				1 735	
11:45	12:00	16	18	11	11	276	21	16	4	21	49	395	49				1 890	
12:00	12:15	5	6	6	7	173	18	15	5	11	33	147	11				2 016	
12:15	12:30	29	6	5	12	309	30	15	7	25	22	215	24				2 382	
12:30	12:45	14	5	8	11	156	18	16	4	8	28	187	16				2 494	
12:45	13:00	9	4	2	4	254	30	19	9	18	27	209	25				2 217	
13:00	13:15	17	7	7	9	199	12	15	10	14	30	172	28				2 300	
13:15	13:30	28	7	7	8	228	19	20	6	12	29	243	25				2 233	
13:30	13:45	16	3	7	8	220	20	14	4	13	28	146	11				2 252	
13:45	14:00	16	8	6	4	225	22	8	3	19	18	183	17				2 171	
14:00	14:15	24	8	7	12	204	16	7	7	29	20	208	25				2 218	
14:15	14:30	19	2	7	10	192	13	10	8	16	25	228	27				2 143	
14:30	14:45	30	2	7	11	221	32	12	5	35	43	289	41				2 381	
14:45	15:00	15	5	7	6	192	19	6	4	17	18	143	13				2 297	
15:00	15:15	14	9	12	2	188	19	11	5	25	23	224	41				2 303	
15:15	15:30	6	4	7	11	194	23	13	5	22	22	175	21				2 249	
15:30	15:45	16	1	5	5	173	23	4	1	16	13	176	18				1 972	
15:45	16:00	11	10	7	11	201	18	9	4	25	23	188	17				2 051	
16:00	16:15	17	4	3	15	247	23	16	12	22	41	254	22				2 154	
16:15	16:30	12	5	6	8	138	11	15	5	13	19	169	8				2 060	
16:30	16:45	15	6	6	14	211	20	22	12	21	26	215	23				2 200	
16:45	17:00	10	2	7	9	212	23	14	11	23	30	247	31				2 295	
17:00	17:15	8	9	17	19	181	16	13	5	13	31	209	17				2 157	
17:15	17:30	5	3	10	6	97	10	6	4	5	6	87	11				1 998	
17:30	17:45	32	5	27	29	296	32	26	1	32	32	312	30				2 261	
17:45	18:00	14	1	5	5	137	15	4	0	11	22	131	8				1 995	
18:00	18:15																1 457	
18:15	18:30																1 207	

ANNEXURE B: DETAILED SIDRA OUTPUTS

Intersection of N9 Knysna Street & Saasveld Road

2019 Base Year

AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: N9 Knysna St												
2	T1	1254	3.0	0.566	7.1	LOS A	8.5	60.7	0.72	0.64	0.72	53.7
3	R2	309	3.0	0.594	13.9	LOS B	3.8	27.1	0.91	0.81	0.93	47.7
Approach		1563	3.0	0.594	8.4	LOS A	8.5	60.7	0.76	0.67	0.77	52.4
East: Saasveld Road												
4	L2	307	3.0	0.681	22.8	LOS C	6.1	43.8	0.97	0.87	1.09	42.7
6	R2	229	3.0	0.509	21.1	LOS C	4.2	29.9	0.92	0.80	0.92	43.6
Approach		537	3.0	0.681	22.1	LOS C	6.1	43.8	0.95	0.84	1.02	43.1
North: N9 Knysna St												
7	L2	254	3.0	0.210	7.5	LOS A	1.2	8.8	0.45	0.67	0.45	52.6
8	T1	674	3.0	0.639	15.7	LOS B	6.3	45.5	0.94	0.82	1.01	47.7
Approach		927	3.0	0.639	13.4	LOS B	6.3	45.5	0.81	0.78	0.85	49.0
All Vehicles		3027	3.0	0.681	12.4	LOS B	8.5	60.7	0.81	0.73	0.84	49.5

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: N9 Knysna St												
2	T1	948	3.0	0.351	4.5	LOS A	5.4	38.7	0.50	0.43	0.50	55.9
3	R2	175	3.0	0.394	13.4	LOS B	1.8	13.2	0.82	0.77	0.82	48.0
Approach		1123	3.0	0.394	5.9	LOS A	5.4	38.7	0.55	0.49	0.55	54.5
East: Saasveld Road												
4	L2	127	3.0	0.397	27.1	LOS C	3.0	21.3	0.94	0.77	0.94	40.7
6	R2	116	3.0	0.361	27.0	LOS C	2.7	19.2	0.93	0.77	0.93	40.8
Approach		243	3.0	0.397	27.1	LOS C	3.0	21.3	0.94	0.77	0.94	40.7
North: N9 Knysna St												
7	L2	186	3.0	0.139	6.9	LOS A	0.8	5.8	0.33	0.64	0.33	53.0
8	T1	1179	3.0	0.666	12.9	LOS B	11.9	85.2	0.86	0.76	0.86	49.5
Approach		1365	3.0	0.666	12.1	LOS B	11.9	85.2	0.79	0.74	0.79	50.0
All Vehicles		2732	3.0	0.666	10.9	LOS B	11.9	85.2	0.70	0.64	0.70	50.7

2024 Design Year + Phase 1 Development

AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: N9 Knysna St												
2	T1	1384	3.0	0.625	7.4	LOS A	9.8	70.2	0.76	0.67	0.76	53.5
3	R2	340	3.0	0.672	15.0	LOS B	4.4	31.6	0.95	0.85	1.05	47.0
Approach		1724	3.0	0.672	8.9	LOS A	9.8	70.2	0.80	0.71	0.82	52.1
East: Saasveld Road												
4	L2	317	3.0	0.702	23.1	LOS C	6.4	45.8	0.97	0.89	1.13	42.6
6	R2	279	3.0	0.618	21.9	LOS C	5.3	38.2	0.95	0.84	1.01	43.2
Approach		596	3.0	0.702	22.6	LOS C	6.4	45.8	0.96	0.86	1.07	42.9
North: N9 Knysna St												
7	L2	404	3.0	0.333	7.7	LOS A	2.1	15.2	0.49	0.69	0.49	52.4
8	T1	744	3.0	0.706	16.7	LOS B	7.4	52.8	0.96	0.88	1.10	47.1
Approach		1148	3.0	0.706	13.5	LOS B	7.4	52.8	0.80	0.81	0.88	48.8
All Vehicles		3468	3.0	0.706	12.8	LOS B	9.8	70.2	0.82	0.77	0.88	49.2

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: N9 Knysna St												
2	T1	1047	3.0	0.401	5.2	LOS A	6.5	46.6	0.54	0.47	0.54	55.3
3	R2	208	3.0	0.500	15.0	LOS B	2.5	17.8	0.90	0.79	0.90	47.0
Approach		1256	3.0	0.500	6.8	LOS A	6.5	46.6	0.60	0.53	0.60	53.7
East: Saasveld Road												
4	L2	172	3.0	0.707	28.9	LOS C	6.5	46.6	0.99	0.88	1.14	39.9
6	R2	339	3.0	0.707	28.9	LOS C	6.5	46.6	0.99	0.88	1.14	39.9
Approach		511	3.0	0.707	28.9	LOS C	6.5	46.6	0.99	0.88	1.14	39.9
North: N9 Knysna St												
7	L2	354	3.0	0.264	7.2	LOS A	1.7	12.4	0.38	0.66	0.38	52.8
8	T1	1302	3.0	0.772	16.7	LOS B	15.4	110.7	0.93	0.89	1.05	47.1
Approach		1656	3.0	0.772	14.7	LOS B	15.4	110.7	0.81	0.84	0.90	48.2
All Vehicles		3422	3.0	0.772	13.9	LOS B	15.4	110.7	0.76	0.73	0.83	48.5

2029 Planning Year + Phase 1+2 Development

AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: N9 Knysna St												
2	T1	1528	3.0	0.690	8.2	LOS A	11.7	83.9	0.80	0.73	0.82	52.9
3	R2	368	3.0	0.748	16.5	LOS B	5.1	36.7	0.98	0.90	1.19	46.1
Approach		1897	3.0	0.748	9.8	LOS A	11.7	83.9	0.84	0.76	0.89	51.4
East: Saasveld Road												
4	L2	326	3.0	0.723	23.5	LOS C	6.7	47.9	0.98	0.90	1.16	42.4
6	R2	324	3.0	0.719	23.5	LOS C	6.6	47.5	0.98	0.90	1.15	42.5
Approach		651	3.0	0.723	23.5	LOS C	6.7	47.9	0.98	0.90	1.16	42.4
North: N9 Knysna St												
7	L2	548	3.0	0.448	8.1	LOS A	3.2	23.2	0.54	0.71	0.54	52.1
8	T1	821	3.0	0.779	18.5	LOS B	8.7	62.5	0.99	0.96	1.24	46.0
Approach		1369	3.0	0.779	14.3	LOS B	8.7	62.5	0.81	0.86	0.96	48.3
All Vehicles		3917	3.0	0.779	13.7	LOS B	11.7	83.9	0.85	0.82	0.96	48.6

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: N9 Knysna St												
2	T1	1156	3.0	0.414	6.7	LOS A	10.4	74.4	0.50	0.45	0.50	54.1
3	R2	237	3.0	0.613	24.3	LOS C	5.5	39.5	0.97	0.84	1.02	42.0
Approach		1393	3.0	0.613	9.7	LOS A	10.4	74.4	0.58	0.51	0.59	51.5
East: Saasveld Road												
4	L2	212	3.0	0.876	48.1	LOS D	16.8	120.8	1.00	0.99	1.33	33.0
6	R2	535	3.0	0.876	48.1	LOS D	16.8	120.8	1.00	0.99	1.33	33.0
Approach		746	3.0	0.876	48.1	LOS D	16.8	120.8	1.00	0.99	1.33	33.0
North: N9 Knysna St												
7	L2	495	3.0	0.363	8.2	LOS A	4.5	32.5	0.41	0.68	0.41	52.2
8	T1	1437	3.0	0.861	27.4	LOS C	33.9	243.3	0.90	0.93	1.07	41.4
Approach		1932	3.0	0.861	22.5	LOS C	33.9	243.3	0.77	0.87	0.90	43.7
All Vehicles		4071	3.0	0.876	22.8	LOS C	33.9	243.3	0.75	0.77	0.87	43.4

Intersection of N9 Knysna Street & Kraaibosch Road

2019 Base Year AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: N9 Knysna St												
1	L2	33	3.0	0.023	6.1	LOS A	0.1	0.7	0.17	0.58	0.17	53.6
2	T1	841	3.0	0.558	19.7	LOS B	11.7	83.8	0.86	0.74	0.86	45.4
3	R2	69	3.0	0.088	17.1	LOS B	0.6	4.5	0.74	0.69	0.74	46.2
Approach		943	3.0	0.558	19.0	LOS B	11.7	83.8	0.82	0.73	0.82	45.7
East: Kraaibosch Road												
4	L2	67	3.0	0.058	8.3	LOS A	0.6	4.3	0.36	0.63	0.36	52.0
5	T1	28	3.0	0.039	26.4	LOS C	0.4	2.9	0.86	0.60	0.86	42.0
6	R2	131	3.0	0.294	24.8	LOS C	3.4	24.4	0.83	0.74	0.83	42.3
Approach		226	3.0	0.294	20.1	LOS C	3.4	24.4	0.70	0.69	0.70	44.7
North: N9 Knysna St												
7	L2	89	3.0	0.060	6.1	LOS A	0.3	2.0	0.17	0.59	0.17	53.6
8	T1	777	3.0	0.516	19.3	LOS B	10.6	75.9	0.84	0.72	0.84	45.7
9	R2	61	3.0	0.084	17.4	LOS B	0.5	3.9	0.76	0.69	0.76	46.0
Approach		927	3.0	0.516	17.9	LOS B	10.6	75.9	0.77	0.71	0.77	46.3
West: Protea Park												
10	L2	83	3.0	0.085	8.9	LOS A	0.8	6.0	0.40	0.64	0.40	51.6
11	T1	34	3.0	0.051	26.6	LOS C	0.5	3.5	0.86	0.61	0.86	41.9
12	R2	65	3.0	0.419	41.0	LOS D	2.3	16.4	0.99	0.75	0.99	35.7
Approach		182	3.0	0.419	23.7	LOS C	2.3	16.4	0.69	0.68	0.69	42.9
All Vehicles		2279	3.0	0.558	19.0	LOS B	11.7	83.8	0.78	0.71	0.78	45.6

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: N9 Knysna St												
1	L2	48	3.0	0.035	6.1	LOS A	0.2	1.2	0.13	0.58	0.13	53.7
2	T1	851	3.0	0.370	15.1	LOS B	12.8	91.7	0.61	0.54	0.61	48.2
3	R2	81	3.0	0.107	15.7	LOS B	0.8	6.0	0.57	0.67	0.57	47.1
Approach		980	3.0	0.370	14.7	LOS B	12.8	91.7	0.58	0.55	0.58	48.3
East: Kraaibosch Road												
4	L2	71	3.0	0.064	7.9	LOS A	0.7	5.2	0.26	0.61	0.26	52.4
5	T1	42	3.0	0.065	42.9	LOS D	1.0	7.0	0.88	0.63	0.88	35.4
6	R2	83	3.0	0.240	41.9	LOS D	3.7	26.5	0.86	0.73	0.86	35.4
Approach		196	3.0	0.240	29.9	LOS C	3.7	26.5	0.65	0.67	0.65	40.0
North: N9 Knysna St												
7	L2	122	3.0	0.082	6.0	LOS A	0.4	2.8	0.12	0.58	0.12	53.7
8	T1	932	3.0	0.405	15.4	LOS B	14.3	102.9	0.63	0.55	0.63	47.9
9	R2	88	3.0	0.114	15.3	LOS B	0.9	6.6	0.55	0.66	0.55	47.3
Approach		1142	3.0	0.405	14.4	LOS B	14.3	102.9	0.57	0.56	0.57	48.5
West: Protea Park												
10	L2	57	3.0	0.057	8.1	LOS A	0.6	4.4	0.27	0.61	0.27	52.2
11	T1	18	3.0	0.030	42.6	LOS D	0.4	2.9	0.87	0.60	0.87	35.5
12	R2	23	3.0	0.233	62.8	LOS E	1.3	9.1	0.99	0.71	0.99	29.5
Approach		98	3.0	0.233	27.3	LOS C	1.3	9.1	0.55	0.63	0.55	41.2
All Vehicles		2416	3.0	0.405	16.3	LOS B	14.3	102.9	0.58	0.57	0.58	47.3

2024 Design Year + Phase 1 Development AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: N9 Knysna St												
1	L2	33	3.0	0.023	6.2	LOS A	0.1	0.8	0.18	0.58	0.18	53.5
2	T1	959	3.0	0.637	20.4	LOS C	13.8	99.1	0.89	0.77	0.89	45.0
3	R2	100	3.0	0.135	17.6	LOS B	0.9	6.5	0.77	0.70	0.77	45.9
Approach		1092	3.0	0.637	19.7	LOS B	13.8	99.1	0.86	0.76	0.86	45.3
East: Kraaibosch Road												
4	L2	77	3.0	0.068	8.6	LOS A	0.7	5.2	0.38	0.64	0.38	51.8
5	T1	67	3.0	0.093	26.9	LOS C	1.0	7.1	0.87	0.64	0.87	41.8
6	R2	160	3.0	0.406	25.4	LOS C	4.2	30.5	0.88	0.77	0.88	42.0
Approach		304	3.0	0.406	21.5	LOS C	4.2	30.5	0.75	0.70	0.75	44.1
North: N9 Knysna St												
7	L2	180	3.0	0.129	6.6	LOS A	0.9	6.5	0.24	0.61	0.24	53.3
8	T1	858	3.0	0.570	19.8	LOS B	12.0	85.9	0.86	0.74	0.86	45.4
9	R2	61	3.0	0.090	18.0	LOS B	0.5	3.9	0.79	0.69	0.79	45.7
Approach		1099	3.0	0.570	17.5	LOS B	12.0	85.9	0.75	0.72	0.75	46.5
West: Protea Park												
10	L2	83	3.0	0.091	10.0	LOS A	1.0	7.0	0.44	0.66	0.44	50.8
11	T1	154	3.0	0.234	27.9	LOS C	2.3	16.8	0.90	0.69	0.90	41.3
12	R2	65	3.0	0.419	41.0	LOS D	2.3	16.4	0.99	0.75	0.99	35.7
Approach		302	3.0	0.419	25.8	LOS C	2.3	16.8	0.79	0.70	0.79	42.0
All Vehicles		2797	3.0	0.637	19.7	LOS B	13.8	99.1	0.80	0.73	0.80	45.3

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: N9 Knysna St												
1	L2	48	3.0	0.035	6.6	LOS A	0.2	1.8	0.23	0.60	0.23	53.3
2	T1	973	3.0	0.734	24.6	LOS C	15.6	112.0	0.95	0.86	1.01	42.8
3	R2	115	3.0	0.186	20.8	LOS C	1.1	8.2	0.88	0.73	0.88	44.2
Approach		1136	3.0	0.734	23.5	LOS C	15.6	112.0	0.91	0.84	0.96	43.3
East: Kraaibosch Road												
4	L2	115	3.0	0.102	9.3	LOS A	1.2	8.9	0.42	0.66	0.42	51.3
5	T1	220	3.0	0.304	28.2	LOS C	3.4	24.4	0.92	0.72	0.92	41.2
6	R2	217	3.0	0.451	23.2	LOS C	5.4	38.9	0.87	0.78	0.87	43.1
Approach		552	3.0	0.451	22.3	LOS C	5.4	38.9	0.79	0.73	0.79	43.7
North: N9 Knysna St												
7	L2	222	3.0	0.157	6.6	LOS A	1.2	8.3	0.24	0.61	0.24	53.3
8	T1	1028	3.0	0.792	26.9	LOS C	18.0	129.1	0.97	0.93	1.09	41.7
9	R2	88	3.0	0.142	20.3	LOS C	0.9	6.3	0.85	0.71	0.85	44.4
Approach		1339	3.0	0.792	23.1	LOS C	18.0	129.1	0.84	0.86	0.94	43.4
West: Protea Park												
10	L2	57	3.0	0.065	10.8	LOS B	0.7	5.1	0.48	0.65	0.48	50.3
11	T1	152	3.0	0.231	27.9	LOS C	2.3	16.6	0.90	0.69	0.90	41.3
12	R2	23	3.0	0.099	35.8	LOS D	0.7	5.2	0.91	0.70	0.91	37.6
Approach		232	3.0	0.231	24.5	LOS C	2.3	16.6	0.80	0.68	0.80	42.8
All Vehicles		3258	3.0	0.792	23.2	LOS C	18.0	129.1	0.85	0.82	0.91	43.4

2029 Planning Year + Phase 1+2 Development AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: N9 Knysna St												
1	L2	33	3.0	0.023	6.2	LOS A	0.1	0.8	0.18	0.58	0.18	53.5
2	T1	1084	3.0	0.722	21.9	LOS C	16.7	119.6	0.93	0.83	0.96	44.2
3	R2	128	3.0	0.185	18.4	LOS B	1.2	8.5	0.81	0.72	0.81	45.5
Approach		1245	3.0	0.722	21.2	LOS C	16.7	119.6	0.89	0.81	0.92	44.5
East: Kraaibosch Road												
4	L2	86	3.0	0.078	9.3	LOS A	0.9	6.6	0.41	0.65	0.41	51.3
5	T1	104	3.0	0.144	27.2	LOS C	1.6	11.1	0.88	0.66	0.88	41.6
6	R2	187	3.0	0.531	26.1	LOS C	5.1	36.3	0.93	0.78	0.93	41.7
Approach		378	3.0	0.531	22.6	LOS C	5.1	36.3	0.80	0.72	0.80	43.5
North: N9 Knysna St												
7	L2	266	3.0	0.199	7.1	LOS A	1.8	12.6	0.30	0.64	0.30	52.9
8	T1	947	3.0	0.629	20.3	LOS C	13.6	97.5	0.89	0.77	0.89	45.1
9	R2	61	3.0	0.096	18.7	LOS B	0.5	3.9	0.82	0.70	0.82	45.3
Approach		1275	3.0	0.629	17.5	LOS B	13.6	97.5	0.76	0.74	0.76	46.5
West: Protea Park												
10	L2	83	3.0	0.096	11.3	LOS B	1.1	8.0	0.51	0.67	0.51	49.9
11	T1	269	3.0	0.411	29.0	LOS C	4.3	30.7	0.94	0.75	0.94	40.8
12	R2	65	3.0	0.419	41.0	LOS D	2.3	16.4	0.99	0.75	0.99	35.7
Approach		418	3.0	0.419	27.3	LOS C	4.3	30.7	0.86	0.73	0.86	41.4
All Vehicles		3316	3.0	0.722	20.7	LOS C	16.7	119.6	0.83	0.76	0.84	44.7

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	v/c	sec		veh	m				km/h
South: N9 Knysna St												
1	L2	48	3.0	0.036	7.1	LOS A	0.4	2.7	0.23	0.60	0.23	53.0
2	T1	1098	3.0	0.717	28.8	LOS C	23.4	168.0	0.91	0.81	0.91	40.8
3	R2	143	3.0	0.322	28.4	LOS C	2.0	14.5	0.92	0.75	0.92	40.5
Approach		1289	3.0	0.717	28.0	LOS C	23.4	168.0	0.89	0.79	0.89	41.1
East: Kraaibosch Road												
4	L2	155	3.0	0.147	12.4	LOS B	2.8	20.1	0.46	0.68	0.46	49.2
5	T1	378	3.0	0.560	42.7	LOS D	8.7	62.6	0.97	0.79	0.97	35.4
6	R2	335	3.0	0.608	28.9	LOS C	11.6	83.5	0.90	0.82	0.90	40.4
Approach		867	3.0	0.608	32.0	LOS C	11.6	83.5	0.85	0.78	0.85	39.2
North: N9 Knysna St												
7	L2	307	3.0	0.219	7.3	LOS A	2.7	19.2	0.27	0.63	0.27	52.8
8	T1	1136	3.0	0.818	33.5	LOS C	30.0	215.1	0.93	0.89	1.02	38.8
9	R2	88	3.0	0.186	26.0	LOS C	1.2	8.8	0.85	0.72	0.85	41.5
Approach		1532	3.0	0.818	27.8	LOS C	30.0	215.1	0.80	0.83	0.86	41.2
West: Protea Park												
10	L2	57	3.0	0.076	14.8	LOS B	1.1	8.2	0.52	0.67	0.52	47.8
11	T1	264	3.0	0.432	41.9	LOS D	6.0	42.9	0.95	0.76	0.95	35.7
12	R2	23	3.0	0.064	40.7	LOS D	0.9	6.6	0.84	0.70	0.84	35.8
Approach		344	3.0	0.432	37.3	LOS D	6.0	42.9	0.87	0.74	0.87	37.3
All Vehicles		4033	3.0	0.818	29.6	LOS C	30.0	215.1	0.84	0.80	0.87	40.4

Intersection of Saasveld Road & Meyer Road

2019 Base Year AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	28	3.0	0.052	0.0	LOS A	0.0	0.2	0.02	0.13	0.02	58.8
6	R2	7	3.0	0.052	5.7	LOS A	0.0	0.2	0.02	0.13	0.02	56.5
Approach		36	3.0	0.052	1.2	NA	0.0	0.2	0.02	0.13	0.02	58.3
North: Meyer												
7	L2	24	3.0	0.149	8.4	LOS A	0.0	0.0	0.00	1.00	0.00	51.7
9	R2	5	3.0	0.149	8.0	LOS A	0.0	0.0	0.00	1.00	0.00	51.2
Approach		29	3.0	0.149	8.3	LOS A	0.0	0.0	0.00	1.00	0.00	51.6
West: Saasveld												
10	L2	3	3.0	0.032	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	57.9
11	T1	58	3.0	0.032	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		61	3.0	0.032	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.6
All Vehicles		126	3.0	0.149	2.4	NA	0.0	0.2	0.00	0.29	0.00	57.2

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	51	3.0	0.134	0.0	LOS A	0.1	1.0	0.05	0.18	0.05	58.3
6	R2	21	3.0	0.134	5.7	LOS A	0.1	1.0	0.05	0.18	0.05	56.0
Approach		72	3.0	0.134	1.7	NA	0.1	1.0	0.05	0.18	0.05	57.6
North: Meyer												
7	L2	21	3.0	0.134	8.3	LOS A	0.0	0.0	0.00	1.00	0.00	51.7
9	R2	5	3.0	0.134	8.0	LOS A	0.0	0.0	0.00	1.00	0.00	51.2
Approach		26	3.0	0.134	8.2	LOS A	0.0	0.0	0.00	1.00	0.00	51.6
West: Saasveld												
10	L2	13	3.0	0.028	5.6	LOS A	0.0	0.0	0.00	0.14	0.00	57.0
11	T1	41	3.0	0.028	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	58.7
Approach		54	3.0	0.028	1.3	NA	0.0	0.0	0.00	0.14	0.00	58.3
All Vehicles		152	3.0	0.134	2.7	NA	0.1	1.0	0.02	0.31	0.02	56.7

2024 Design Year + Phase 1 Development

AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	87	3.0	0.163	0.0	LOS A	0.1	0.6	0.05	0.15	0.05	58.5
6	R2	27	3.0	0.163	6.5	LOS A	0.1	0.6	0.05	0.15	0.05	56.2
Approach		115	3.0	0.163	1.5	NA	0.1	0.6	0.05	0.15	0.05	57.9
North: Meyer												
7	L2	48	3.0	0.333	8.7	LOS A	0.0	0.1	0.00	1.00	0.00	51.8
9	R2	25	3.0	0.333	8.8	LOS A	0.0	0.1	0.00	1.00	0.00	51.3
Approach		74	3.0	0.333	8.8	LOS A	0.0	0.1	0.00	1.00	0.00	51.6
West: Saasveld												
10	L2	63	3.0	0.128	5.6	LOS A	0.0	0.0	0.00	0.16	0.00	56.9
11	T1	178	3.0	0.128	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.6
Approach		241	3.0	0.128	1.5	NA	0.0	0.0	0.00	0.16	0.00	58.1
All Vehicles		429	3.0	0.333	2.7	NA	0.1	0.6	0.01	0.30	0.01	56.8

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	318	3.0	0.635	0.1	LOS A	1.4	9.9	0.23	0.18	0.25	57.6
6	R2	111	3.0	0.635	9.6	LOS A	1.4	9.9	0.23	0.18	0.25	55.4
Approach		428	3.0	0.635	2.5	NA	1.4	9.9	0.23	0.18	0.25	57.0
North: Meyer												
7	L2	42	3.0	0.658	8.9	LOS A	0.2	1.3	0.00	1.00	0.00	51.9
9	R2	95	3.0	0.658	9.1	LOS A	0.2	1.3	0.00	1.00	0.00	51.4
Approach		137	3.0	0.658	9.0	LOS A	0.2	1.3	0.00	1.00	0.00	51.5
West: Saasveld												
10	L2	80	3.0	0.135	5.6	LOS A	0.0	0.0	0.00	0.19	0.00	56.6
11	T1	175	3.0	0.135	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.3
Approach		255	3.0	0.135	1.8	NA	0.0	0.0	0.00	0.19	0.00	57.8
All Vehicles		820	3.0	0.658	3.4	NA	1.4	9.9	0.12	0.32	0.13	56.2

2029 Planning Year + Phase 1+2 Development

AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	142	3.0	0.256	0.0	LOS A	0.1	0.5	0.04	0.15	0.05	58.2
6	R2	45	3.0	0.256	7.9	LOS A	0.1	0.5	0.04	0.15	0.05	55.9
Approach		187	3.0	0.256	1.9	NA	0.1	0.5	0.04	0.15	0.05	57.6
North: Meyer												
7	L2	142	3.0	0.817	26.2	LOS D	0.4	2.6	1.00	1.10	1.44	39.4
9	R2	43	3.0	0.817	52.0	LOS F	0.4	2.6	1.00	1.10	1.44	39.1
Approach		185	3.0	0.817	32.2	LOS D	0.4	2.6	1.00	1.10	1.44	39.3
West: Saasveld												
10	L2	121	3.0	0.220	5.6	LOS A	0.0	0.0	0.00	0.17	0.00	56.7
11	T1	294	3.0	0.220	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	58.4
Approach		415	3.0	0.220	1.7	NA	0.0	0.0	0.00	0.17	0.00	57.9
All Vehicles		787	3.0	0.817	8.9	NA	0.4	2.6	0.24	0.39	0.35	52.0

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	554	3.0	1.046	42.5	LOS E	28.5	204.5	1.00	0.46	4.71	30.3
6	R2	188	3.0	1.046	106.8	LOS F	28.5	204.5	1.00	0.46	4.71	29.6
Approach		742	3.0	1.046	58.9	NA	28.5	204.5	1.00	0.46	4.71	30.1
North: Meyer												
7	L2	42	3.0	1.564	521.9	LOS F	51.7	371.4	1.00	4.72	20.06	5.8
9	R2	173	3.0	1.564	557.8	LOS F	51.7	371.4	1.00	4.72	20.06	5.8
Approach		215	3.0	1.564	550.8	LOS F	51.7	371.4	1.00	4.72	20.06	5.8
West: Saasveld												
10	L2	136	3.0	0.225	5.6	LOS A	0.0	0.0	0.00	0.19	0.00	56.6
11	T1	287	3.0	0.225	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	58.2
Approach		423	3.0	0.225	1.8	NA	0.0	0.0	0.00	0.19	0.00	57.7
All Vehicles		1380	3.0	1.564	117.9	NA	51.7	371.4	0.69	1.04	5.65	19.9

2029 Planning Year + Phase 1+2 Development + Upgrades

AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	142	3.0	0.146	4.9	LOS A	1.0	7.0	0.21	0.51	0.21	53.6
6	R2	45	3.0	0.146	8.2	LOS A	1.0	7.0	0.21	0.51	0.21	53.2
Approach		187	3.0	0.146	5.7	LOS A	1.0	7.0	0.21	0.51	0.21	53.5
North: Meyer												
7	L2	142	3.0	0.206	7.1	LOS A	1.3	9.0	0.55	0.67	0.55	51.7
9	R2	43	3.0	0.206	10.3	LOS B	1.3	9.0	0.55	0.67	0.55	52.1
Approach		185	3.0	0.206	7.8	LOS A	1.3	9.0	0.55	0.67	0.55	51.7
West: Saasveld												
10	L2	121	3.0	0.308	5.0	LOS A	2.2	16.0	0.23	0.48	0.23	53.3
11	T1	294	3.0	0.308	5.0	LOS A	2.2	16.0	0.23	0.48	0.23	54.1
Approach		415	3.0	0.308	5.0	LOS A	2.2	16.0	0.23	0.48	0.23	53.9
All Vehicles		787	3.0	0.308	5.8	LOS A	2.2	16.0	0.30	0.53	0.30	53.3

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	554	3.0	0.680	7.0	LOS A	7.8	55.8	0.77	0.65	0.77	51.8
6	R2	188	3.0	0.680	10.3	LOS B	7.8	55.8	0.77	0.65	0.77	51.4
Approach		742	3.0	0.680	7.8	LOS A	7.8	55.8	0.77	0.65	0.77	51.7
North: Meyer												
7	L2	42	3.0	0.245	7.1	LOS A	1.6	11.7	0.60	0.71	0.60	50.4
9	R2	173	3.0	0.245	10.3	LOS B	1.6	11.7	0.60	0.71	0.60	50.8
Approach		215	3.0	0.245	9.7	LOS A	1.6	11.7	0.60	0.71	0.60	50.7
West: Saasveld												
10	L2	136	3.0	0.416	6.5	LOS A	3.4	24.7	0.60	0.61	0.60	52.1
11	T1	287	3.0	0.416	6.5	LOS A	3.4	24.7	0.60	0.61	0.60	52.8
Approach		423	3.0	0.416	6.5	LOS A	3.4	24.7	0.60	0.61	0.60	52.6
All Vehicles		1380	3.0	0.680	7.7	LOS A	7.8	55.8	0.69	0.65	0.69	51.8

Access 1 & Meyer Road

2029 Planning Year + Phase 1+2 Development AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meyer												
1	L2	5	3.0	0.111	5.2	LOS A	0.6	4.0	0.25	0.62	0.25	51.2
2	T1	5	3.0	0.111	5.2	LOS A	0.6	4.0	0.25	0.62	0.25	52.0
3	R2	118	3.0	0.111	8.4	LOS A	0.6	4.0	0.25	0.62	0.25	51.6
Approach		128	3.0	0.111	8.1	LOS A	0.6	4.0	0.25	0.62	0.25	51.6
East: Access 1												
4	L2	38	3.0	0.093	4.9	LOS A	0.5	3.4	0.15	0.60	0.15	52.1
5	T1	5	3.0	0.093	4.8	LOS A	0.5	3.4	0.15	0.60	0.15	52.9
6	R2	76	3.0	0.093	8.1	LOS A	0.5	3.4	0.15	0.60	0.15	52.6
Approach		119	3.0	0.093	6.9	LOS A	0.5	3.4	0.15	0.60	0.15	52.4
North: Meyer												
7	L2	236	3.0	0.230	5.6	LOS A	1.3	9.3	0.35	0.56	0.35	52.9
8	T1	15	3.0	0.230	5.6	LOS A	1.3	9.3	0.35	0.56	0.35	53.7
9	R2	5	3.0	0.230	8.8	LOS A	1.3	9.3	0.35	0.56	0.35	53.3
Approach		256	3.0	0.230	5.7	LOS A	1.3	9.3	0.35	0.56	0.35	52.9
West: Arthur Bleksley												
10	L2	5	3.0	0.025	5.8	LOS A	0.1	0.8	0.36	0.59	0.36	51.7
11	T1	5	3.0	0.025	5.7	LOS A	0.1	0.8	0.36	0.59	0.36	52.5
12	R2	15	3.0	0.025	9.0	LOS A	0.1	0.8	0.36	0.59	0.36	52.1
Approach		25	3.0	0.025	7.6	LOS A	0.1	0.8	0.36	0.59	0.36	52.1
All Vehicles		528	3.0	0.230	6.7	LOS A	1.3	9.3	0.28	0.59	0.28	52.5

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meyer												
1	L2	17	3.0	0.174	7.0	LOS A	0.9	6.6	0.52	0.71	0.52	50.5
2	T1	17	3.0	0.174	6.9	LOS A	0.9	6.6	0.52	0.71	0.52	51.3
3	R2	123	3.0	0.174	10.1	LOS B	0.9	6.6	0.52	0.71	0.52	50.9
Approach		157	3.0	0.174	9.5	LOS A	0.9	6.6	0.52	0.71	0.52	50.9
East: Access 1												
4	L2	167	3.0	0.356	4.9	LOS A	2.4	17.4	0.17	0.59	0.17	52.0
5	T1	5	3.0	0.356	4.8	LOS A	2.4	17.4	0.17	0.59	0.17	52.8
6	R2	336	3.0	0.356	8.1	LOS A	2.4	17.4	0.17	0.59	0.17	52.4
Approach		508	3.0	0.356	7.0	LOS A	2.4	17.4	0.17	0.59	0.17	52.3
North: Meyer												
7	L2	246	3.0	0.240	5.7	LOS A	1.4	10.4	0.38	0.57	0.38	52.8
8	T1	14	3.0	0.240	5.6	LOS A	1.4	10.4	0.38	0.57	0.38	53.7
9	R2	5	3.0	0.240	8.8	LOS A	1.4	10.4	0.38	0.57	0.38	53.3
Approach		265	3.0	0.240	5.7	LOS A	1.4	10.4	0.38	0.57	0.38	52.9
West: Arthur Bleksley												
10	L2	5	3.0	0.028	7.5	LOS A	0.1	1.0	0.55	0.66	0.55	50.7
11	T1	5	3.0	0.028	7.4	LOS A	0.1	1.0	0.55	0.66	0.55	51.5
12	R2	13	3.0	0.028	10.7	LOS B	0.1	1.0	0.55	0.66	0.55	51.1
Approach		23	3.0	0.028	9.2	LOS A	0.1	1.0	0.55	0.66	0.55	51.1
All Vehicles		954	3.0	0.356	7.1	LOS A	2.4	17.4	0.30	0.61	0.30	52.2

Access 2 & Saasveld Road

2029 Planning Year + Phase 1+2 Development AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	38	3.0	0.131	5.1	LOS A	0.7	5.0	0.24	0.60	0.24	52.4
6	R2	118	3.0	0.131	8.3	LOS A	0.7	5.0	0.24	0.60	0.24	52.0
Approach		156	3.0	0.131	7.5	LOS A	0.7	5.0	0.24	0.60	0.24	52.1
North: Access 2												
7	L2	38	3.0	0.104	5.4	LOS A	0.5	3.9	0.31	0.61	0.31	51.6
9	R2	76	3.0	0.104	8.6	LOS A	0.5	3.9	0.31	0.61	0.31	52.1
Approach		114	3.0	0.104	7.5	LOS A	0.5	3.9	0.31	0.61	0.31	51.9
West: Saasveld												
10	L2	236	3.0	0.302	5.5	LOS A	1.9	13.4	0.35	0.54	0.35	52.9
11	T1	118	3.0	0.302	5.5	LOS A	1.9	13.4	0.35	0.54	0.35	53.7
Approach		354	3.0	0.302	5.5	LOS A	1.9	13.4	0.35	0.54	0.35	53.2
All Vehicles		623	3.0	0.302	6.4	LOS A	1.9	13.4	0.31	0.57	0.31	52.7

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Saasveld												
5	T1	167	3.0	0.326	7.2	LOS A	2.0	14.6	0.60	0.72	0.60	51.8
6	R2	123	3.0	0.326	10.4	LOS B	2.0	14.6	0.60	0.72	0.60	51.5
Approach		291	3.0	0.326	8.6	LOS A	2.0	14.6	0.60	0.72	0.60	51.7
North: Access 2												
7	L2	167	3.0	0.424	5.7	LOS A	3.1	22.3	0.42	0.62	0.42	51.3
9	R2	336	3.0	0.424	8.8	LOS A	3.1	22.3	0.42	0.62	0.42	51.8
Approach		503	3.0	0.424	7.8	LOS A	3.1	22.3	0.42	0.62	0.42	51.6
West: Saasveld												
10	L2	120	3.0	0.217	5.5	LOS A	1.3	9.6	0.36	0.53	0.36	52.8
11	T1	123	3.0	0.217	5.4	LOS A	1.3	9.6	0.36	0.53	0.36	53.7
Approach		243	3.0	0.217	5.5	LOS A	1.3	9.6	0.36	0.53	0.36	53.3
All Vehicles		1037	3.0	0.424	7.5	LOS A	3.1	22.3	0.45	0.63	0.45	52.0

Access 3 & Saasveld Road / Kraaibosch Road

2029 Planning Year + Phase 1+2 Development AM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Kraaibosch												
1	L2	118	3.0	0.269	5.0	LOS A	1.6	11.2	0.20	0.49	0.20	53.3
2	T1	236	3.0	0.269	4.9	LOS A	1.6	11.2	0.20	0.49	0.20	54.2
3	R2	5	3.0	0.269	8.2	LOS A	1.6	11.2	0.20	0.49	0.20	53.8
Approach		359	3.0	0.269	5.0	LOS A	1.6	11.2	0.20	0.49	0.20	53.9
East: Saasveld												
4	L2	5	3.0	0.015	5.5	LOS A	0.1	0.5	0.31	0.55	0.31	52.3
5	T1	5	3.0	0.015	5.5	LOS A	0.1	0.5	0.31	0.55	0.31	53.1
6	R2	5	3.0	0.015	8.7	LOS A	0.1	0.5	0.31	0.55	0.31	52.8
Approach		16	3.0	0.015	6.6	LOS A	0.1	0.5	0.31	0.55	0.31	52.7
North: Access 3												
7	L2	5	3.0	0.112	4.8	LOS A	0.6	4.3	0.09	0.52	0.09	53.2
8	T1	114	3.0	0.112	4.7	LOS A	0.6	4.3	0.09	0.52	0.09	54.0
9	R2	38	3.0	0.112	8.0	LOS A	0.6	4.3	0.09	0.52	0.09	53.6
Approach		157	3.0	0.112	5.5	LOS A	0.6	4.3	0.09	0.52	0.09	53.9
West: Saasveld												
10	L2	118	3.0	0.131	6.2	LOS A	0.7	4.8	0.43	0.61	0.43	52.6
11	T1	5	3.0	0.131	6.2	LOS A	0.7	4.8	0.43	0.61	0.43	53.5
12	R2	5	3.0	0.131	9.4	LOS A	0.7	4.8	0.43	0.61	0.43	53.1
Approach		128	3.0	0.131	6.4	LOS A	0.7	4.8	0.43	0.61	0.43	52.7
All Vehicles		660	3.0	0.269	5.4	LOS A	1.6	11.2	0.22	0.52	0.22	53.6

PM Peak Hour

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Kraaibosch												
1	L2	123	3.0	0.345	6.0	LOS A	2.1	15.3	0.44	0.58	0.44	52.5
2	T1	246	3.0	0.345	6.0	LOS A	2.1	15.3	0.44	0.58	0.44	53.4
3	R2	5	3.0	0.345	9.2	LOS A	2.1	15.3	0.44	0.58	0.44	53.0
Approach		375	3.0	0.345	6.0	LOS A	2.1	15.3	0.44	0.58	0.44	53.1
East: Saasveld												
4	L2	5	3.0	0.023	9.1	LOS A	0.1	0.8	0.64	0.68	0.64	50.1
5	T1	5	3.0	0.023	9.0	LOS A	0.1	0.8	0.64	0.68	0.64	50.8
6	R2	5	3.0	0.023	12.2	LOS B	0.1	0.8	0.64	0.68	0.64	50.5
Approach		16	3.0	0.023	10.1	LOS B	0.1	0.8	0.64	0.68	0.64	50.4
North: Access 3												
7	L2	5	3.0	0.441	4.8	LOS A	3.5	25.2	0.13	0.52	0.13	53.0
8	T1	503	3.0	0.441	4.8	LOS A	3.5	25.2	0.13	0.52	0.13	53.9
9	R2	167	3.0	0.441	8.0	LOS A	3.5	25.2	0.13	0.52	0.13	53.5
Approach		676	3.0	0.441	5.6	LOS A	3.5	25.2	0.13	0.52	0.13	53.8
West: Saasveld												
10	L2	60	3.0	0.074	6.2	LOS A	0.4	2.7	0.45	0.60	0.45	52.5
11	T1	5	3.0	0.074	6.1	LOS A	0.4	2.7	0.45	0.60	0.45	53.3
12	R2	5	3.0	0.074	9.4	LOS A	0.4	2.7	0.45	0.60	0.45	53.0
Approach		71	3.0	0.074	6.4	LOS A	0.4	2.7	0.45	0.60	0.45	52.6
All Vehicles		1137	3.0	0.441	5.8	LOS A	3.5	25.2	0.26	0.54	0.26	53.4