Appendix H.10

TRAFFIC ASSESSMENT

Komati Power Station Repurposing

Transport Impact Assessment – Report

WSP Group Africa

May 2023

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SUMMARY SHEET

Report Type	Transport Impact Assessment – Report
Title	Komati Power Station Repurposing
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Client	WSP Group Africa
Reference Number	ITS 4484
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1 INTRODUCTION

Eskom generates, transmits and distributes electricity and supplies approximately 95% of the country's electricity. Eskom has a 2035 strategy which illustrates their intent to respond to the changing energy environment and the impact this has towards a sustainable power utility. This includes the shutting down of a number of coal-fired power stations, repurposing and repowering, delivering new clean generation projects, expanding the Transmission grid, and rolling out micro grid solutions.

The proposed solar photovoltaic facility is situated in Komati Power Station, which reached its end-of-life in September 2022. Eskom has developed a Just Energy Transition Project (EJETP) to mitigating the negative impacts from shutting down of the plant. The EJETP is also to implement projects for the repowering and repurposing related to the Komati Power Station.

The proposed development consists of Photovoltaic (PV) solar energy facilities (SEF) with ancillary Battery Energy Storage Systems (BESS), to generate a total of 150 MW of energy, located on various Eskom-owned land parcels surrounding the existing Komati Power Station in Middelburg, Mpumalanga. Komati Power Station is located approximately 40 km south of Middelburg within the Steve Tshwete Local Municipality, refer to **Annexure A, Figure A1** for the locality map.

In this TIA, the impact of the additional traffic of the proposed developments on the road network will be investigated and mitigation measures will be proposed if required. The transportation activities will include transportation activities during the construction phase, operational phase and the decommissioning phase. This Transport Impact Assessment will form part of the Environmental Impact Study.

2 PROPOSED DEVELOPMENT AND LAND USE

The proposed development is located on Eskom property and is currently zoned for various land uses including mining and an airstrip. Permission for the applicable land use rights will have to be obtained from the relevant authorities through a town planning process. The proposed 150 MW PV facilities are to be spread over two sites known as PV Site A and PV Site B.

The proposed project will comprise the following key components:

- Solar Energy Facility – the solar modules will be elevated above the ground and monted either on fixed tilt systems or tracking system;
- Grid Connection (i.e. powerlines) - new access roads or tracks may be required to provide access to sections of the powerline route. Access roads will be mostly a two-track gravel road under the OHPL in order to access pylons for construction and maintenance purposes;
- Site Substation and BESS - three facilities with capacity of 150 MW, with four hours standby time; and
- Associated infrastructure – will include but not limited to access roads, perimeter roads, parking area and roads, etc.

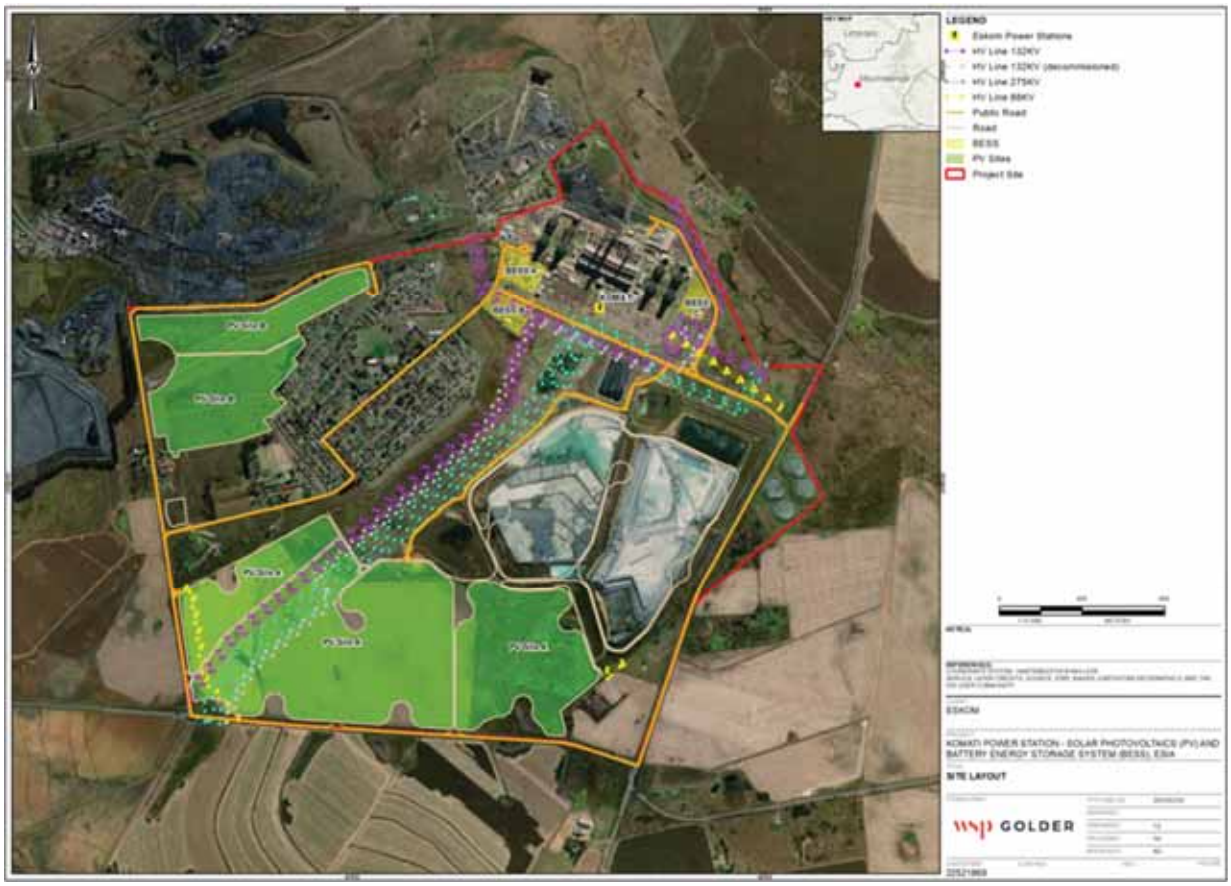


Figure 1: Site Development Plan

3 TRAFFIC VOLUMES

3.1 Background Traffic Volumes 2022

Traffic counts were conducted, at the intersections shown in **Annexure A**, **Figure A2** covering 12 hours on Wednesday, 1 June 2022. The counts conducted were used for the 2022 base year traffic. The background weekday AM and PM peak hour traffic volumes for 2022 are shown in **Annexure B**.

3.2 Future Background Traffic Volumes 2024

A growth rate of 2% per annum was applied to the 2022 background peak hour volumes to estimate the future background volumes for the 2024 horizon year. Analysis of the horizon year 2024 corresponds with the estimated construction period of the development.

3.3 Future Background Traffic Volumes 2027

A growth rate of 2% per annum was applied to the 2022 background peak hour volumes to estimate the future background volumes for the 2027 horizon year. Analysis of the horizon year 2027 corresponds with the estimated period in which the development will be in normal operations.

3.4 Future Background Traffic Volume 2047

A growth rate of 2% per annum was applied to the 2022 background peak hour volumes to estimate the future background volumes for the 2043 horizon year. Analysis of the horizon year 2043 corresponds with the estimated period in which the development will be in decommissioning phase.

4 TRIP GENERATION

The trip generation of the proposed developments is calculated based on the estimated number of person and truck trips during the construction of the different sites. The operational phase of each site will also develop a certain number of person trips as well as the decommissioning phase.

The expected number of person trips based on the employment opportunities for the developments is 1 285 during the construction phase, 150 person trips during the operational phase and 1 285 persons trips during the decommissioning phase.

The estimated number of person trips are converted into vehicle trips for the phases and sites and adjusted for public transport usage. **Table 1** shows a summary of the expected number of trips generated by the proposed development during the AM and PM peak hours. The calculation of the trip generation is included in **Annexure C**. The expected trip distribution of the proposed developments are shown in **Annexure A**, **Figure A3.**

Table 1: Expected Trip Generation

AM Peak Hour Trip Generation							
No	**Land Use**	**Scenario**	**Split In (%)**	**Split Out (%)**	**Trips In**	**Trips Out**	**Total Trips**
1	Komati PV A	Construction Phase	70%	30%	39	16	55
2	Komati PV B	Construction Phase	70%	30%	20	9	29
	Komati PV	**Construction Phase**			59	25	84
3	Komati PV A	Operational Phase	70%	30%	23	10	33
4	Komati PV B	Operational Phase	70%	30%	12	5	17
	Komati PV	**Operational Phase**			35	15	50
5	Komati PV A	Decomissioning Phase	70%	30%	39	16	55
6	Komati PV B	Decomissioning Phase	70%	30%	20	9	29
	Komati PV	**Decomissioning Phase**			59	25	84
PM Peak Hour Trip Generation							
No	**Land Use**	**Scenario**	**Split In (%)**	**Split Out (%)**	**Trips In**	**Trips Out**	**Total Trips**
7	Komati PV A	Construction Phase	30%	70%	16	39	55
8	Komati PV B	Construction Phase	30%	70%	9	20	29
	Komati PV	**Construction Phase**			25	59	84
9	Komati PV A	Operational Phase	30%	70%	10	23	33
10	Komati PV B	Operational Phase	30%	70%	5	12	17
	Komati PV	**Operational Phase**			15	35	50
11	Komati PV A	Decomissioning Phase	70%	30%	16	39	55
12	Komati PV B	Decomissioning Phase	70%	30%	9	20	29
	Komati PV	**Decomissioning Phase**			25	59	84

5 EXISTING ROAD NETWORK

The roads in the vicinity of the proposed developments are as follows:

- **R543:** Is a Class 3 provincial road and is located to the south of the proposed PV Site A and the town of Komati. This road serves as an East-West link between the R544 and the R35.
- **R35:** Is a Class 3 provincial road and is located to the northeast of the proposed developments and the town of Komati. This road serves as the link between Middelburg and Bethal.
- **Main Road:** Is a Class 4 municipal road and borders the proposed developments on the western boundaries of PV Site A and PV Site B.
- **Flamingo Street:** Is a Class 5 municipal road and borders the proposed PV Site A on the northern boundary of the site. Flamingo Street also provides access to the town of Komati.

The locations of these roads relative to the proposed development are shown in **Annexure A, Figure A4.**

6 ACCESS

The project area and surrounding areas are already easily accessible due to existing access roads. New access roads or tracks may be required to provide access to sections of the powerline route.

Access to the proposed developments is proposed from Flamingo Street for PV Site A and from the current road that borders the airfield to the north, for PV Site B respectively.

Access roads will be mostly a two-track gravel road under the OHPL in order to access pylons for construction and maintenance purposes. The width of the access roads will be determined during the design phase.

7 CAPACITY ANALYSIS

PTV Vistro software was used to conduct the capacity analysis for the intersections included in the study area. The intersections that were included in the analysis are:

- Int 1 – Main Road / Koornfontein Mine Access
- Int 2 – R542 / Main Road
- Int 3 – R35 / R542 to Emalahleni
- Int 4 – R35 / R542 to Hendrina
- Int 5 – R35 / Komati Power Station
- Int 6 – Main Road / Flamingo St

The scenarios that were analysed for the peak hours are summarised in **Table 2**.

Table 2: Scenarios Analysed for the Proposed Komati PV Developments

No	Scenario No	Scenario
1	Scenario 1	2022 AM and PM Weekday Peak Hour Background Traffic with Existing Geometry.
2	Scenario 2	2024 AM and PM Weekday Peak Hour Background Traffic with Existing Geometry.
3	Scenario 3	2027 AM and PM Weekday Peak Hour Background Traffic with Existing Geometry.
4	Scenario 4	2047 AM and PM Weekday Peak Hour Background Traffic with Existing Geometry.
5	Scenario 5	2024 AM and PM Weekday Peak Hour Development (Construction) Traffic with Existing Geometry.
6	Scenario 6	2027 AM and PM Weekday Peak Hour Development (Operational) Traffic with Existing Geometry.
7	Scenario 7	2047 AM and PM Weekday Peak Hour Development (Deccomission) Traffic with Existing Geometry.

The capacity analysis results for the intersections included in the study area are summarised in **Table 3** and **Table 4.** Refer to **Annexure B** for the PTV Vistro output.

Table 3: Capacity Analysis Results for the Weekday AM Peak Hour

Scenario	Intersection	INT 1	INT 2	INT 3	INT 4	INT 5	INT 6	PV A ACCESS	PV B ACCESS
Scenario 1: 2022 AM Peak Hour Traffic with Existing Geometry	LOS	A	A	A	A	B	A	-	-
	Del	9,02	9,22	9,91	9,96	10,81	8,94	-	-
	v/c	0,03	0,02	0,05	0,08	0,04	0,02	-	-
Scenario 2: 2024 AM Peak Hour Background Traffic with Existing Geometry	LOS	A	A	A	B	B	A	-	-
	Del	9,04	9,25	9,97	10,04	10,93	8,96	-	-
	v/c	0,03	0,03	0,05	0,08	0,04	0,02	-	-
Scenario 3: 2027 AM Peak Hour Background Traffic with Existing Geometry	LOS	A	A	B	B	B	A	-	-
	Del	9,08	9,31	10,09	10,14	11,09	8,99	-	-
	v/c	0,03	0,03	0,05	0,09	0,04	0,03	-	-
Scenario 4: 2047 AM Peak Hour Background Traffic with Existing Geometry	LOS	A	A	B	B	B	A	-	-
	Del	9,40	9,76	11,18	11,38	13,00	9,25	-	-
	v/c	0,04	0,04	0,09	0,15	0,08	0,04	-	-
Scenario 5: 2024 AM Peak Hour with Construction Traffic	LOS	A	A	B	B	B	A	A	A
	Del	9,39	9,89	10,01	10,64	11,25	9,7	8,37	8,35
	v/c	0,03	0,04	0,05	0,09	0,04	0,03	0,02	0,01
Scenario 6: 2027 AM Peak Hour with Operational Traffic	LOS	A	A	B	B	B	A	A	A
	Del	9,31	10,04	10,74	11,03	11,27	9,4	8,35	8,33
	v/c	0,03	0,04	0,06	0,1	0,04	0,03	0,01	0,01
Scenario 7: 2047 AM Peak Hour with Decommission Traffic	LOS	A	B	B	B	B	B	A	A
	Del	9,80	10,50	11,24	12,21	11,25	13,46	8,37	8,35
	v/c	0,05	0,06	0,10	0,17	0,04	0,08	0,02	0,01

Table 4: Capacity Analysis Results for the Weekday PM Peak Hour

Scenario	Intersection	INT 1	INT 2	INT 3	INT 4	INT 5	INT 6	PV A ACCESS	PV B ACCESS
Scenario 1: 2022 PM Peak Hour Traffic with Existing Geometry	LOS	A	B	B	B	B	A	-	-
	Del	9,53	10	11,81	10,99	10,86	9,24	-	-
	v/c	0	0,02	0,11	0,12	0,02	0,01	-	-
Scenario 2: 2024 PM Peak Hour Background Traffic with Existing Geometry	LOS	A	B	B	B	B	A	-	-
	Del	9,54	10,07	11,98	11,1	10,97	9,27	-	-
	v/c	0	0,02	0,12	0,12	0,03	0,01	-	-
Scenario 3: 2027 PM Peak Hour Background Traffic with Existing Geometry	LOS	A	B	B	B	A	A	-	-
	Del	9,57	10,16	12,28	11,32	11,15	9,32	-	-
	v/c	0	0,03	0,13	0,13	0,03	0,01	-	-
Scenario 4: 2047 PM Peak Hour Background Traffic with Existing Geometry	LOS	A	A	C	B	B	A	-	-
	Del	9,73	10,98	15,73	13,51	13,03	9,79	-	-
	v/c	0,00	0,04	0,24	0,23	0,05	0,02	-	-
Scenario 5: 2024 PM Peak Hour with Construction Traffic	LOS	A	B	B	B	B	B	A	A
	Del	9,75	10,22	11,02	11	11,23	10,07	8,37	8,35
	v/c	0,01	0,04	0,11	0,12	0,03	0,015	0,02	0,01
Scenario 6: 2027 PM Peak Hour with Operational Traffic	LOS	A	B	B	B	B	A	A	A
	Del	9,67	10,41	12,14	11,51	11,27	9,77	8,35	8,33
	v/c	0,01	0,04	0,13	0,14	0,03	0,02	0,01	0,01
Scenario 7: 2047 PM Peak Hour with Decommission Traffic	LOS	B	B	B	B	B	B	A	A
	Del	10,02	11,09	13,75	13,18	13,37	10,70	8,37	8,35
	v/c	0,00	0,06	0,21	0,23	0,05	0,03	0,02	0,01

The existing road network is operating at acceptable levels of service with the existing geometry. The future traffic scenarios are also expected to operate at acceptable levels of service with the existing geometry. The existing geometry of the road network is shown schematically in **Annexure A**, **Figure A3.** No road upgrades are expected to be required to accommodate the additional traffic generated by the proposed developments.

8 CUMULATIVE IMPACT ASSESSMENT

Cumulative impact can result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. There are several renewable energy developments in the surrounding areas of the development, refer to **Figure 2**. Only two of these are within a 30 km radius of the Komai Power Station. One of these developments has been approved and the other is in process as shown in **Table 5**.

The two projects within a 30 km radius from the Komati Power Station will have little to no cumulative impact due to their relative locations. Furthermore, each development is located in close proximity to a regional road that easily gives access to national road network and other regional roads. Their traffic impact will not overlap and thus the cumulative impact will be insignificant.

Table 5: Renewable Energy Projects within 30 km radius of Komati Power Station

Renewable Energy Project	DFFE Rference	Status
Proposed installation of a Solar photovoltaic power plant at ESKOM Duvha power station	14/12/16/3/3/2/759	Approved
Proposed Forzando North Coal Mine photovoltaic solar facility in Emalahleni Local Municipality, Mpumalanga Province	12/12/16/3/3/1/451	In Process

Figure 2: Renewable Projects Surrounding the Komati Power Station

9 PUBLIC TRANSPORT

Due to the locality of the proposed developments, no formal public transport facilities are located in close approximation to the proposed development. It is not expected that public transport facilities will be required.

10 ENVIRONMENTAL IMPACT OF THE TRANSPORT ACTIVITIES

The environmental impact of the transport activities for the PV developments will be assessed and quantified according to the prescribed impact tables as provided. The assessment based on available data is shown below.

The impact of the transport activities for the construction phase, operational phase and decomissioning phase of the project will be assessed based on the following parameters and scoring as provided in the impact tables:

- Impact Magnitude (M)
- Impact Extent (A)
- Impact Reversibility (R)
- Impact Duration (D)
- Probability of Occurrence (P)
- Significance Rating [S = (E + D + R + M) x P]

Refer to **Table 6.**

The impact significance without mitigation measures will be assessed with the design controls in place. The mitigation measures chosen are based on the mitigation hierarchy, shown in **Figure 3**, which allows for consideration of five (5) different levels, which include:

- Avoid/prevent,
- Minimise,
- Rehabilitate/restore,
- Offset, and
- No-go in that order.

The assessment of the transportation activities for the proposed developments are shown in **Table 7** to **Table 9**. The traffic impact and environmental impact shows that the proposed development will not have any negative impact on the existing road network as well as the environment. It is however, recommended that a Transport Management Plan be done for the construction and decommissioning phase of the project. This is to improve road safety during these phases for the community as well as to limit the construction and decommissioning phase traffic within the local peak hours.

Table 6: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

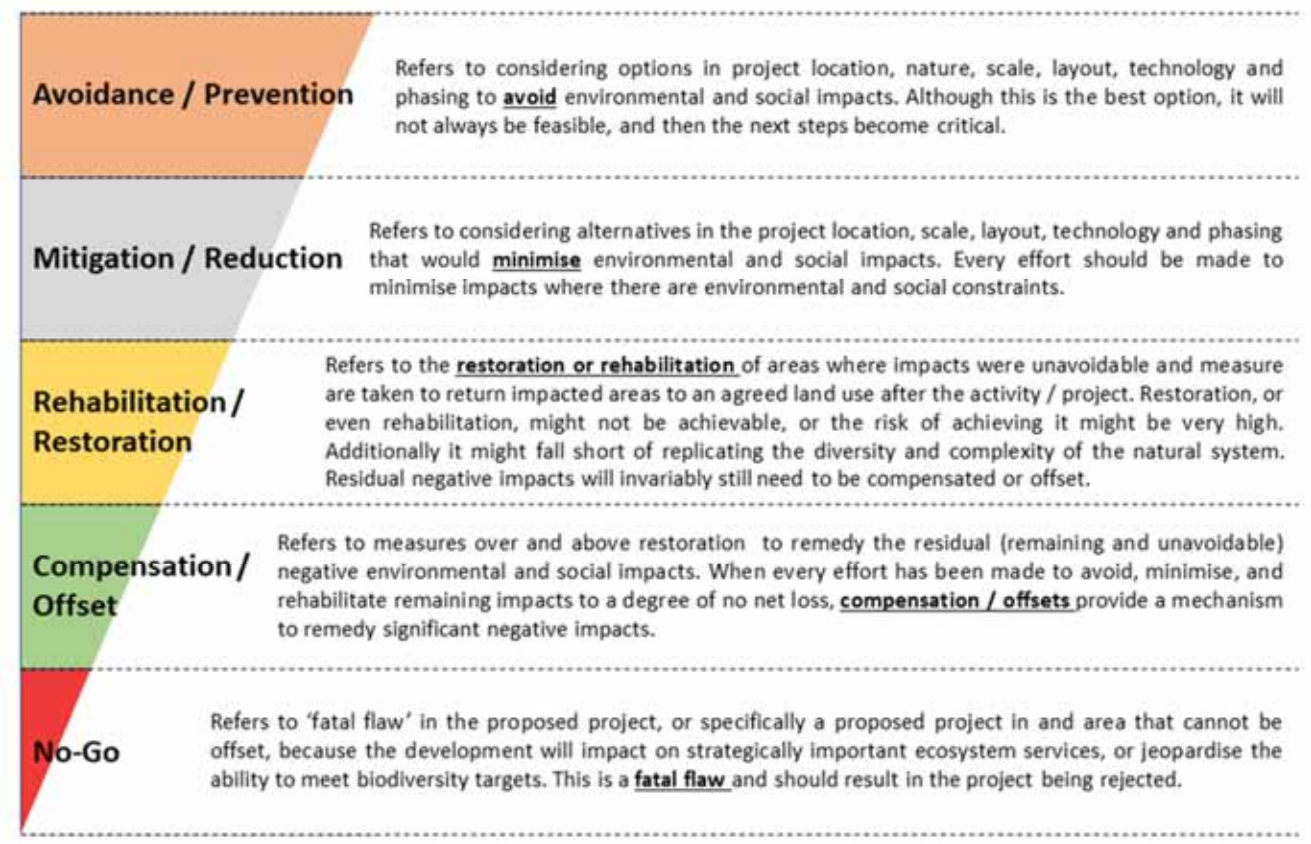


Figure 3: Mitigation Hierarchy

Table 7: Environmental Impact Assessment for Construction Phase

CONSTRUCTION

Impact number	Aspect	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S	Rating	(M+	E+	R+	D)x	P=	S	Rating
Impact 1:	Transportation	Impact of construction vehicles on roads and access roads	Construction	Negative	Moderate	1	1	3	2	4	**28**	**N2**	1	1	3	2	4	**28**	**N2**
					Significance	**N2 - Low**							**N2 - Low**						

Table 8: Environmental Impact Assessment for Operational Phase

OPERATIONAL

Impact number	Receptor	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S	Rating	(M+	E+	R+	D)x	P=	S	Rating
Impact 1:	Transportation	Transportation activities during operations	Operational	Negative	Moderate	1	1	1	4	4	**28**	**N2**	1	1	1	4	4	**28**	**N2**
					Significance	**N2 - Low**							**N2 - Low**						

Table 9: Environmental Impact Assessment for Construction Phase

DECOMMISSION

Impact number	Aspect	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S	Rating	(M+	E+	R+	D)x	P=	S	Rating
Impact 1:	Transportation	Impact of construction vehicles on roads and access roads	Decommission	Negative	Moderate	1	1	3	2	4	**28**	**N2**	1	1	3	2	4	**28**	**N2**
					Significance	**N2 - Low**							**N2 - Low**						

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 Conclusions

The following conclusions were made:

- Photovoltaic (PV) solar energy facilities (SEF) with ancillary Battery Energy Storage Systems (BESS), to generate a total of 150 MW of energy, are planned on Eskom-owned land parcels surrounding the existing Komati Power Station in Middelburg.
- In this TIA, the impact of the transportation activities of the proposed Komati SEF developments on the road network was investigated. The transportation activites include transportation activities during the construction phase, operational phase and the decommissioning phase of the project.
- The proposed developments are located on Eskom properties which are currently zoned for various land uses including mining and an airstrip. Permission for the applicable land use rights will have to be obtained from the relevant authorities through a town planning process.The proposed 150 MW PV facilities are to be spread over two sites known as PV Site A and PV Site B.
- Traffic counts were conducted, at the intersections shown in **Annexure A, Figure A2** covering 12 hours on Wednesday, 1 June 2022.
- A growth rate of 2% per annum was applied to the 2022 background peak hour taffic volumes to estimate the future background volumes for the 2024, 2027 and 2047 horizon years.
- The expected number of person trips based on the employment opportunities for the developments are 1 285 during the construction and decomissioning phase as well as 150 person trips during the operational phase.
- Access to the proposed developments is proposed from Flamingo Street for PV Site A and from the current road that borders the airfield to the north, for PV Site B respectively.
- PTV Vistro software was used to conduct the capacity analysis for the intersections included in the study area.
- The existing road network is operating at acceptable levels of service with the existing geometry. The future traffic scenarios are also expected to operate at acceptable levels of service with the existing geometry.
- Other renewable energy projects within a 30 km radius of the Komati Power Station will have no significant cumulative impact because their traffic impact will not overlap.
- Due to the locality of the proposed developments, no formal public transport facilities are located in close approximation to the proposed development. It is not expected that public transport facilities will be required.
- The environmental impact of the transportation activities during the construction, operaions and decommissioning phases of the proposed development, with a significance rating of N2, is expected to be low.

11.2 Recommendations

The following recommendations are made:

- A Transport Management Plan should be compiled for the construction and decommissioning phase of the project. The aim of the Traffic Management Plan would be to improve road safety during these phases for the community as well as to limit the construction and decommissioning phase traffic within the local peak hours.
- The proposed development should be considered favourably from a traffic engineering point of view by Steve Tshwete Local Municipality.

12 REFERENCES

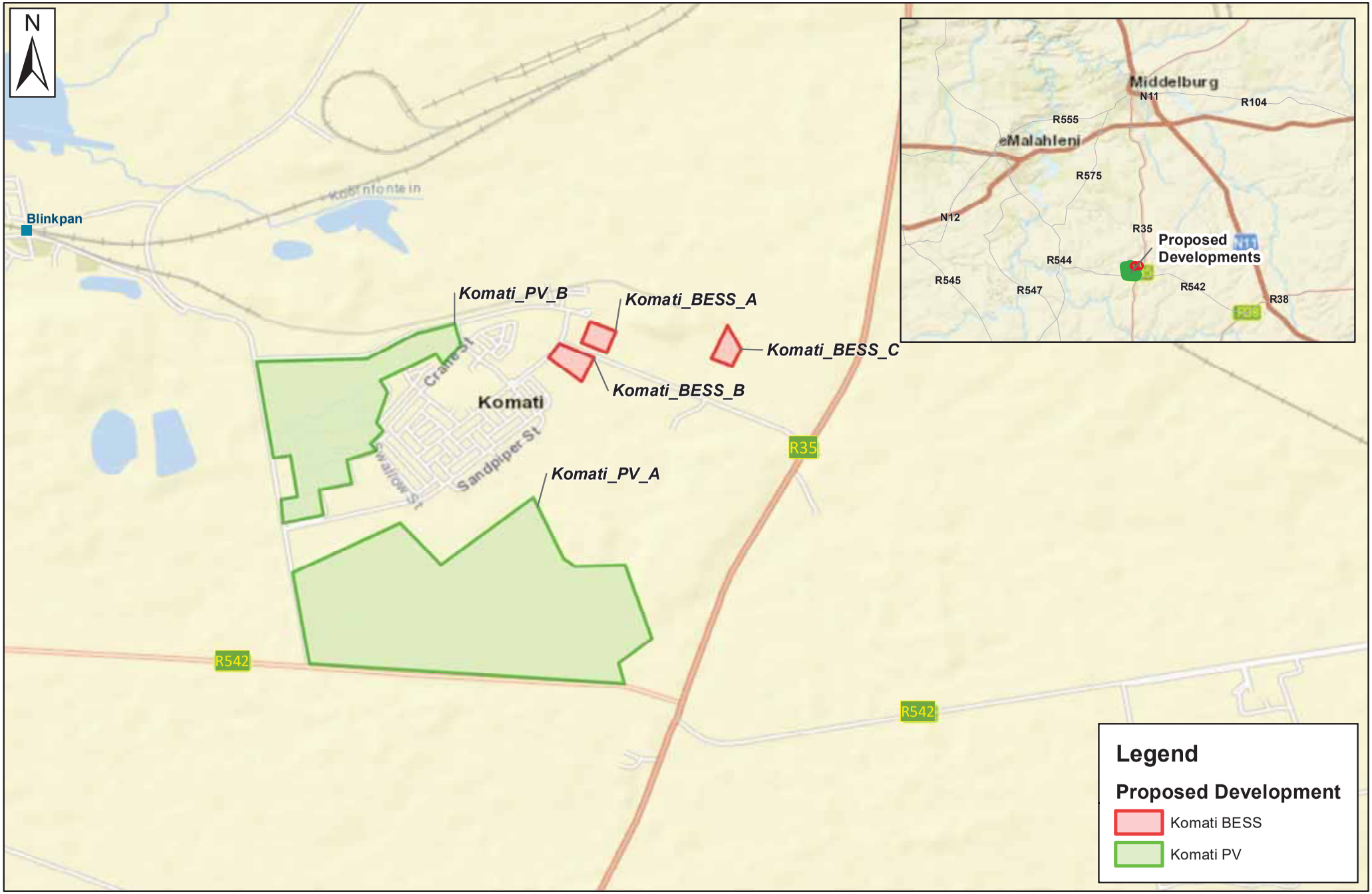
[1] Committee of Transport Officials (COTO) Technical Methods for Highways (TMH 17) Volume 1 "South African Trip Data Manual.

[2] Committee of Transport Officials (COTO) Technical Methods for Highways (TMH 16) Volume 1, South African Traffic Impact and Site Traffic Assessment Standards Manual, August 2012.

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

Annexure A

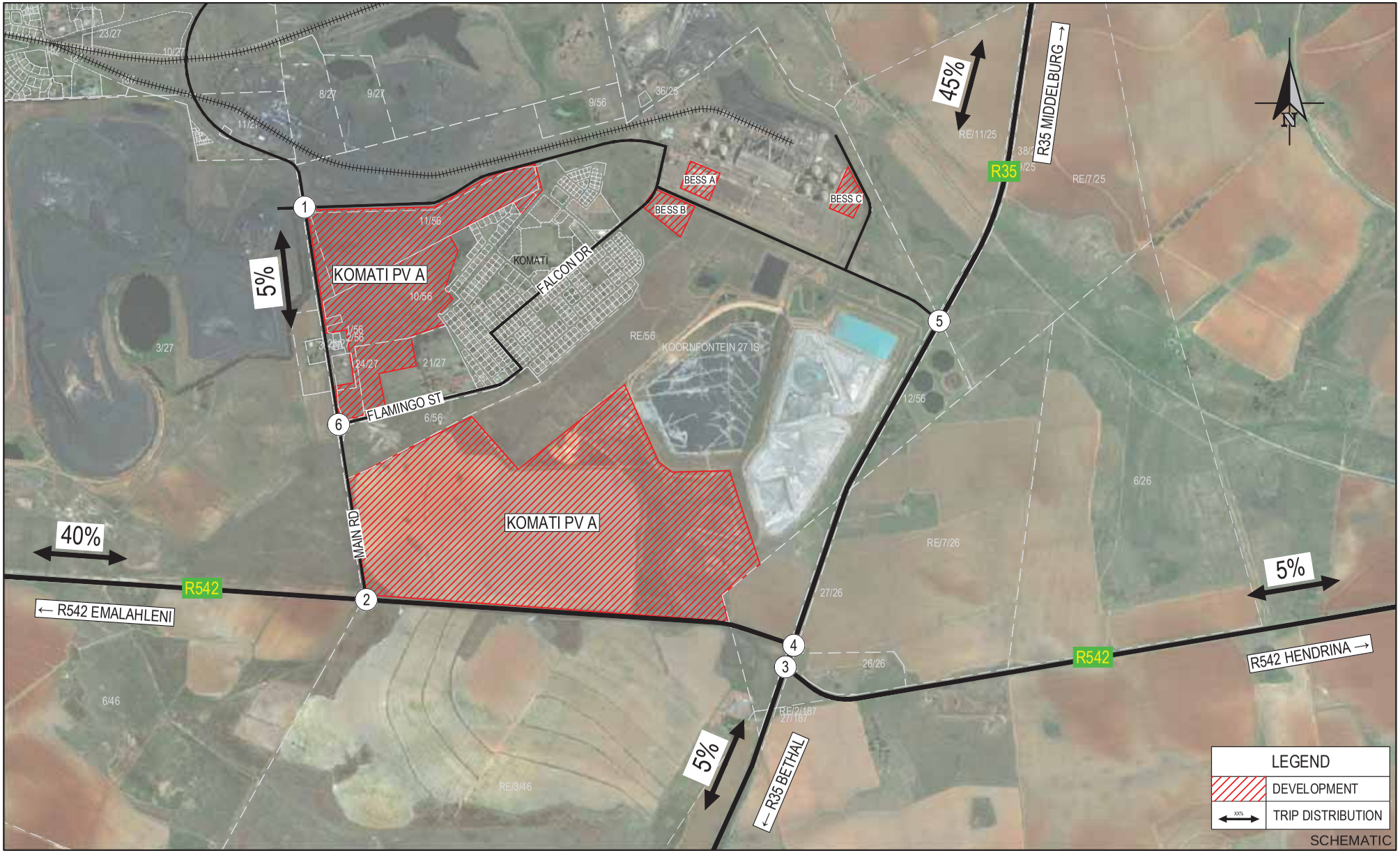
Figures



4484 /Fig A1

PROJECT:	MAP:	NO:
KOMATI POWER STATION TIA	LOCALITY MAP	A1

its	PROJECT:	MAP:	SCALE:	NO:
	KOMATI POWER STATION TIA	INTERSECTIONS COUNTED	1:18 000	A1



PROJECT:	FIGURE:	NUMBER:
KOMATI POWER STATION TIA	TRIP DISTRIBUTION	A3

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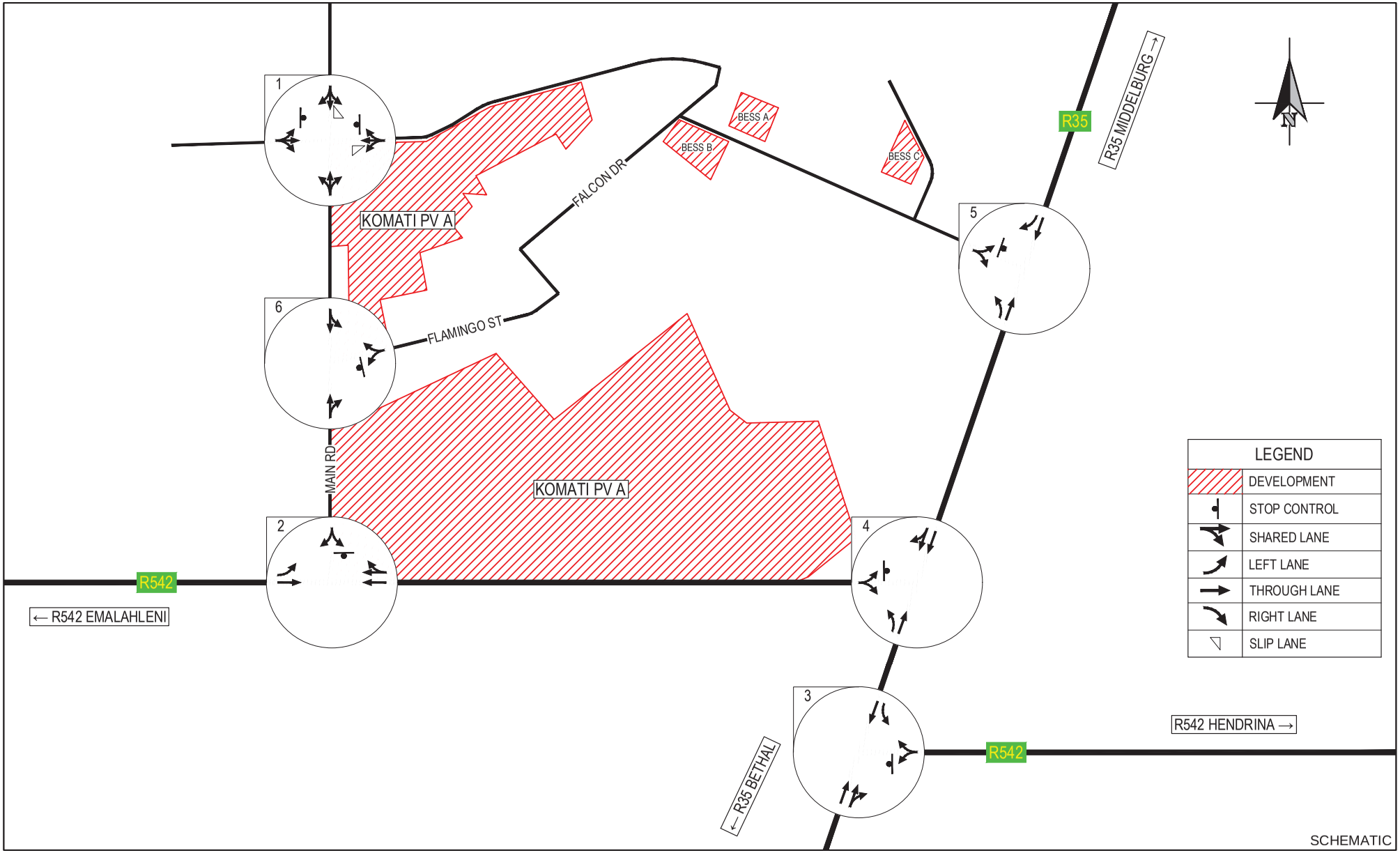

PROJECT:	FIGURE:	NUMBER:
KOMATI POWER STATION TIA	EXISTING GEOMETRY	A4

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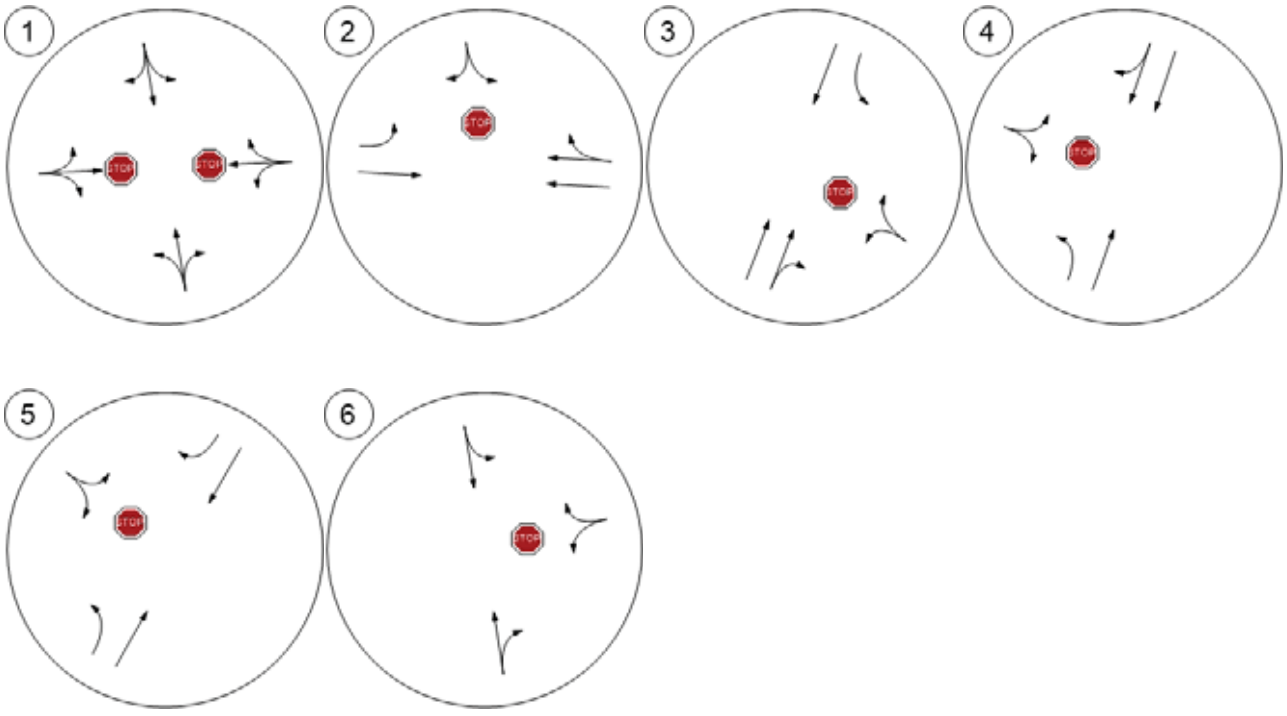
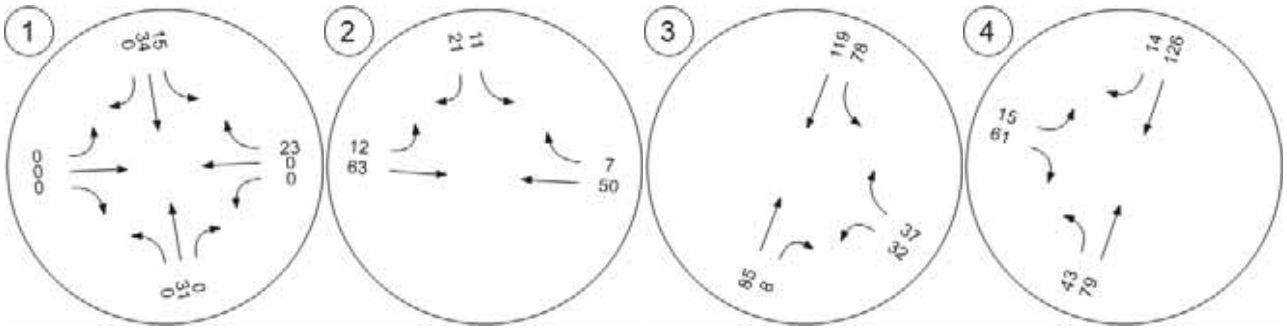
Annexure B

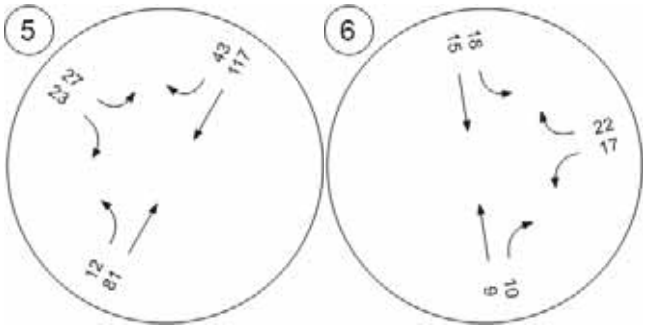
PTV Vistro Output

Lane Configuration and Traffic Control

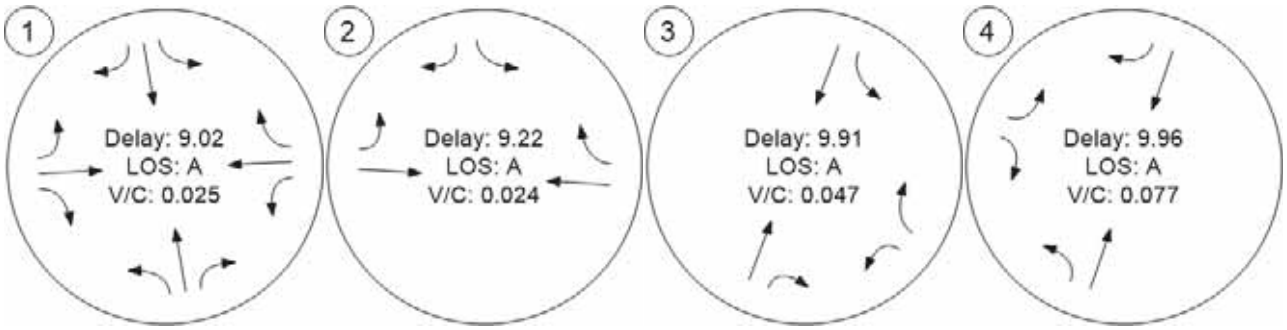


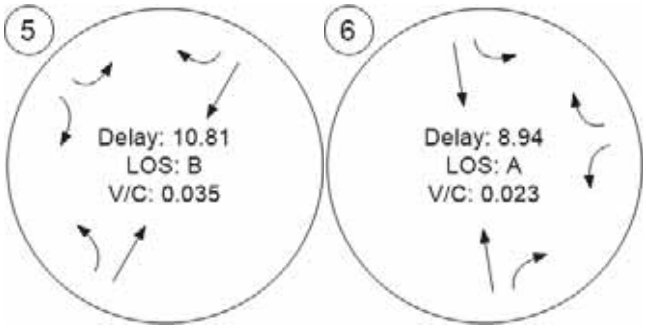
Traffic Volume - Base Volume



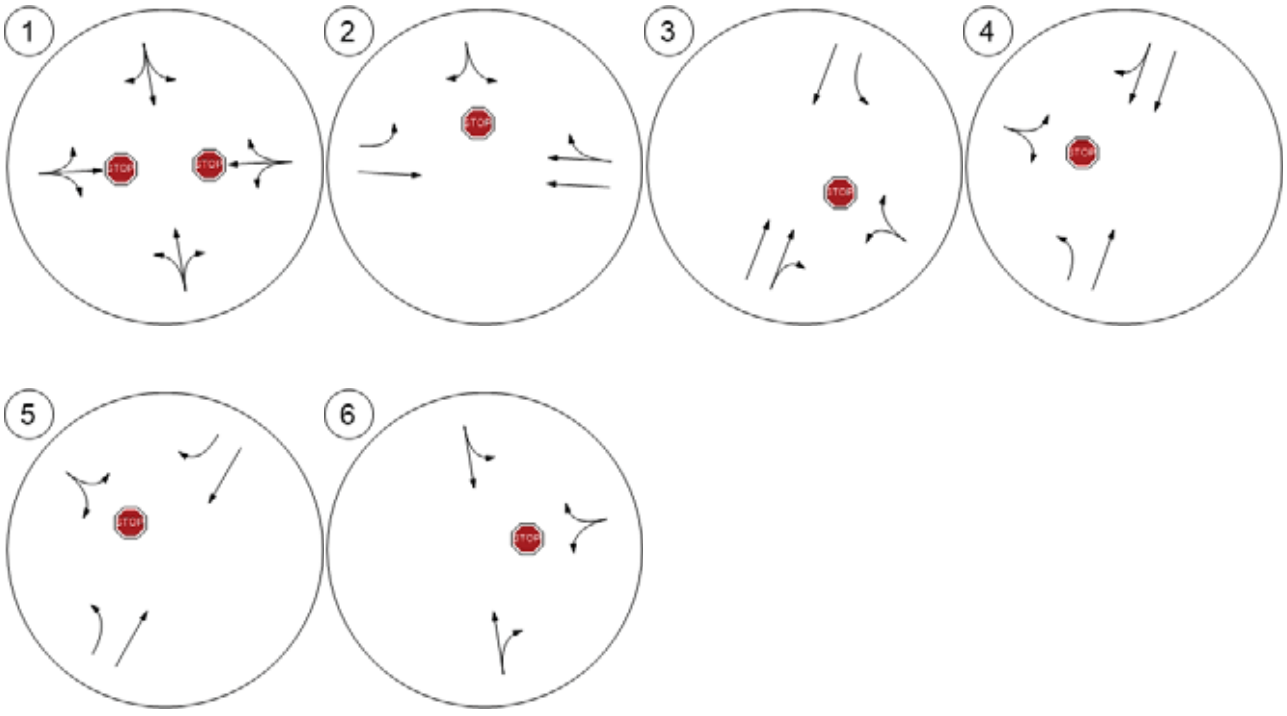


Traffic Conditions

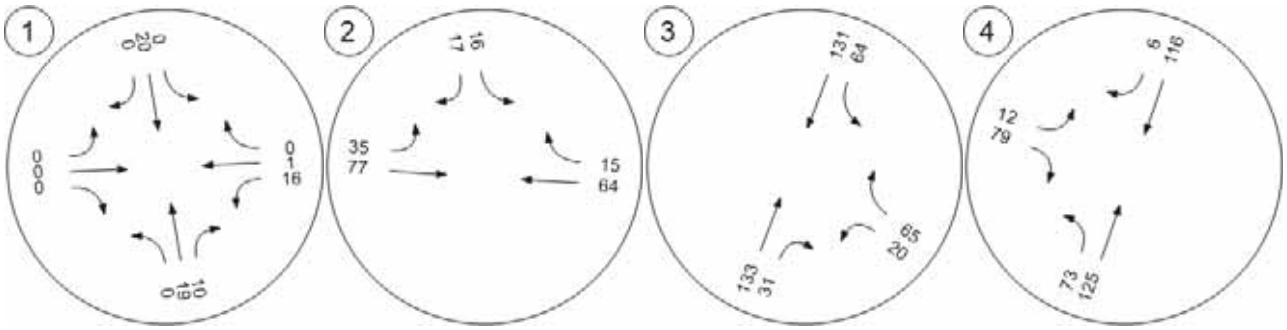


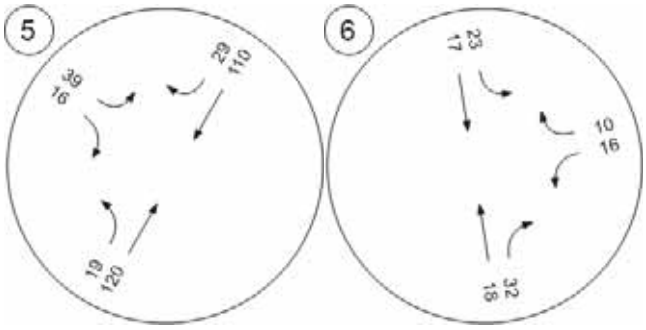


Lane Configuration and Traffic Control

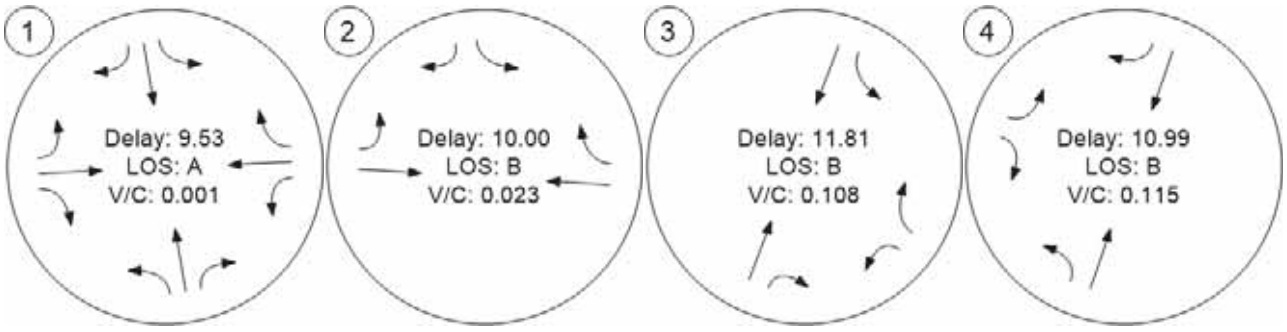


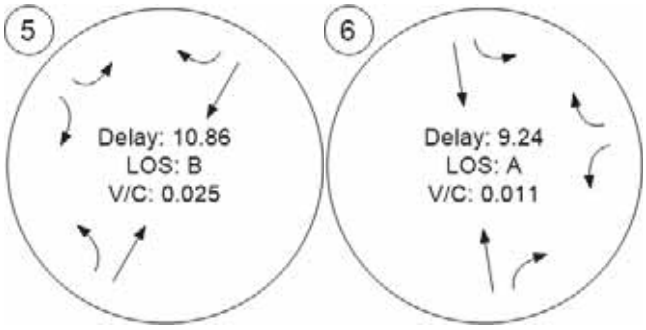
Traffic Volume - Base Volume



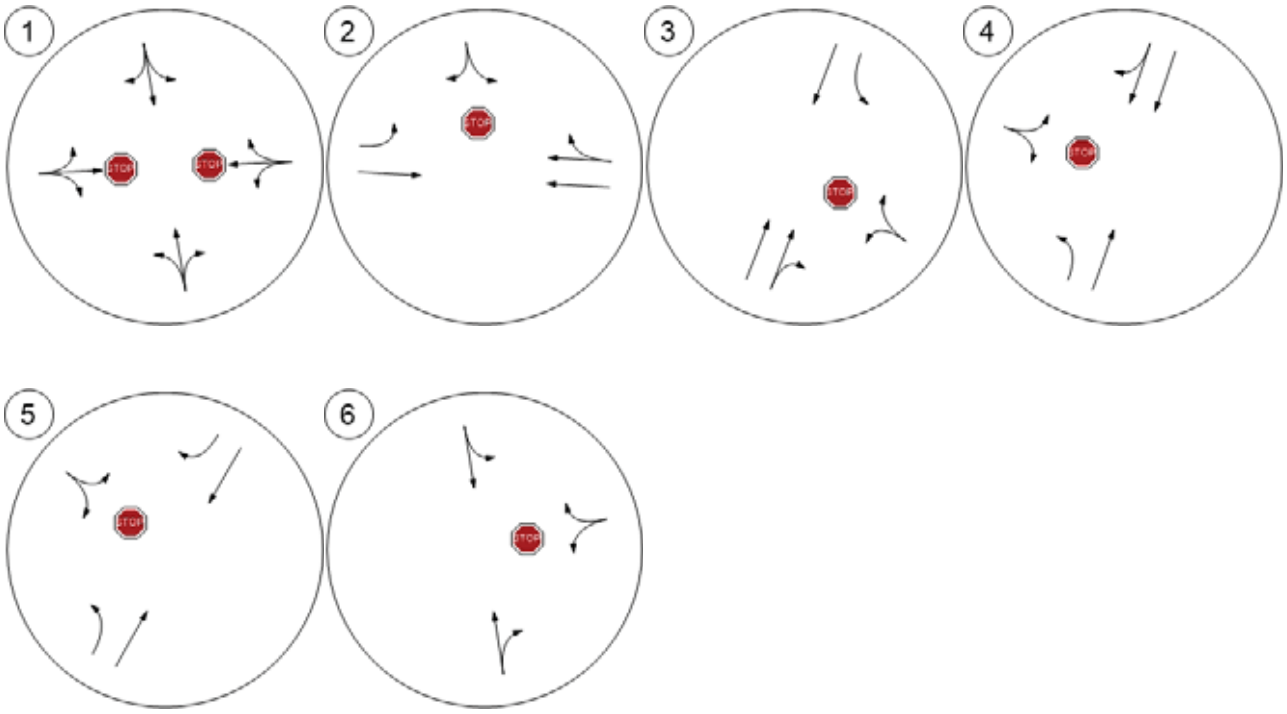


Traffic Conditions

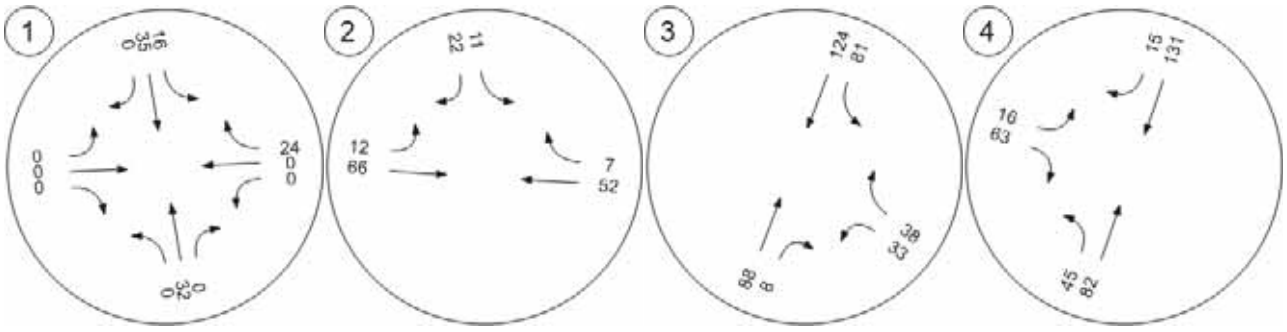


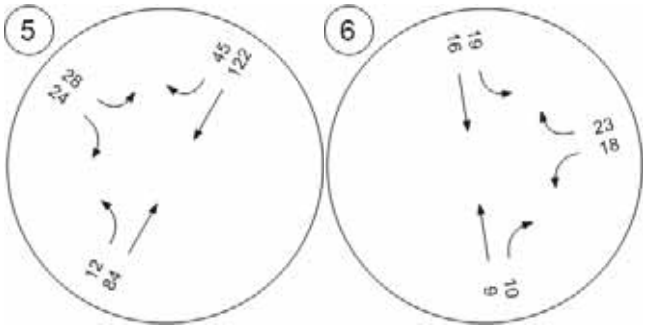


Lane Configuration and Traffic Control



Traffic Volume - Future Total Volume





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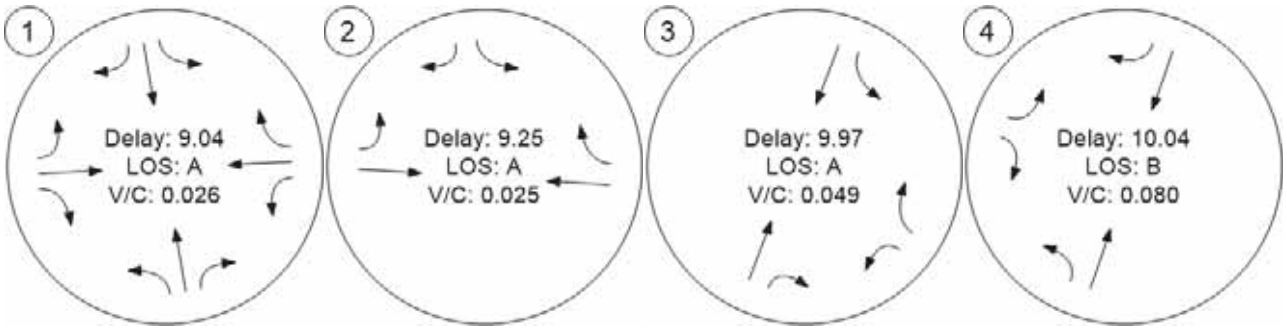
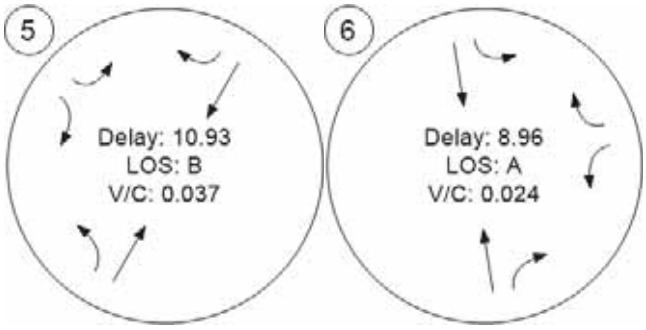
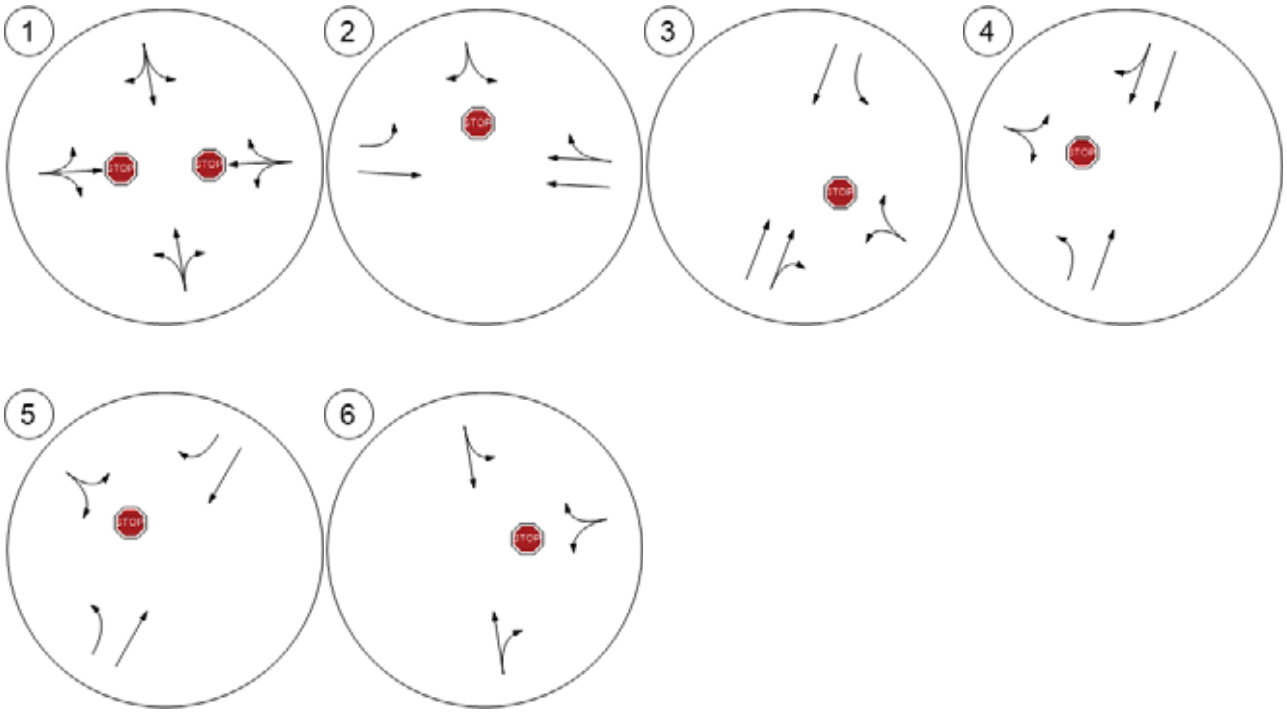
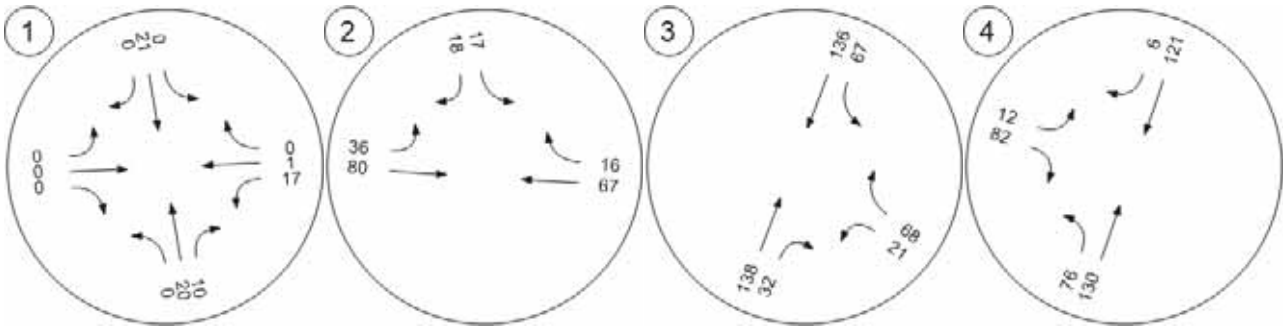


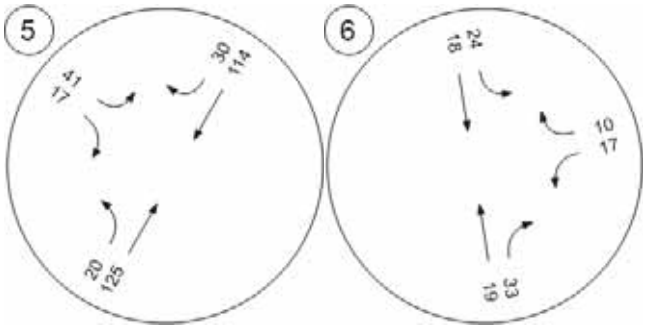


Lane Configuration and Traffic Control

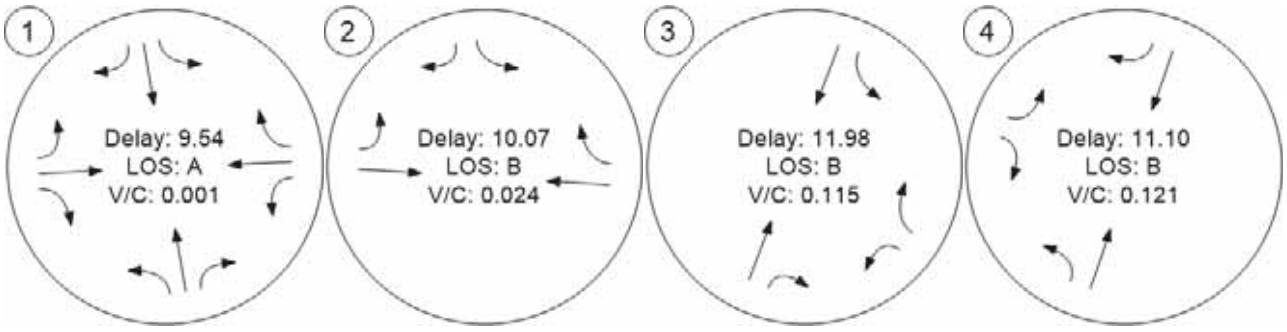


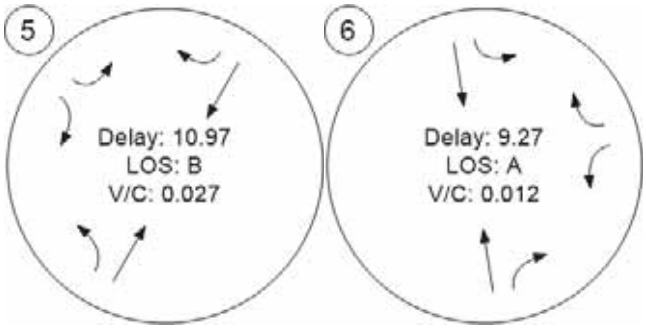
Traffic Volume - Future Total Volume



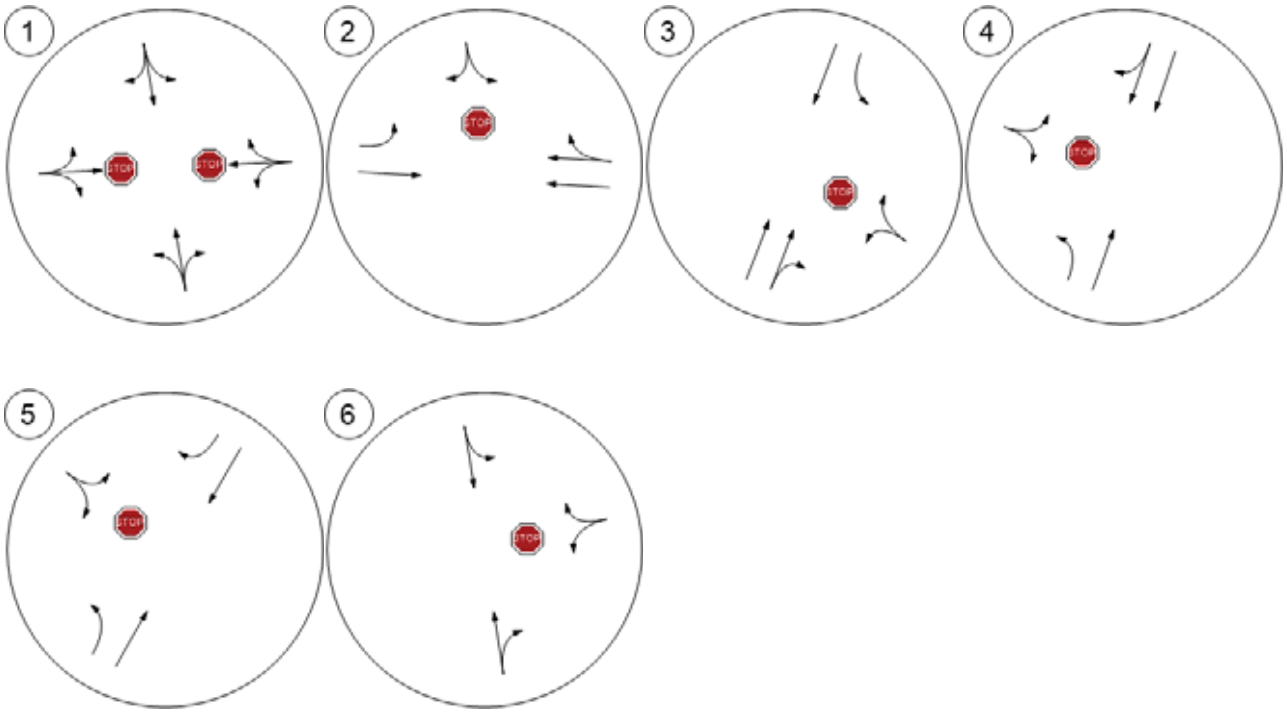


Traffic Conditions

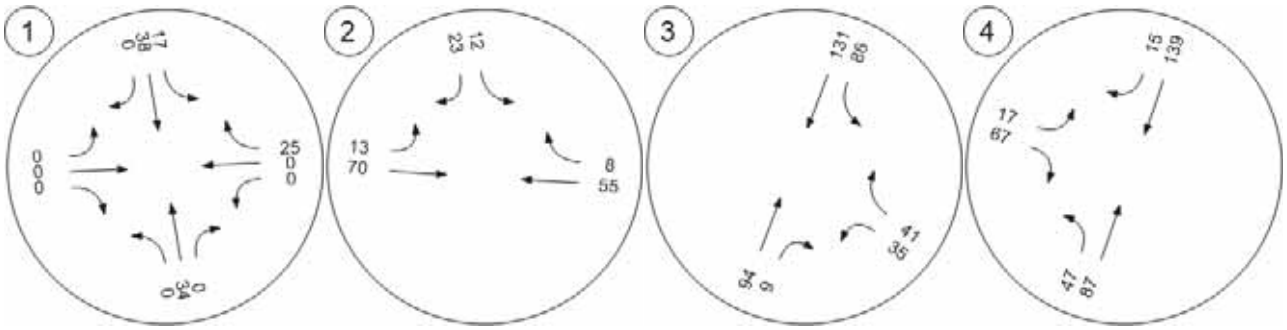


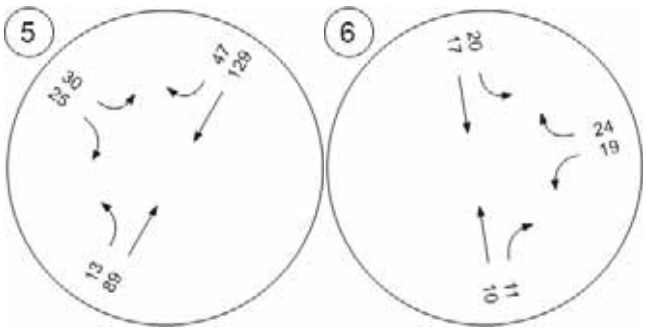


Lane Configuration and Traffic Control



Traffic Volume - Future Total Volume





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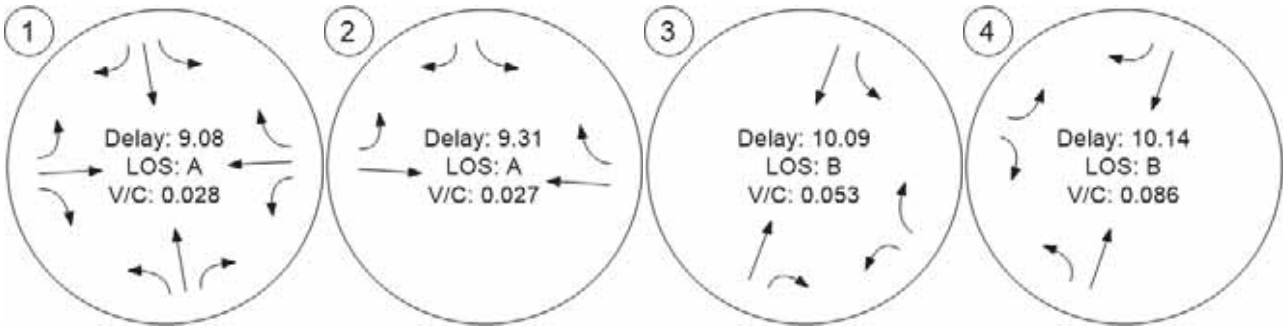
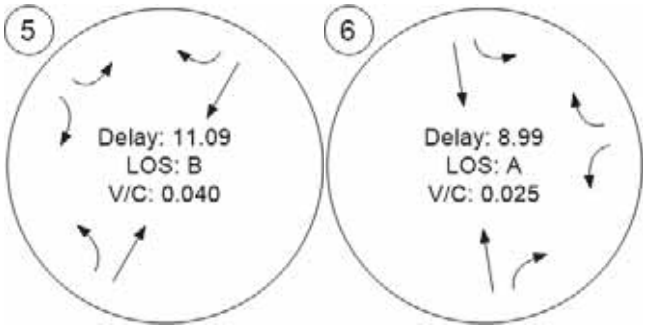
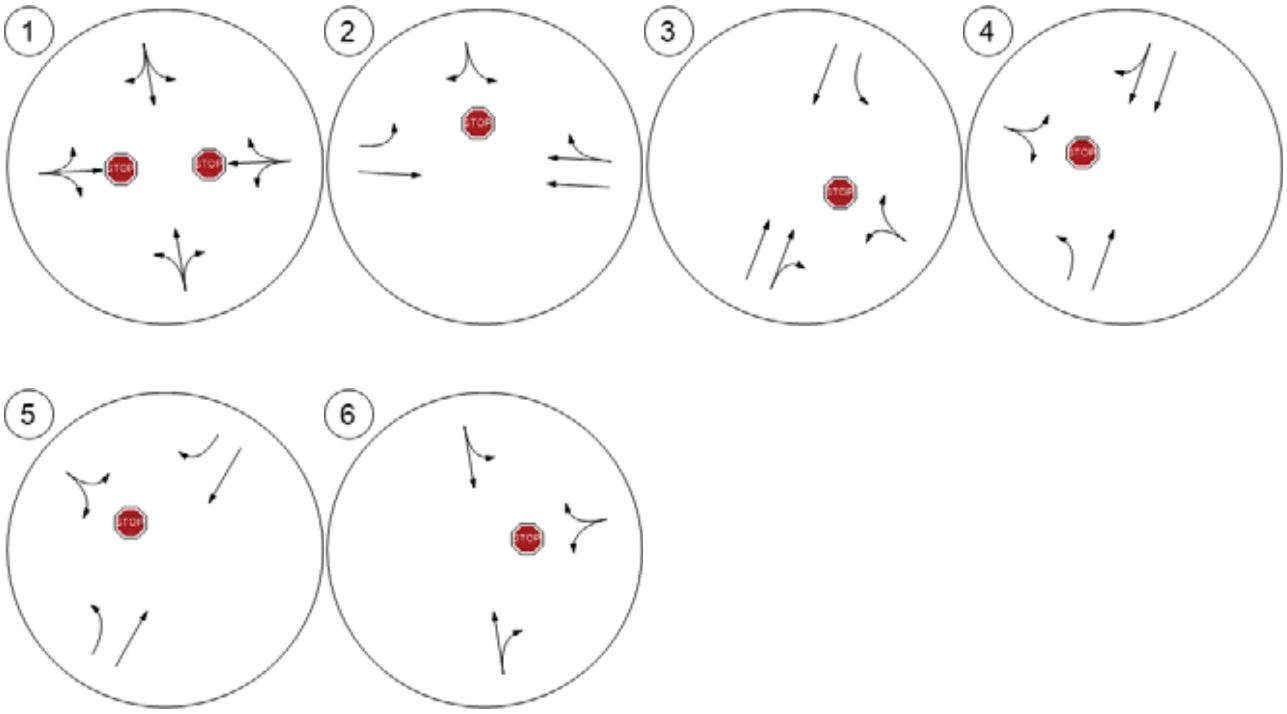
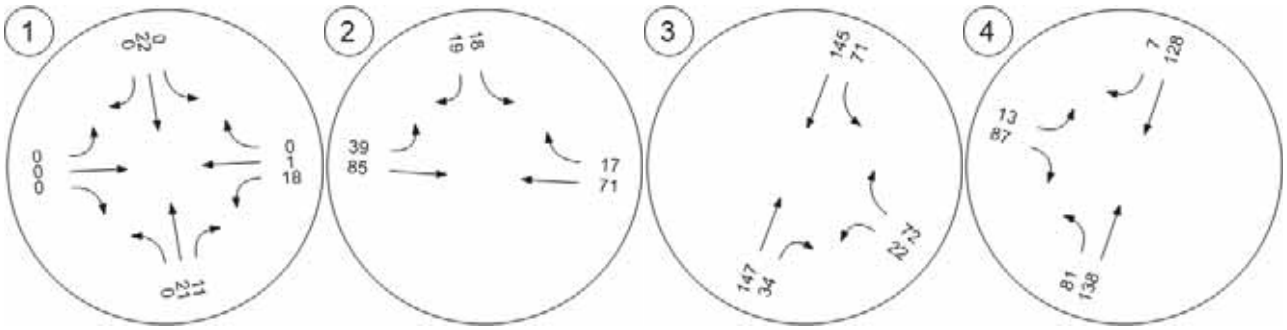


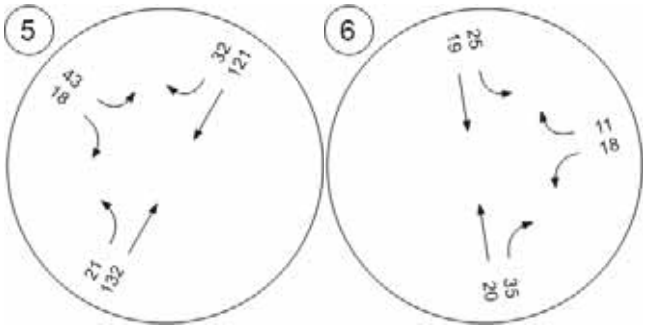


Lane Configuration and Traffic Control



Traffic Volume - Future Total Volume





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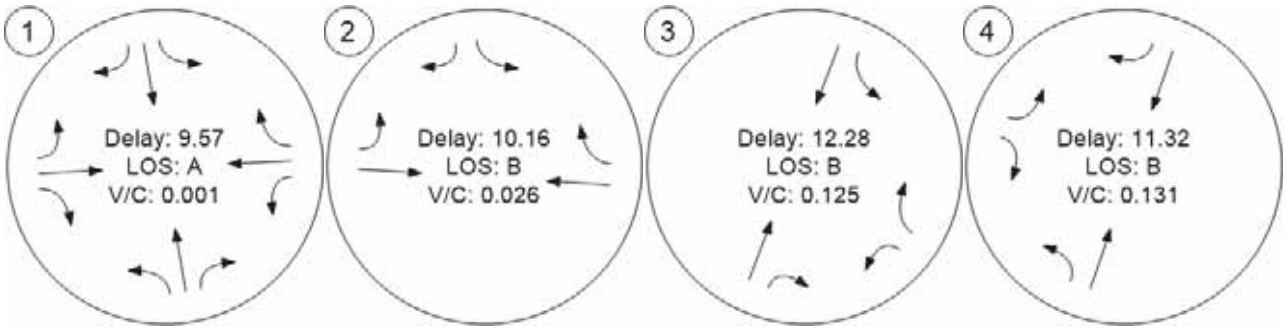
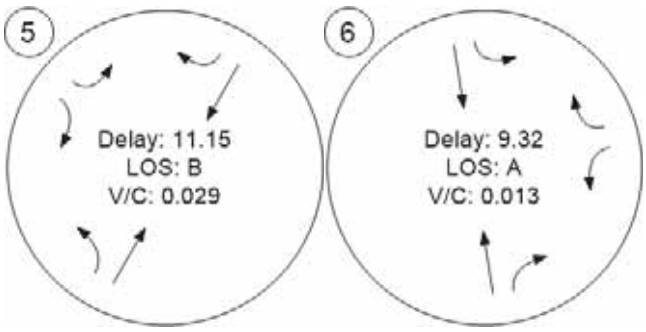
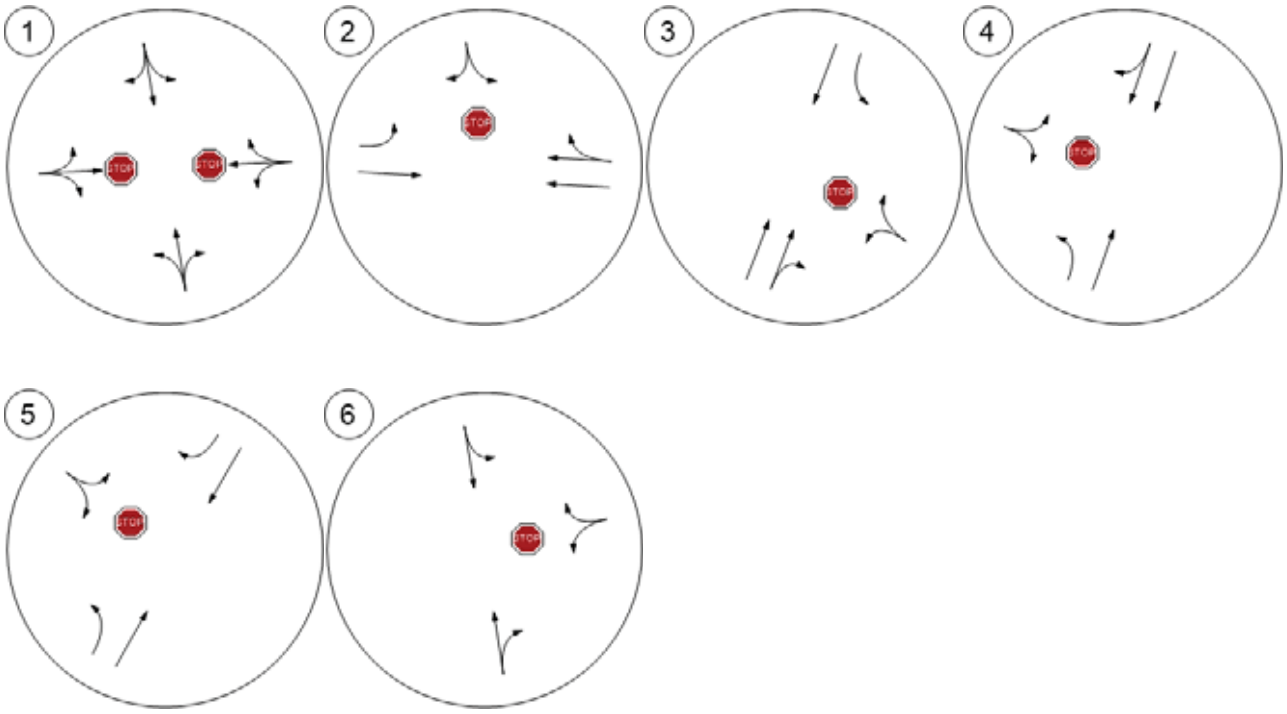
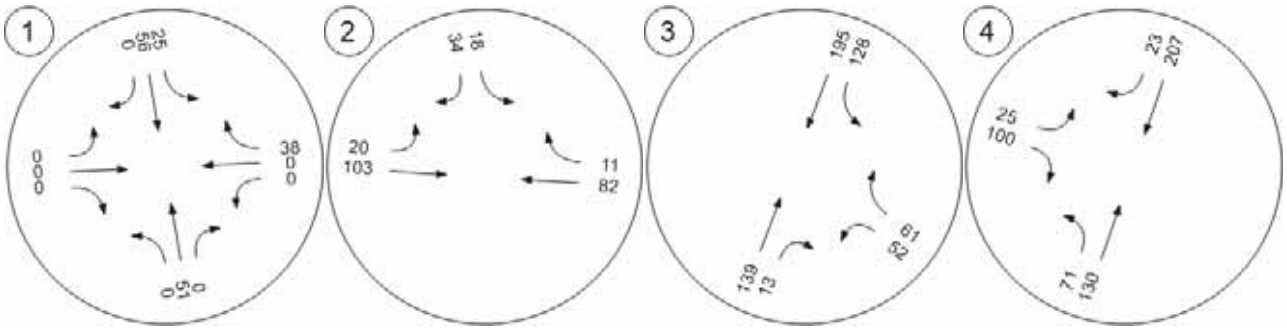


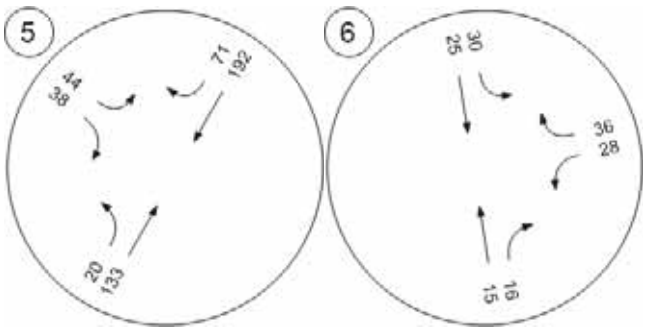


Lane Configuration and Traffic Control



Traffic Volume - Future Total Volume





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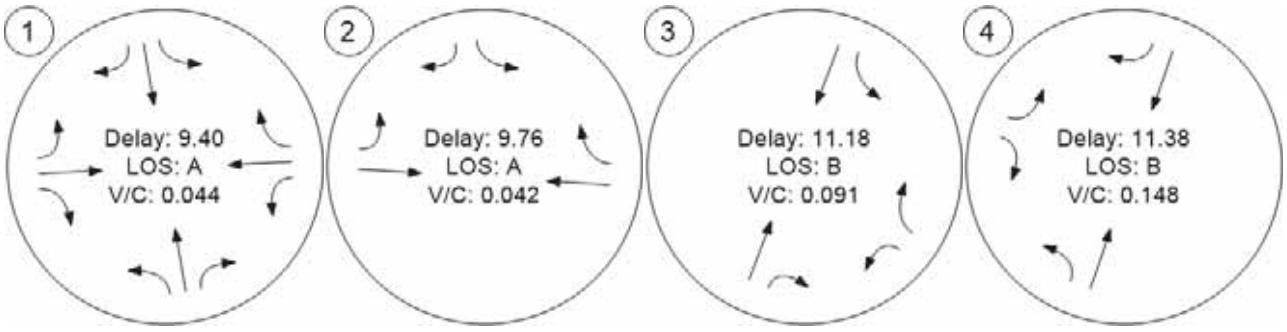
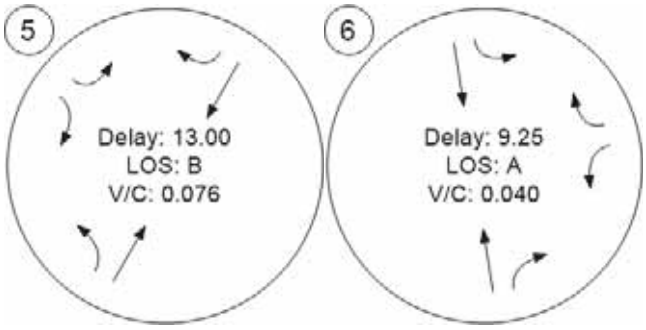
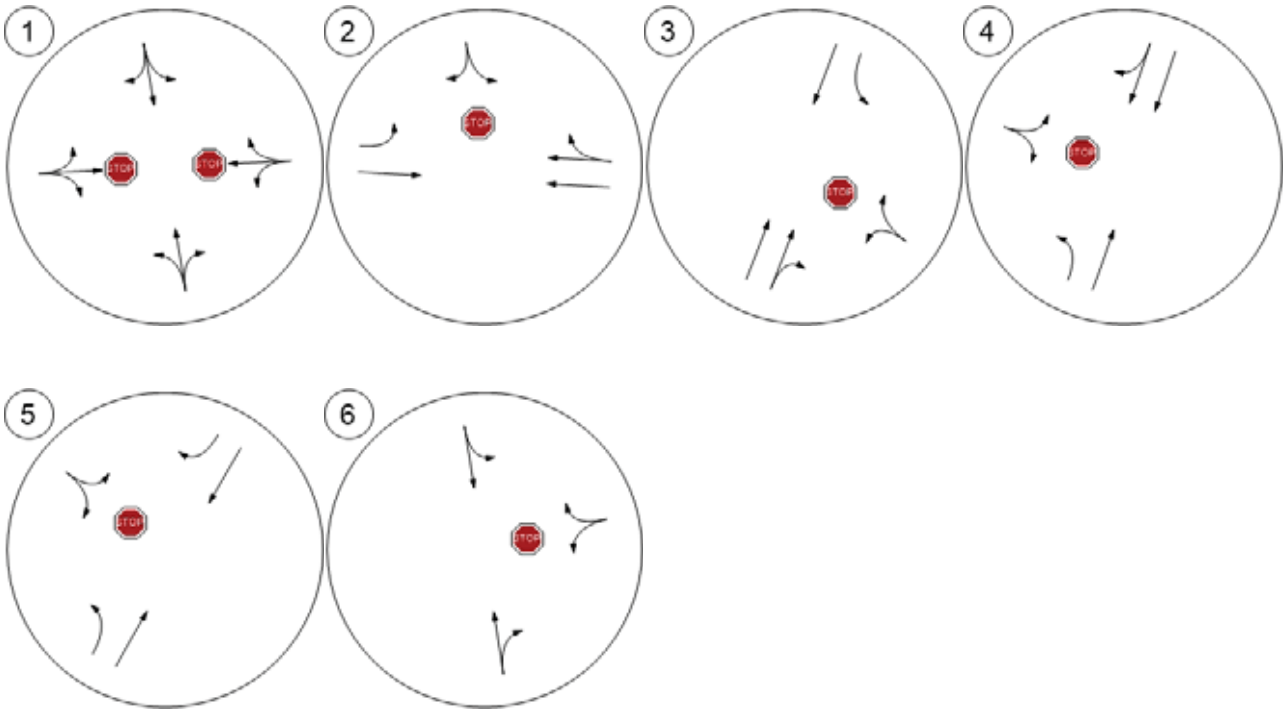
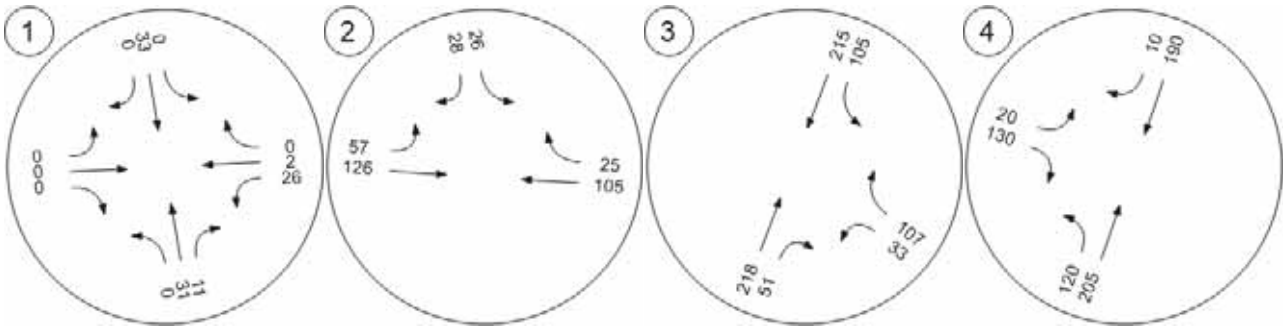


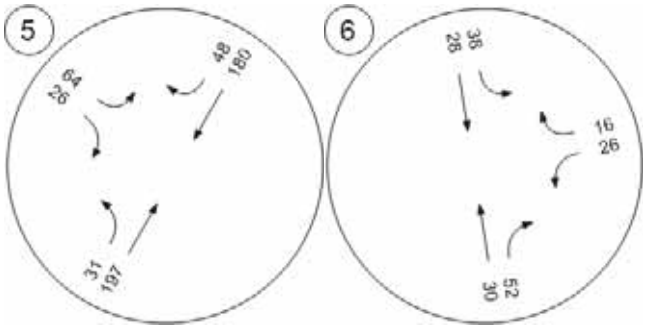


Lane Configuration and Traffic Control



Traffic Volume - Future Total Volume





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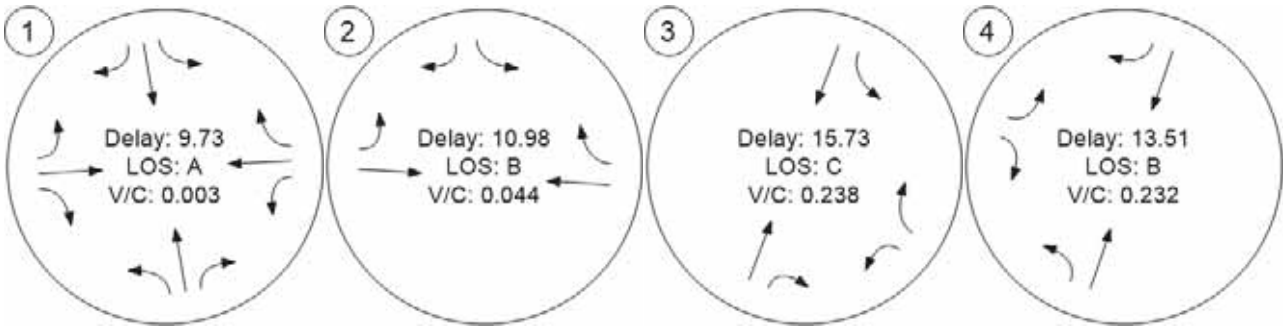
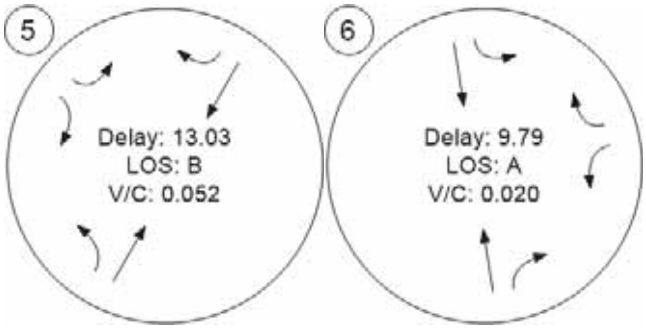
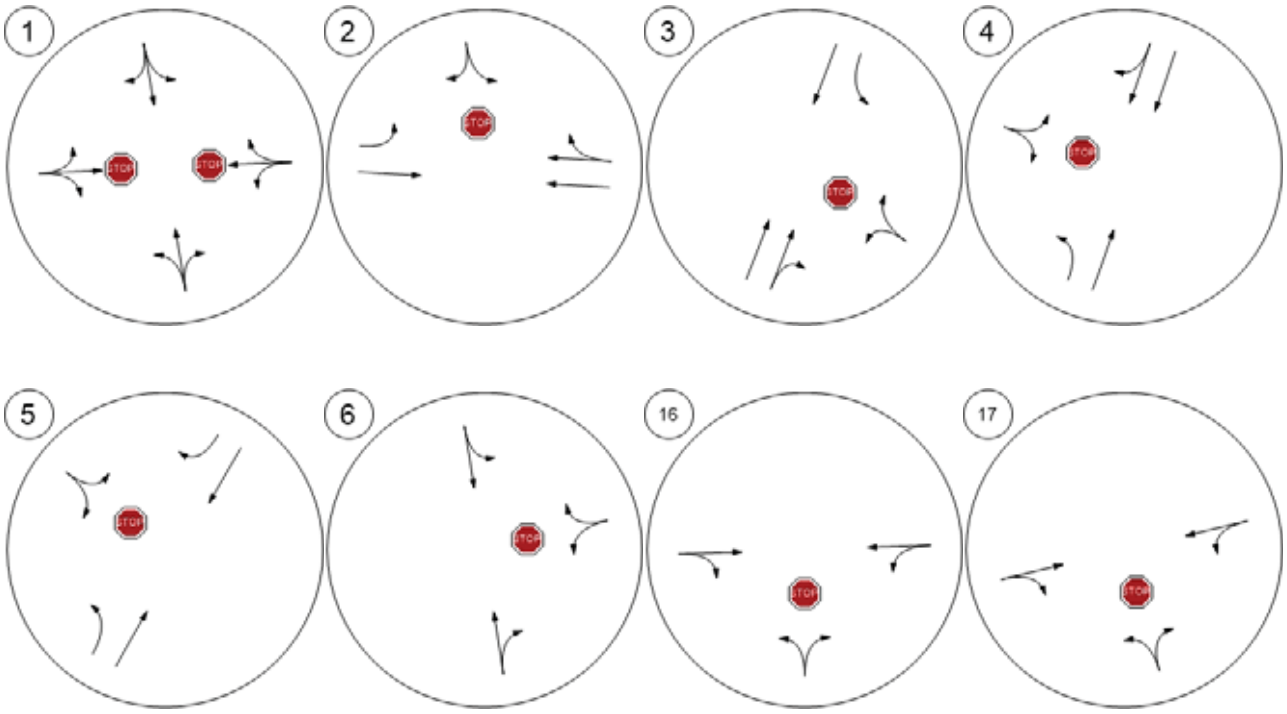
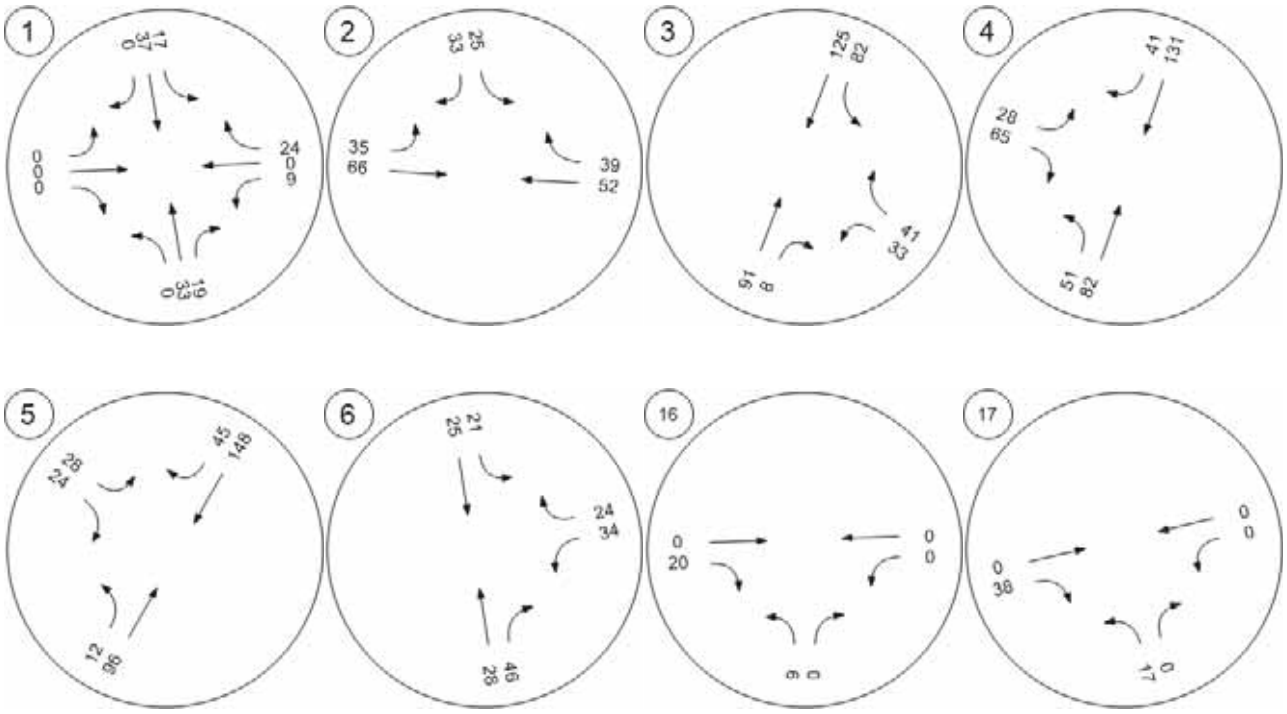




Lane Configuration and Traffic Control



Traffic Volume - Future Total Volume



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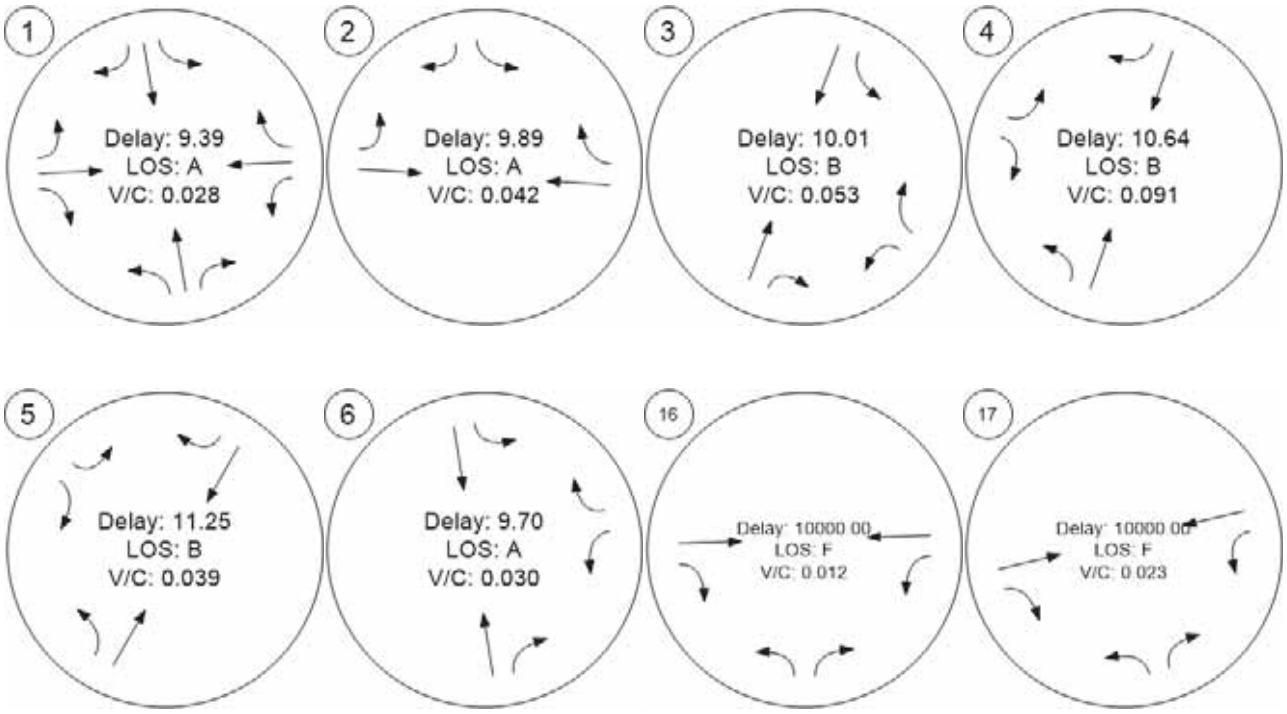
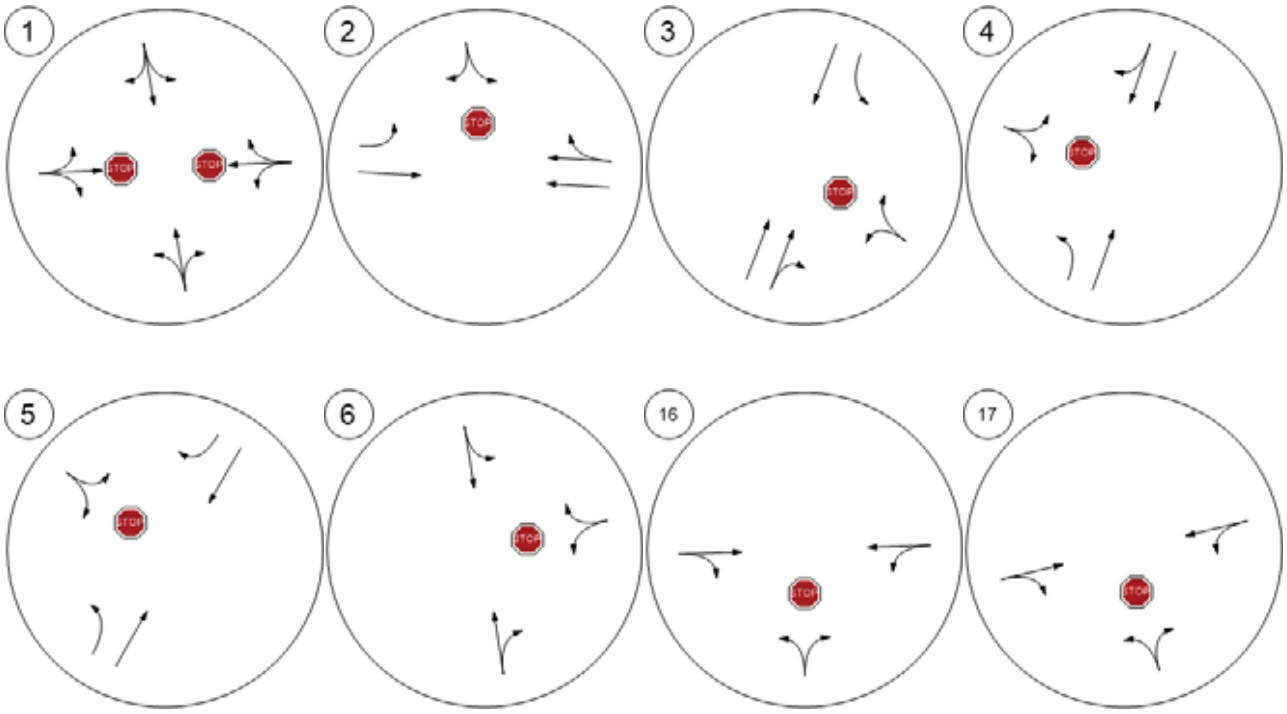
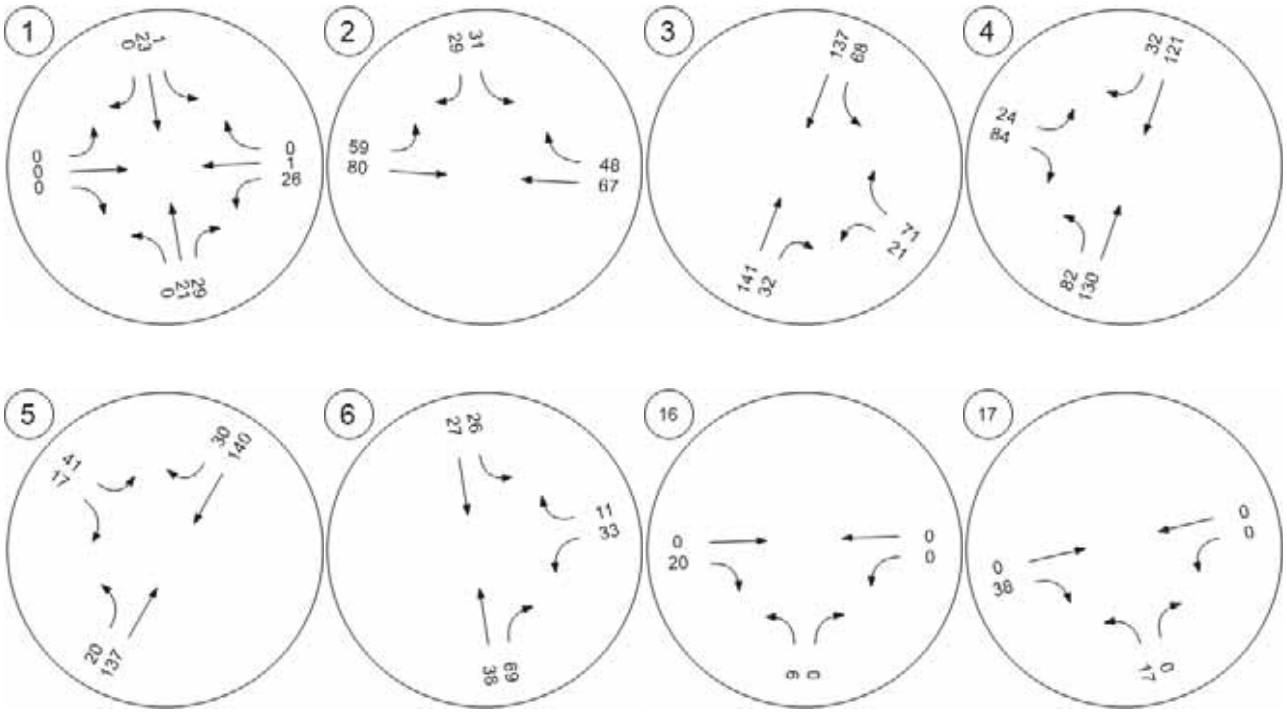


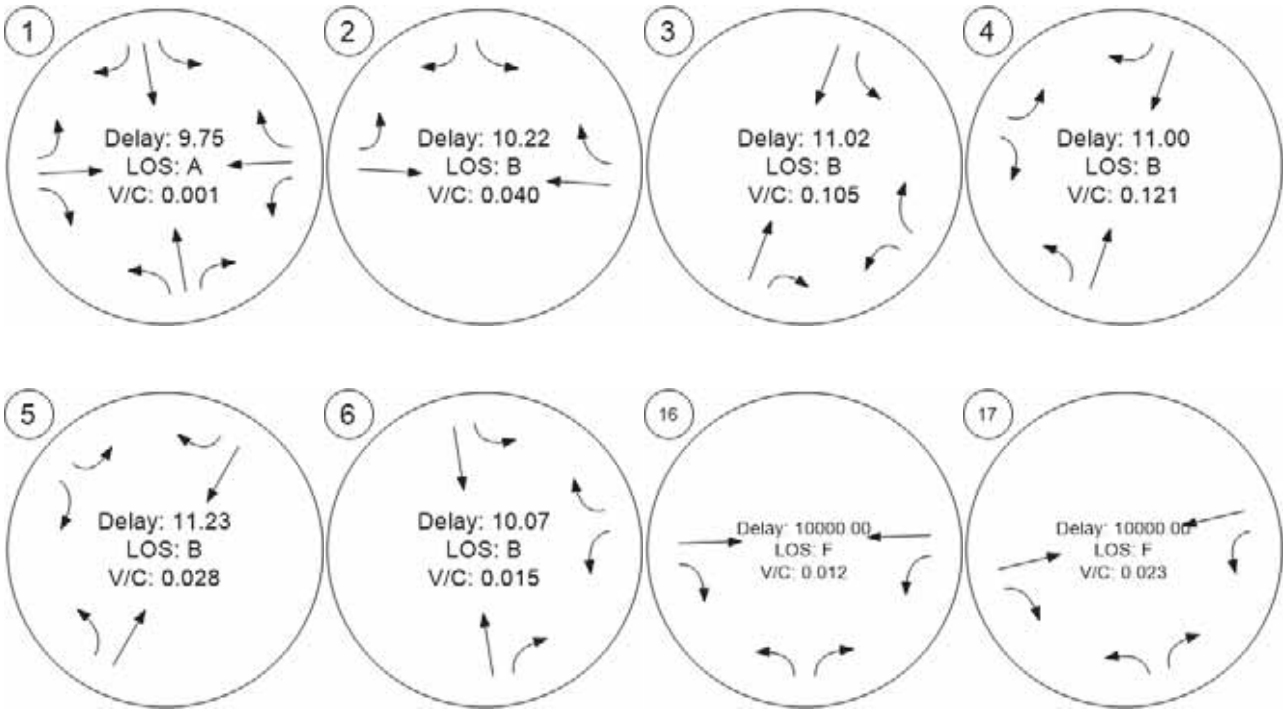
Lane Configuration and Traffic Control



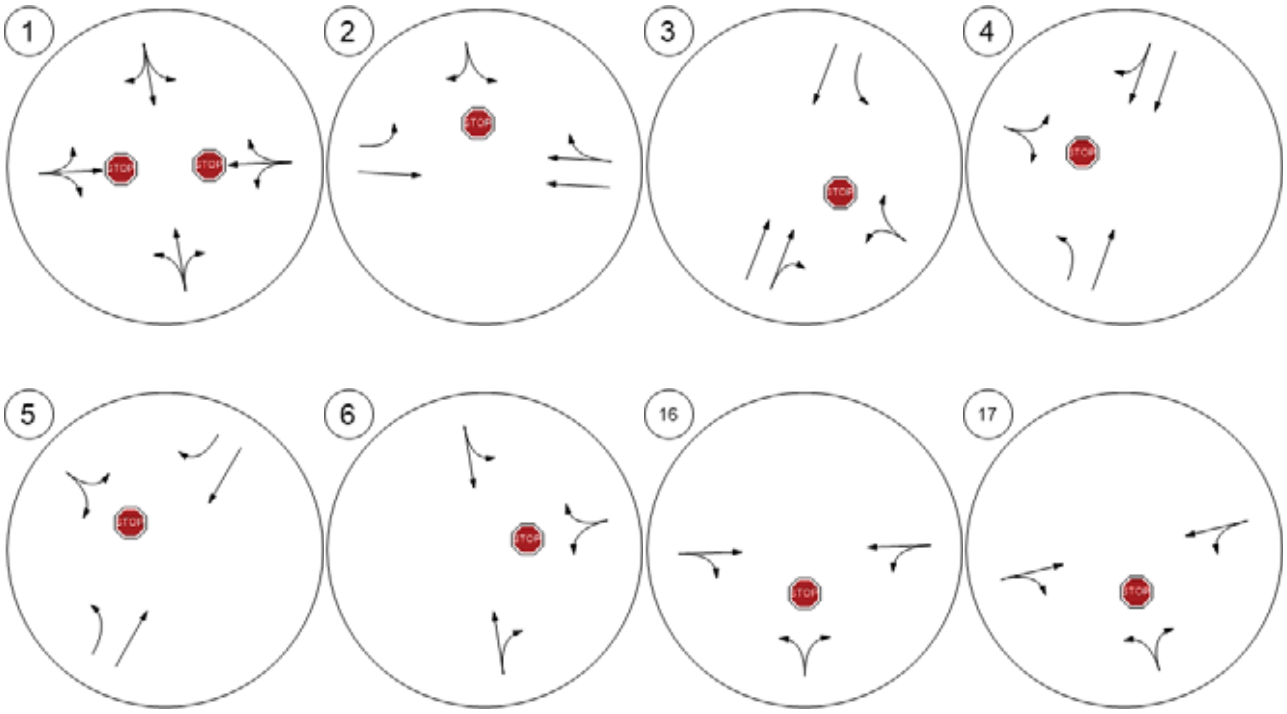
Traffic Volume - Future Total Volume



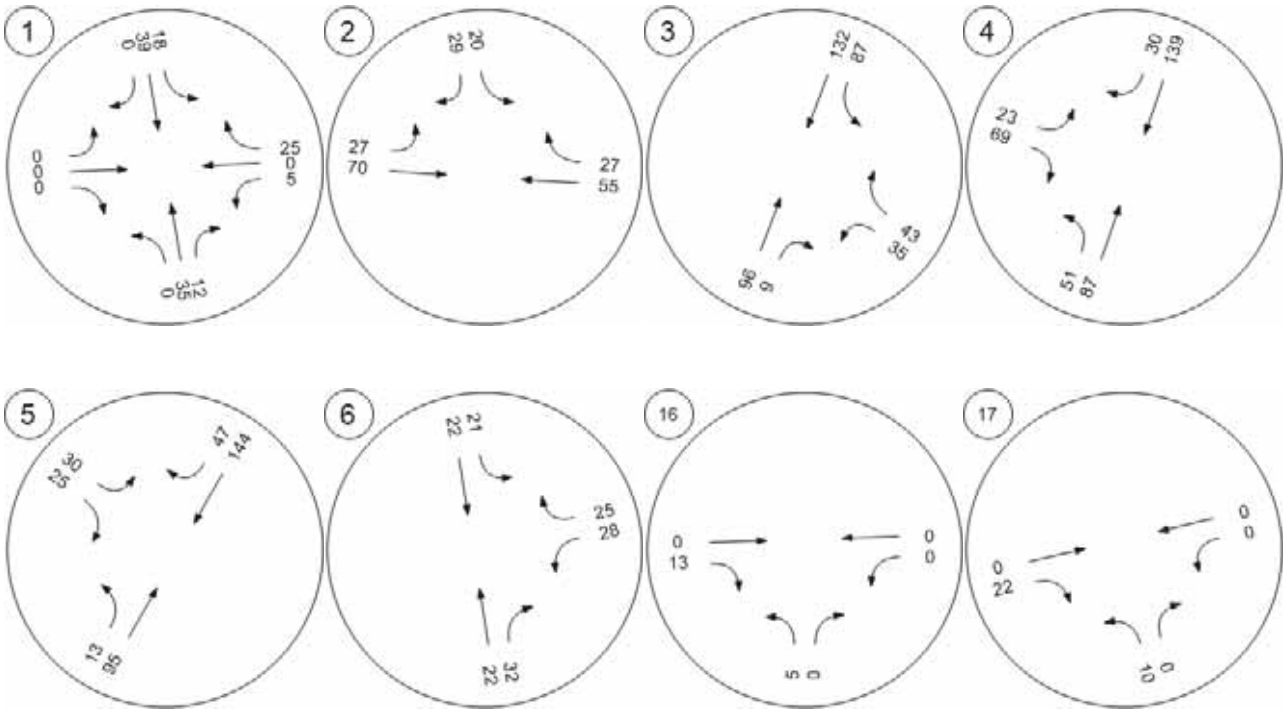
Traffic Conditions



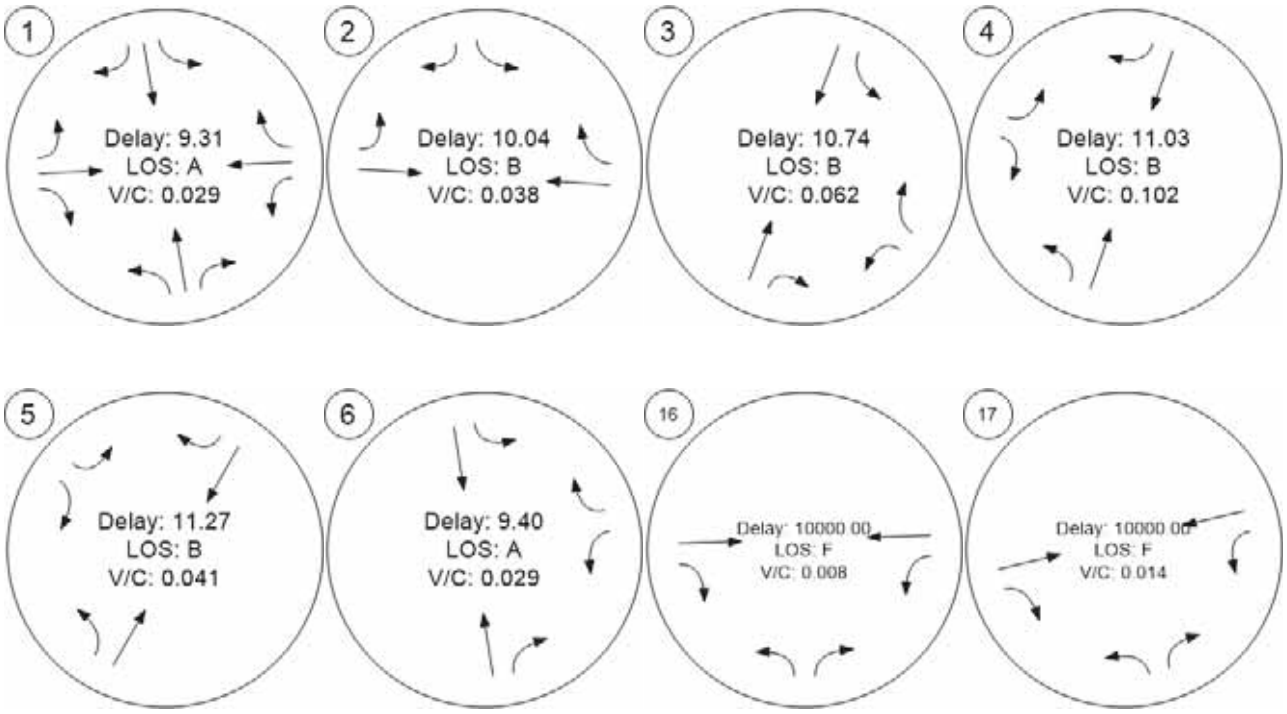
Lane Configuration and Traffic Control



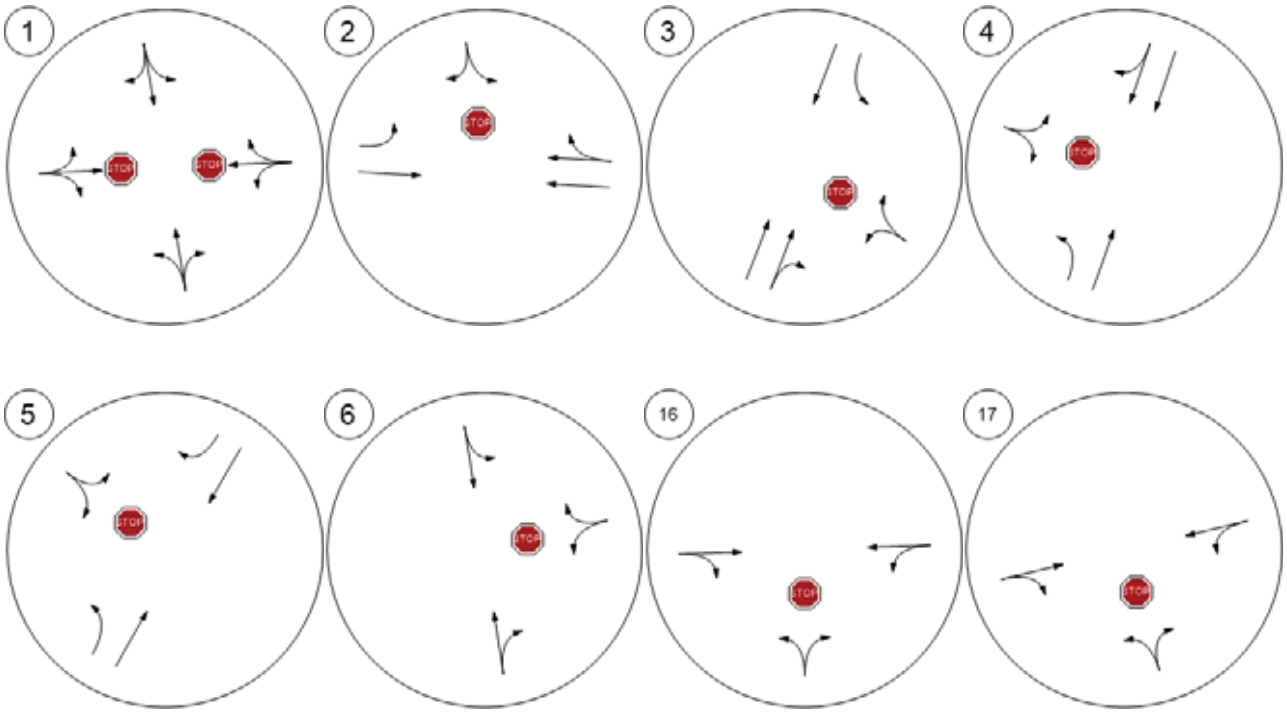
Traffic Volume - Future Total Volume



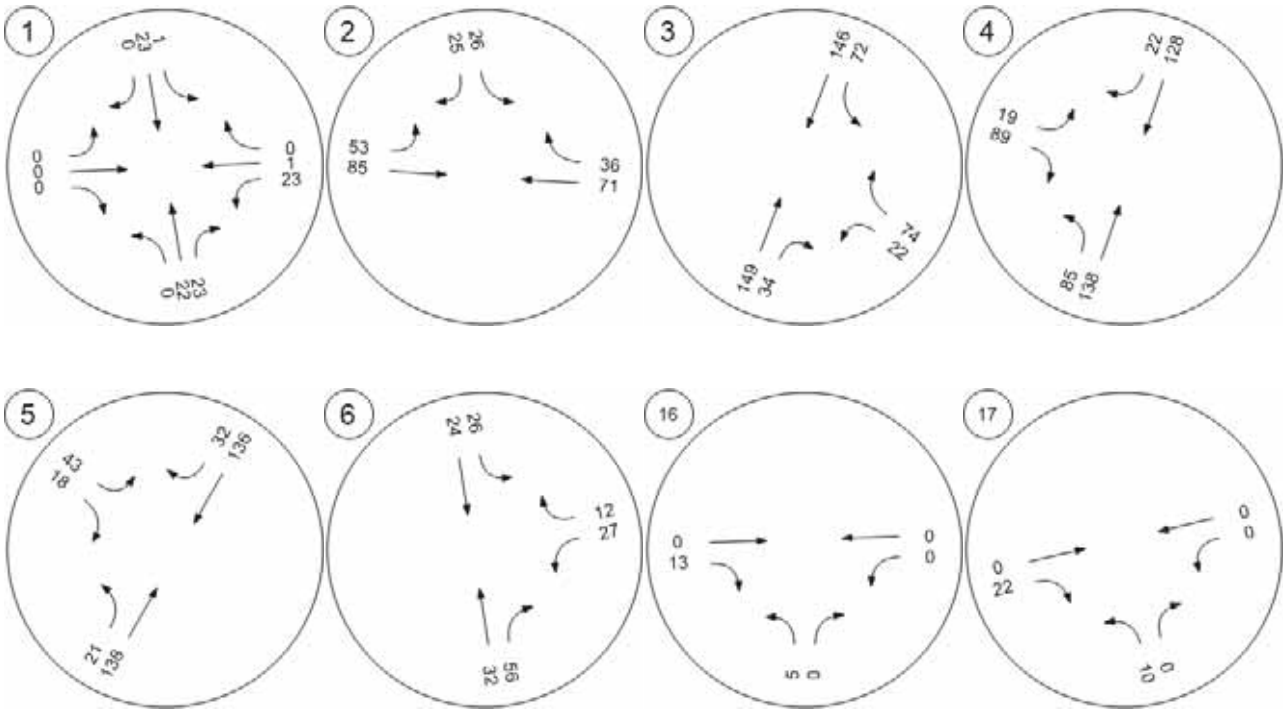
Traffic Conditions



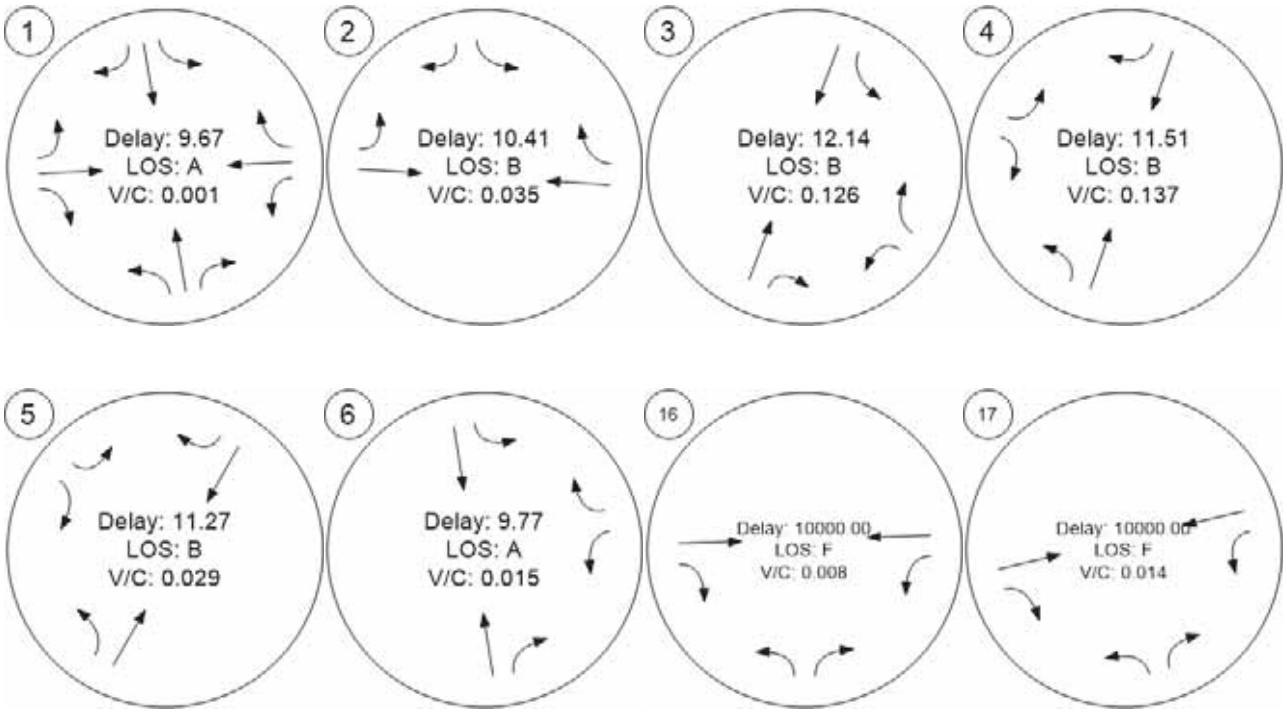
Lane Configuration and Traffic Control



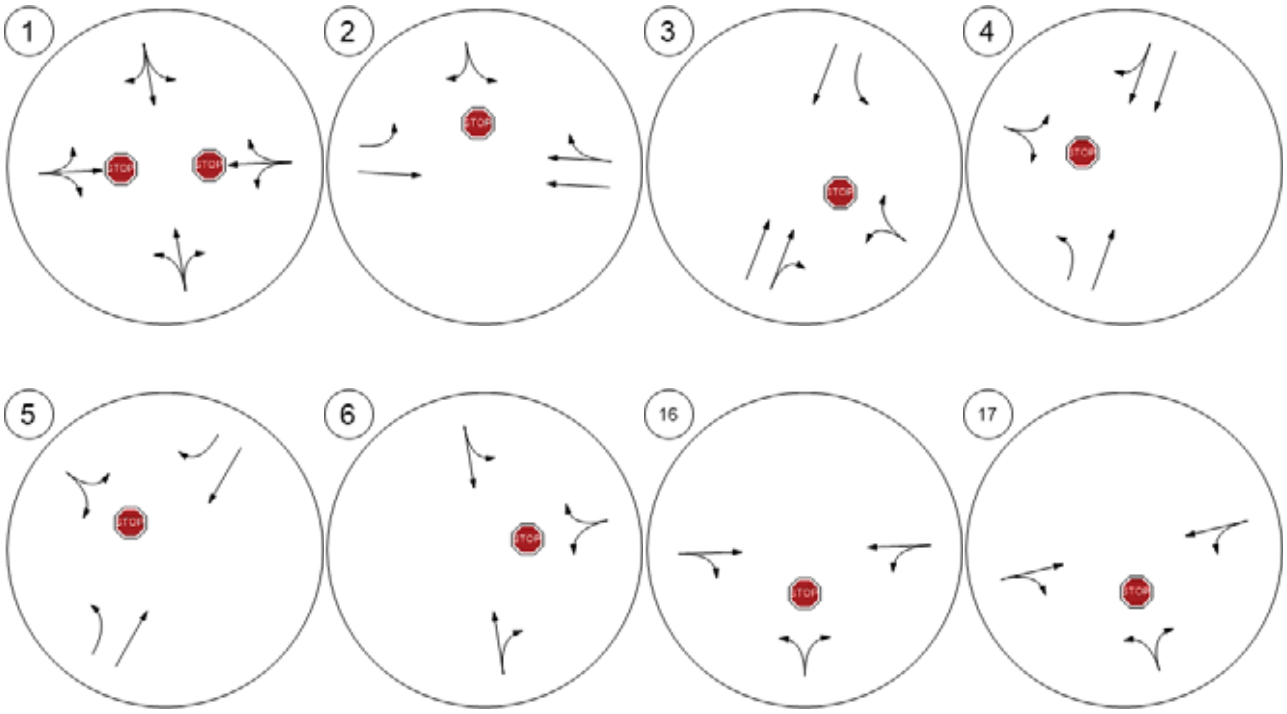
Traffic Volume - Future Total Volume



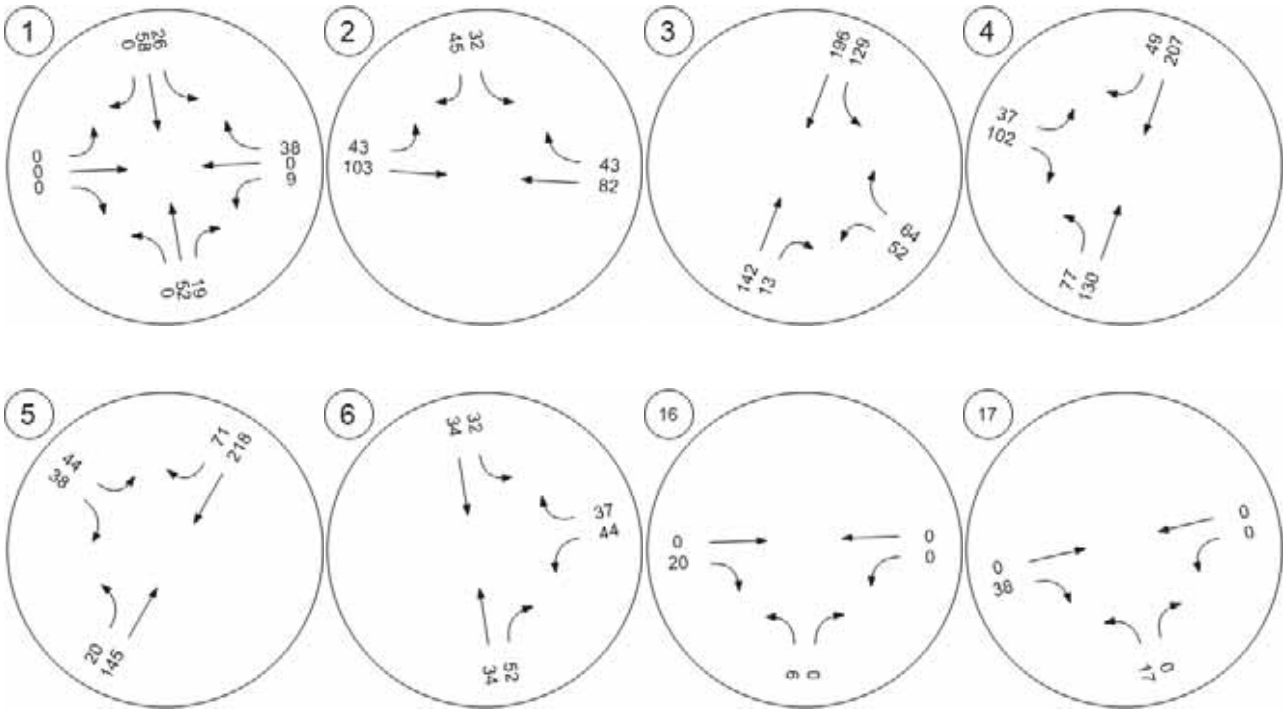
Traffic Conditions



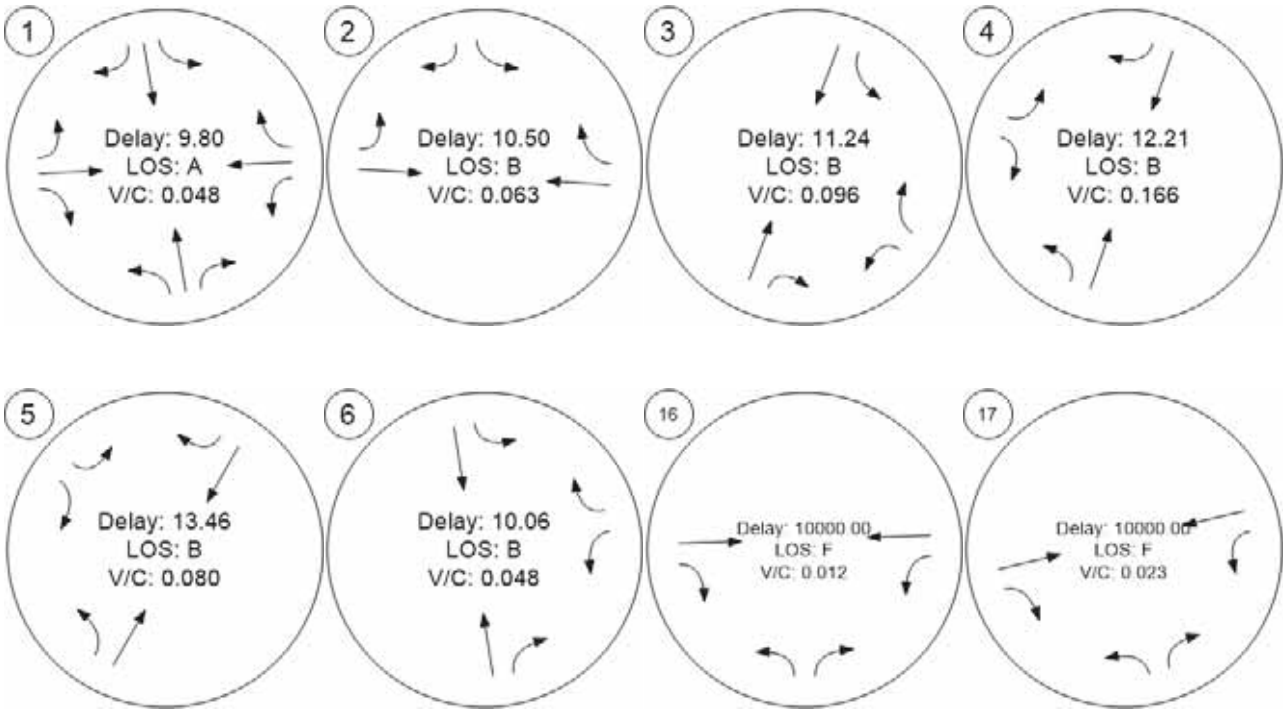
Lane Configuration and Traffic Control



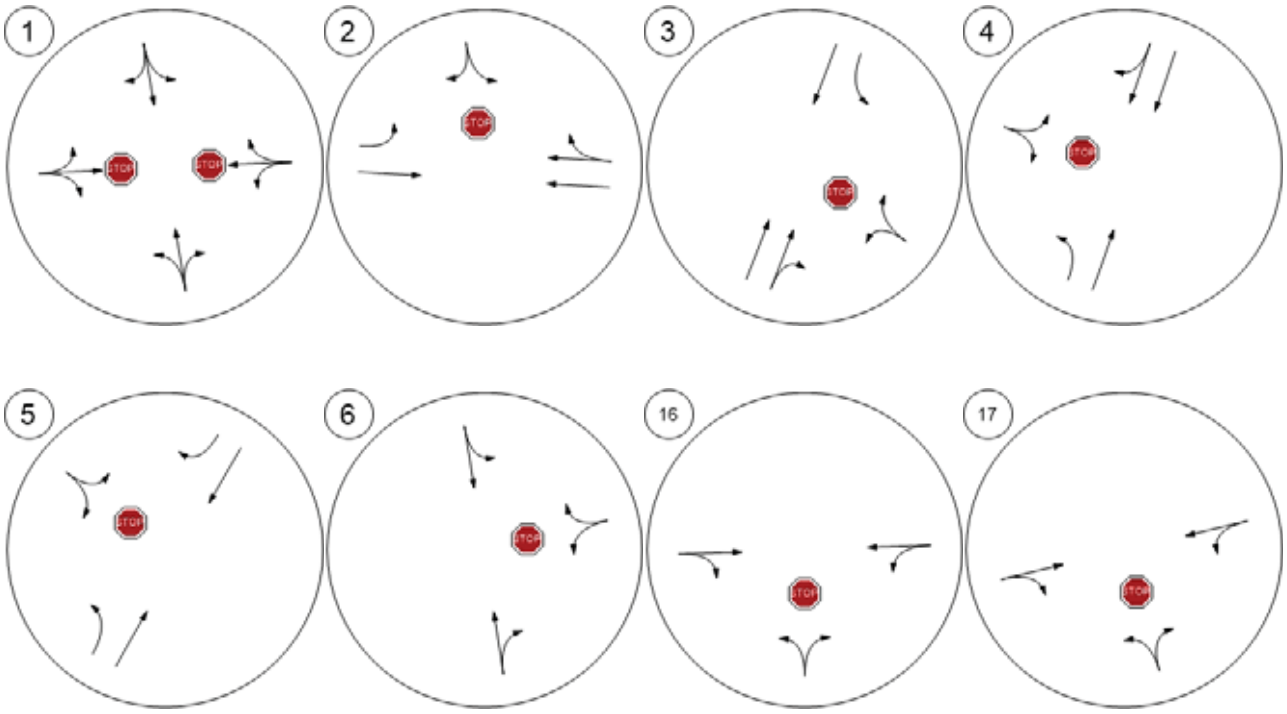
Traffic Volume - Future Total Volume



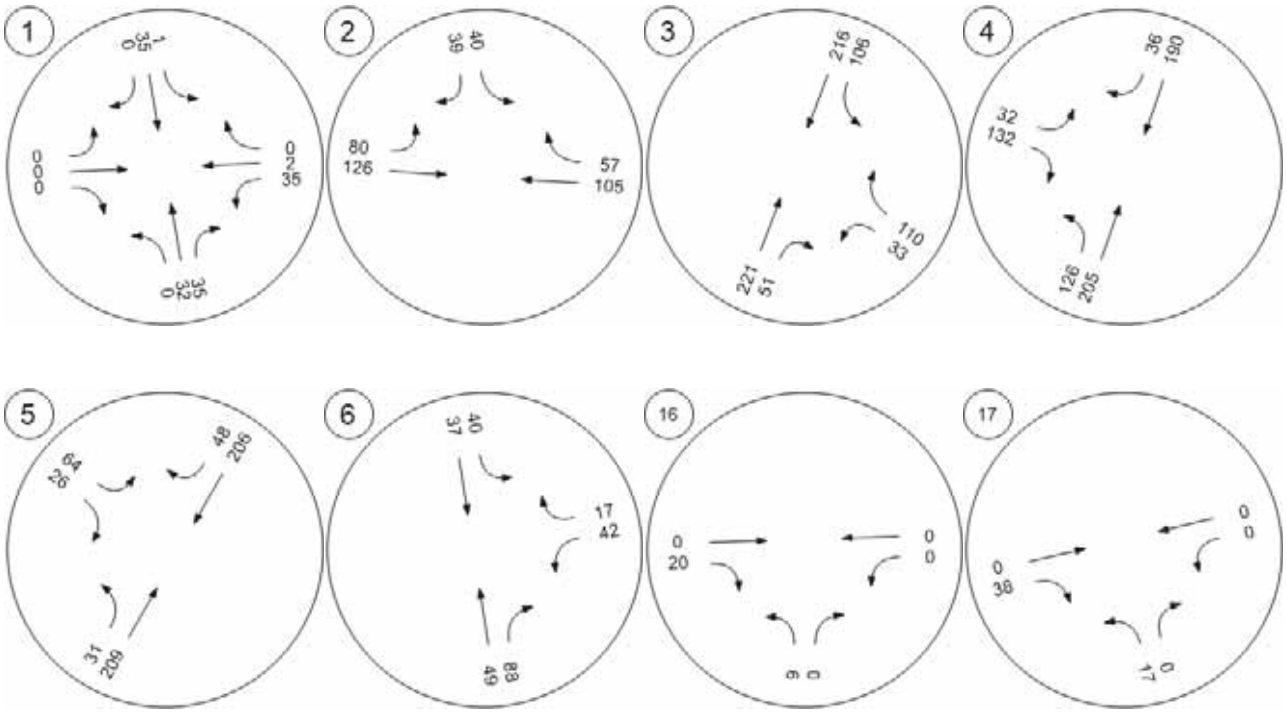
Traffic Conditions



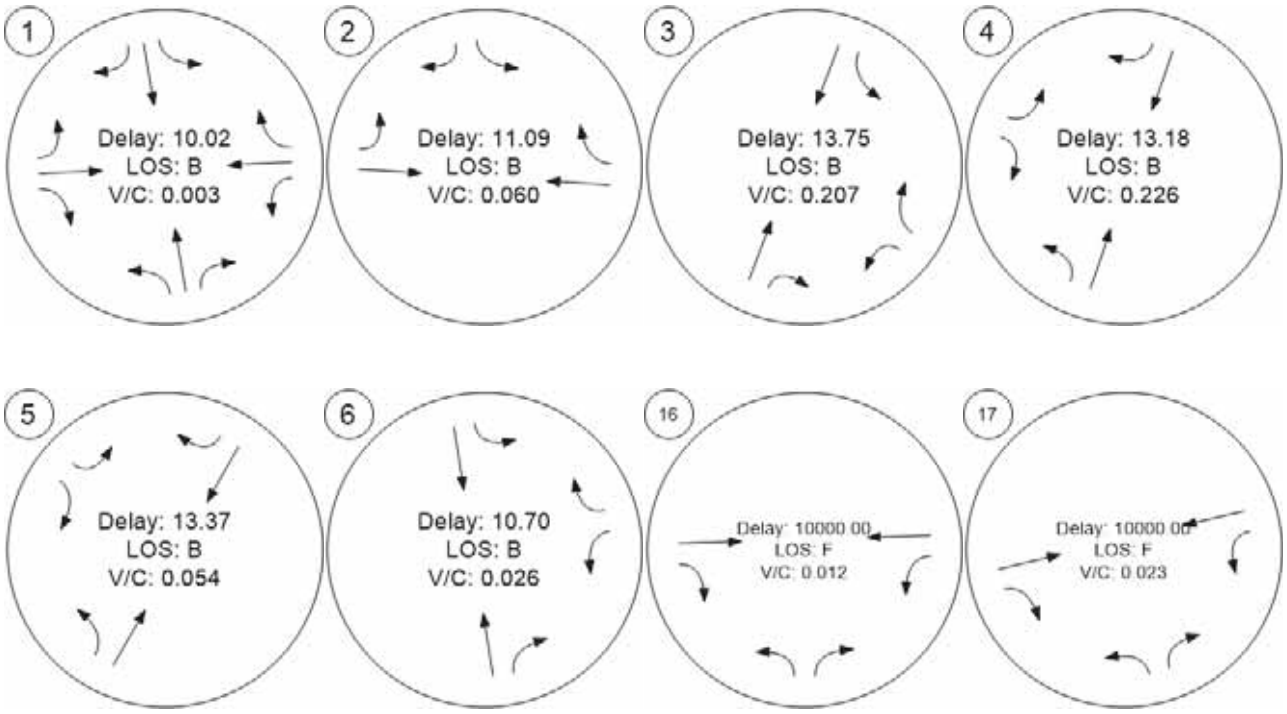
Lane Configuration and Traffic Control



Traffic Volume - Future Total Volume



Traffic Conditions



Annexure C

Trip Generation

AM Trip Generation (calculated per person trips) - Construction and Decommissioning Phase

Land Use	Extent (nr of employees)	Total person trips	Estimated split (%)		Nr of Person trips with split		Capacity utilised (%)		Estimated Public Transport mode split (%)		Estimated vehicle trips in AM Peak Hour			Inbound vehicle trips (70%)	Outbound vehicle trips (30%)	Total vehicle trips
			Public Transport	Private Mode	Public Transport	Private Mode	Public Transport	Private Mode	Bus	Taxi	Public Transport		Private Mode			
											Bus	Taxi	Car	70%	30%	
PV A	855	855	90	10	770	86	0,9	0,9	70	30	5	9	40	37,8	16,2	54
PV B	430	430	90	10	387	43	0,9	0,9	70	30	3	5	20	20	8	28
Total :	1285	1285								Capacity per vehicle:	65	16	1,2	**57,4**	**24,6**	**82**

AM Trip Generation (calculated truck trips) - Construction and Decommissioning Phase

Land Use	Extent (nr of trucks)	Total truck trips	Estimated portion of total trucks in AM Peak (%)	Inbound vehicle trips	Outbound vehicle trips	Total vehicle trips
				70%	30%	
PV A	10	10	10%	1	0	1
PV B	10	10	10%	1	0	1

AM Trip Generation (total calculated trips) - Construction and Decommissioning Phase

Land Use	Inbound vehicle trips	Outbound vehicle trips	Total vehicle trips
PV A	39	17	55
PV B	20	9	29
Total:	**59**	**25**	**84**

PM Trip Generation (calculated per person trips) - Construction and Decommissioning Phase

Land Use	Extent (nr of employees)	Total person trips	Estimated split (%)		Nr of Person trips with split		Capacity utilised (%)		Estimated Public Transport mode split (%)		Estimated vehicle trips in PM Peak Hour			Inbound vehicle trips (70%)	Outbound vehicle trips (30%)	Total vehicle trips
			Public Transport	Private Mode	Public Transport	Private Mode	Public Transport	Private Mode	Bus	Taxi	Public Transport		Private Mode			
											Bus	Taxi	Car	30%	70%	
PV A	855	855	90	10	770	86	0,9	0,9	70	30	5	9	40	16,2	37,8	54
PV B	430	430	90	10	387	43	0,9	0,9	70	30	3	5	20	8	20	28
Total :	1285	1285								**Capacity per vehicle:**	65	16	1,2	**24,6**	**57,4**	**82**

PM Trip Generation (calculated truck trips) - Construction and Decommissioning Phase

Land Use	Extent (nr of trucks)	Total truck trips	Estimated portion of total trucks in PM Peak (%)	Inbound vehicle trips	Outbound vehicle trips	Total vehicle trips
				30%	70%	
PV A	10	10	10%	0	1	1
PV B	10	10	10%	0	1	1

PM Trip Generation (total calculated trips) - Construction and Decommissioning Phase

Land Use	Inbound vehicle trips	Outbound vehicle trips	Total vehicle trips
PV A	17	39	55
PV B	9	20	29
Total:	**25**	**59**	**84**

AM Trip Generation (calculated per person trips) - Operational Phase

Land Use	Extent (nr of employees)	Total person trips	Estimated split (%)		Nr of Person trips with split		Capacity utilised (%)		Estimated Public Transport mode split (%)		Estimated vehicle trips in AM Peak Hour			Inbound vehicle trips (70%)	Outbound vehicle trips (30%)	Total vehicle trips
			Public Transport	Private Mode	Public Transport	Private Mode	Public Transport	Private Mode	Bus	Taxi	Public Transport		Private Mode			
											Bus	Taxi	Car	70%	30%	
PV A	100	100	70	30	70	30	0,9	0,9	0	100	0	5	28	23,1	9,9	33
PV B	50	50	70	30	35	15	0,9	0,9	0	100	0	3	14	12	5	17
Total :	150	150								**Capacity per vehicle:**	65	16	1,2	**35,0**	**15**	**50**

PM Trip Generation (calculated per person trips) - Operational Phase

Land Use	Extent (nr of employees)	Total person trips	Estimated split (%)		Nr of Person trips with split		Capacity utilised (%)		Estimated Public Transport mode split (%)		Estimated vehicle trips in PM Peak Hour			Inbound vehicle trips (70%)	Outbound vehicle trips (30%)	Total vehicle trips
			Public Transport	Private Mode	Public Transport	Private Mode	Public Transport	Private Mode	Bus	Taxi	Public Transport		Private Mode			
											Bus	Taxi	Car	30%	70%	
PV A	100	100	70	30	70	30	0,9	0,9	0	100	0	5	28	9,9	23,1	33
PV B	50	50	70	30	35	15	1,9	0,9	0	100	0	2	14	5	11	16
Total :	150	150								**Capacity per vehicle:**	65	16	1,2	**15,0**	**35**	**49**