Technical Memorandum

Aura P18 Signals

Date	29/8/2025	Project Number	P0053364
Client	Stockland	Prepared By	Ryan Peel
Project	Aura P18 - Signals	Reviewed By	Andy Johnston

1 Introduction

1.1 Background

Urbis has been engaged by Stockland to provide traffic and transport advice relating to the proposed signalised intersection located in Aura Precinct 18. In particular, this technical memo will focus on Condition 26 of the PDA Development Conditions.

1.2 Development Conditions

Approval for Precinct 18 of the wider Aura development was granted by Economic Development Queensland (EDQ) with on 02 August 2024 (EDQ application reference: DEV2024/1458). The key condition assessed as part of this tech memo is shown below, with the relevant sections bolded.

Item 26 – Amended Engineering Services Report and ROL Plan

a) Submit to EDQ DA, an amended Engineering Services Report and ROL plan to reflect the changes to the signalised intersections as marked in red in the approved plans, and in accordance with the following:

i. Aura Boulevard/Trunk Collector C2 signalised intersection (noting it may not be in the ultimate form). While approved as part of this application, this intersection will be reassessed as part of the future development application/s in accordance with the STIA Traffic Model Update.

ii. **At Trunk Collector C2/Neighbourhood Connector N1 signalised intersection, provide auxiliary left-turn lane and shared through/right hand turn. The signal phasing is to be in accordance with DRMT Selection and Design of Cycle Tracks (LTS1).**

iii. At Trunk Collector C2/Neighbourhood Connector N1 signalised intersection, all legs of the intersection must have minimum 2.0m landscaping width between the kerb and footpath. The verge typology must be generally in accordance with the approved road cross section as shown in the PoD.

iv. Amend Section 4.7 of the Engineering Services report to include final detail of the acoustic fence opening.

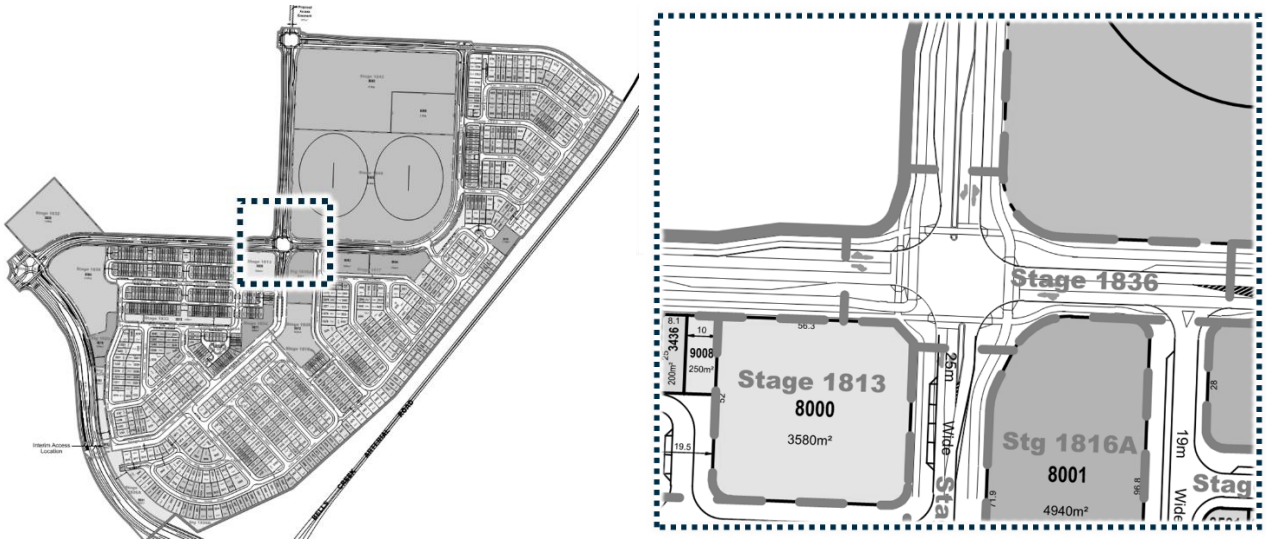
b) Lodge amended PoD to reflect an incidental changes to surrounding lots.

2 Traffic Assessment

2.1 Intersection Layout

The intersection layout as part of the updated approval in February 2025 is shown below in Figure 1. The intersection approaches include shared through-left turn lanes, and right turn only lanes. The northern, eastern and southern approaches include short turn right run lanes, while the western approach includes a short through-left turn lane.

Figure 1: Approved Intersection Layout



A dedicated separated cycle track is provided throughout the wider urban footprint in the PDA. Through the intersection, the separated cycle track is included on the western and northern departure legs as shown in Figure 2.

Figure 2: Dedicated Separated Cycle Track

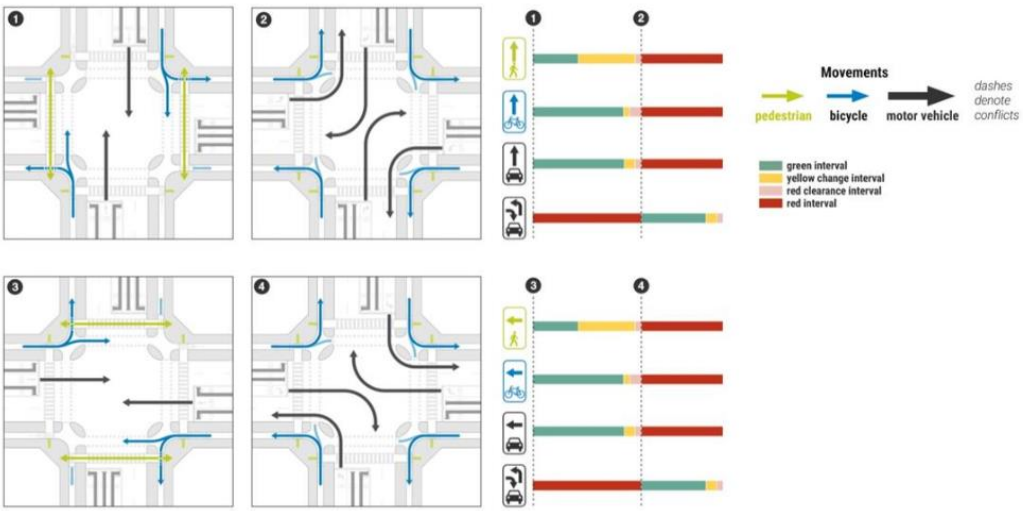
2.2 Separated Cycle Guidance

TMR's Selection and Design of Cycle Tracks outlines the recommended guidance when designing protected signalised intersections. A protected signalised intersection maximises the physical separation of the cycle track throughout an intersection and minimises the conflict area to where motorised vehicles are travelling below critical speeds. Additionally, they are designed to boost driver visibility to bicycle traffic.

For the design of signalised intersections the key conflict for cyclists utilising the intersection is with left-turning vehicles. This is due to the observation angle of motorists to approaching bicycle traffic.

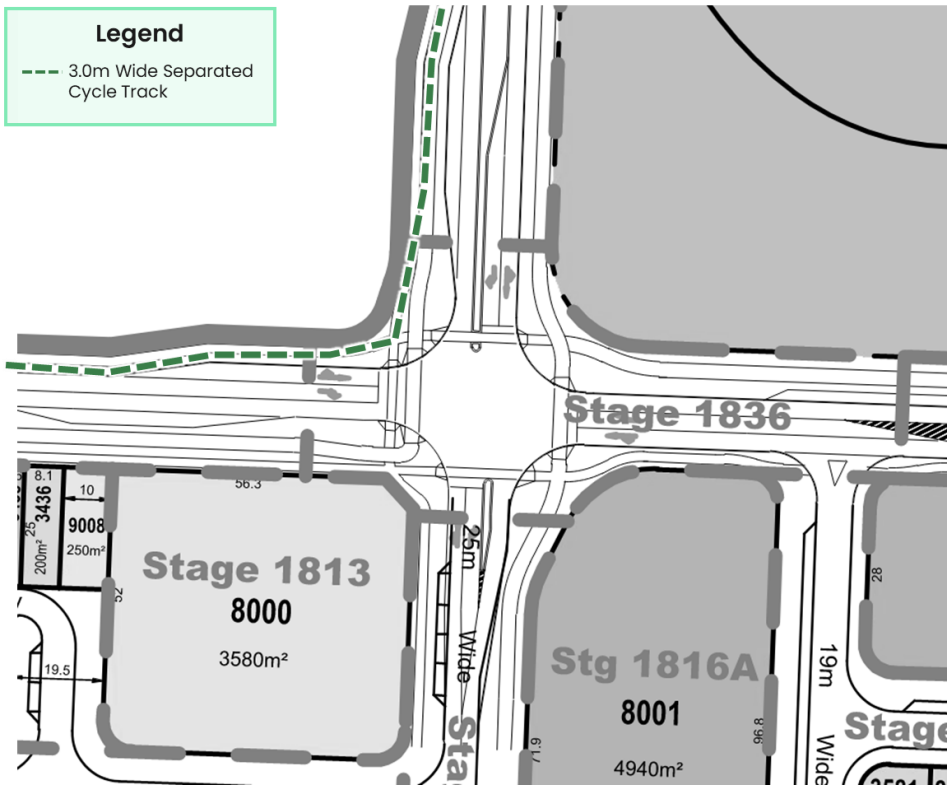
To allow for cyclist safety when crossing through a signalised intersection, a protected bicycle phase is recommended to be included in the signal design. This is a bicycle phase that runs with parallel through vehicle traffic, with turning vehicles occurring either before or after the through phase. This removes potential turning vehicle conflicts with cyclists by reducing filter turns over the crossing. The typical design of the priority cycle phase is shown in Figure 3.

Figure 3: Protected Bicycle Phase



As part of wider update Aura development, Urbis has been informed that the separated cycle track is proposed to change to the northern side of the western approach, shown in Figure 4. This change will remove the current need for cyclist crossings through the intersection. **This removes the need to provide shared through-right lanes in order to provide priority phasing at the intersection.**

Figure 4: Proposed Separated Cycle Track Update

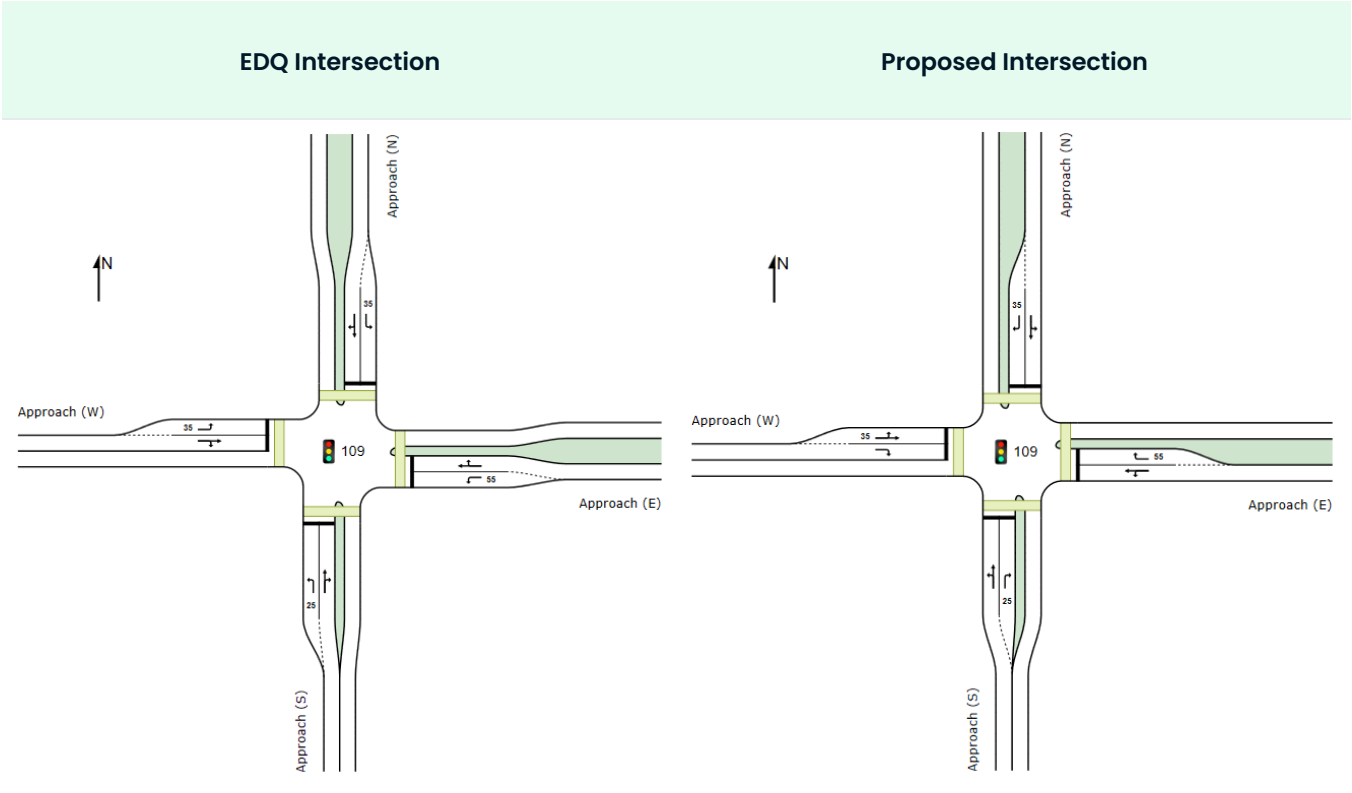


Regardless, Urbis have conducted intersection assessment of the requested intersection layout, expanded upon in the following sections. The full modelling methodology for the first principles assessment ins provided in Appendix A. This has been undertaken to highlight the deficiencies in the provision of EDQ's conditioned lane configuration in this instance.

2.3 SIDRA Assessment

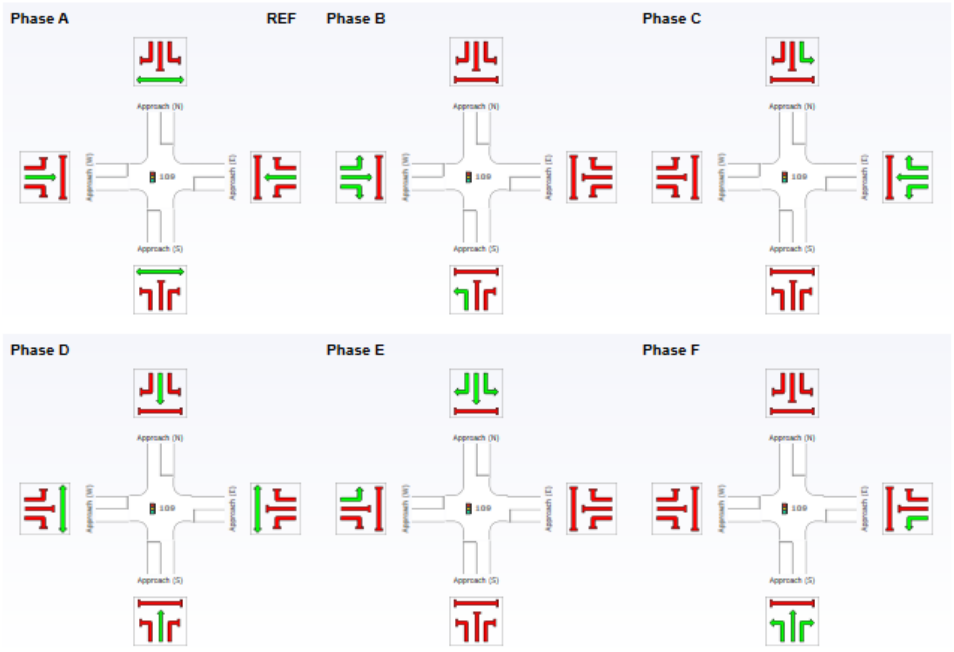
Both the requested intersection and proposed intersection layouts were assessed for the ultimate traffic scenario. The intersection layouts are shown in Figure 5. As requested, the intersection has been modelled with auxiliary left turn lanes, and shared through-right turn lanes.

Figure 5: EDQ Requested and Proposed Intersection Layouts



To ensure safe and efficient cyclist and pedestrian movement and adherence to TMR's *Selection and Design of Cycle Tracks*, the signal phasing includes a priority dedicated separated cycle track movement in the phase design. The intersection signal phasing utilised for this assessment is shown in Figure 6.

Figure 6: Intersection Signal Design



The results of the SIDRA assessment for the EDQ requested and the proposed intersection layouts are shown in Table 1 and Table 4 respectively. As shown, the EDQ requested intersection exceeds practical capacity in the AM peak. The northern approach and western approaches exceed a DOS of 0.9, with maximum delays of 97.5 seconds and queue lengths of 97.9m.

For comparison, the proposed intersection layout remains within practical capacity, with a maximum DOS of 0.77. The maximum delay occurs on the northern approach with 40.4s, and a queue length of 61.5m.

Table 1: SIDRA Intersection Summary – EDQ Requested Layout

Scenario *DoS - Degree of Saturation (%)* *Delay of Critical Approach Movement (s)* *95th Percentile Queue Length (m)* *Critical Movement of Approach*	Northern Approach				Southern Approach				Eastern Approach				Western Approach				Total Int			
	DoS	Delay (s)	95th Queue (m)	Crit Movement	DoS	Delay (s)	95th Queue (m)	Crit Movement	DoS	Delay (s)	95th Queue (m)	Crit Movement	DoS	Delay (s)	95th Queue (m)	Crit Movement	DoS	Delay (s)	95th Queue (m)	Crit Movement
AM Peak - Ultimate	0.94	80.9	64	N-R	0.60	56.8	45.3	S-R	0.52	54.3	51.7	E-R	0.93	97.5	97.9	W-R	0.94	46.6	97.9	W-R
PM Peak - Ultimate	0.85	75.2	63.8	N-R	0.20	61.4	22.5	S-R	0.35	62.5	27.6	E-R	0.85	90.3	132	W-R	0.85	53.9	132	W-R

Table 2: SIDRA Intersection Summary - Proposed Layout

Scenario *DoS - Degree of Saturation (%)* *Delay of Critical Approach Movement (s)* *95th Percentile Queue Length (m)* *Critical Movement of Approach*	Northern Approach				Southern Approach				Eastern Approach				Western Approach				Total Int			
	DoS	Delay (s)	95th Queue (m)	Crit Movement	DoS	Delay (s)	95th Queue (m)	Crit Movement	DoS	Delay (s)	95th Queue (m)	Crit Movement	DoS	Delay (s)	95th Queue (m)	Crit Movement	DoS	Delay (s)	95th Queue (m)	Crit Movement
AM Peak - Ultimate	0.67	40.4	27.3	N-R	0.60	39.6	53	S-R	0.51	36.9	45.9	E-R	0.54	38.8	48.5	W-R	0.67	30.7	53	N-R
PM Peak - Ultimate	0.49	40	19.2	N-R	0.32	37.3	26.2	S-R	0.30	35	25.8	E-R	0.77	41.5	61.5	W-R	0.77	31.7	61.5	W-R

It is acknowledged that the intersection design needs for the development needs to balance the safety of all road users and the network capacity of road users. The signal design utilised above is designed for cycle tracks on all approaches crossing through the intersection. As outlined in Section 2.2, the need for cycle crossing treatments is being removed due to the separated cycle track shifting to the northern side of the western approach.

As such, it is recommended to maintain the approved through-left movement lane design for the intersection as shown in Figure 1.

3 Summary

Based on the assessment within this letter, Urbis supports maintaining the approved intersection layout for the following reasons:

- There is no requirement to protect the separated cycleway traffic from left turning vehicles as the proposed layout does not require cyclists to cross the intersection.
- The amendments identified in the EDQ conditions result in a worsening to the operation of the intersection.

Therefore, the intersection should remain as per the proposed layout shown previously in Figure 4

Kind regards,

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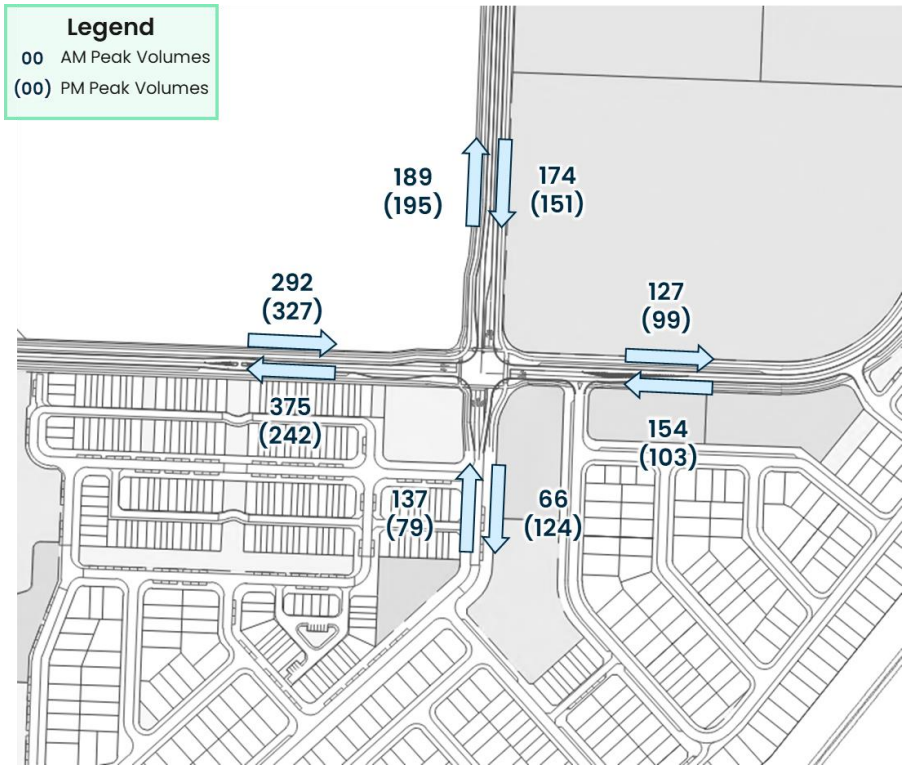
Appendix A – Modelling Methodology

3.1 Approved Modelling

Modelling for Precinct 18 and the wider Aura catchment has been undertaken by PwC as part of the approved masterplan. The *Aura P17-P19 Traffic Modelling Refresh Report* was published in June 2024 and approved by EDQ in August 2024. The through volumes on the four intersection approaches for both he AM and PM peak hours are shown in Figure 7.

Figure 7: Approved Modelling Volumes

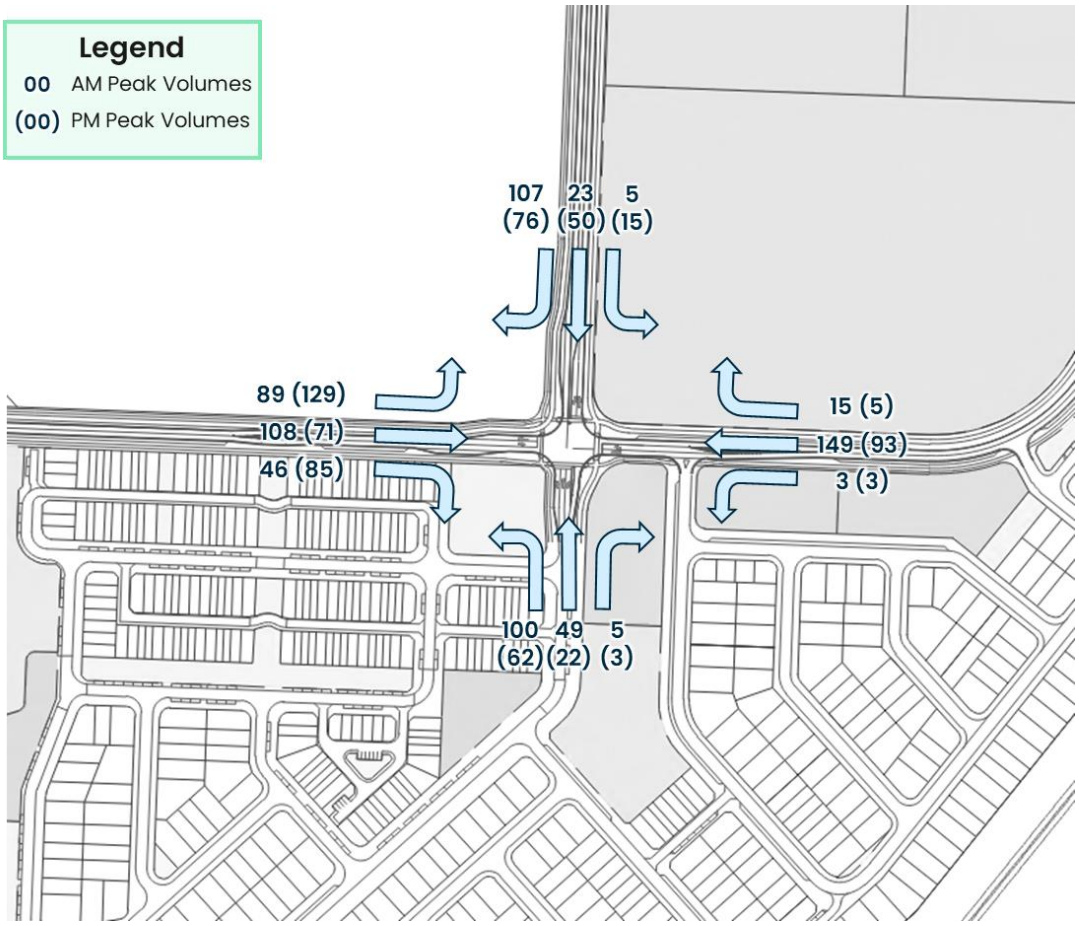


As the detailed turning volumes for each approach are not available from the approved models due to the scale of the model zones, a first principles traffic assessment has been undertaken in the following sections.

3.2 Updated Modelling

Further traffic modelling was undertaken for the adjacent Aura Precincts 17-19 as part of a current development application before EDQ(EDQ Ref: DEV2024/1585). The *Aura Lakes Precinct 17-19 Traffic Modelling Report* was published by Dykman Consulting and included in the Gagalba Traffic Impact Assessment. The turning volumes included from the updated traffic modelling for the signalised intersection is shown in Figure 8.

Figure 8: Model Intersection Turning Volumes



To ensure a conservative assessment, traffic generation for Precinct 18 has been undertaken and added to the estimated modelled volumes. The trip generation is expanded upon in the following sections.

3.3 Traffic Generation for P18

To ensure a thorough traffic assessment, trip generation was estimated for the total Aura Precinct 18 catchment. These included the approved dwelling catchments of Precinct 18. A summary of the trip generation rates utilised in this assessment are shown in Table 3.

Table 3: Trip Generation Rates

Land Use	Source	Peak Hour Trip Rates	
		AM Peak Hour	PM Peak Hour
Residential Dwellings	Roads and Maritime Services (RMS) NSW, 2013	0.65 trips per dwelling	0.65 trips per dwelling

Traffic generation for the catchment has been calculated utilising the trip generation rates outlined in Table 3. to determine the number of vehicles generated by the immediate catchment on the internal road network during the AM and PM peak hours.

Table 4 shows the calculation of the catchment traffic generation.

Table 4: Catchment Traffic Generation

Land Use	Yield	AM Peak Trips	PM Peak Trips
P18 Dwellings	749 dwellings	487 trips	487 trips

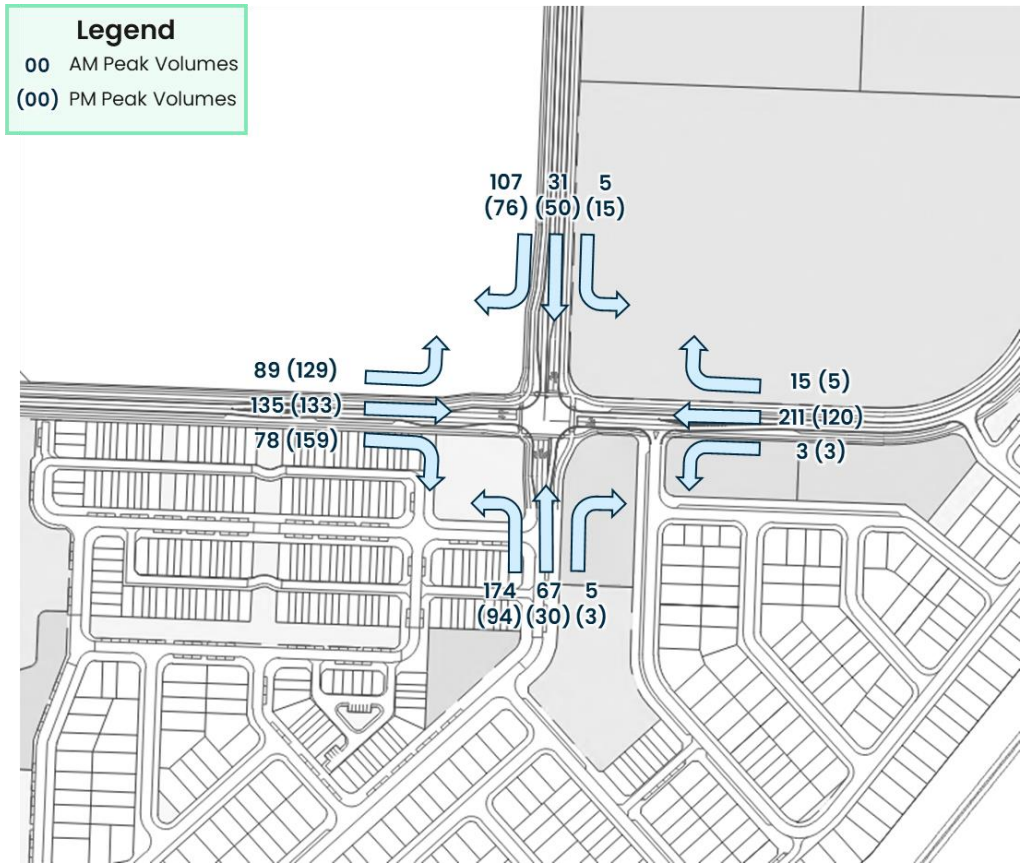
3.4 Trip Distribution

In assigning the catchment generated traffic to the road network, the following assumptions we made:

- During the peak hours, the following directional distributions were assumed:
  - 70% of trips are outbound and 30% of trips are inbound in the AM peak. 30% of trips are outbound and 70% of trips are inbound in the PM peak.
- It has been assumed that 50% of all residential trips will occur within the Aura P18 catchment, 50% of trips are assumed to flow to/from the external catchment, with the following distribution:
  - West towards the Gagalba development: 80%
  - North towards the existing Aura development: 20%

The ultimate traffic volumes estimated for the study intersection are shown in Figure 9.

Figure 9: Ultimate Traffic Volumes



3.5 Intersection Assessment

As the study intersection is within the Caloundra South PDA, the assessment complies with the requirements outlined within the Caloundra South Infrastructure Agreement. The SIDRA assessment utilises the traffic volumes and assumptions outlined in Section 2, corresponding to the ultimate development scenarios.

Modelling Parameters

A summary of the SIDRA Modelling parameters adopted for this assessment are summarised below:

- Peak Flow Factor – 0.95 (30min/60min)
- Basic Saturation Flow – 1,950tcu/hr

Assessment Criteria

The performance of the study intersections has been analysed using SIDRA Intersection 9.1 (SIDRA). SIDRA is an industry recognised analysis tool that estimates the capacity and performance of intersections based on input parameters, including geometry and traffic volumes, and provides estimates of an intersection's Degree of Saturation (DOS), queues and delays.

Intersection Delay

The TMR Guide to Traffic Impact Assessments (GTIA) recognises the intersection delay as a greater indicator of intersection performance in comparison to the previous TMR Guidelines for Assessment of Road Impacts of Development (GARID) significance on the degree of saturation (DOS). The TMR GTIA appreciates that in urban networks, the DOS of an intersection may not be the most accurate representation of the intersection operation as it is expected that existing intersections are approaching capacity with the growth of our cities.

For priority-controlled intersections, where the average peak hour delays for any movement exceeds 42 seconds, as outlined in the GTIA, the intersection should be upgraded for safety reasons.

Intersection Degree of Saturation

While the movement delay is considered to provide a better indication of intersection performance and safety for priority-controlled intersections and roundabouts, the DOS should still be considered when assessing the performance of the intersection.

Table 5 provides the DOS thresholds adopted for the assessment. The results of the detailed intersection analysis are discussed in Section 6.

Table 5: Degree of Saturation Thresholds

Intersection Treatment	DOS Threshold
Signalised Intersections	Less than or equal to 0.90
Roundabouts	Less than or equal to 0.85
Priority-controlled Intersections	Less than or equal to 0.80

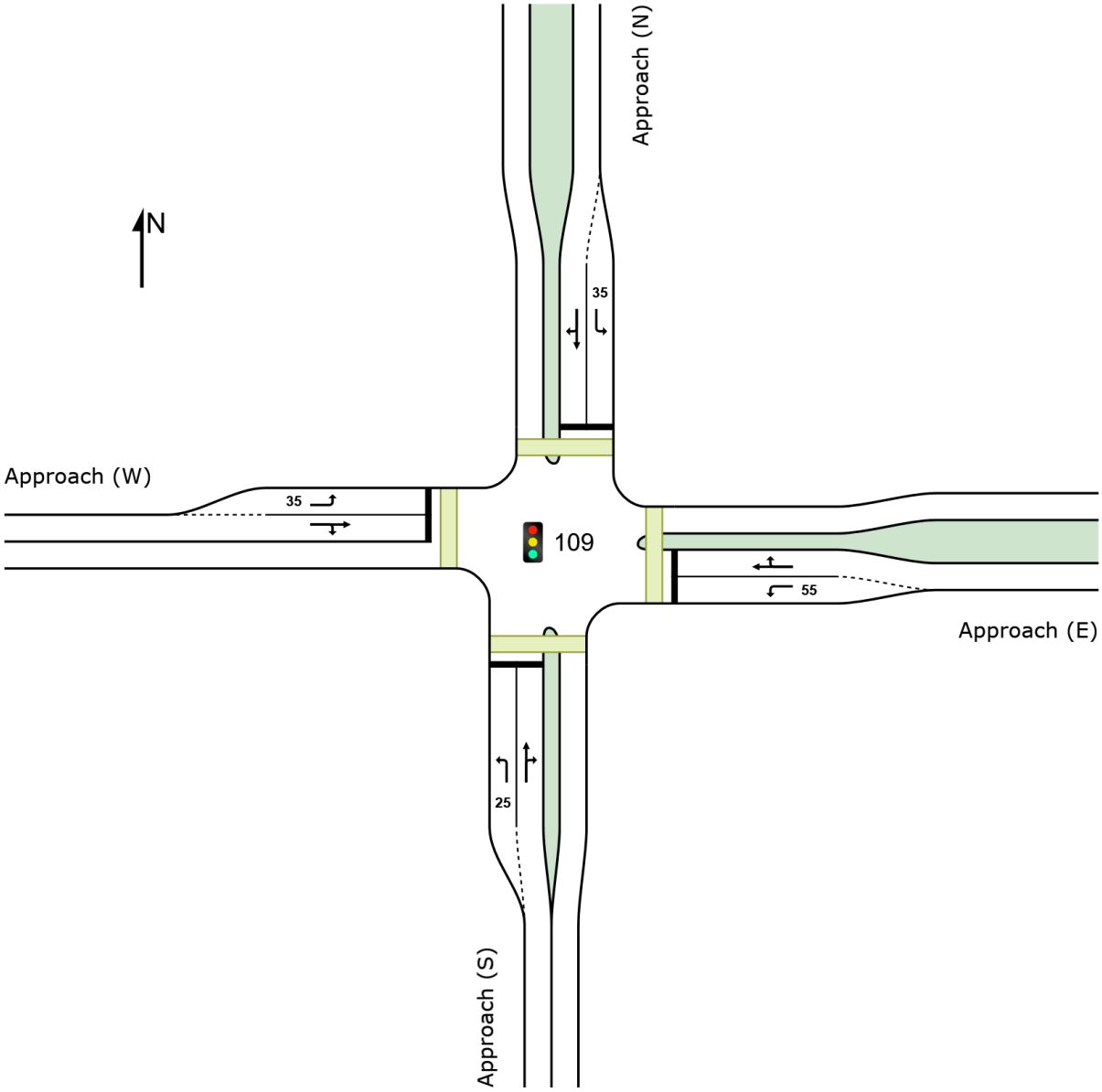
Appendix B – SIDRA Intersection Summaries

SITE LAYOUT

Site: 109 [AM Peak - EDQ Intersection (Site Folder: P18 - Intersection 109 - Phasing Review)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: URBIS | Licence: NETWORK / 1PC | Created: Friday, 29 August 2025 4:10:31 PM
Project: C:\Users\rpeel\Urbis Ltd\P0053364 SUB Aura Transport Masterplanning - General\02_Workspace\08_Transport\01_Analysis\P18 Access\P0053364_Aura Transport Masterplan_Intersection Analysis_250404_P18 Analysis.sip9

MOVEMENT SUMMARY

Site: 109 [AM Peak - EDQ Intersection (Site Folder: P18 - Intersection 109 - Phasing Review)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 104 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Approach (S)															
1	L2	All MCs	183	0.0	183	0.0	*0.603	34.3	LOS C	6.5	45.3	0.97	0.82	0.97	37.4
2	T1	All MCs	71	0.0	71	0.0	0.232	23.3	LOS C	2.5	17.6	0.90	0.69	0.90	42.2
3	R2	All MCs	5	0.0	5	0.0	0.232	56.8	LOS E	2.5	17.6	0.90	0.69	0.90	41.0
Approach			259	0.0	259	0.0	0.603	31.8	LOS C	6.5	45.3	0.95	0.78	0.95	38.6
East: Approach (E)															
4	L2	All MCs	3	0.0	3	0.0	0.009	24.7	LOS C	0.1	0.5	0.84	0.62	0.84	41.4
5	T1	All MCs	222	0.0	222	0.0	0.516	19.7	LOS B	7.4	51.7	0.92	0.76	0.92	44.1
6	R2	All MCs	16	0.0	16	0.0	*0.516	54.3	LOS D	7.4	51.7	0.92	0.76	0.92	42.8
Approach			241	0.0	241	0.0	0.516	22.0	LOS C	7.4	51.7	0.92	0.76	0.92	44.0
North: Approach (N)															
7	L2	All MCs	5	0.0	5	0.0	0.014	25.9	LOS C	0.1	1.0	0.82	0.64	0.82	40.9
8	T1	All MCs	33	0.0	33	0.0	*0.941	52.2	LOS D	9.1	64.0	1.00	1.09	1.58	27.0
9	R2	All MCs	113	0.0	113	0.0	0.941	80.9	LOS F	9.1	64.0	1.00	1.09	1.58	26.5
Approach			151	0.0	151	0.0	0.941	72.7	LOS E	9.1	64.0	0.99	1.07	1.56	26.9
West: Approach (W)															
10	L2	All MCs	94	0.0	94	0.0	0.276	35.7	LOS D	2.4	16.5	0.90	0.76	0.90	40.6
11	T1	All MCs	142	0.0	142	0.0	*0.929	65.5	LOS E	14.0	97.9	1.00	1.11	1.47	28.3
12	R2	All MCs	82	0.0	82	0.0	0.929	97.5	LOS F	14.0	97.9	1.00	1.11	1.47	27.8
Approach			318	0.0	318	0.0	0.929	65.0	LOS E	14.0	97.9	0.97	1.01	1.30	28.7
All Vehicles			968	0.0	968	0.0	0.941	46.6	LOS D	14.0	97.9	0.96	0.89	1.15	33.6

Site Level of Service (LOS) Method: Delay (SIDRA). 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 Flows 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	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Approach (S)												
P1	Full	150	158	46.5	LOS E	0.4	0.4	0.95	0.95	200.3	200.0	1.00
East: Approach (E)												

P2	Full	150	158	46.5	LOS E	0.4	0.4	0.95	0.95	200.3	200.0	1.00
North: Approach (N)												
P3	Full	150	158	46.5	LOS E	0.4	0.4	0.95	0.95	200.3	200.0	1.00
West: Approach (W)												
P4	Full	150	158	46.5	LOS E	0.4	0.4	0.95	0.95	200.3	200.0	1.00
All Pedestrians		600	632	46.5	LOS E	0.4	0.4	0.95	0.95	200.3	200.0	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: 109 [PM Peak - EDQ Intersection (Site Folder: P18 - Intersection 109 - Phasing Review)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 116 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Approach (S)															
1	L2	All MCs	99	0.0	99	0.0	*0.193	26.4	LOS C	3.2	22.1	0.80	0.74	0.80	40.6
2	T1	All MCs	32	0.0	32	0.0	*0.126	27.3	LOS C	1.3	9.3	0.90	0.67	0.90	40.0
3	R2	All MCs	3	0.0	3	0.0	0.126	61.5	LOS E	1.3	9.3	0.90	0.67	0.90	38.9
Approach			134	0.0	134	0.0	0.193	27.5	LOS C	3.2	22.1	0.83	0.72	0.83	40.4
East: Approach (E)															
4	L2	All MCs	3	0.0	3	0.0	0.013	30.6	LOS C	0.1	0.7	0.89	0.62	0.89	38.8
5	T1	All MCs	126	0.0	126	0.0	*0.353	21.7	LOS C	3.9	27.1	0.90	0.72	0.90	43.4
6	R2	All MCs	5	0.0	5	0.0	*0.353	62.5	LOS E	3.9	27.1	0.90	0.72	0.90	42.1
Approach			135	0.0	135	0.0	0.353	23.5	LOS C	3.9	27.1	0.90	0.72	0.90	43.2
North: Approach (N)															
7	L2	All MCs	16	0.0	16	0.0	0.055	33.5	LOS C	0.6	4.0	0.88	0.68	0.88	37.7
8	T1	All MCs	72	0.0	72	0.0	0.865	52.4	LOS D	9.6	67.1	1.00	0.99	1.32	28.2
9	R2	All MCs	80	0.0	80	0.0	*0.865	82.8	LOS F	9.6	67.1	1.00	0.99	1.32	27.7
Approach			167	0.0	167	0.0	0.865	65.1	LOS E	9.6	67.1	0.99	0.96	1.28	28.6
West: Approach (W)															
10	L2	All MCs	136	0.0	136	0.0	0.242	41.1	LOS D	3.2	22.3	0.79	0.75	0.79	42.4
11	T1	All MCs	140	0.0	140	0.0	0.822	57.0	LOS E	18.0	126.1	1.00	0.95	1.15	31.8
12	R2	All MCs	167	0.0	167	0.0	*0.822	85.5	LOS F	18.0	126.1	1.00	0.95	1.15	31.1
Approach			443	0.0	443	0.0	0.822	62.9	LOS E	18.0	126.1	0.94	0.89	1.04	29.1
All Vehicles			879	0.0	879	0.0	0.865	51.9	LOS D	18.0	126.1	0.92	0.85	1.03	32.0

Site Level of Service (LOS) Method: Delay (SIDRA). 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 Flows 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	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Approach (S)												
P1	Full	150	158	52.5	LOS E	0.5	0.5	0.95	0.95	206.3	200.0	0.97
East: Approach (E)												

P2	Full	150	158	52.5	LOS E	0.5	0.5	0.95	0.95	206.3	200.0	0.97
North: Approach (N)												
P3	Full	150	158	52.5	LOS E	0.5	0.5	0.95	0.95	206.3	200.0	0.97
West: Approach (W)												
P4	Full	150	158	52.5	LOS E	0.5	0.5	0.95	0.95	206.3	200.0	0.97
All Pedestrians		600	632	52.5	LOS E	0.5	0.5	0.95	0.95	206.3	200.0	0.97

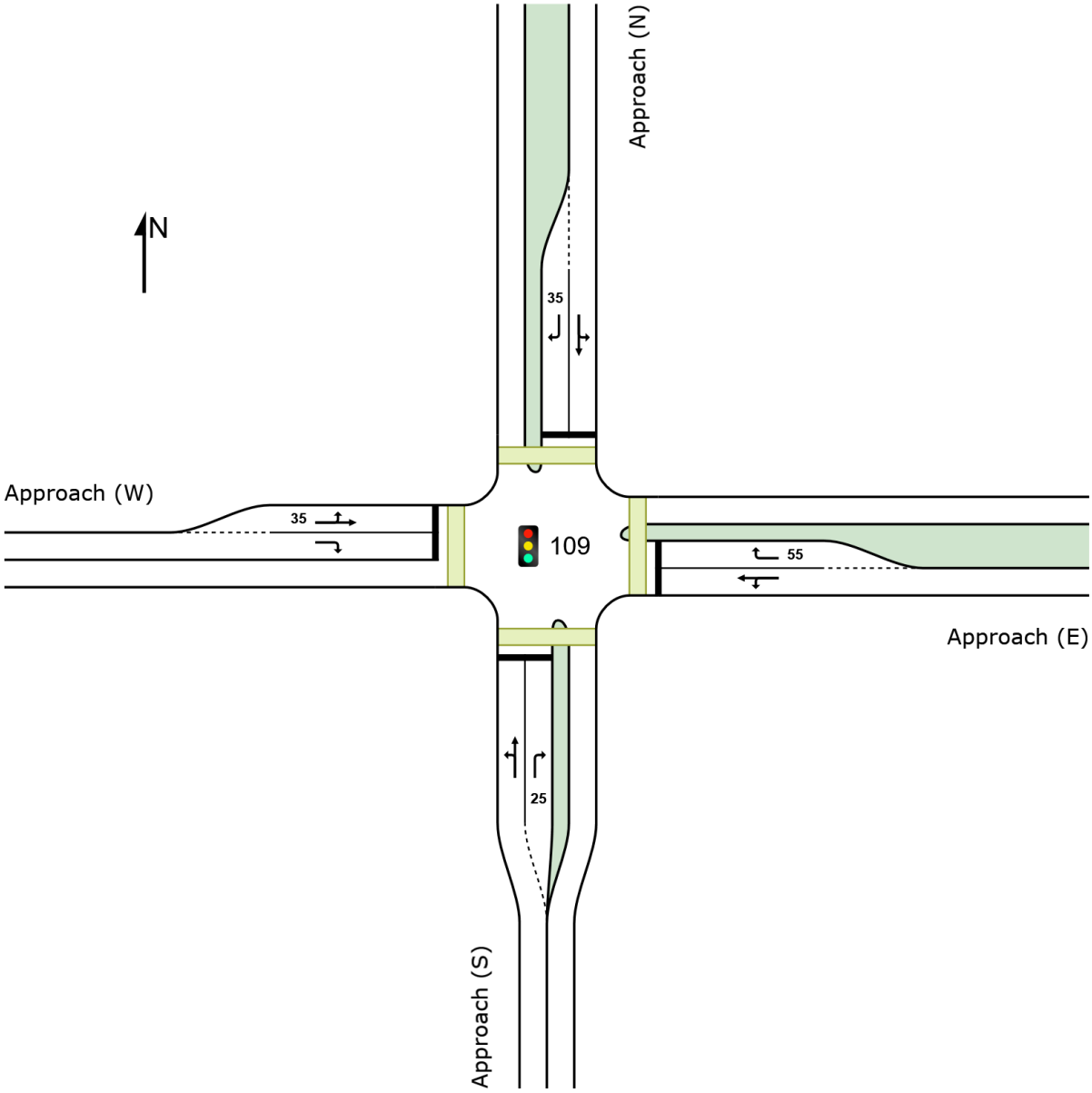
Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 109 [AM Peak - Original (Site Folder: P18 - Intersection 109 - Phasing Review)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 109 [AM Peak - Original (Site Folder: P18 - Intersection 109 - Phasing Review)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 66 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Approach (S)															
1	L2	All MCs	183	0.0	183	0.0	0.595	34.2	LOS C	7.6	53.0	0.94	0.81	0.94	39.3
2	T1	All MCs	71	0.0	71	0.0	* 0.595	28.6	LOS C	7.6	53.0	0.94	0.81	0.94	40.5
3	R2	All MCs	5	0.0	5	0.0	0.031	39.6	LOS D	0.2	1.1	0.93	0.64	0.93	36.6
Approach			259	0.0	259	0.0	0.595	32.8	LOS C	7.6	53.0	0.94	0.81	0.94	38.2
East: Approach (E)															
4	L2	All MCs	3	0.0	3	0.0	0.509	30.3	LOS C	6.6	45.9	0.92	0.76	0.92	41.3
5	T1	All MCs	222	0.0	222	0.0	0.509	24.8	LOS C	6.6	45.9	0.92	0.76	0.92	42.6
6	R2	All MCs	16	0.0	16	0.0	0.094	36.9	LOS D	0.5	3.5	0.94	0.69	0.94	36.4
Approach			241	0.0	241	0.0	0.509	25.7	LOS C	6.6	45.9	0.92	0.76	0.92	42.1
North: Approach (N)															
7	L2	All MCs	5	0.0	5	0.0	0.086	27.5	LOS C	1.0	6.8	0.82	0.62	0.82	42.3
8	T1	All MCs	33	0.0	33	0.0	0.086	22.0	LOS C	1.0	6.8	0.82	0.62	0.82	43.7
9	R2	All MCs	113	0.0	113	0.0	* 0.667	40.4	LOS D	3.9	27.3	1.00	0.84	1.15	35.1
Approach			151	0.0	151	0.0	0.667	35.9	LOS D	3.9	27.3	0.95	0.79	1.07	36.9
West: Approach (W)															
10	L2	All MCs	94	0.0	94	0.0	0.543	30.6	LOS C	6.9	48.5	0.93	0.79	0.93	40.2
11	T1	All MCs	142	0.0	142	0.0	* 0.543	25.1	LOS C	6.9	48.5	0.93	0.79	0.93	41.5
12	R2	All MCs	82	0.0	82	0.0	* 0.486	38.8	LOS D	2.7	19.1	0.99	0.76	0.99	35.7
Approach			318	0.0	318	0.0	0.543	30.2	LOS C	6.9	48.5	0.95	0.78	0.95	39.5
All Vehicles			968	0.0	968	0.0	0.667	30.7	LOS C	7.6	53.0	0.94	0.78	0.96	39.3

Site Level of Service (LOS) Method: Delay (SIDRA). 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 Flows 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	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Approach (S)												
P1	Full	150	158	27.5	LOS C	0.3	0.3	0.92	0.92	181.3	200.0	1.10
East: Approach (E)												

P2	Full	150	158	27.5	LOS C	0.3	0.3	0.92	0.92	181.3	200.0	1.10
North: Approach (N)												
P3	Full	150	158	27.5	LOS C	0.3	0.3	0.92	0.92	181.3	200.0	1.10
West: Approach (W)												
P4	Full	150	158	27.5	LOS C	0.3	0.3	0.92	0.92	181.3	200.0	1.10
All Pedestrians		600	632	27.5	LOS C	0.3	0.3	0.92	0.92	181.3	200.0	1.10

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: 109 [PM Peak - Original (Site Folder: P18 - Intersection 109 - Phasing Review)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 68 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Approach (S)															
1	L2	All MCs	99	0.0	99	0.0	0.315	30.2	LOS C	3.7	26.2	0.88	0.76	0.88	39.6
2	T1	All MCs	32	0.0	32	0.0	*0.315	24.6	LOS C	3.7	26.2	0.88	0.76	0.88	40.7
3	R2	All MCs	3	0.0	3	0.0	0.019	37.3	LOS D	0.1	0.7	0.93	0.62	0.93	36.3
Approach			134	0.0	134	0.0	0.315	29.0	LOS C	3.7	26.2	0.88	0.75	0.88	39.7
East: Approach (E)															
4	L2	All MCs	3	0.0	3	0.0	0.301	30.0	LOS C	3.7	25.8	0.88	0.70	0.88	41.4
5	T1	All MCs	126	0.0	126	0.0	0.301	24.5	LOS C	3.7	25.8	0.88	0.70	0.88	42.7
6	R2	All MCs	5	0.0	5	0.0	0.024	35.0	LOS D	0.2	1.1	0.91	0.64	0.91	37.1
Approach			135	0.0	135	0.0	0.301	25.0	LOS C	3.7	25.8	0.88	0.70	0.88	42.4
North: Approach (N)															
7	L2	All MCs	16	0.0	16	0.0	0.205	29.4	LOS C	2.4	17.0	0.85	0.68	0.85	41.3
8	T1	All MCs	72	0.0	72	0.0	0.205	23.9	LOS C	2.4	17.0	0.85	0.68	0.85	42.6
9	R2	All MCs	80	0.0	80	0.0	*0.488	40.0	LOS D	2.7	19.2	0.99	0.76	0.99	35.3
Approach			167	0.0	167	0.0	0.488	32.1	LOS C	2.7	19.2	0.92	0.72	0.92	38.7
West: Approach (W)															
10	L2	All MCs	136	0.0	136	0.0	0.657	33.0	LOS C	8.8	61.5	0.96	0.84	1.00	39.0
11	T1	All MCs	140	0.0	140	0.0	*0.657	27.5	LOS C	8.8	61.5	0.96	0.84	1.00	40.1
12	R2	All MCs	167	0.0	167	0.0	*0.766	41.5	LOS D	6.1	42.4	1.00	0.92	1.24	34.8
Approach			443	0.0	443	0.0	0.766	34.5	LOS C	8.8	61.5	0.98	0.87	1.09	37.6
All Vehicles			879	0.0	879	0.0	0.766	31.7	LOS C	8.8	61.5	0.94	0.80	1.00	38.8

Site Level of Service (LOS) Method: Delay (SIDRA). 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 Flows 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	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Approach (S)												
P1	Full	150	158	28.5	LOS C	0.3	0.3	0.92	0.92	182.3	200.0	1.10
East: Approach (E)												

P2	Full	150	158	28.5	LOS C	0.3	0.3	0.92	0.92	182.3	200.0	1.10
North: Approach (N)												
P3	Full	150	158	28.5	LOS C	0.3	0.3	0.92	0.92	182.3	200.0	1.10
West: Approach (W)												
P4	Full	150	158	28.5	LOS C	0.3	0.3	0.92	0.92	182.3	200.0	1.10
All Pedestrians		600	632	28.5	LOS C	0.3	0.3	0.92	0.92	182.3	200.0	1.10

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.