

Harris Road-No Left Turn Sign

Traffic Management Plan

Final Report

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Revision

Revision	Date	Comment	Prepared By	Approved By
A-Dr	27 March 2024	Draft	Sabal Sharma & Helen Aberra	Bayzid Khan
Final	14 May 2024	Final	Helen Aberra	Bayzid Khan

For and on behalf of

Stantec Australia Pty Ltd

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Acknowledgment of Country

In the spirit of reconciliation, Stantec acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

Limitations

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CONTENTS

TRAFFIC MANAGEMENT PLAN

Harris Road-No Left Turn Sign

1.	Introduction	1
1.1	Overview	1
2.	Description of Proposal	2
3.	Identification and Assessment of Impacts of the Proposed Measures	2
3.1	Overview	2
3.2	Existing Traffic Conditions	2
3.3	Traffic Redistribution	5
3.4	Traffic Impact Analysis	6
4.	Measures to Ameliorate the Impacts of Reassigned Traffic	7
5.	Assessment of Public Transport Services Affected	7
6.	Details of Provision Made for Emergency Vehicles, Heavy Vehicles, Cyclists and Pedestrians	8
7.	Assessment of Effect on Existing and Future Developments with Transport Implications in the Vicinity of the Proposed Measure	8
8.	Assessment of Effect of Proposed Measures on Traffic Movements in Adjoining Council Areas	8
9.	Public Consultation	8

Appendices

Appendix A.	Traffic Volumes
Appendix B.	SIDRA Modelling Results

1. Introduction

1.1 Overview

Stantec has been engaged by City of Canada Bay Council (Council) to prepare a Traffic Management Plan (TMP) for the proposed 'No Left Turn' for vehicles larger than 6m light vehicles at the Harris Road /Queens Road intersection.

Council have identified that large vehicles turning left from Harris Road onto Queens Road are mounting the existing kerb. Restriction for larger vehicles is required at the signalised intersection to ensure that vehicles turning left from Harris Road onto Queens Road do not mount the existing kerb.

Council's initial discussion with TfNSW indicated that this project will require a full TMP in accordance with the *TfNSW 'Procedures for use in the preparation of a traffic management plan (TMP)'*.

This TMP has been prepared in accordance with *Transport for NSW Procedures for Use in the Preparation of a Traffic Management Plan, Version 2.0, December 2001*. This includes an assessment of the impacts of the proposed no-left turn and required measures to ameliorate any impacts.

The proposed restricted movement is shown in Figure 1.1.

Figure 1.1: Subject Site and Its Environs



Base image source: Nearmap

2. Description of Proposal

The proposal is for 'No Left Turn' for vehicles larger than 6m light vehicles at the Harris Road /Queens Road intersection. Council have identified that large vehicles turning left from Harris Road onto Queens Road are mounting the existing kerb. Restriction for larger vehicles is required to at the signalised intersection is required to ensure that vehicles turning left from Harris Road onto Queens Road do not mount the existing kerb.

The proposed restricted movement is shown in Figure 1.1.

3. Identification and Assessment of Impacts of the Proposed Measures

3.1 Overview

Intersection capacity analysis has been conducted at key intersections near the site to assess the traffic implications of no left turn. The modelling scenarios are detailed in Table 3.1.

Table 3.1: Scenario analysis for modelling traffic impact

#	Scenario	Description
1	Existing Conditions	2024 traffic surveys
2	2024 With Left Turn Ban for vehicles larger than 6m light vehicles	Left turn ban

3.2 Existing Traffic Conditions

3.2.1 Traffic Volumes

Traffic movement counts were completed on Tuesday 20/02/2024 for the following key intersections between 6:00am to 10:00am and 3:00pm to 7:00pm:

- Harris Road and Queens Road
- Harris Road and Kings Road

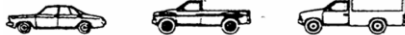
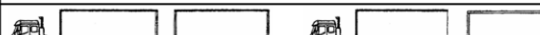
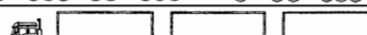
The traffic survey data also includes vehicle classification data based on Austroads Vehicle Classification System as shown indicatively in Figure 3.1.

It is to be noted that the Austroads Vehicle Classification System categorizes vehicles based on axle configuration or vehicle length. However, As shown in Figure 3.1, there is no specific class for vehicles up to 6 meters in length. As such, for the purposes for traffic modelling and intersection assessment, it is assumed that vehicles up to 5.5m long (Austroads Class 1) will be allowed to turn left from Harris Road onto Queens Road and vehicles greater than 5.5m in length (Austroads Class 2-12) will be restricted from doing such left turn.

Figure 3.2 and Figure 3.3 summarise the AM and PM peak hours respectively and are separated into two categories: Austroads Class 1 vehicles (vehicles less than 5.5m) and Austroads Class 2-12 vehicles (vehicles greater than 5.5m). The full traffic movement results are provided in Appendix A of this Traffic Management Plan.



Figure 3.1: Austroads Vehicle Classification System

AUSTROADS Vehicle Classification System						
Level 1	Level 2		Level 3	AUSTROADS Classification		
Length (indicative)	Axles and Axle Groups		Vehicle Type			
Type	Axles	Groups	Typical Description	Class	Parameters	Typical Configuration
Short up to 5.5m		1 or 2	Short Sedan, Wagon, 4WD, Utility, Light Van, Bicycle, Motorcycle, etc	1	$d(1) \leq 3.2\text{m}$ and axles = 2	
	3, 4 or 5	3	Short - Towing Trailer, Caravan, Boat, etc	2	groups = 3 $d(1) \geq 2.1\text{m}$, $d(1) \leq 3.2\text{m}$, $d(2) \geq 2.1\text{m}$ and axles = 3, 4 or 5	
Medium 5.5m to 14.5m	HEAVY VEHICLES					
	2	2	Two Axle Truck or Bus	3	$d(1) > 3.2\text{m}$ and axles = 2	
	3	2	Three Axle Truck or Bus	4	axles = 3 and groups = 2	
	> 3	2	Four Axle Truck	5	axles > 3 and groups = 2	
Long 11.5m to 19.0m	3	3	Three Axle Articulated Three axle articulated vehicle, or Rigid vehicle and trailer	6	$d(1) > 3.2\text{m}$, axles = 3 and groups = 3	
	4	> 2	Four Axle Articulated Four axle articulated vehicle, or Rigid vehicle and trailer	7	$d(2) < 2.1\text{m}$ or $d(1) < 2.1\text{m}$ or $d(1) > 3.2\text{m}$ axles = 4 and groups > 2	
	5	> 2	Five Axle Articulated Five axle articulated vehicle, or Rigid vehicle and trailer	8	$d(2) < 2.1\text{m}$ or $d(1) < 2.1\text{m}$ or $d(1) > 3.2\text{m}$ axles = 5 and groups > 2	
	≥ 6	> 2	Six Axle Articulated Six axle articulated vehicle, or Rigid vehicle and trailer	9	axles = 6 and groups > 2 or axles > 6 and groups = 3	
	Medium Combination 17.5m to 36.5m	> 6	4	B Double B Double, or Heavy truck and trailer	10	groups = 4 and axles > 6
> 6		5 or 6	Double Road Train Double road train, or Medium articulated vehicle and one dog trailer (M.A.D.)	11	groups = 5 or 6 and axles > 6	
Large Combination Over 33.0m	> 6	> 6	Triple Road Train Triple road train, or Heavy truck and three trailers	12	groups > 6 and axles > 6	

Definitions:

Group:

Axle group, where adjacent axles are less than 2.1m apart

Groups:

Number of axle groups

Axles:

Number of axles (maximum axle spacing of 10.0m)

$d(1)$: Distance between first and second axle

$d(2)$: Distance between second and third axle

Source: Austroads 1994

Figure 3.2: Existing traffic volumes AM

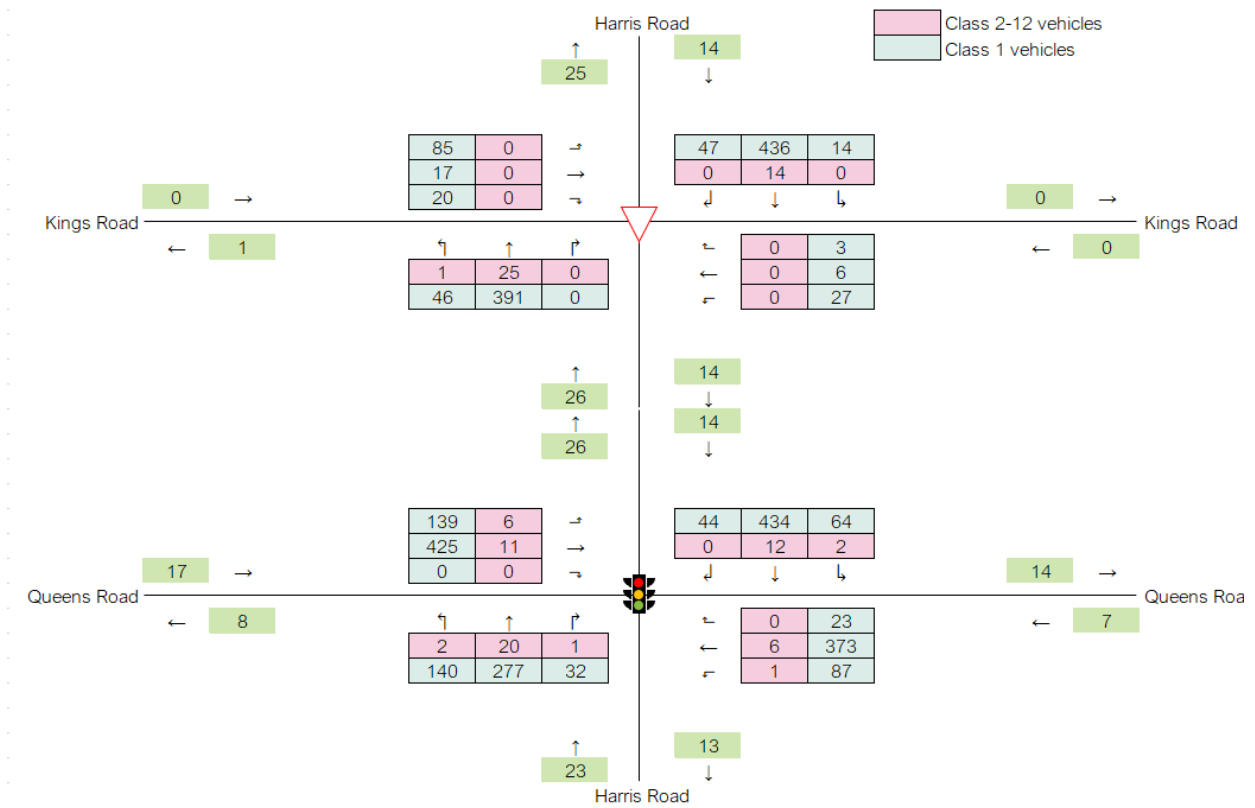
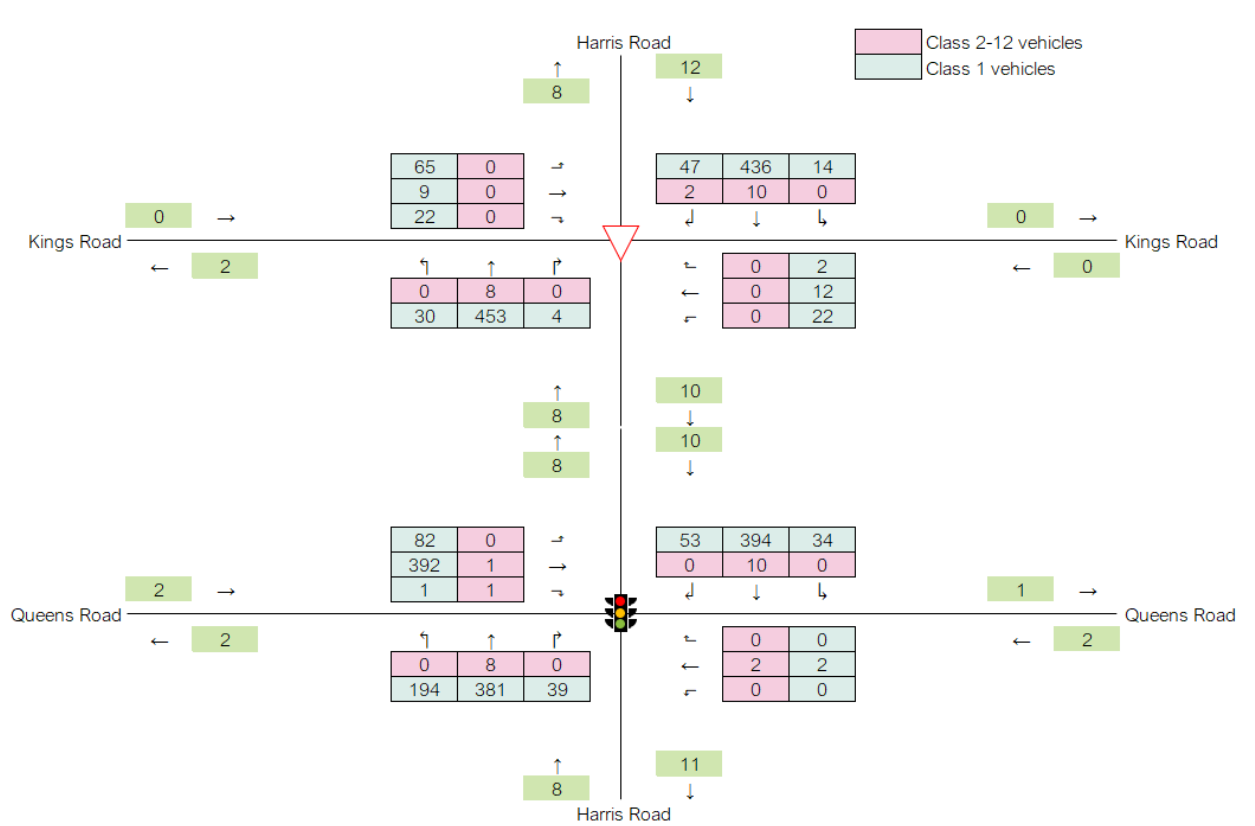


Figure 3.3: Existing traffic volumes PM



3.2.2 Intersection Performance

The commonly used measure of intersection performance, as defined by Transport for NSW, is vehicle delay. SIDRA Intersection determines the average delay that vehicles encounter and provides a measure of the level of service. A Level of Service of D or better is generally considered acceptable operation.

Table 3.2 shows the criteria that SIDRA Intersection adopts in assessing the level of service.

Table 3.2: SIDRA Intersection level of service criteria

Level of Service	Average delay per vehicle (secs/ veh)	Traffic signals, roundabout	Give way, stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

SCATS signal information has been obtained from Transport for NSW to assist with coding the signalised intersection. SIDRA calculated cycle time/ phase times were calibrated to align with the SCATS cycle time/ phase times. A site visit was conducted, and the models were checked to ensure that calculated queues were similar to what was observed during the site visit. Pedestrian protections were coded at the signalised intersection of Harris Road and Queens Road intersection in accordance with existing conditions.

Table 3.3 presents a summary of the existing operation of the key intersections during both peak periods.

Table 3.3: Existing operation condition

Intersection	Control	Peak Hour	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Harris Road and Queens Road	Signalised	AM	0.67	31	96	C
		PM	0.81	33	125	C
Harris Road and Kings Road	Priority	AM	0.22	17	2	C
		PM	0.16	15	2	B

All intersections assessed currently operate satisfactorily, with a Level of Service C or better and spare capacity during both AM and PM peak hours.

3.3 Traffic Redistribution

The 'No Left Turn' from Harris Road (southern approach) into Queens Road results in a re-assignment of the traffic. The vehicles (larger than 5.5m light vehicles) taking the left turn from Harris Road onto Queens Road are summarised in Table 3.4.

Table 3.4: Harris Road left turn volumes (Class 2-12)

Peak Hour Traffic	Austrorads User Class 3	Austrorads User Class 4
Harris Road Left onto Queens Road AM	1	1
Harris Road Left onto Queens Road PM	0	0

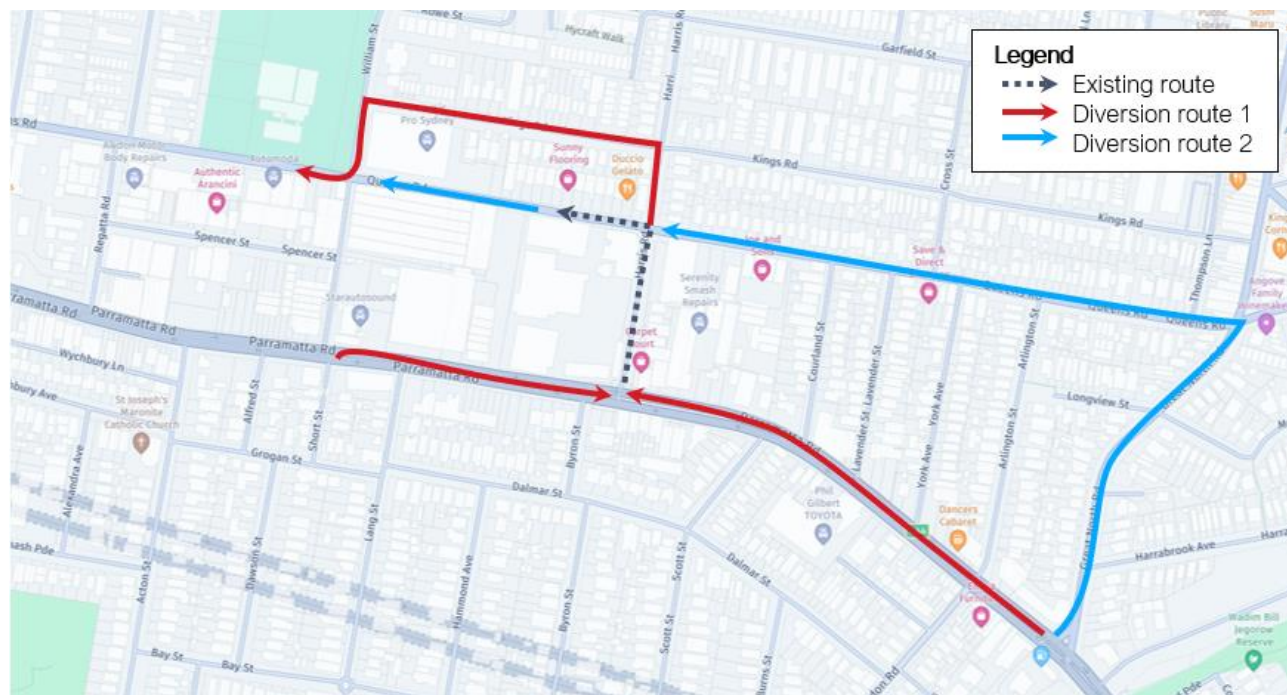
Table 3.4 shows that there are only two vehicles (more than 5.5m) turning left onto Queens Road during the AM. This includes one User Class 3 vehicle and one User Class 4. There were no vehicles greater than 5.5m turning left during the PM peak.

It is assumed that there will likely be two diversion routes for heavy vehicles based on the direction of travel, namely Route 1 and Route 2 as shown in Figure 3.4. Route 1 involves both eastbound and westbound heavy vehicles travelling



north via Harris Road and turning left from Kings Road. However, it is also assumed that some westbound heavy vehicles may also turn right into Great Northern Road and turn left onto Queens Road as shown in Route 2.

Figure 3.4: Diversion Route



Base image source: Nearmap

3.4 Traffic Impact Analysis

The performance of the intersections for the 'No Left Turn' for vehicles larger than 6m light vehicles from Harris Road (south approach) into Queens Road is summarised in Table 3.5.

As shown in Table 3.4, only two vehicles larger than 5.5m is currently turning left from Harris Road onto Queens Road during AM peak hour. No heavy vehicle is turning left currently from Harris Road onto Queens Road in the PM peak. The intersection traffic modelling has been updated by adjusting the intersection turn flows for heavy vehicles in the AM peak hour only based on the two diversion routes discussed above. No update/adjustment is made to the PM peak hour traffic model, hence no change to the PM peak model results for the two diversion route options.

Table 3.5: Intersection Performance Results (left turn ban)

Intersection	Scenario	Control	Peak Hour	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Harris Road and Queens Road	Existing	Signalised	AM	0.67	31	96	C
			PM	0.81	33	125	C
	Diversion route 1		AM	0.67	31	96	C
			PM	0.81	33	125	C
	Diversion route 2		AM	0.67	31	97	C
			PM	0.81	33	125	C
Harris Road and Kings Road	Existing	Priority	AM	0.22	19	2	C
			PM	0.17	17	2	B
	Diversion route 1		AM	0.22	19	2	B
			PM	0.16	15	2	B
	Diversion route 2		AM	0.22	19	2	B
			PM	0.16	15	2	B

Table 3.5 demonstrates that all intersections will continue to operate well at a Level of Service of C or better with spare capacity during both AM and PM peak hours in all scenarios with no material change to the average delays. As such, the two heavy vehicles diverted in the AM peak hour will make no material difference to the operation of the modelled network and the surrounding road network.

Overall, the above modelling indicates that no left turn for heavy vehicles from Harris Road onto Queens Road can be supported from a traffic impact perspective.

4. Measures to Ameliorate the Impacts of Reassigned Traffic

The two heavy vehicles diverted in the AM peak hour will make no material difference to surrounding road network. Furthermore, the road geometry of the rerouted route along Harris Road-Kings Road-Queens Road and Paramatta Road -Great North Road- Queens Road can accommodate the rerouted vehicles. Hence, there are no measures required to ameliorate re-assigned traffic due to no adverse impact being identified as a result of the proposal.

5. Assessment of Public Transport Services Affected

There are no public transport services that are affected by the proposal. The public transport services travel through along Harris Road or take a southbound right turn from the northern approach of Harris Road. There are no known public or school bus services taking a left turn from the southern approach of Harris Road onto Queens Road.

The existing bus services travelling along Harris Road along with the route are summarised in Table 5.1.

Table 5.1: Existing public transport

Bus	Route	Movement
406	Hurlstone Park to Five Dock	Harris Road Through
415	Campsie to Chiswick	Harris Road Through
530	Chatswood to Burwood	Harris Road Through
570s	Rosebank College to Five Dock Shops	Harris Road Through
571s	Rosebank College to Five Dock Shops	Harris Road Through
577s	Rodd Point to St Patricks Strathfield	Harris Road Through
578s	St Patricks Strathfield to Five Dock Shops	Harris Road Through
598s	Earlwood to Hunters High	Harris Road Through
679s	Domremy College to Bexley Road and William Street, Kingsgrove	Harris Road Through
568s	Rosebank College to Strathfield Station	Southbound Right onto Queens Road
573s	Rosebank College to Concord Hospital	Southbound Right onto Queens Road
574s	Rosebank College to Homebush Station	Southbound Right onto Queens Road
575s	Homebush Station to Rosebank College	Southbound Right onto Queens Road
656s	Concord High School to Five Dock Shops	Southbound Right onto Queens Road
665s	Domremy College to Sydney Olympic Park	Southbound Right onto Queens Road
674s	Domremy College to Concord West Station	Southbound Right onto Queens Road
677s	Domremy College to Concord Shops	Southbound Right onto Queens Road

6. Details of Provision Made for Emergency Vehicles, Heavy Vehicles, Cyclists and Pedestrians

No special provisions for emergency vehicles will be required. Emergency vehicles more than 6m long will have alternative routes available along the road network including King Street. There are no additional provisions provided for heavy vehicles as alternate routes remain available. Cyclist and pedestrian access will be maintained.

7. Assessment of Effect on Existing and Future Developments with Transport Implications in the Vicinity of the Proposed Measure

No other known developments of significance are expected to be impacted by the proposal.

8. Assessment of Effect of Proposed Measures on Traffic Movements in Adjoining Council Areas

The two heavy vehicles diverted in the AM peak hour proposal will not affect traffic movements in adjoining council areas.

9. Public Consultation

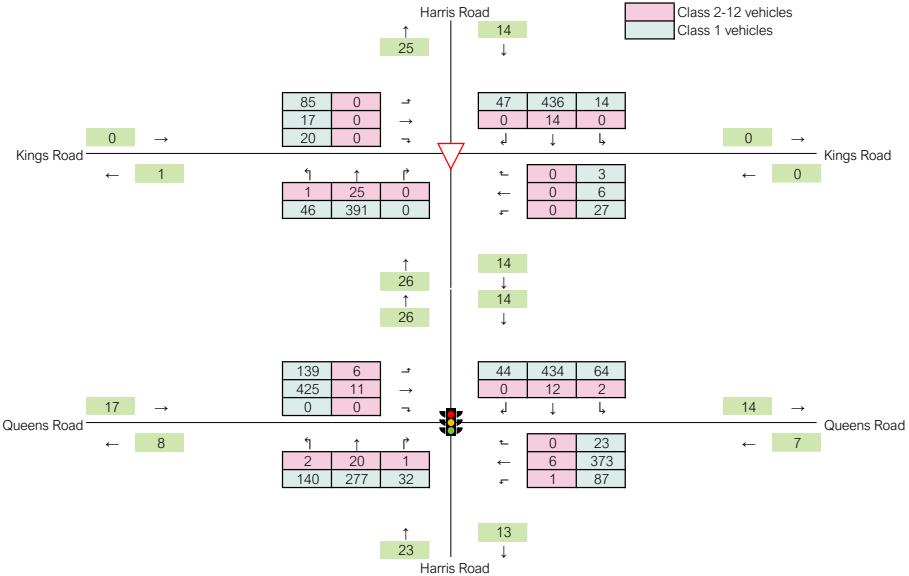
The council will be undertaking community consultation on the proposal separately.



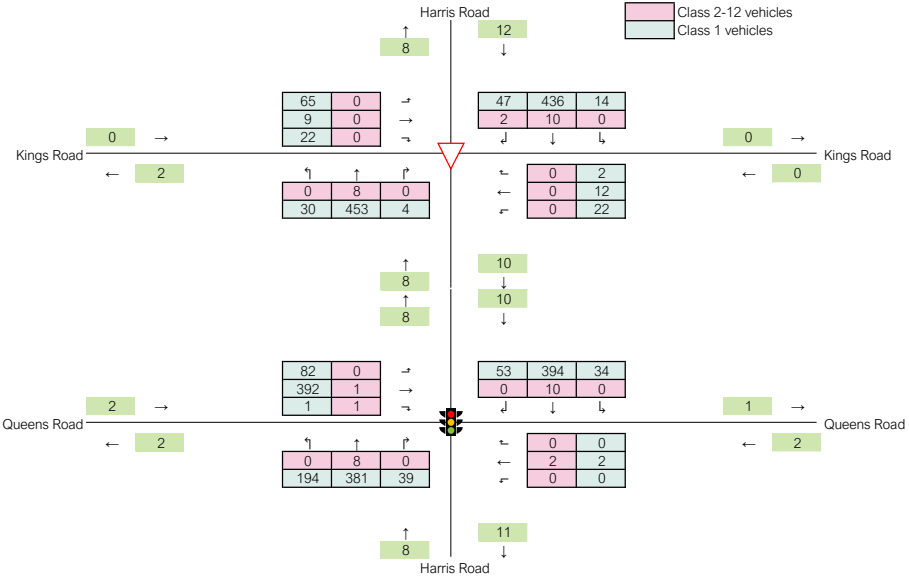
Appendix A. Traffic Volumes



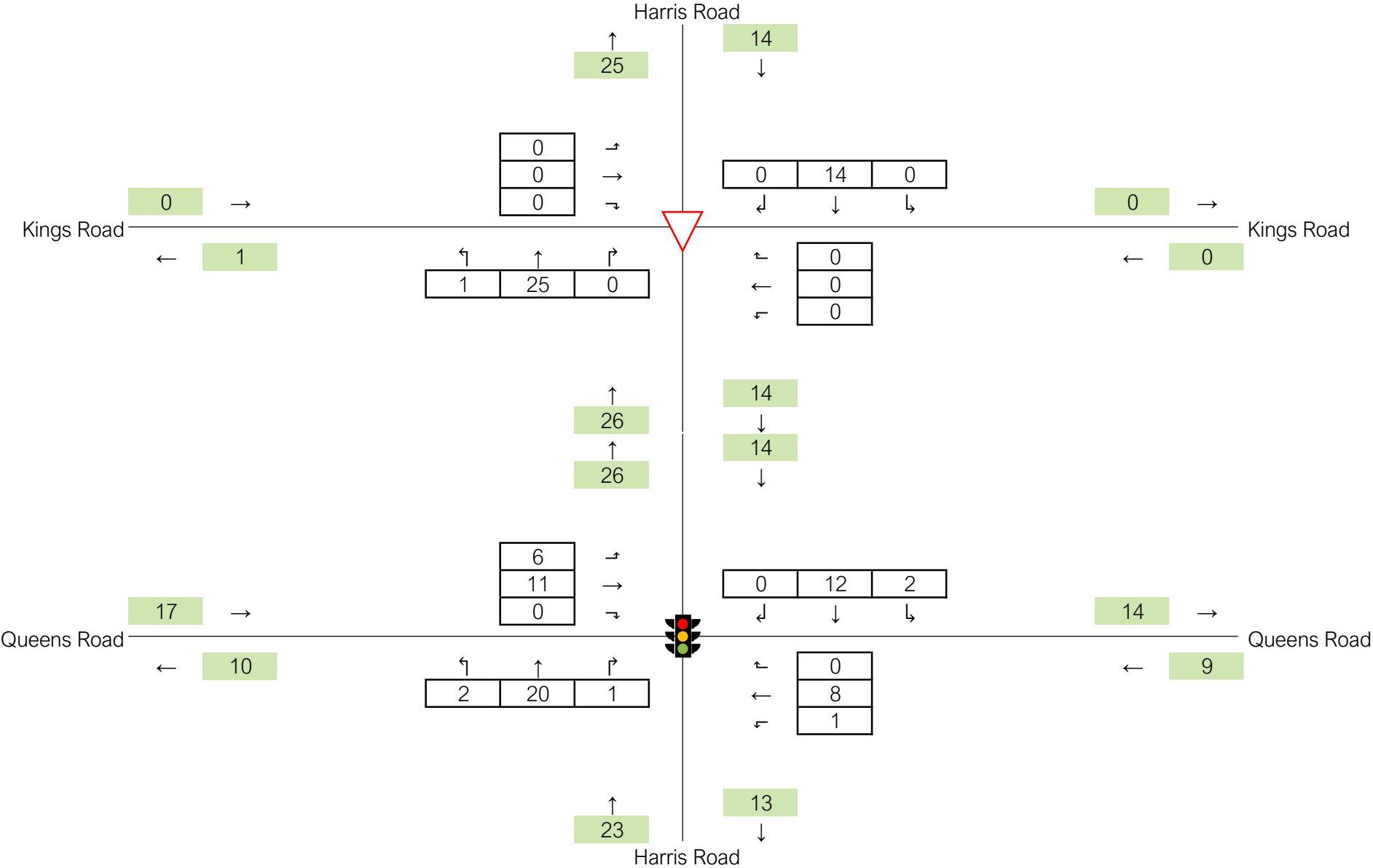
AM Peak hour



PM Peak hour



Redirected AM Peak hour scenario



Appendix B. SIDRA Modelling Results



MOVEMENT SUMMARY

Site: 0433 [Queens Rd/ Harris Rd_AM_Existing (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Harris Road															
4	L2	All MCs	149	1.4	149	1.4	0.268	34.2	LOS C	3.8	26.8	0.80	0.74	0.80	29.2
5	T1	All MCs	313	6.7	313	6.7	* 0.669	36.6	LOS C	10.0	73.8	0.93	0.81	0.93	23.9
6	R2	All MCs	35	3.0	35	3.0	0.669	42.2	LOS C	10.0	73.8	0.93	0.81	0.93	32.1
Approach			497	4.9	497	4.9	0.669	36.2	LOS C	10.0	73.8	0.89	0.79	0.89	26.5
East: Queens Road															
7	L2	All MCs	94	1.1	94	1.1	0.666	30.3	LOS C	13.5	95.9	0.86	0.78	0.86	30.8
8	T1	All MCs	400	1.6	400	1.6	* 0.666	27.0	LOS B	13.5	95.9	0.86	0.78	0.86	30.7
9	R2	All MCs	24	0.0	24	0.0	0.666	30.5	LOS C	13.5	95.9	0.86	0.78	0.86	26.2
Approach			518	1.4	518	1.4	0.666	27.8	LOS B	13.5	95.9	0.86	0.78	0.86	30.6
North: Harris Road															
10	L2	All MCs	69	3.0	69	3.0	0.548	37.5	LOS C	8.8	63.3	0.89	0.77	0.89	24.2
11	T1	All MCs	469	2.7	469	2.7	0.548	35.2	LOS C	8.8	63.3	0.89	0.77	0.89	23.8
12	R2	All MCs	46	0.0	46	0.0	0.548	39.9	LOS C	7.4	52.9	0.90	0.77	0.90	23.5
Approach			585	2.5	585	2.5	0.548	35.8	LOS C	8.8	63.3	0.89	0.77	0.89	23.8
West: Queens Road															
1	L2	All MCs	153	4.1	153	4.1	0.193	24.4	LOS B	3.1	22.1	0.65	0.70	0.65	27.7
2	T1	All MCs	465	2.5	465	2.5	0.559	24.7	LOS B	11.3	80.3	0.80	0.71	0.80	31.5
Approach			618	2.9	618	2.9	0.559	24.6	LOS B	11.3	80.3	0.76	0.70	0.76	30.8
All Vehicles			2218	2.9	2218	2.9	0.669	30.9	LOS C	13.5	95.9	0.85	0.76	0.85	28.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival values used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- * Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Input Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped	Dist]					
						ped	m			sec	m	m/sec
South: Harris Road												

P2	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.5	214.8	1.00
East: Queens Road												
P3	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	211.8	211.3	1.00
North: Harris Road												
P4	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.7	215.0	1.00
West: Queens Road												
P1	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	213.0	212.9	1.00
All	Pedestrians	200	211	49.3	LOS E	0.2	0.2	0.95	0.95	213.5	213.5	1.00

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

MOVEMENT SUMMARY

Site: 0433 [Queens Rd/ Harris Rd_PM_Existing (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 105 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				km/h
South: Harris Road															
4	L2	All MCs	204	0.0	204	0.0	0.328	31.6	LOS C	4.8	33.6	0.79	0.76	0.79	29.8
5	T1	All MCs	409	2.1	409	2.1	* 0.796	38.1	LOS C	13.7	97.2	0.97	0.91	1.05	23.4
6	R2	All MCs	41	0.0	41	0.0	0.796	43.7	LOS D	13.7	97.2	0.97	0.91	1.05	31.6
Approach			655	1.3	655	1.3	0.796	36.4	LOS C	13.7	97.2	0.91	0.86	0.97	26.4
East: Queens Road															
7	L2	All MCs	71	0.0	71	0.0	0.812	36.8	LOS C	17.9	125.4	0.96	0.91	1.02	29.3
8	T1	All MCs	515	0.4	515	0.4	* 0.812	33.3	LOS C	17.9	125.4	0.95	0.90	1.02	29.2
9	R2	All MCs	20	0.0	20	0.0	0.812	36.9	LOS C	17.9	125.4	0.96	0.91	1.02	24.4
Approach			605	0.3	605	0.3	0.812	33.9	LOS C	17.9	125.4	0.95	0.90	1.02	29.1
North: Harris Road															
10	L2	All MCs	36	0.0	36	0.0	0.487	33.4	LOS C	7.8	55.7	0.85	0.73	0.85	25.5
11	T1	All MCs	425	2.5	425	2.5	0.487	32.2	LOS C	7.8	55.7	0.87	0.74	0.87	24.7
12	R2	All MCs	56	0.0	56	0.0	0.487	39.6	LOS C	5.5	39.4	0.90	0.76	0.90	23.5
Approach			517	2.0	517	2.0	0.487	33.1	LOS C	7.8	55.7	0.87	0.75	0.87	24.6
West: Queens Road															
1	L2	All MCs	86	0.0	86	0.0	0.116	25.3	LOS B	1.7	11.8	0.66	0.68	0.66	27.4
2	T1	All MCs	416	0.3	416	0.3	0.540	25.9	LOS B	10.0	69.6	0.82	0.72	0.82	31.2
Approach			502	0.2	502	0.2	0.540	25.8	LOS B	10.0	69.6	0.79	0.71	0.79	30.7
All Vehicles			2279	1.0	2279	1.0	0.812	32.6	LOS C	17.9	125.4	0.89	0.81	0.92	27.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival values used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

- * Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Input Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped	Dist]			sec	m	m/sec
						ped	m					
South: Harris Road												

P2 Full	50	53	46.8	LOS E	0.1	0.1	0.94	0.94	212.0	214.8	1.01
East: Queens Road											
P3 Full	50	53	46.8	LOS E	0.1	0.1	0.94	0.94	209.3	211.3	1.01
North: Harris Road											
P4 Full	50	53	46.8	LOS E	0.1	0.1	0.94	0.94	212.2	215.0	1.01
West: Queens Road											
P1 Full	50	53	46.8	LOS E	0.1	0.1	0.94	0.94	210.5	212.9	1.01
All Pedestrians	200	211	46.8	LOS E	0.1	0.1	0.94	0.94	211.0	213.5	1.01

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

MOVEMENT SUMMARY

Site: 101 [Harris Road/ Kings Road_AM_Existing (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Harris Road															
1	L2	All MCs	49	2.1	49	2.1	0.260	4.7	LOS A	0.0	0.0	0.00	0.06	0.00	56.2
2	T1	All MCs	438	6.0	438	6.0	0.260	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.0
Approach			487	5.6	487	5.6	0.260	0.5	NA	0.0	0.0	0.00	0.06	0.00	58.7
East: Kings Road															
4	L2	All MCs	28	0.0	28	0.0	0.050	7.7	LOS A	0.1	0.5	0.54	0.72	0.54	45.3
5	T1	All MCs	6	0.0	6	0.0	0.050	14.0	LOS A	0.1	0.5	0.54	0.72	0.54	51.3
Approach			35	0.0	35	0.0	0.050	8.8	LOS A	0.1	0.5	0.54	0.72	0.54	46.8
North: Harris Road															
7	L2	All MCs	22	0.0	22	0.0	0.375	8.5	LOS A	0.6	4.3	0.25	0.11	0.30	56.4
8	T1	All MCs	537	2.7	537	2.7	0.375	0.9	LOS A	0.6	4.3	0.25	0.11	0.30	56.4
9	R2	All MCs	88	0.0	88	0.0	0.375	8.7	LOS A	0.6	4.3	0.25	0.11	0.30	55.8
Approach			647	2.3	647	2.3	0.375	2.2	NA	0.6	4.3	0.25	0.11	0.30	56.3
West: Kings Road															
10	L2	All MCs	89	0.0	89	0.0	0.222	7.4	LOS A	0.3	2.2	0.58	0.77	0.58	50.1
11	T1	All MCs	18	0.0	18	0.0	0.222	14.9	LOS B	0.3	2.2	0.58	0.77	0.58	50.2
12	R2	All MCs	21	0.0	21	0.0	0.222	19.3	LOS B	0.3	2.2	0.58	0.77	0.58	43.5
Approach			128	0.0	128	0.0	0.222	10.4	LOS A	0.3	2.2	0.58	0.77	0.58	49.3
All Vehicles			1298	3.2	1298	3.2	0.375	2.5	NA	0.6	4.3	0.20	0.17	0.22	55.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Harris Road/ Kings Road_PM_Exsting (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				
South: Harris Road															
1	L2	All MCs	32	0.0	32	0.0	0.269	4.8	LOS A	0.0	0.0	0.00	0.04	0.00	56.6
2	T1	All MCs	485	1.7	485	1.7	0.269	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.3
Approach			517	1.6	517	1.6	0.269	0.3	NA	0.0	0.0	0.00	0.04	0.00	59.2
East: Kings Road															
4	L2	All MCs	23	0.0	23	0.0	0.055	7.3	LOS A	0.1	0.5	0.54	0.72	0.54	45.1
5	T1	All MCs	13	0.0	13	0.0	0.055	12.1	LOS A	0.1	0.5	0.54	0.72	0.54	51.2
Approach			36	0.0	36	0.0	0.055	9.0	LOS A	0.1	0.5	0.54	0.72	0.54	47.8
North: Harris Road															
7	L2	All MCs	15	0.0	15	0.0	0.304	8.4	LOS A	0.3	2.4	0.18	0.08	0.20	56.9
8	T1	All MCs	469	2.2	469	2.2	0.304	0.6	LOS A	0.3	2.4	0.18	0.08	0.20	57.4
9	R2	All MCs	52	4.1	52	4.1	0.304	8.7	LOS A	0.3	2.4	0.18	0.08	0.20	56.1
Approach			536	2.4	536	2.4	0.304	1.6	NA	0.3	2.4	0.18	0.08	0.20	57.2
West: Kings Road															
10	L2	All MCs	68	0.0	68	0.0	0.170	7.5	LOS A	0.2	1.7	0.58	0.77	0.58	50.2
11	T1	All MCs	9	0.0	9	0.0	0.170	12.7	LOS A	0.2	1.7	0.58	0.77	0.58	50.4
12	R2	All MCs	23	0.0	23	0.0	0.170	16.7	LOS B	0.2	1.7	0.58	0.77	0.58	43.7
Approach			101	0.0	101	0.0	0.170	10.1	LOS A	0.2	1.7	0.58	0.77	0.58	49.2
All Vehicles			1189	1.8	1189	1.8	0.304	2.0	NA	0.3	2.4	0.15	0.14	0.15	56.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

**Site: 0433 [Queens Rd/ Harris Rd_AM_Existing - scenario 1
(Site Folder: Left turn ban)]**

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)

- * Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped	Dist]			sec	m	m/sec
South: Harris Road												

P2 Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.5	214.8	1.00
East: Queens Road											
P3 Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	211.8	211.3	1.00
North: Harris Road											
P4 Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.7	215.0	1.00
West: Queens Road											
P1 Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	213.0	212.9	1.00
All Pedestrians	200	211	49.3	LOS E	0.2	0.2	0.95	0.95	213.5	213.5	1.00

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

**Site: 0433 [Queens Rd/ Harris Rd_AM_Existing - Scenario 2
(Site Folder: Left turn ban)]**

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Cycle Time)

- * Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Input Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped	Dist]			sec	m	m/sec
						ped	m					
South: Harris Road												

P2	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.5	214.8	1.00
East: Queens Road												
P3	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	211.8	211.3	1.00
North: Harris Road												
P4	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	214.7	215.0	1.00
West: Queens Road												
P1	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	213.0	212.9	1.00
All	Pedestrians	200	211	49.3	LOS E	0.2	0.2	0.95	0.95	213.5	213.5	1.00

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

MOVEMENT SUMMARY

Site: 101 [Harris Road/ Kings Road_AM_Existing -Scenario 1
(Site Folder: Left turn ban)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Harris Road															
1	L2	All MCs	52	6.1	52	6.1	0.262	4.7	LOS A	0.0	0.0	0.00	0.06	0.00	55.8
2	T1	All MCs	438	6.0	438	6.0	0.262	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.0
Approach			489	6.0	489	6.0	0.262	0.5	NA	0.0	0.0	0.00	0.06	0.00	58.7
East: Kings Road															
4	L2	All MCs	28	0.0	28	0.0	0.050	7.7	LOS A	0.1	0.5	0.54	0.72	0.54	45.2
5	T1	All MCs	6	0.0	6	0.0	0.050	14.1	LOS A	0.1	0.5	0.54	0.72	0.54	51.3
Approach			35	0.0	35	0.0	0.050	8.9	LOS A	0.1	0.5	0.54	0.72	0.54	46.8
North: Harris Road															
7	L2	All MCs	22	0.0	22	0.0	0.376	8.5	LOS A	0.6	4.3	0.25	0.11	0.30	56.3
8	T1	All MCs	537	2.7	537	2.7	0.376	0.9	LOS A	0.6	4.3	0.25	0.11	0.30	56.4
9	R2	All MCs	88	0.0	88	0.0	0.376	8.7	LOS A	0.6	4.3	0.25	0.11	0.30	55.8
Approach			647	2.3	647	2.3	0.376	2.2	NA	0.6	4.3	0.25	0.11	0.30	56.2
West: Kings Road															
10	L2	All MCs	89	0.0	89	0.0	0.222	7.4	LOS A	0.3	2.2	0.58	0.77	0.58	50.1
11	T1	All MCs	18	0.0	18	0.0	0.222	15.0	LOS B	0.3	2.2	0.58	0.77	0.58	50.2
12	R2	All MCs	21	0.0	21	0.0	0.222	19.4	LOS B	0.3	2.2	0.58	0.77	0.58	43.5
Approach			128	0.0	128	0.0	0.222	10.4	LOS A	0.3	2.2	0.58	0.77	0.58	49.3
All Vehicles			1300	3.4	1300	3.4	0.376	2.6	NA	0.6	4.3	0.20	0.17	0.22	55.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Harris Road/ Kings Road_AM_Existing - Scenario 2
(Site Folder: Left turn ban)]

Output produced by SIDRA INTERSECTION Version: 9.0.1.9664

Reprocess the Site in this Version to see the selected Movement Class results. All results may be affected by reprocessing compared with Version 9.0 results.

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Harris Road															
1	L2	All MCs	49	2.1	49	2.1	0.260	4.7	LOS A	0.0	0.0	0.00	0.06	0.00	56.2
2	T1	All MCs	438	6.0	438	6.0	0.260	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.0
Approach			487	5.6	487	5.6	0.260	0.5	NA	0.0	0.0	0.00	0.06	0.00	58.7
East: Kings Road															
4	L2	All MCs	28	0.0	28	0.0	0.050	7.7	LOS A	0.1	0.5	0.54	0.72	0.54	45.3
5	T1	All MCs	6	0.0	6	0.0	0.050	14.0	LOS A	0.1	0.5	0.54	0.72	0.54	51.3
Approach			35	0.0	35	0.0	0.050	8.8	LOS A	0.1	0.5	0.54	0.72	0.54	46.8
North: Harris Road															
7	L2	All MCs	22	0.0	22	0.0	0.375	8.5	LOS A	0.6	4.3	0.25	0.11	0.30	56.4
8	T1	All MCs	537	2.7	537	2.7	0.375	0.9	LOS A	0.6	4.3	0.25	0.11	0.30	56.4
9	R2	All MCs	88	0.0	88	0.0	0.375	8.7	LOS A	0.6	4.3	0.25	0.11	0.30	55.8
Approach			647	2.3	647	2.3	0.375	2.2	NA	0.6	4.3	0.25	0.11	0.30	56.3
West: Kings Road															
10	L2	All MCs	89	0.0	89	0.0	0.222	7.4	LOS A	0.3	2.2	0.58	0.77	0.58	50.1
11	T1	All MCs	18	0.0	18	0.0	0.222	14.9	LOS B	0.3	2.2	0.58	0.77	0.58	50.2
12	R2	All MCs	21	0.0	21	0.0	0.222	19.3	LOS B	0.3	2.2	0.58	0.77	0.58	43.5
Approach			128	0.0	128	0.0	0.222	10.4	LOS A	0.3	2.2	0.58	0.77	0.58	49.3
All Vehicles			1298	3.2	1298	3.2	0.375	2.5	NA	0.6	4.3	0.20	0.17	0.22	55.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

