Genesis Traffic

Traffic Impact Assessment

190 Waterloo Road, Greenacre

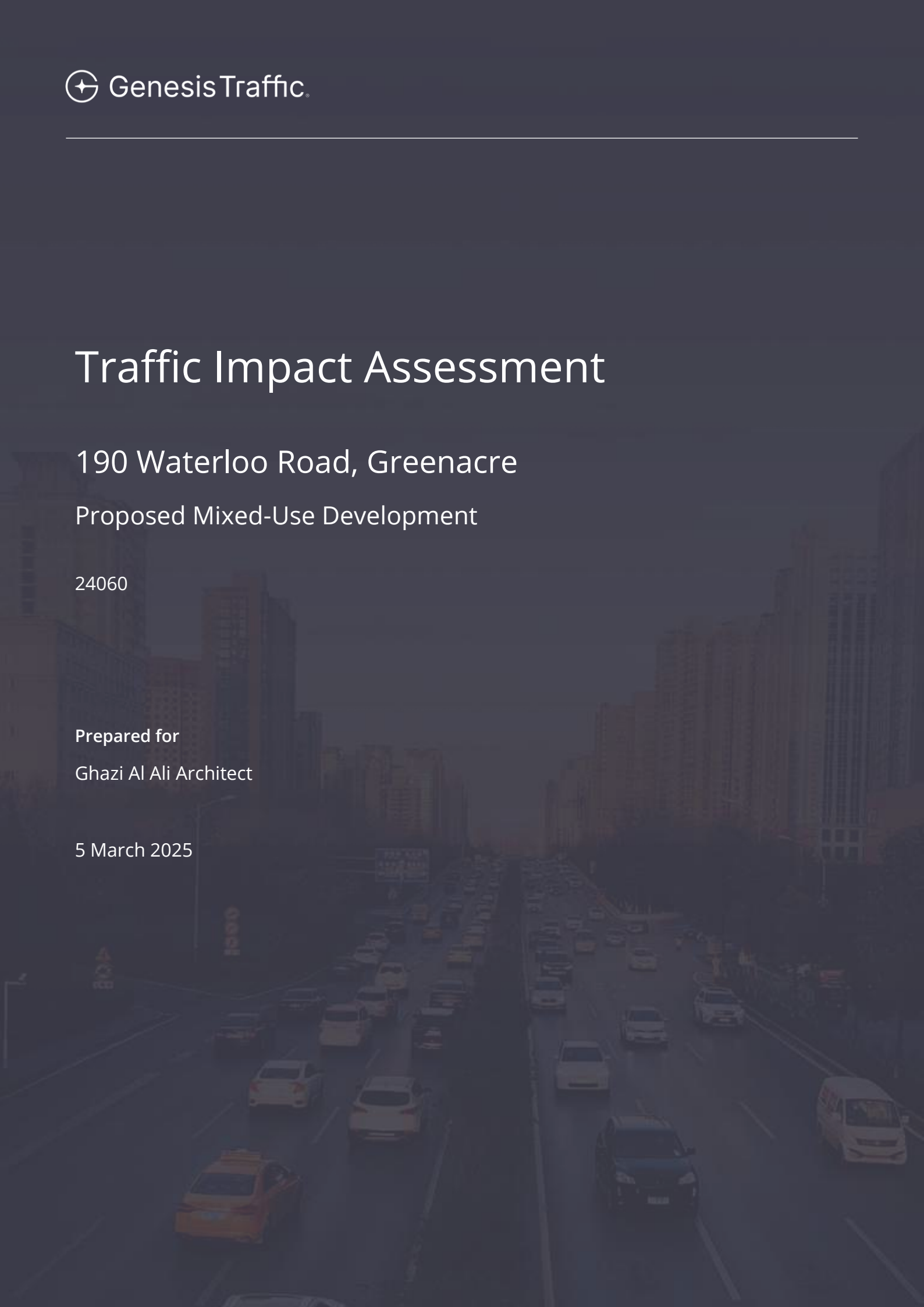
Proposed Mixed-Use Development

24060

Prepared for

Ghazi Al Ali Architect

5 March 2025



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Document Information

Report	Traffic Impact Assessment
Proposal	Proposed Mixed-Use Development
Architect	Ghazi Al Ali Architect
Project Location	190 Waterloo Road, Greenacre
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1	11/02/2025	Draft	BB, LN	BL
2	18/02/2025	Final Draft	LN	BL
3	5/03/2025	Final	LN	BL

Table of Contents

Attachments

Tables

Figures

1 Introduction

1.1 Background

This report has been prepared to accompany a Development Application to Canterbury Bankstown Council for a Proposed Mixed-Use Development at 190 Waterloo Road, Greenacre (Figure 1-1).

Figure 1-1 Site

Source: Mecone (Modified by Genesis Traffic)

1.2 Scope of Works

The purpose of this report is to:

- describe the proposed development scheme
- describe the existing site, road network serving the site and the prevailing traffic conditions
- assess the adequacy of the proposed parking provision
- assess the potential traffic implications
- assess the suitability of the proposed vehicle access, internal circulation and servicing arrangements

1.3 Reference Documents

Reference has been made to the following documents when preparing this report:

- Australian Standard Part 1: Off-Street Car Parking (AS2890.1:2004)
- Australian Standard Part 3: Bicycle Parking (AS2890.3:2015)
- Australian Standard Part 6: Off-street Parking for People with Disabilities (AS2890.6:2022)
- Development Control Plan (Canterbury Bankstown Council)
- Guide to Transport Impact Assessment, NSW Government, 2024
- State Environmental Planning Policy (Housing) 2021, NSW
- Technical Direction TDT 2002/12c, Stopping and Parking Restrictions at Intersections and Crossings, RTA NSW

1.4 Response to Pre-DA Lodgement Advice

Our response to the Council Pre-DA Lodgement Advice (PRE-DA-35/2024) are outlined in Table 1-1

Table 1-1 Pre-DA Lodgement Advice

Council Comment	Our Response
This Development Application will be referred to TfNSW due to one of its frontages (Boronia) being on a State Road. Waterloo is also a regional road.	Noted.
There will need to be a detailed Traffic and Parking Impact Assessment (T&PIA) taking in account all the traffic impact that might result from the traffic being generated by the development. The T&PIA, will need to model the intersection of Boronia and Waterloo in light of the proposed development as well as address traffic distribution and model the intersection of Chiswick and Waterloo Road to identify if there is impact from the development.	Refer to Section 6.
For the retail component on Waterloo/Boronia Road, please be advised that Council had received representation from the shop owners that are located across the road at 171A Hijab house of many near misses and cars crashing into these retail shops, whereby Council had to install crash bollards. The applicant's T&PIA will need to address the likelihood of similar crashes occurring at the proposed new retail shops and will need to provide protection measures against crashes at the intersection.	Crash bollards are provided. Refer to **Attachment 1**.
Basement height clearance have been designed to only be 2.9m in the submitted pre-da plan, this means that they are relying on, on– street waste collection from Boronia Road as stated in the written statement and as anticipated from the location of their waste bin room. As advised above Boronia Road is a State Road and Council doubts that this will be permissible especially that there is currently No Stopping restriction all	The proposed development will rely on Waterloo Road for waste collection. Refer to further assessment in Section 6.

along Boronia Road to facilitate flow of traffic and capacity at the traffic lights. It is recommended that this design is therefore discussed with TfNSW prior to lodgement. If the proposed design cannot be accommodated, further discussion will need to occur with Council's Waste Services for more advise in regard to if waste collection can be facilitated on site, and if so, then the height clearance will need to be 4.5m minimum.	
Likewise Loading zones for developments must be accommodated on the property, Traffic unit will not support for loading zones for the retail component of the development to be facilitated on street.	Noted.
It is also worth noting that the location of the site can cause issues with an appropriate works zone for construction vehicles.	Noted.

2 Proposed Development

The proposal seeks consent for a development outcome that involves:

- 62 apartments (under SEPP provisions) in the following composition:
    - 12 x affordable unit(s)
        - 1 x one-bedroom apartment(s)
        - 11 x two-bedroom apartment(s)
    - 50 x non-affordable unit(s)
        - 8 x one-bedroom apartment(s)
        - 36 x two-bedroom apartment(s)
        - 6 x three-bedroom apartment(s)
- Ground level retail floor space (279.65m^2 floor area)
- Basement carpark - 74 car spaces

Vehicle access will be provided at Waterloo Road.

Details of the proposal are indicated in the architectural plans prepared by Ghazi Al Ali Architect which accompany the submission and are reproduced in part in **Attachment 1**.

3 Existing Conditions

3.1 Site and Surrounding Context

The development site (Figure 3-1) is legally known as Lot 21 in DP624967, located at 190 Waterloo Road, Greenacre. The site occupies an area of 1,782m² and has frontages to Waterloo Road and Boronia Road.

Figure 3-1 Site Context

Source: Metromap and Google Map (Modified by Genesis Traffic)

The site is occupied by a service station and a car wash station at present (see inset above), with vehicle access points located at Waterloo Road and Boronia Road.

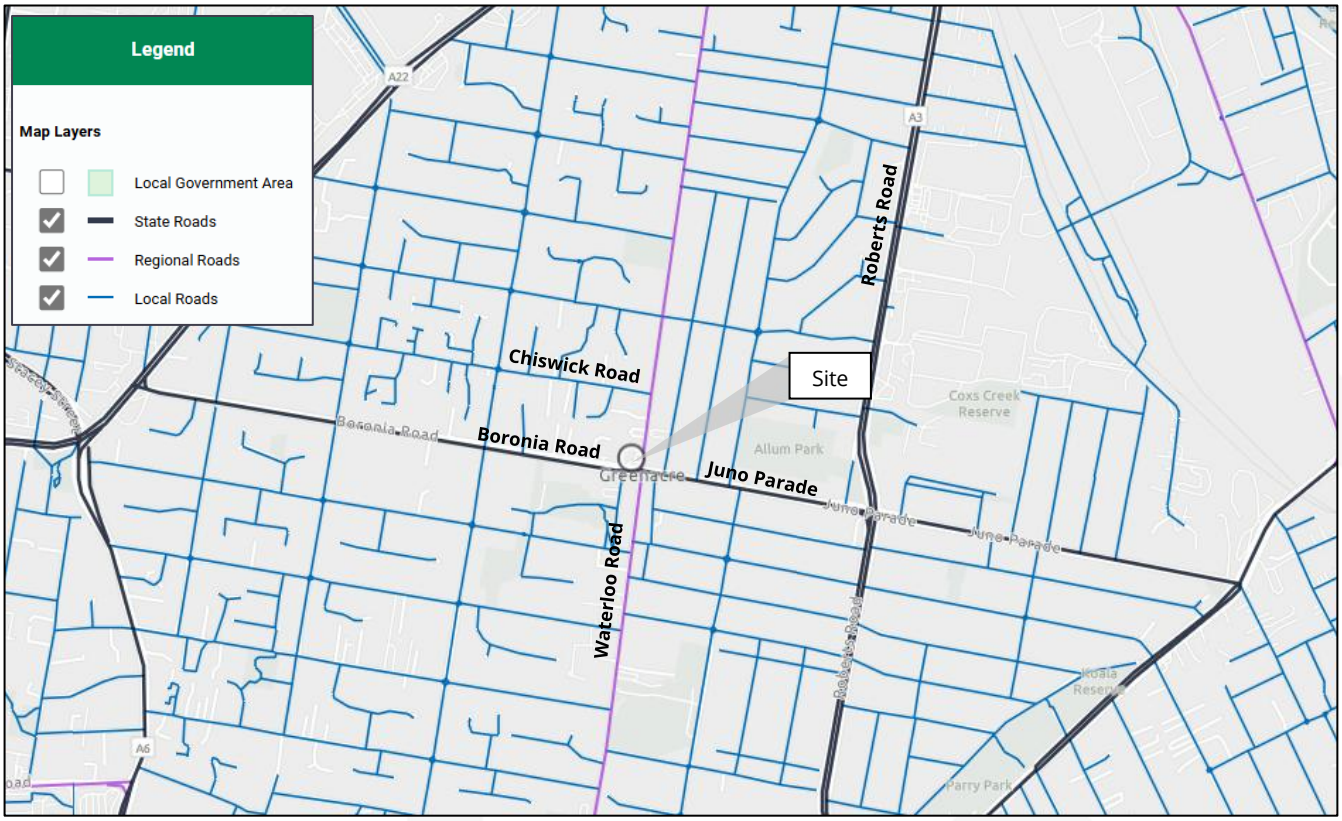
The adjoining and surrounding land uses include:

- Retail premises along Waterloo Road
- Residential development to the north and west

3.2 Road Network

The existing road network serving the site area (Figure 3-2) are detailed in Table 3-1:

Figure 3-2 Road Network



Source: TfNSW (modified by Genesis Traffic)

Table 3-1 Surrounding Road Network

Road Name	Description
Juno Parade / Boronia Road	· State Road · Speed limit 60 km/h · 2 lane(s) in each direction · No Stopping restriction along both sides of the street within the site vicinity
Waterloo Road	· Regional Road · Speed limit 60 km/h, 40 km/h along the retail premises within the site vicinity · 1 lane(s) in each direction · Unrestricted on-street parking generally along both sides of the street, time-restricted on-street parking along both sides of street within the site vicinity

Chiswick Road	· Local Road · Speed limit 50 km/h · 1 lane(s) in each direction · Unrestricted on-street parking along both sides of the street

3.3 Traffic Controls

The traffic controls on the road system in the vicinity of the site comprise (Table 3-2):

Table 3-2 Surrounding Traffic Controls

Traffic Control	Location
Traffic Signal	· Intersection(s) of: o Boronia Road and Waterloo Road
Roundabout	· Intersection(s) of: o Chiswick Road and Noble Avenue
Give-way / Stop Control	· Intersection(s) of: o Waterloo Road and Chiswick Road
School Zone	· Along part(s) of o Waterloo Road
Pedestrian Crossing	· Along part(s) of o Waterloo Road

3.4 Public Transport Services

The local public transport services are illustrated in Figure 3-3.

Figure 3-3 Local Public Transport Locations

Source: Metromap (Modified by Genesis Traffic)

Bus

Local bus services are within walking distance of the site. The nearest bus stop is located opposite the site on Boronia Road. Table 3-3 outlines the surrounding available bus services.

Table 3-3 Bus Services Provision

Bus Line	Bus Route	Peak Frequency
914	Greenacre to Strathfield	2 trips per hour
939	Greenacre to Bankstown	2 trips per hour
941	Bankstown to Hurstville via Greenacre	2 trips per hour
946	Roselands to Bankstown via Lakemba & Greenacre	2 trips per hour
M90	Burwood to Liverpool	4 trips per hour

3.5 Existing On-Street Parking

Figure 3-4 below demonstrates the existing on-street parking arrangements surrounding the site.

Figure 3-4 Existing On-Street Parking Arrangement

3.6 Crash History

Transport for NSW (TfNSW) provides a history of recorded crash data between 2019 and 2023 (data for 2024 is not available at the time of this assessment). The data reveal the following recorded crashes at the intersection of Boronia Road and Waterloo Road (Table 3-4).

Table 3-4 Crash Data Record

Date of Crash	RUM Code	RUM Description	Number Killed	Number Injured	Degree of Cash
2019	10	Cross traffic	-	-	Non-casualty (towaway)
2019	32	Right rear	-	1	Minor/Other Injury
2019	2	Ped far side	-	1	Serious Injury
2019	10	Cross traffic	-	-	Non-casualty (towaway)
2019	10	Cross traffic	-	3	Serious Injury
2019	37	Left turn sideswipe	-	1	Minor/Other Injury
2020	2	Ped far side	-	1	Serious Injury
2020	2	Ped far side	-	3	Moderate Injury
2020	21	Right through	-	-	Non-casualty (towaway)
2020	36	Right turn sideswipe	-	2	Minor/Other Injury
2021	21	Right through	-	1	Minor/Other Injury
2022	21	Right through	-	1	Moderate Injury
2022	21	Right through	-	2	Moderate Injury
2023	31	Left rear	-	1	Minor/Other Injury
2023	34	Lane change right	-	1	Minor/Other Injury

Source: TfNSW

The data reveal 15 crashes at the intersection of Boronia Road and Waterloo Road over the most recent 5-year period. Amongst these, the most common crash type was 'Right-through', occurring 4 times in the 5-year period. However, the number of incidents has gradually decreased over the past 5 years.

The assessment notes that the Council has concerns regarding road safety near the site. Accordingly, crash barriers will be provided in the proposed scheme.

4 Parking Assessment

4.1 Car Parking Requirement

The applicable car parking rates (Table 4-1) are provided in the SEPP (Housing) 2021 and Council DCP.

Table 4-1 SEPP and DCP Car Parking Rates

Land Use	Source	Element	Minimum Parking Rates
Affordable Housing	Section 19, Chapter 2, Part 2 (In-fill Affordable Housing) SEPP (Housing) 2021	1-bed	0.4 space(s) per dwelling
		2-bed	0.5 space(s) per dwelling
		3-bed	1.0 space(s) per dwelling
Non-Affordable Housing		1-bed	0.5 space(s) per dwelling
		2-bed	1.0 space(s) per dwelling
		3-bed	1.5 space(s) per dwelling
Visitor	Chapter 3.2 (Parking) DCP		1.0 space(s) per 5 dwellings
Retail			1.0 spaces(s) per 40m^2 GFA

Application of the proposal using the above criteria would indicate the following requirement(s) in Table 4-2.

Table 4-2 Required Car Parking Spaces

Element		Unit/GFA	Minimum Requirement	Provision
Affordable Housing	1-bed	1 unit(s)	0.4	55
	2-bed	11 unit(s)	5.5	
Non-Affordable Housing	1-bed	8 unit(s)	4	
	2-bed	36 unit(s)	36	
	3-bed	6 unit(s)	9	
Visitor		62 unit(s)	12.4	12
Retail		279.65m^2 GFA	7	7
	Total		**74.3 (74 spaces)**	**74 spaces**

Accordingly, the proposed indicates a minimum requirement of 74 car spaces. It is proposed to provide 74 parking spaces to comply with the above criteria. These spaces will include:

- 55 x Residents
- 12 x Visitors

- 7 x Retail (Staff only)

4.2 Bicycle Parking and End of Trip Facility Requirement

The applicable bicycle parking rates (Table 4-3) are provided in Chapter 3.2 of Council's DCP.

Table 4-3 Bicycle Parking Rates

Development Type	Element	Parking Rates
Residential Flat Building	Visitor	1 space per 10 dwellings
Retail	Staff	1 space per 300m^2 GFA
	Visitor	1 space per 500m^2 GFA over 1000m^2

Application of the above DCP rates to the proposal indicates the following bicycle parking requirement(s) (Table 4-4).

Table 4-4 Required Bicycle Storage/Parking Spaces

Element	Unit/GFA	Requirement		Provision
		Visitor	Staff	
Residential	62 units	6.2 (6)	0	7
Retail	279.65m^2 GFA	0	1	
Total		**7 spaces**		**7 spaces**

It is proposed to provide 7 bicycle spaces to comply with the DCP requirement, in the following composition:

- 6 x Visitor (residential)
- 1 x Retail

4.3 Loading and Servicing Requirement & Arrangement

It is proposed to undertake waste collection on-street (private waste collection) along the Waterloo Road frontage. Other infrequent loading and servicing needs will also rely on the on-street parking on Waterloo Road frontage.

4.4 Proposed On-Street Parking Arrangement

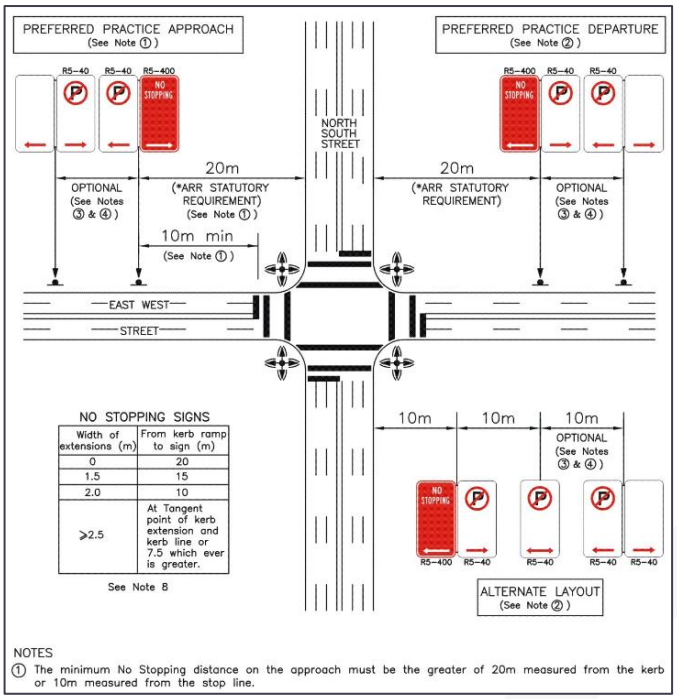
It is proposed to establish a 15m long 'Loading Zone' along the site frontage to accommodate kerbside waste collection and loading activities. Figure 3-4 below demonstrates the proposed arrangement having due

regard to the requirements set out in the Austroads design guide, TfNSW TDT2002/12c and the Australian Road Rules.

Figure 4-1 Proposed On-Street Parking Arrangement along Waterloo Road Site Frontage

** Note: 20m No Stopping Zone is measured from the kerb as per TDT 2002/12c Guideline (extract overleaf).*

Figure 4-2 No Stopping Distance at Signalised Intersection



Source: RTA

5 Access and Circulation Design

5.1 Access

The proposed access driveway will be located at Waterloo Road, setback 2m from the northern boundary.

Details of the access design and geometry are discussed in Section 5.2.

5.2 Design Assessment and Internal Circulation

A detailed review of the carpark has been undertaken to assess its conformance with the relevant AS2890 design criteria. The assessment outcome is tabulated below for ease of reference.

Table 5-1 Off-street Car Parking (AS2890.1:2004) Criteria

Features	Requirement	Provision	Compliance	Notes
Access Driveways				
Access Driveway Location	6m clear from intersection	>6.0m	Yes	
Access Width	(Category 1) 3.0m – 6.0m	5.8m	Yes	
Sight Triangle (Pedestrian)	2.5m long x 2.0m wide	Provided	Yes	
Sight Distance (50km/h)	Min 45m	Provided	Yes	
First 6m Ramp Grade	Max 5% (1:20) down Max 12.5% (1:8) up	Level	Yes	
Straight Ramp / Driveway				
Ramp Grade	Private Carpark: Max 25% (1:4)	1:4	Yes	
Transitions	Min 2.0m	2.0m	Yes	
Grade Transitions	Max 12.5% (1:8)	1:8	Yes	
Roadways Width (Two-way)	Min 5.5m	7.1m	Yes	
Vertical Obstruction Clearance / Kerbs	300mm on both sides	Provided	Yes	
Headroom Clearance	Min 2.2m	Provided	Yes	
Parking Modules				
Car Space Dimension	**User Class 1A** 5.4m long x 2.4m wide	Provided	Yes	

Aisle Width	5.8m (+ 300mm from wall)	5.8m	Yes	
Door Clearance	300mm	Provided	Yes	
Blind Aisle	Min 1.0m	Provided	Yes	
Headroom Clearance	Min 2.2m	>2.2m	Yes	
Gradient	Max 5% (1:20)	Level	Yes	

Table 5-2 Bicycle Parking (AS2890.3:2015) Criteria

Features	Requirement	Provision	Compliance	Notes
Horizontal Bicycle Parking				
Space Dimension	1.8m long x 0.5m wide	Provided	Yes	
Aisle	1.5m	Provided	Yes	
Gradient	Max 5% (1:20)	Provided	Yes	
Height Clearance	Min 2.2m	>2.2m	Yes	

Table 5-3 Off-street Parking for People with Disabilities (AS2890.6:2022) Criteria

Features	Requirement	Provision	Compliance	Notes
Space Dimension	5.4m long x 2.4m wide	5.4m long x 2.4m wide	Yes	
Shared Zone + Bollard	5.4m long x 2.4m wide	5.4m long x 2.4m wide	Yes	
Height Clearance	Min 2.5m	>2.5m	Yes	
Gradient	Max 2.5% (1:40)	Level	Yes	

In summary, the assessment confirms that the design provisions in relation to the access, car parking circulation and arrangement in respect to the proposal generally comply with the AS2890 design criteria.

5.3 Swept Path Analysis

All critical vehicle movements in the proposed car parking facility have been assessed using Autoturn. Details of the assessment outcome, which demonstrate a satisfactory design provision, are provided in **Attachment 2**.

6 Traffic Assessment

6.1 Existing Traffic Conditions

Traffic surveys were commissioned as part of this assessment to record the AM peak and PM peak traffic flows at the intersection of Waterloo Road / Boronia Road and Waterloo Road / Chiswick Road.

The traffic survey data is reproduced in **Attachment 3**.

The existing intersection operation has been assessed using SIDRA traffic modelling program. SIDRA is a micro-analytical tool for individual and network intersection modelling based on collected traffic survey data. SIDRA provides a few performance indicators, as follows:

- Degree of Saturation – the total usage of the intersection expressed as a factor of 1, with 1 representing 100% use/saturation.
- Average Delay – the average delay encountered by all vehicles passing through the intersection.
- 95% Queue Length (Q95) – is defined to be the queue length in metres that has only a 5% probability of being exceeded during the analysis period. It transforms the average delays into measurable distance units.
- Level of Service (LOS) – this is a categorisation of average delay, intended for simple reference. The RMS adopts the following bands (Table 6-1)

Table 6-1 Intersection Performance – Levels of Service

Level of Service	Average Delay (s/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity. At signals, incidents would cause excessive delays. Roundabouts require other control mode	At capacity and requires other mode of control
F	> 70	Extra capacity required	Extreme delay, major treatment required

An indication of the prevailing traffic operations at the intersections is provided in the SIDRA assessment (Table 6-2).

Table 6-2 Existing Intersection Traffic Circumstance

Intersection	AM Peak			PM Peak		
	LOS	AVD	DOS	LOS	AVD	DOS
Waterloo Road and Boronia Road	D	49.1s	0.681	D	47.7s	0.548
Waterloo Road and Chiswick Road	A (WRT)	13.7s	0.257	A (WRT)	13.9s	0.269

Abbreviation:
WRT = West Right Turn

Details of SIDRA results are reproduced in **Attachment 4**.

The assessment found the local road network operating with ample spare capacity under existing traffic demand (including the existing site's traffic movements).

6.2 Existing Traffic Generation

Service Station

The most recently published Guide to Transport Impact Assessment 2024 (GTIA) provides average peak hour traffic generation rates for service stations. The relevant rates are below:

- AM peak hour = $0.2815(N)^2 + 14.047(N) + 16.715$
- PM peak hour = $0.0205(S) + 88.52$

Where N is the number of service channels and S is the total site area in square metres.

On the basis of the above, the peak hour traffic generated from the existing service station with a site area of 1,782 m^2 and 8 service channels are:

AM peak hour = $(0.2815*8^2) + (14.047*8) + 16.715$ = 147 vtph

PM peak hour = (0.0205*1782) + 88.52 = 125 vtph

A 15-minute survey was conducted at the subject site in the AM and PM peak periods to estimate the total trips generated over a 1-hour period at the existing driveways. Table 6-3 below presents the existing site trip movements during peak periods.

Table 6-3 Service Station Traffic Survey Data

Periods	Time	15-minute Total Trips	Estimated 1-hour Total Trips
AM Peak	8:45am – 9:00am	24 trips	96 trips
PM Peak	4:45pm – 5:00pm	30 trips	120 trips

The above information confirms that the site-surveyed trip movement is generally consistent with trips derived from the GTIA.

Nevertheless, the assessment will not discount the existing service station trips as a conservative approach.

6.3 Development Traffic Generation

Medium Density Residential Building

The GTIA specifies average peak hour traffic generation rates for medium-density residential development in Sydney areas, as follows:

- 0.39 vehicle trips per hour (vtph) per unit during AM peak
- 0.37 vehicle trips per hour (vtph) per unit during PM peak

Based on the above, the proposed 62 residential units would generate 25 vtph and 23 vtph during AM and PM peak periods respectively.

Retail Premises

The assessment adopts the highest shopping centre rates in Sydney areas from GTIA. The relevant rates are as follows:

- 1.78 vtph / 100m^2 GLFA during AM peak
- 3.71 vtph / 100 m^2 GLFA during PM peak

Applying these rates to the retail premises of 279.65m^2 would generate 5 vtph and 11 vtph during AM and PM peak respectively.

6.4 Overall Traffic Generation and Distribution

The expected overall net traffic generation outcome is tabulated in Table 6-4 as follows:

Table 6-4 Total Peak Hour Traffic Generation

	AM Peak (vtph)		PM Peak (vtph)	
Period	In	Out	In	Out
Residential	5	20	19	4

Retail	3	3	6	6
Total Traffic	**8**	**23**	**25**	**10**

The development traffic is evenly distributed on the road network as shown in Table 6-5.

Table 6-5 Proportion of Inbound and Outbound Traffic

Direction	Proportion	
	Residential	Retail
North	25%	25%
East	25%	25%
South	25%	25%
West	25%	25%

Source: Australian Bureau of Statistics

The nominal route choices from/to each direction are illustrated in Figure 6-1.

Figure 6-1 Approach and Depart Route Distribution

Source: Mecone (modified by Genesis Traffic)

On this basis, the resulting traffic generation from each direction is illustrated in Figure 6-2 and Figure 6-3.

Figure 6-2 Inbound and Outbound Traffic during AM Peak

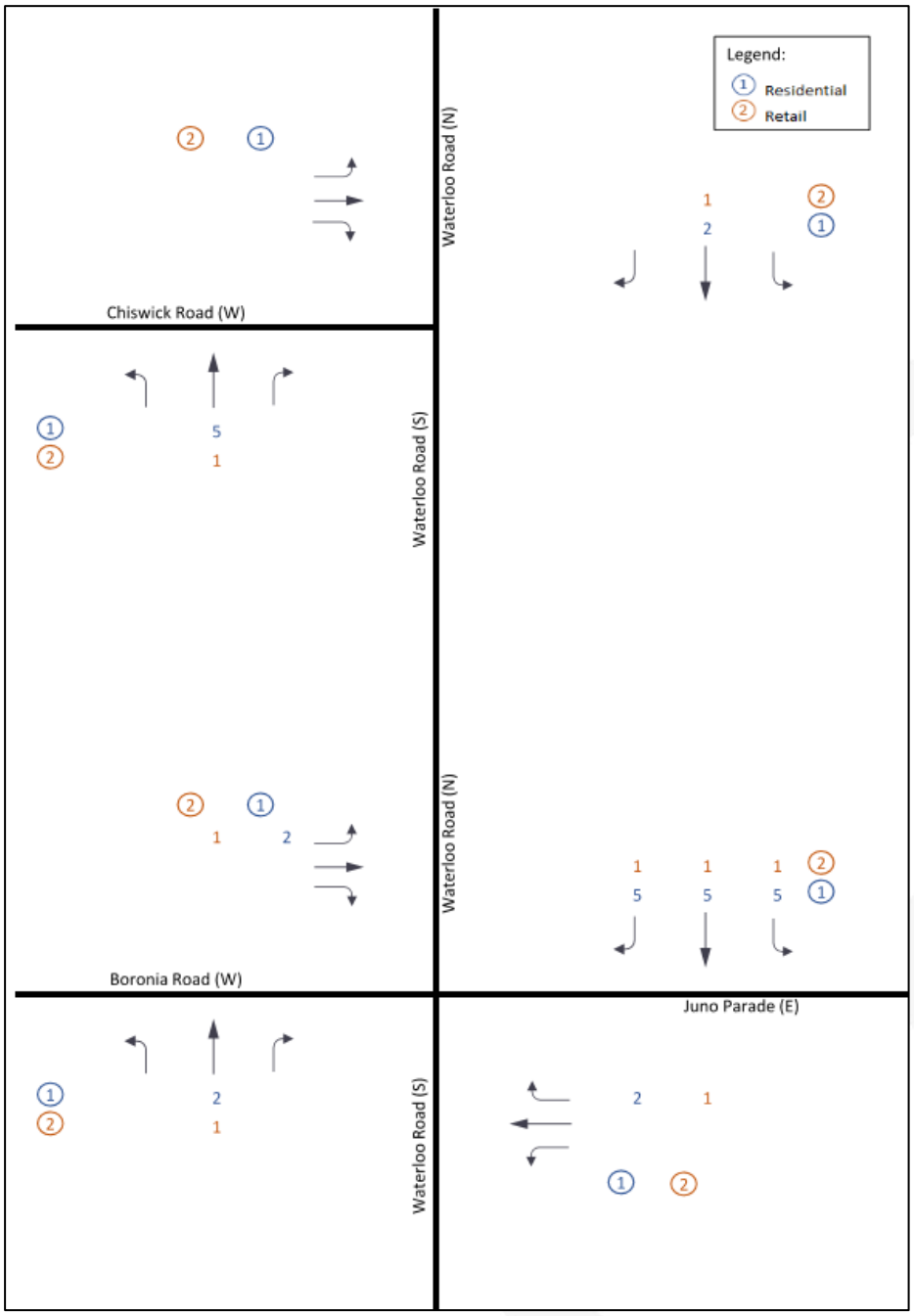
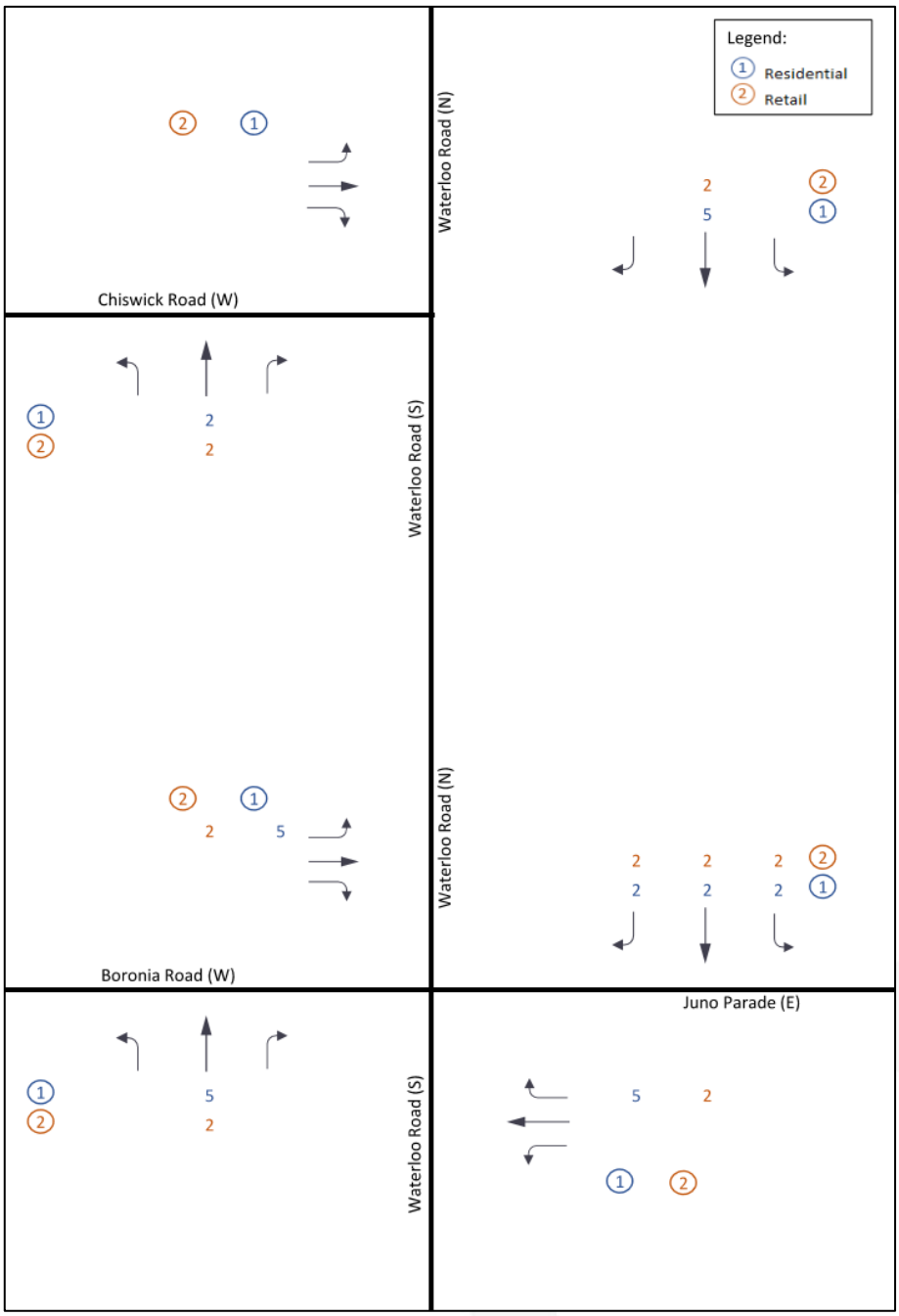


Figure 6-3 Inbound and Outbound Traffic during PM Peak



The projected development traffic is then added onto the background traffic and reanalysed using SIDRA. The assessment considers the existing state and post development state to provide an objective comparison in terms of traffic generation impact on the road network. The proposed Loading Zone with 20m No Stopping Zone is also taken into consideration to quantify the impact of this change on the intersection's performance. The assessed model outcome is summarised in Table 6-6.

Table 6-6 Existing and Post-Development SIDRA Assessment Outcome

Intersection	AM Peak			PM Peak		
	LOS	AVD	DOS	LOS	AVD	DOS
Pre-development						
Waterloo Road and Boronia Road	D	49.1s	0.681	D	47.7s	0.548
Waterloo Road and Chiswick Road	A (WRT)	13.7s	0.257	A (WRT)	13.9s	0.269
Post Development						
Waterloo Road and Boronia Road	D	49.6s	0.693	D	47.8s	0.572
Waterloo Road and Chiswick Road	A (WRT)	13.8s	0.258	A (WRT)	14.0s	0.273

Abbreviation:
WRT = West Right Turn

The SIDRA output is reproduced in **Attachment 4**.

Of note, the assessment results also found that the proposed 20m No Stopping Zone on the departure side of Waterloo Road (adjoining the proposed Loading Zone) will not unduly affect the intersection's operation. The existing level of service will be maintained following the addition of the subject development. This outcome is conservative as the assessment did not "discount" the existing service station traffic movements (of some 120 vtph) that will be removed from the network following cessation of the business. On this basis, the assessment finds the proposal suitable and adequate from a traffic impact standpoint.

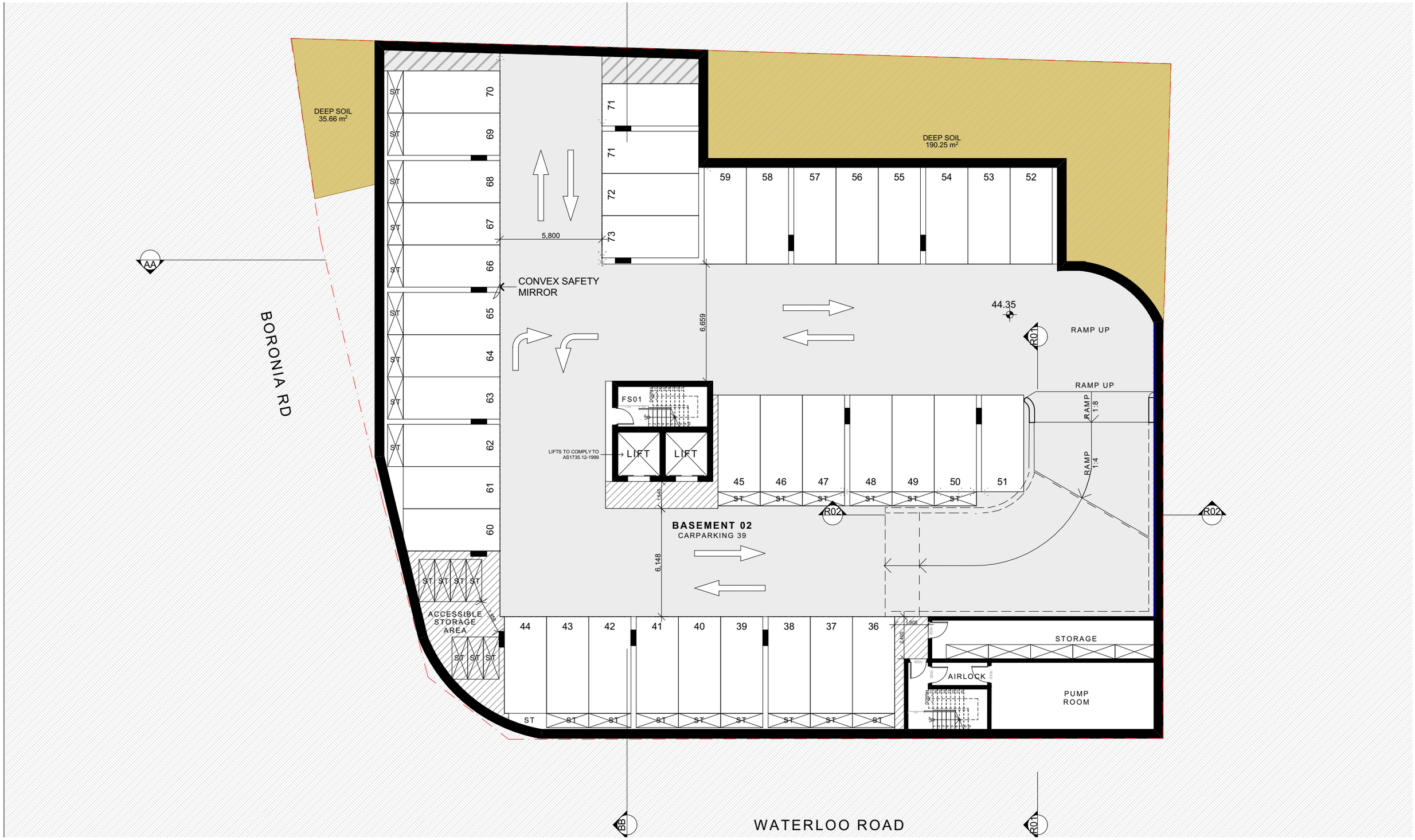
7 Conclusion

The traffic and parking assessment undertaken for the Proposed Mixed-Use Development at 190 Waterloo Road, Greenacre has concluded that:

- The traffic generation of the proposed development and the proposed Loading Zone on Waterloo Road will not present any adverse traffic implications
- The proposed parking provision will comply with the SEPP (Housing) 2021 and Council's DCP criteria, and will adequately serve the development
- The proposed access, internal circulation and parking arrangements will be appropriate to AS design criteria

Attachment 1

Architectural Plan



BASEMENT 02
1:200

SCALE 1:200 @ A3

0 1 2 5 10M

FOR DA PURPOSES ONLY

NOT FOR CONSTRUCTION

DA

A3 Drawing Original Size

Rev	Date	Description
A	28/02/205	DA SUBMISSION

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PROJECT
190 WATERLOO RD, GREENACRE

CLIENT
MOHAMMED DAHAR

SCALE	DATE
1:200	28/02/2025

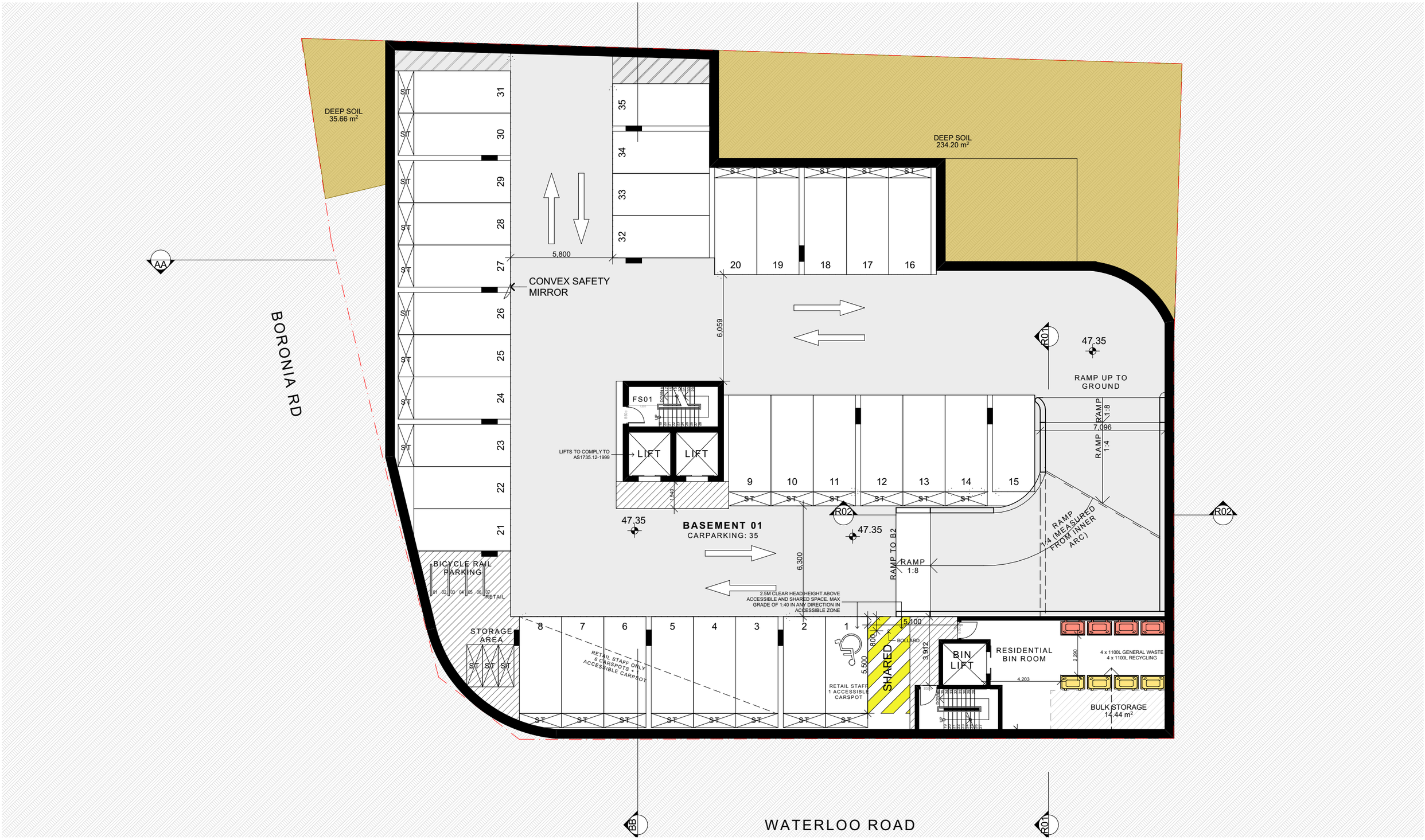
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
SN, MO, FA, CJ	MO	GA

DRAWING NAME
BASEMENT 02 PLAN

PROJECT NUMBER
29.17

DRAWING NUMBER
DA A 1201

ISSUE
A



BASEMENT 01
1:200

SCALE 1:200 @ A3

0 1 2 5 10M

FOR DA PURPOSES ONLY

NOT FOR CONSTRUCTION

DA

A3 Drawing Original Size

Rev	Date	Description
A	28/02/2025	DA SUBMISSION

N

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PROJECT
190 WATERLOO RD, GREENACRE

CLIENT
MOHAMMED DAHAR

SCALE	DATE
1:200	28/02/2025

DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
SN, MO, FA, CJ	MO	GA

DRAWING NAME
BASEMENT 01 PLAN

PROJECT NUMBER
29.17

DRAWING NUMBER
DA A 1202

ISSUE
A

LEGEND

- 3x3m DIMENSION
- 3.6x3.6m DIMENSION
- 4x4m DIMENSION

SCALE 1:200 @ A3

0 1 2 5 10M

GROUND FLOOR PLAN
1:200

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NOT FOR CONSTRUCTION
DA
Drawing Original Size A3

Rev	Date	Description
A	28/02/2025	DA SUBMISSION

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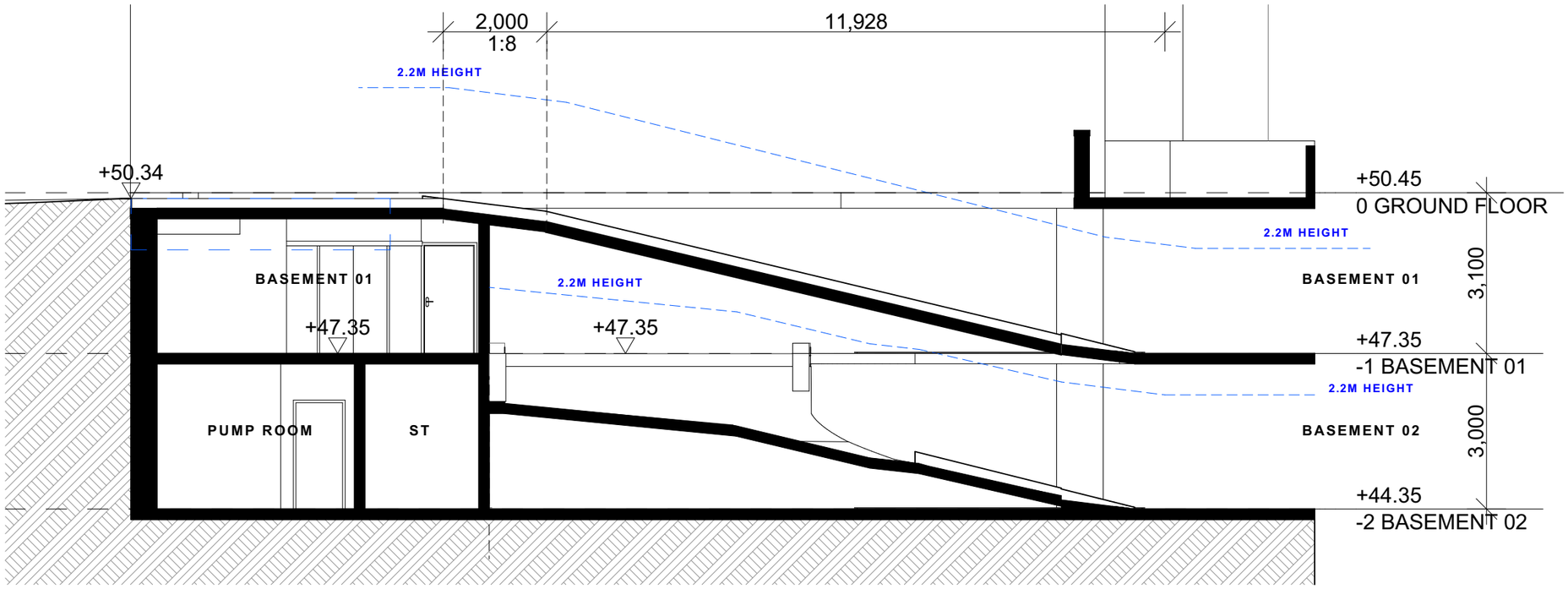
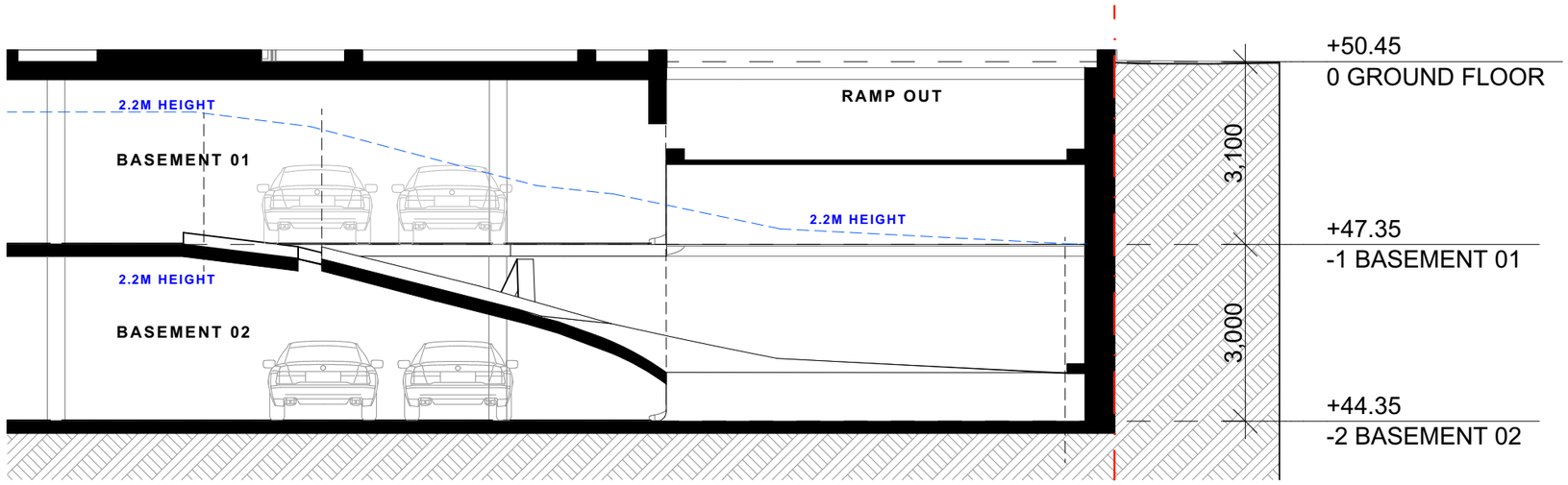
PROJECT
190 WATERLOO RD, GREENACRE
CLIENT
MOHAMMED DAHAR
SCALE **1:200, 1:100**
DATE **28/02/2025**
DRAWN **SN, MO, FA, CJ**
PROJECT ARCHITECT **MO**
PROJECT DIRECTOR **GA**

DRAWING NAME
GROUND FLOOR PLAN
PROJECT NUMBER **29.17**
DRAWING NUMBER **DA A 1203**
ISSUE **A**



RAMP SECTION R01
1:100



RAMP SECTION R02
1:100

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DA
A3
Drawing Original Size

Rev	Date	Description
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PROJECT
190 WATERLOO RD, GREENACRE

CLIENT
MOHAMMED DAHAR

SCALE	DATE		
1:100	**28/02/2025**		
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR	
SN, MO, FA, CJ	**MO**	**GA**	

DRAWING NAME
RAMP SECTION

PROJECT NUMBER
29.17

DRAWING NUMBER
DA A 1403

ISSUE
A

Attachment 2

Turning Path Assessment

NOTES:

- MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2m
- MINIMUM HEIGHT CLEARANCE OF 2.2m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE CIRCULATION AISLES AND PARKING SPACES
- MINIMUM HEIGHT CLEARANCE OF 2.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE ACCESSIBLE PARKING SPACES
- MINIMUM HEIGHT CLEARANCE OF 4.5m (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE SERVICE VEHICLE ACCESS ROADWAYS AND LOADING DOCKS
- HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1:2004

ENSURE PLANTER BOX IS NOT MORE THAN 1.1m HIGH

190 WATERLOO ROAD, GREENACRE
GROUND FLOOR
COMPLIANCE ASSESSMENT

DRAWING REF NO. 24060-V1.9-SP

SHEET NO. 01 OF 08

ISSUE DATE 5 March 2025

DESIGNED BY L.NG, L.MRKONJA, R.MIURA

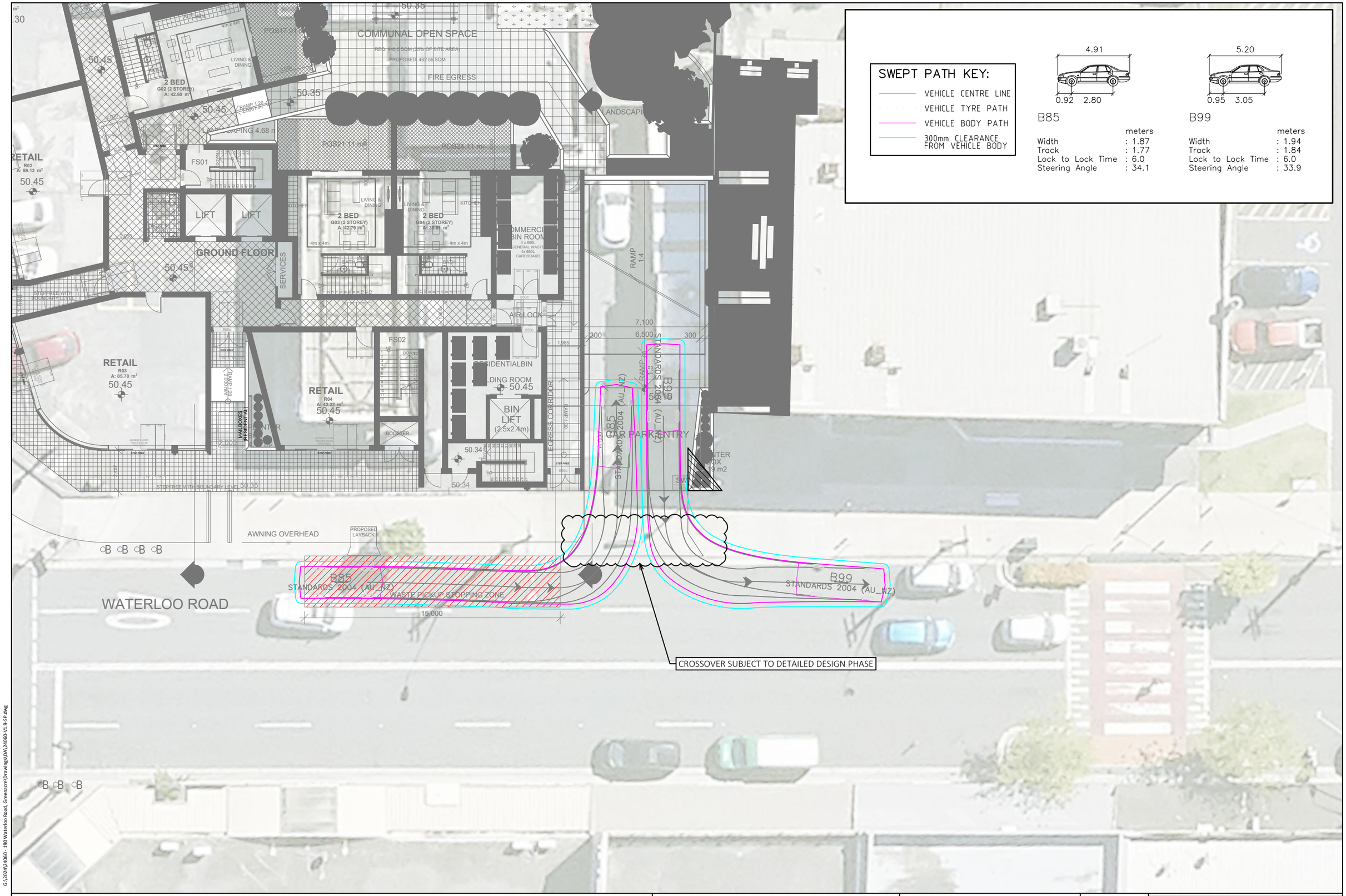
REVIEWED BY B.LO

SCALE A3 1:200

DRAWING REFERENCE (SOURCE): G:\2024\24060 - 190 WATERLOO ROAD, GREENACRE\DRAWINGS\DA\20250303

Genesis Traffic

Plotted by Liam Mrkonja G:\2024\24060 - 190 Waterloo Road, Greenacre\Drawings\DA\24060-V1.9-SP.dwg



190 WATERLOO ROAD, GREENACRE
GROUND FLOOR
SWEPT PATH ASSESSMENT - B85 AND B99 PASSING

DRAWING REF NO. 24060-V1.9-SP SHEET NO. 02 OF 08 ISSUE DATE 5 March 2025

DESIGNED BY L.NG, L.MRKONJA, R.MIURA
REVIEWED BY B.LO
SCALE A3 0 2.0 4.0 1:200

DRAWING REFERENCE (SOURCE):
G:\2024\24060 - 190 WATERLOO ROAD, GREENACRE\DRAWINGS\DA\20250303

Genesis Traffic.

Plotted by Liam Mrkonja
G:\2024\24060 - 190 Waterloo Road, Greenacre\Drawings\DA\24060-V1.9-SP.dwg

NOTES:

- MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2m
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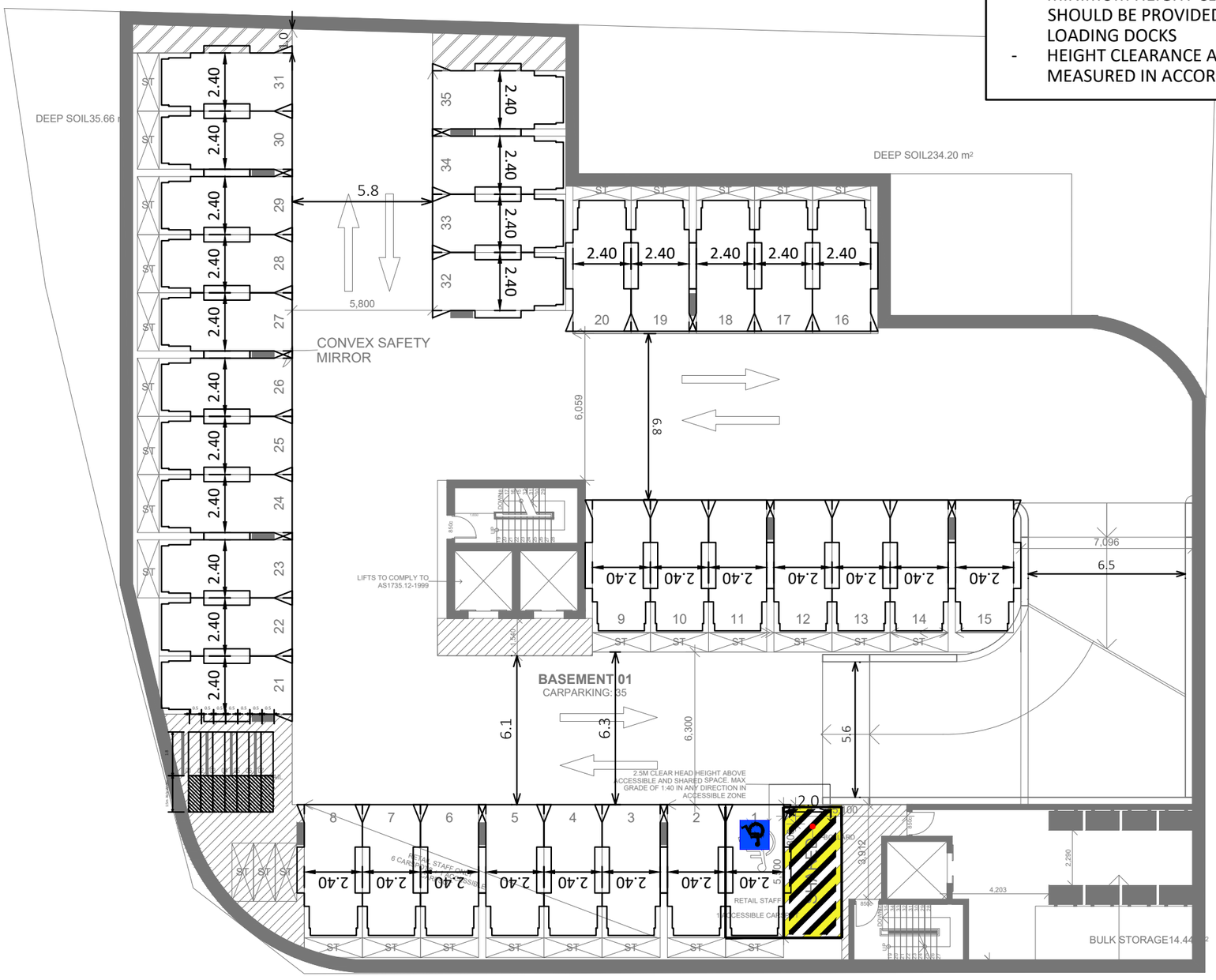
- HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1:2004



190 WATERLOO ROAD, GREENACRE
BASEMENT 1
CAR PARK COMPLIANCE ASSESSMENT

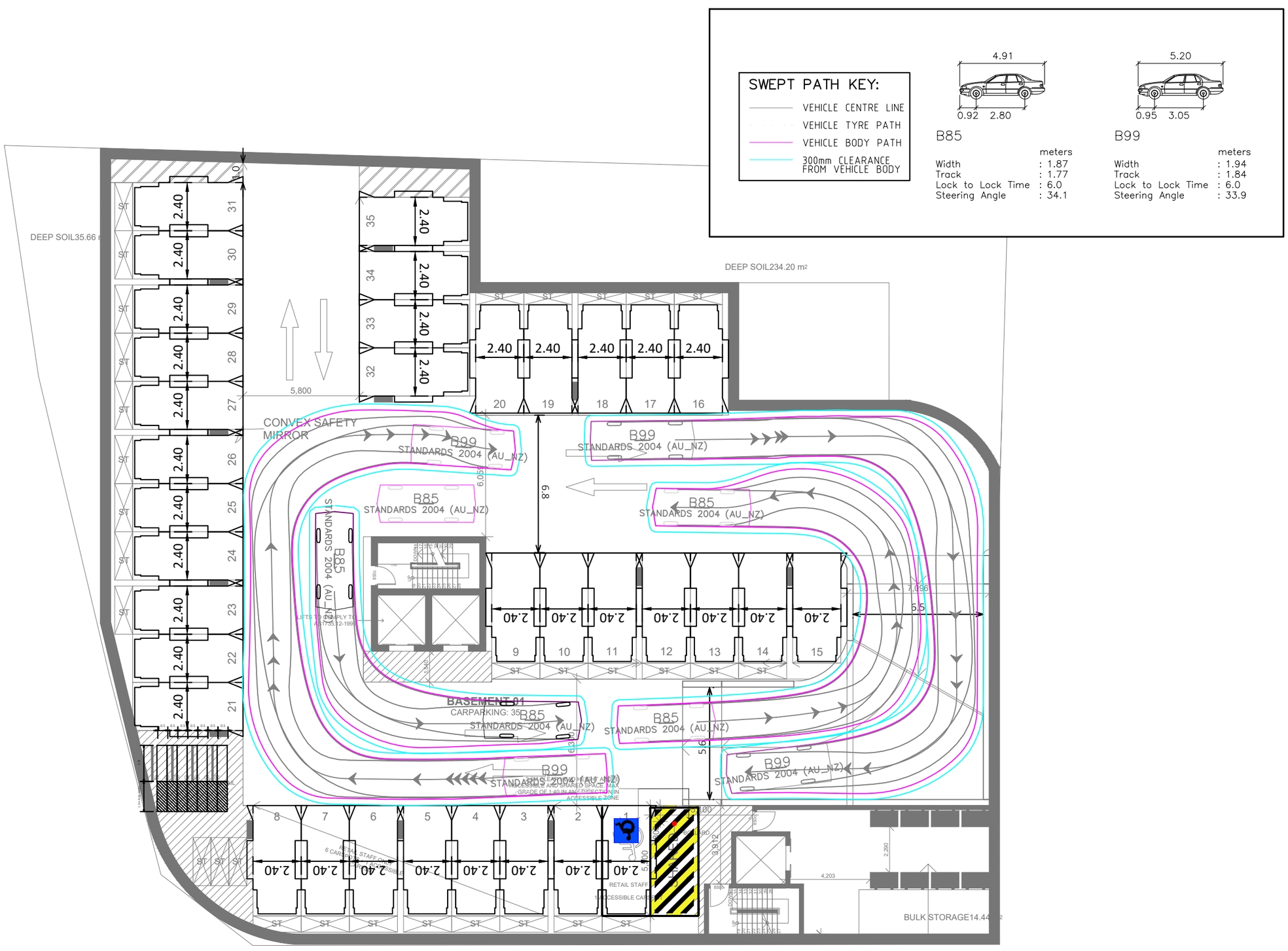
DRAWING REF NO. 24060-V1.9-SP SHEET NO. 03 OF 08 ISSUE DATE 5 March 2025

DESIGNED BY L.NG, L.MRKONJA, R.MIURA
REVIEWED BY B.LO
SCALE A3
1:200

DRAWING REFERENCE (SOURCE):
G:\2024\24060 - 190 WATERLOO ROAD, GREENACRE\DRAWINGS\DA\20250303

Genesis Traffic

Plotted by: Liam Mrkonja
G:\2024\24060 - 190 Waterloo Road, Greenacre\Drawings\DA\24060-V1.9-SP.dwg



190 WATERLOO ROAD, GREENACRE
BASEMENT 1
SWEPT PATH ASSESSMENT - CIRCULATION

DRAWING REF NO. 24060-V1.9-SP SHEET NO. 04 OF 08 ISSUE DATE 5 March 2025

DESIGNED BY L.NG, L.MRKONJA, R.MIURA
REVIEWED BY B.LO
SCALE A3 0 2.0 4.0 1:200

DRAWING REFERENCE (SOURCE):
G:\2024\24060 - 190 WATERLOO ROAD, GREENACRE\DRAWINGS\DA\20250303

Genesis Traffic

Plotted by: Liam Mrkonja
G:\2024\24060 - 190 Waterloo Road, Greenacre\Drawings\DA\24060-V1.9-SP.dwg

NOTES:

- MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2m
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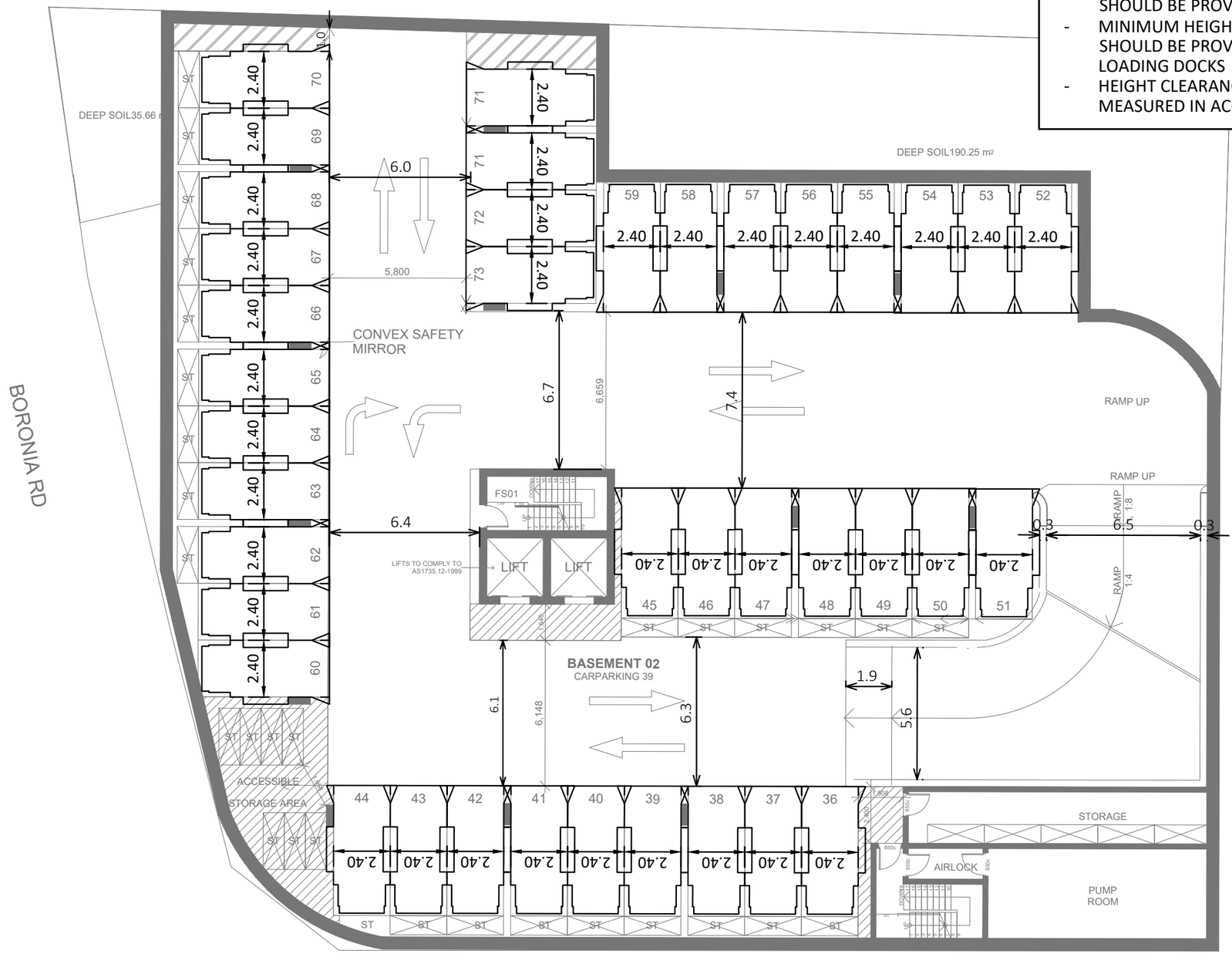
- HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1:2004



WATERLOO ROAD

190 WATERLOO ROAD, GREENACRE
BASEMENT 02
CAR PARK COMPLIANCE ASSESSMENT

DRAWING REF NO. 24060-V1.9-SP SHEET NO. 05 OF 08 ISSUE DATE 5 March 2025

DESIGNED BY L.NG, L.MRKONJA, R.MIURA
REVIEWED BY B.LO
SCALE A3 1:200

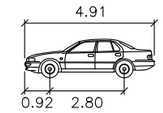
DRAWING REFERENCE (SOURCE): G:\2024\24060 - 190 WATERLOO ROAD, GREENACRE\DRAWINGS\DA\20250303

Genesis Traffic

Plotted by Liam Mrkonja G:\2024\24060 - 190 Waterloo Road, Greenacre\Drawings\DA\24060-V1.9-SP.dwg

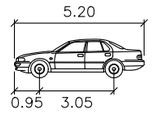
SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY



B85

	meters
Width	: 1.87
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.1



B99

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

190 WATERLOO ROAD, GREENACRE
BASEMENT 02
SWEPT PATH ASSESSMENT - CIRCULATION

DRAWING REF NO. 24060-V1.9-SP SHEET NO. 06 OF 08 ISSUE DATE 5 March 2025

DESIGNED BY L.NG, L.MRKONJA, R.MIURA
REVIEWED BY B.LO
SCALE A3
0 2.0 4.0
1:200

DRAWING REFERENCE (SOURCE):
G:\2024\24060 - 190 WATERLOO ROAD, GREENACRE\DRAWINGS\DA\20250303

Genesis Traffic.

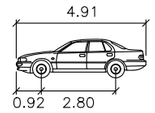
Plotted by Liam Mrkonja G:\2024\24060 - 190 Waterloo Road, Greenacre\Drawings\DA\24060-V1.9-SP.dwg

DEEP SOIL190.25 m2

DEEP SOIL190.25 m2

SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY



B85

	meters
Width	: 1.87
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.1

55 54 53 52

2.40 2.40 2.40 2.40

RAMP UP

RAMP 1:8

RAMP 1:4

STANDARDS 2004 (AU_NZ)

B85

0.3 6.5 0.3

48 49 50 51

ST ST ST

1.9

190 WATERLOO ROAD, GREENACRE
BASEMENT 02
SWEPT PATH ASSESSMENT - B85 PARKING ENTRY AND EXIT

DRAWING REF NO. 24060-V1.9-SP SHEET NO. 07 OF 08 ISSUE DATE 5 March 2025

DESIGNED BY L.NG, L.MRKONJA, R.MIURA

REVIEWED BY B.LO

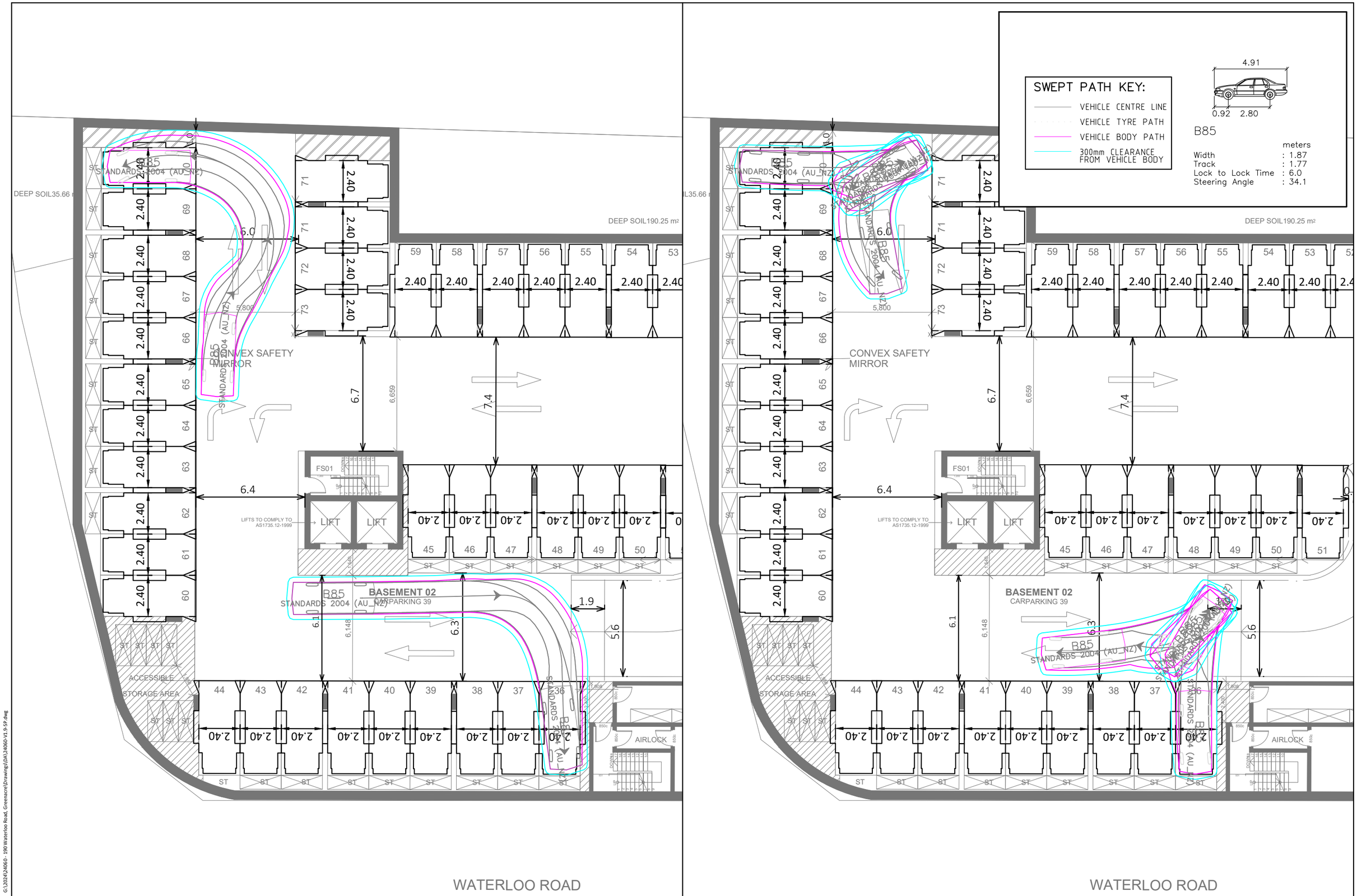
SCALE A3 1:100

DRAWING REFERENCE (SOURCE): G:\2024\24060 - 190 WATERLOO ROAD, GREENACRE\DRAWINGS\DA\20250303

Genesis Traffic

G:\2024\24060 - 190 Waterloo Road, Greenacre\Drawings\DA\24060-V1.9-SP.dwg

Plotted by Liam Mrkonja



190 WATERLOO ROAD, GREENACRE
BASEMENT 02
SWEPT PATH ASSESSMENT - B85 PARKING ENTRY AND EXIT

DRAWING REF NO. 24060-V1.9-SP SHEET NO. 08 OF 08 ISSUE DATE 5 March 2025

DESIGNED BY L.NG, L.MRKONJA, R.MIURA
REVIEWED BY B.LO
SCALE A3 1:200

DRAWING REFERENCE (SOURCE):
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Genesis Traffic

Plotted by Liam Mrkonja
G:\2024\24060 - 190 Waterloo Road, Greenacre\Drawings\DA\24060-V1.9-SP.dwg

Attachment 3

Traffic Survey

Location	Waterloo Rd	Duration	7:00	-	09:00
	Juno Parade			-	
	Waterloo Rd		16:00	-	18:00
	Boronia Rd	Date	Thursday, 6 February 2025		
Suburb	GREENACRE	Weather	-		

All Vehicles Time Per 15 Mins	NORTH *Waterloo Rd*										EAST *Juno Parade*												
	L			T			R				L			T			R				TOTAL		
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15	28	1	29	26	2	28	8	0	8	65	9	1	10	110	10	120	16	0	16	146	387	36	423
7:15 - 7:30	27	1	28	32	4	36	1	1	2	66	7	0	7	91	11	102	24	2	26	135	418	45	463
7:30 - 7:45	27	0	27	28	2	30	5	0	5	62	14	0	14	115	13	128	28	2	30	172	450	27	477
7:45 - 8:00	22	1	23	51	5	56	10	1	11	90	16	1	17	110	8	118	37	1	38	173	479	29	508
8:00 - 8:15	27	0	27	72	2	74	8	1	9	110	16	0	16	112	10	122	46	0	46	184	540	27	567
8:15 - 8:30	27	2	29	73	2	75	12	1	13	117	12	1	13	132	10	142	44	0	44	199	566	31	597
8:30 - 8:45	19	1	20	93	3	96	11	0	11	127	26	0	26	114	10	124	44	1	45	195	574	26	600
8:45 - 9:00	29	0	29	85	1	86	21	1	22	137	21	1	22	144	7	151	40	1	41	214	602	22	624
Period End	206	6	212	460	21	481	76	5	81	774	121	4	125	928	79	1007	279	7	286	1418	4016	243	4259
16:00 - 16:15	27	1	28	70	0	70	21	1	22	120	10	0	10	150	9	159	36	0	36	205	584	15	599
16:15 - 16:30	28	0	28	72	2	74	17	0	17	119	14	1	15	132	10	142	39	1	40	197	545	21	566
16:30 - 16:45	23	0	23	74	1	75	22	1	23	121	12	1	13	174	11	185	31	1	32	230	612	26	638
16:45 - 17:00	28	0	28	77	0	77	17	1	18	123	20	0	20	153	7	160	24	1	25	205	564	16	580
17:00 - 17:15	20	0	20	76	2	78	10	0	10	108	16	0	16	165	5	170	38	0	38	224	579	13	592
17:15 - 17:30	13	0	13	60	2	62	3	0	3	78	12	1	13	143	8	151	33	1	34	198	498	17	515
17:30 - 17:45	28	1	29	74	2	76	11	0	11	116	16	0	16	161	7	168	32	0	32	216	548	20	568
17:45 - 18:00	26	1	27	77	2	79	19	0	19	125	14	1	15	169	5	174	38	0	38	227	584	18	602
Period End	193	3	196	580	11	591	120	3	123	910	114	4	118	1247	62	1309	271	4	275	1702	4514	146	4660

All Vehicles Time Per 15 Mins	SOUTH *Waterloo Rd*										WEST *Boronia Rd*												
	L			T			R				L			T			R				TOTAL		
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15	19	3	22	44	4	48	16	1	17	87	9	0	9	93	13	106	9	1	10	125	387	36	423
7:15 - 7:30	17	0	17	47	4	51	23	1	24	92	4	1	5	135	18	153	10	2	12	170	418	45	463
7:30 - 7:45	21	0	21	57	1	58	29	0	29	108	8	0	8	106	9	115	12	0	12	135	450	27	477
7:45 - 8:00	18	1	19	52	1	53	15	0	15	87	8	0	8	126	10	136	14	0	14	158	479	29	508
8:00 - 8:15	30	0	30	58	1	59	32	0	32	121	11	0	11	116	12	128	12	1	13	152	540	27	567
8:15 - 8:30	33	2	35	49	1	50	30	0	30	115	9	0	9	118	8	126	27	4	31	166	566	31	597
8:30 - 8:45	25	0	25	56	3	59	19	0	19	103	12	0	12	139	7	146	16	1	17	175	574	26	600
8:45 - 9:00	41	1	42	56	0	56	20	0	20	118	8	0	8	113	10	123	24	0	24	155	602	22	624
Period End	204	7	211	419	15	434	184	2	186	831	69	1	70	946	87	1033	124	9	133	1236	4016	243	4259
16:00 - 16:15	28	2	30	55	0	55	19	0	19	104	19	1	20	117	0	117	32	1	33	170	584	15	599
16:15 - 16:30	26	0	26	44	1	45	19	0	19	90	18	0	18	112	5	117	24	1	25	160	545	21	566
16:30 - 16:45	18	0	18	62	2	64	18	0	18	100	13	0	13	138	9	147	27	0	27	187	612	26	638
16:45 - 17:00	28	1	29	54	2	56	14	0	14	99	8	2	10	115	2	117	26	0	26	153	564	16	580
17:00 - 17:15	19	0	19	40	1	41	15	0	15	75	11	0	11	140	5	145	29	0	29	185	579	13	592
17:15 - 17:30	11	0	11	45	1	46	18	1	19	76	12	0	12	130	3	133	18	0	18	163	498	17	515
17:30 - 17:45	24	1	25	44	4	48	19	0	19	92	10	0	10	106	4	110	23	1	24	144	548	20	568
17:45 - 18:00	33	0	33	44	4	48	15	0	15	96	14	0	14	111	5	116	24	0	24	154	584	18	602
Period End	187	4	191	388	15	403	137	1	138	732	105	3	108	969	33	1002	203	3	206	1316	4514	146	4660

Location	**Waterloo Rd**	**Duration**	**7:00**	**-**	**09:00**
	Juno Parade			**-**	
	Waterloo Rd		**16:00**	**-**	**18:00**
	Boronia Rd	**Date**	**Thursday, 6 February 2025**		
Suburb	**GREENACRE**	**Weather**		**-**	

All Vehicles Time Per Hour	**NORTH** *Waterloo Rd*										**EAST** *Juno Parade*												
	L			**T**			**R**				**L**			**T**			**R**				**TOTAL**	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 8:00	104	3	**107**	137	13	**150**	24	2	**26**	**283**	46	2	**48**	426	42	**468**	105	5	**110**	**626**	1734	137	**1871**
7:15 - 8:15	103	2	**105**	183	13	**196**	24	3	**27**	**328**	53	1	**54**	428	42	**470**	135	5	**140**	**664**	1887	128	**2015**
7:30 - 8:30	103	3	**106**	224	11	**235**	35	3	**38**	**379**	58	2	**60**	469	41	**510**	155	3	**158**	**728**	2035	114	**2149**
7:45 - 8:45	95	4	**99**	289	12	**301**	41	3	**44**	**444**	70	2	**72**	468	38	**506**	171	2	**173**	**751**	2159	113	**2272**
8:00 - 9:00	102	3	**105**	323	8	**331**	52	3	**55**	**491**	75	2	**77**	502	37	**539**	174	2	**176**	**792**	2282	106	**2388**
Period End																							
16:00 - 17:00	106	1	**107**	293	3	**296**	77	3	**80**	**483**	56	2	**58**	609	37	**646**	130	3	**133**	**837**	2305	78	**2383**
16:15 - 17:15	99	0	**99**	299	5	**304**	66	2	**68**	**471**	62	2	**64**	624	33	**657**	132	3	**135**	**856**	2300	76	**2376**
16:30 - 17:30	84	0	**84**	287	5	**292**	52	2	**54**	**430**	60	2	**62**	635	31	**666**	126	3	**129**	**857**	2253	72	**2325**
16:45 - 17:45	89	1	**90**	287	6	**293**	41	1	**42**	**425**	64	1	**65**	622	27	**649**	127	2	**129**	**843**	2189	66	**2255**
17:00 - 18:00	87	2	**89**	287	8	**295**	43	0	**43**	**427**	58	2	**60**	638	25	**663**	141	1	**142**	**865**	2209	68	**2277**
Period End																							

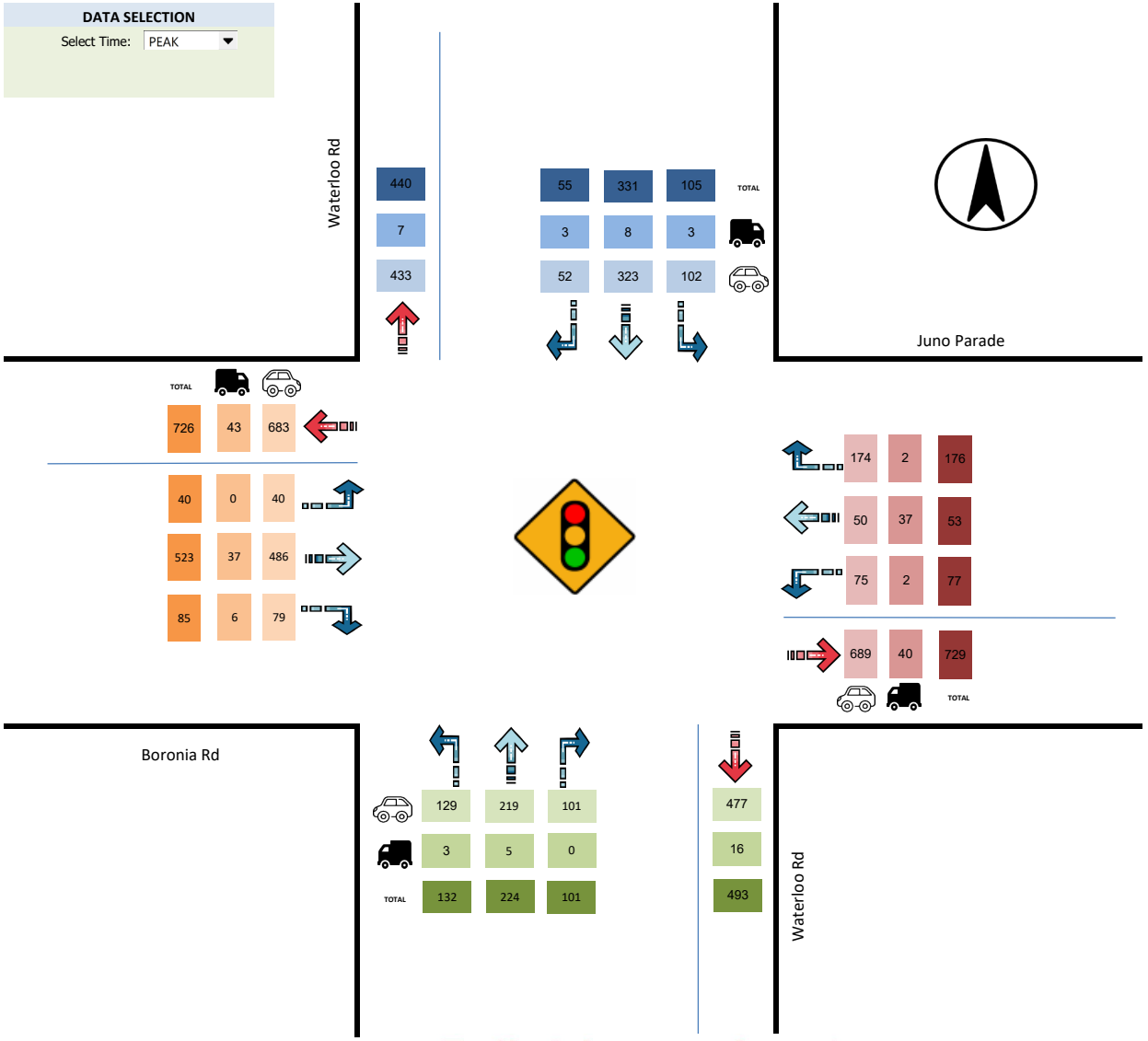
All Vehicles Time Per Hour	**SOUTH** *Waterloo Rd*										**WEST** *Boronia Rd*												
	L			**T**			**R**				**L**			**T**			**R**				**TOTAL**	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 8:00	75	4	**79**	200	10	**210**	83	2	**85**	**374**	29	1	**30**	460	50	**510**	45	3	**48**	**588**	1734	137	**1871**
7:15 - 8:15	86	1	**87**	214	7	**221**	99	1	**100**	**408**	31	1	**32**	483	49	**532**	48	3	**51**	**615**	1887	128	**2015**
7:30 - 8:30	102	3	**105**	216	4	**220**	106	0	**106**	**431**	36	0	**36**	466	39	**505**	65	5	**70**	**611**	2035	114	**2149**
7:45 - 8:45	106	3	**109**	215	6	**221**	96	0	**96**	**426**	40	0	**40**	499	37	**536**	69	6	**75**	**651**	2159	113	**2272**
8:00 - 9:00	129	3	**132**	219	5	**224**	101	0	**101**	**457**	40	0	**40**	486	37	**523**	79	6	**85**	**648**	2282	106	**2388**
Period End																							
16:00 - 17:00	100	3	**103**	215	5	**220**	70	0	**70**	**393**	58	3	**61**	482	16	**498**	109	2	**111**	**670**	2305	78	**2383**
16:15 - 17:15	91	1	**92**	200	6	**206**	66	0	**66**	**364**	50	2	**52**	505	21	**526**	106	1	**107**	**685**	2300	76	**2376**
16:30 - 17:30	76	1	**77**	201	6	**207**	65	1	**66**	**350**	44	2	**46**	523	19	**542**	100	0	**100**	**688**	2253	72	**2325**
16:45 - 17:45	82	2	**84**	183	8	**191**	66	1	**67**	**342**	41	2	**43**	491	14	**505**	96	1	**97**	**645**	2189	66	**2255**
17:00 - 18:00	87	1	**88**	173	10	**183**	67	1	**68**	**339**	47	0	**47**	487	17	**504**	94	1	**95**	**646**	2209	68	**2277**
Period End																							

Location	**Waterloo Rd**	**Duration**	**7:00**	**-**	**09:00**
	Juno Parade			**-**	
	Waterloo Rd		**16:00**	**-**	**18:00**
	Boronia Rd	**Date**	**Thursday, 6 February 2025**		
Suburb	**GREENACRE**	**Weather**	**-**		

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	**-**	**AM**
PEAK		
8:00	**-**	**9:00**



Traffic Information Specialist

ABN: 42 613 389 923

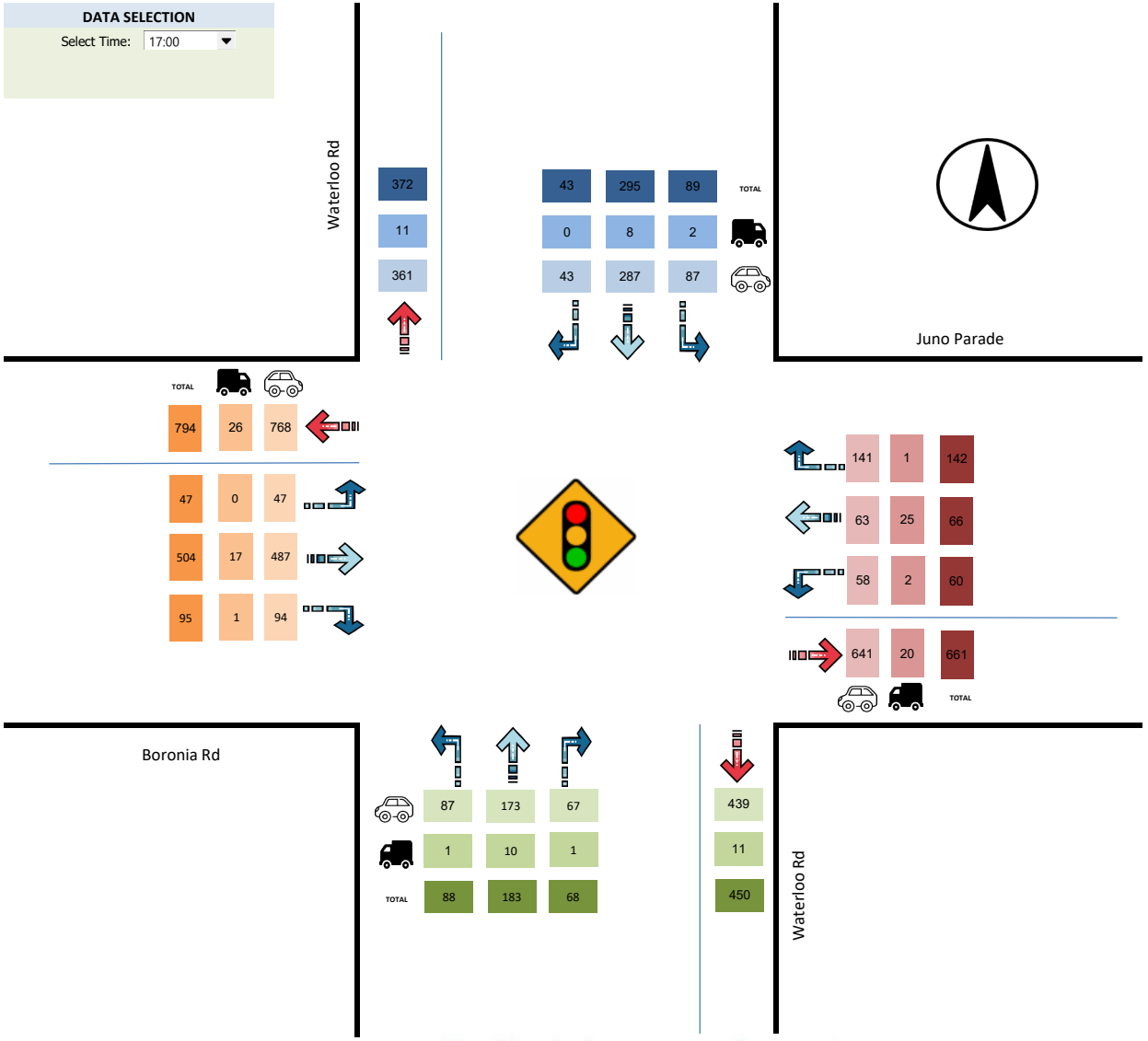
Email info@tistraffic.com.au

Location	**Waterloo Rd**		**Duration**	**7:00**	**-**	**09:00**
	Juno Parade				**-**	
	Waterloo Rd			**16:00**	**-**	**18:00**
	Boronia Rd		**Date**	**Thursday, 6 February 2025**		
Suburb	**GREENACRE**		**Weather**	**-**		

DATA SELECTION

Select Time: 17:00

TIME RANGE		
17:00	**-**	**18:00**
PEAK		
16:00	**-**	**17:00**



Traffic Information Specialist

ABN: 42 613 389 923

Email info@tistraffic.com.au

Location	Waterloo Road	Duration	7:00	-	09:00
				-	
	Waterloo Road		16:00	-	18:00
	Chiswick Road	Date	Thursday, 6 February 2025		
Suburb	GREENARCE	Weather	-		

All Vehicles Time Per 15 Mins	NORTH *Waterloo Road*										EAST *0*												
	L			T			R				L			T			R				TOTAL		
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15				51	5	**56**	2	0	**2**	**58**											124	10	**134**
7:15 - 7:30				44	4	**48**	1	0	**1**	**49**											142	8	**150**
7:30 - 7:45				56	1	**57**	4	0	**4**	**61**											154	6	**160**
7:45 - 8:00				75	5	**80**	5	0	**5**	**85**											193	6	**199**
8:00 - 8:15				79	2	**81**	10	0	**10**	**91**											204	3	**207**
8:15 - 8:30				103	5	**108**	3	0	**3**	**111**											234	6	**240**
8:30 - 8:45				115	4	**119**	6	0	**6**	**125**											244	8	**252**
8:45 - 9:00				126	2	**128**	3	0	**3**	**131**											239	3	**242**
Period End				**649**	**28**	**677**	**34**	**0**	**34**	**711**											**1534**	**50**	**1584**
16:00 - 16:15				109	2	**111**	4	0	**4**	**115**											226	4	**230**
16:15 - 16:30				114	2	**116**	10	0	**10**	**126**											237	3	**240**
16:30 - 16:45				111	1	**112**	9	0	**9**	**121**											264	3	**267**
16:45 - 17:00				106	2	**108**	8	0	**8**	**116**											210	6	**216**
17:00 - 17:15				92	1	**93**	7	0	**7**	**100**											211	4	**215**
17:15 - 17:30				71	2	**73**	11	0	**11**	**84**											177	3	**180**
17:30 - 17:45				102	3	**105**	10	0	**10**	**115**											206	7	**213**
17:45 - 18:00				104	2	**106**	6	1	**7**	**113**											221	4	**225**
Period End				**809**	**15**	**824**	**65**	**1**	**66**	**890**											**1752**	**34**	**1786**

All Vehicles Time Per 15 Mins	SOUTH *Waterloo Road*										WEST *Chiswick Road*												
	L			T			R				L			T			R				TOTAL		
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 7:15	2	0	**2**	58	4	**62**				**64**	4	0	**4**				7	1	**8**	**12**	124	10	**134**
7:15 - 7:30	2	0	**2**	81	4	**85**				**87**	8	0	**8**				6	0	**6**	**14**	142	8	**150**
7:30 - 7:45	7	0	**7**	78	4	**82**				**89**	6	0	**6**				3	1	**4**	**10**	154	6	**160**
7:45 - 8:00	6	0	**6**	100	1	**101**				**107**	2	0	**2**				5	0	**5**	**7**	193	6	**199**
8:00 - 8:15	6	0	**6**	90	1	**91**				**97**	9	0	**9**				10	0	**10**	**19**	204	3	**207**
8:15 - 8:30	12	0	**12**	93	1	**94**				**106**	10	0	**10**				13	0	**13**	**23**	234	6	**240**
8:30 - 8:45	14	0	**14**	98	4	**102**				**116**	8	0	**8**				3	0	**3**	**11**	244	8	**252**
8:45 - 9:00	6	0	**6**	88	1	**89**				**95**	8	0	**8**				8	0	**8**	**16**	239	3	**242**
Period End	**55**	**0**	**55**	**686**	**20**	**706**				**761**	**55**	**0**	**55**				**55**	**2**	**57**	**112**	**1534**	**50**	**1584**
16:00 - 16:15	21	0	**21**	83	2	**85**				**106**	3	0	**3**				6	0	**6**	**9**	226	4	**230**
16:15 - 16:30	22	0	**22**	75	1	**76**				**98**	7	0	**7**				9	0	**9**	**16**	237	3	**240**
16:30 - 16:45	27	0	**27**	100	2	**102**				**129**	7	0	**7**				10	0	**10**	**17**	264	3	**267**
16:45 - 17:00	12	1	**13**	72	3	**75**				**88**	6	0	**6**				6	0	**6**	**12**	210	6	**216**
17:00 - 17:15	23	0	**23**	80	3	**83**				**106**	4	0	**4**				5	0	**5**	**9**	211	4	**215**
17:15 - 17:30	19	0	**19**	71	1	**72**				**91**	3	0	**3**				2	0	**2**	**5**	177	3	**180**
17:30 - 17:45	25	0	**25**	65	4	**69**				**94**	1	0	**1**				3	0	**3**	**4**	206	7	**213**
17:45 - 18:00	19	0	**19**	81	1	**82**				**101**	5	0	**5**				6	0	**6**	**11**	221	4	**225**
Period End	**168**	**1**	**169**	**627**	**17**	**644**				**813**	**36**	**0**	**36**				**47**	**0**	**47**	**83**	**1752**	**34**	**1786**

Location	Waterloo Road		Duration	7:00 - 09:00	
				-	
	Waterloo Road			16:00 - 18:00	
	Chiswick Road		Date	Thursday, 6 February 2025	
Suburb	GREENARCE		Weather	-	

All Vehicles Time Per Hour	NORTH *Waterloo Road*										EAST *0*										TOTAL		
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 8:00				226	15	**241**	12	0	**12**	**253**											613	30	**643**
7:15 - 8:15				254	12	**266**	20	0	**20**	**286**											693	23	**716**
7:30 - 8:30				313	13	**326**	22	0	**22**	**348**											785	21	**806**
7:45 - 8:45				372	16	**388**	24	0	**24**	**412**											875	23	**898**
8:00 - 9:00				423	13	**436**	22	0	**22**	**458**											921	20	**941**
Period End																							
16:00 - 17:00				440	7	**447**	31	0	**31**	**478**											937	16	**953**
16:15 - 17:15				423	6	**429**	34	0	**34**	**463**											922	16	**938**
16:30 - 17:30				380	6	**386**	35	0	**35**	**421**											862	16	**878**
16:45 - 17:45				371	8	**379**	36	0	**36**	**415**											804	20	**824**
17:00 - 18:00				369	8	**377**	34	1	**35**	**412**											815	18	**833**
Period End																							

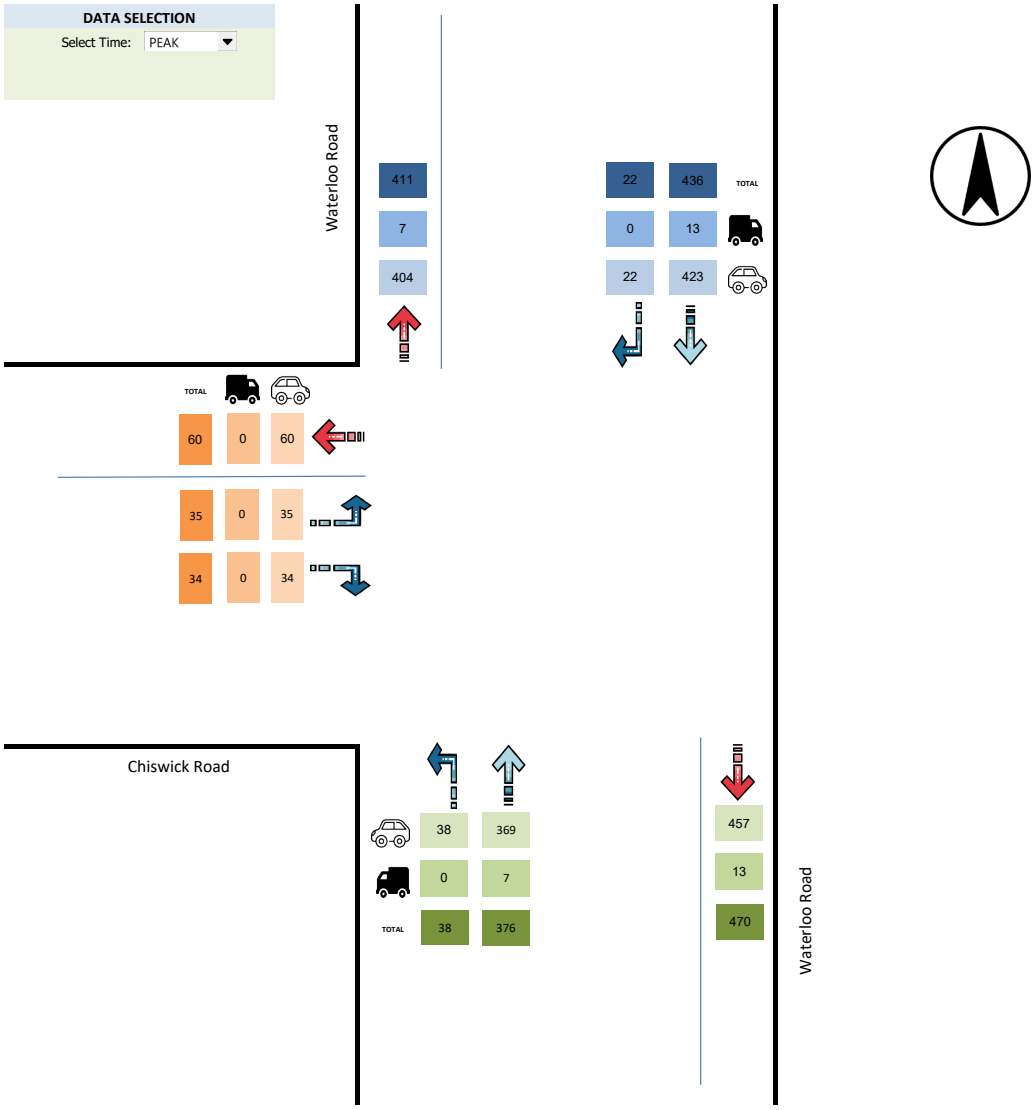
All Vehicles Time Per Hour	SOUTH *Waterloo Road*										WEST *Chiswick Road*										TOTAL		
	L			T			R				L			T			R						
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	TOTAL	LIGHT	HEAVY	TOTAL
7:00 - 8:00	17	0	**17**	317	13	**330**				**347**	20	0	**20**				21	2	**23**	**43**	613	30	**643**
7:15 - 8:15	21	0	**21**	349	10	**359**				**380**	25	0	**25**				24	1	**25**	**50**	693	23	**716**
7:30 - 8:30	31	0	**31**	361	7	**368**				**399**	27	0	**27**				31	1	**32**	**59**	785	21	**806**
7:45 - 8:45	38	0	**38**	381	7	**388**				**426**	29	0	**29**				31	0	**31**	**60**	875	23	**898**
8:00 - 9:00	38	0	**38**	369	7	**376**				**414**	35	0	**35**				34	0	**34**	**69**	921	20	**941**
Period End																							
16:00 - 17:00	82	1	**83**	330	8	**338**				**421**	23	0	**23**				31	0	**31**	**54**	937	16	**953**
16:15 - 17:15	84	1	**85**	327	9	**336**				**421**	24	0	**24**				30	0	**30**	**54**	922	16	**938**
16:30 - 17:30	81	1	**82**	323	9	**332**				**414**	20	0	**20**				23	0	**23**	**43**	862	16	**878**
16:45 - 17:45	79	1	**80**	288	11	**299**				**379**	14	0	**14**				16	0	**16**	**30**	804	20	**824**
17:00 - 18:00	86	0	**86**	297	9	**306**				**392**	13	0	**13**				16	0	**16**	**29**	815	18	**833**
Period End																							

Location	**Waterloo Road**	**Duration**	**7:00**	**-**	**09:00**
				-	
	Waterloo Road		**16:00**	**-**	**18:00**
	Chiswick Road	**Date**	**Thursday, 6 February 2025**		
Suburb	**GREENARCE**	**Weather**	**-**		

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	AM
PEAK		
8:00	-	9:00



Traffic Information Specialist

ABN: 42 613 389 923

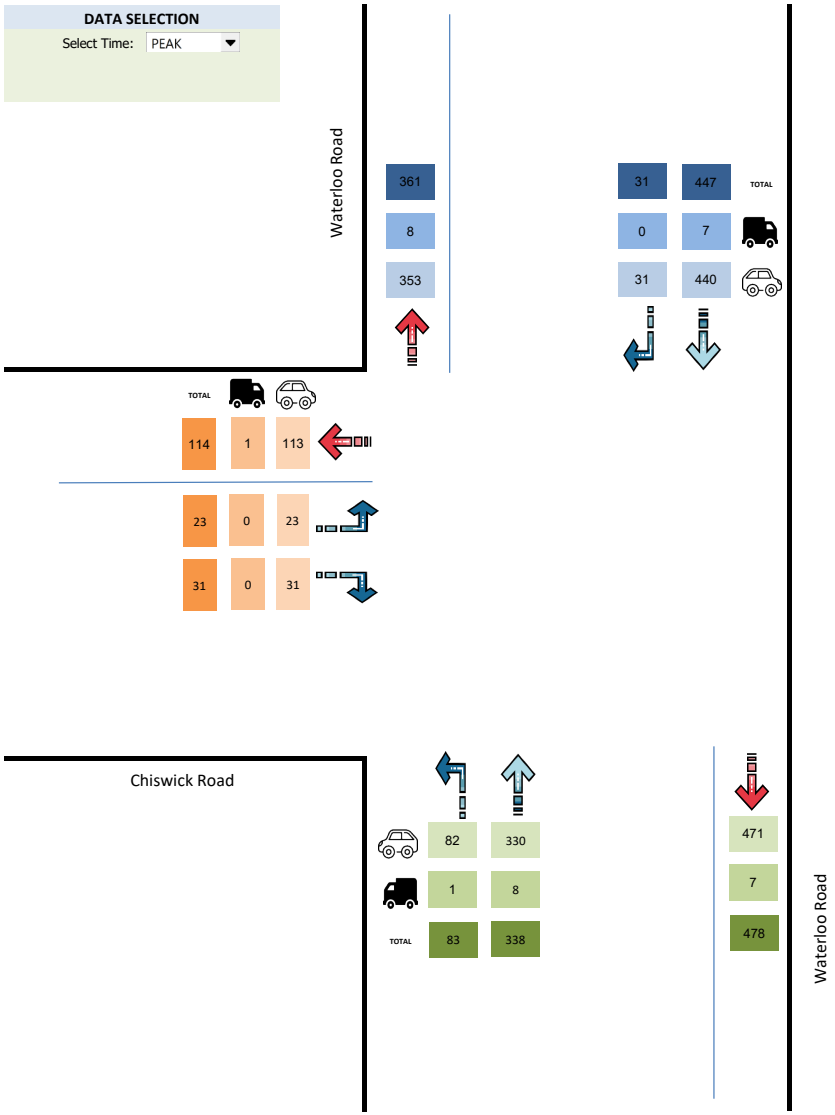
Email info@tistraffic.com.au

Location	**Waterloo Road**	**Duration**	**7:00**	**-**	**09:00**
				-	
	Waterloo Road		**16:00**	**-**	**18:00**
	Chiswick Road	**Date**	**Thursday, 6 February 2025**		
Suburb	**GREENARCE**	**Weather**	**-**		

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	**-**	**PM**
PEAK		
16:00	**-**	**17:00**



Traffic Information Specialist

ABN: 42 613 389 923

Email info@tistraffic.com.au

Attachment 4

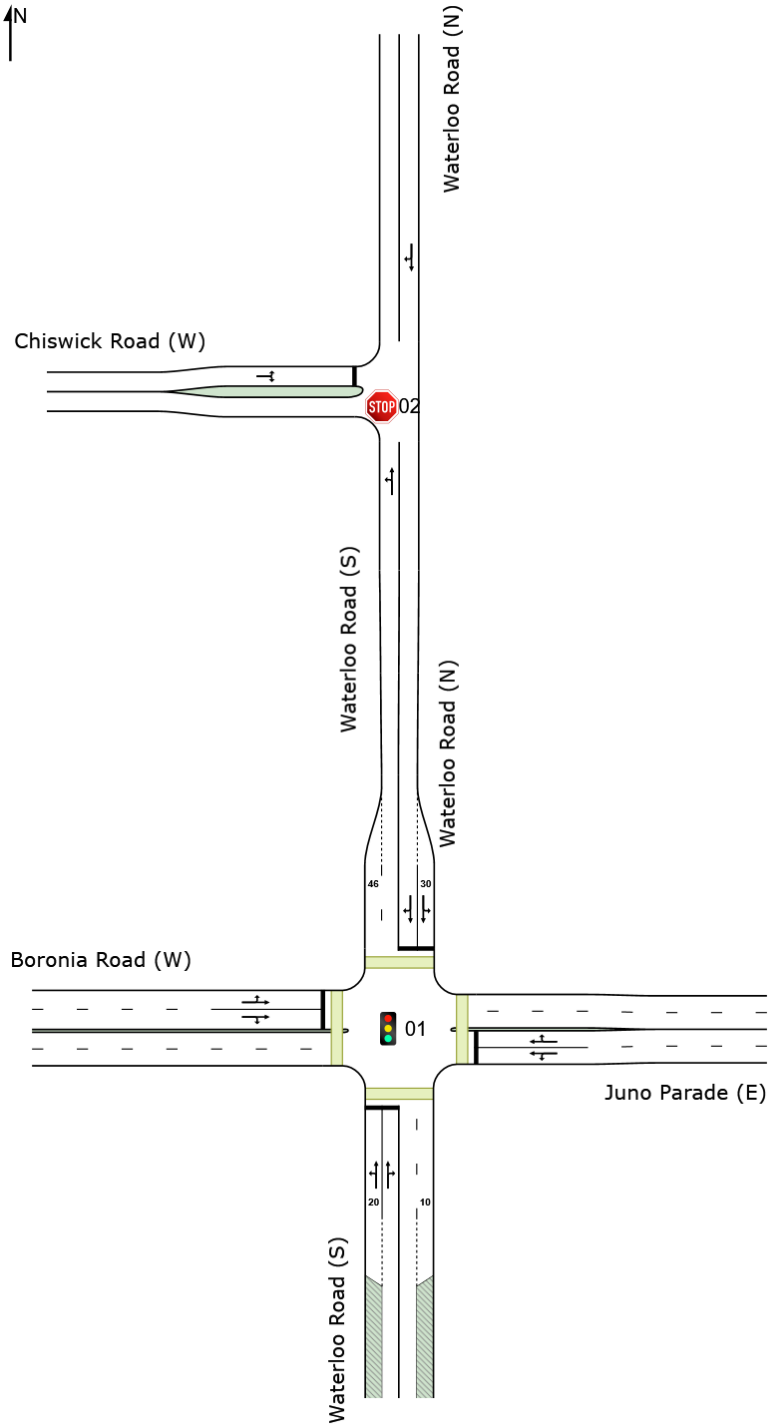
SIDRA Result

NETWORK LAYOUT

Network: N01 [AM Peak (Network Folder: Existing Development)]

AM Peak 8:00am - 9:00am
Network Category: Year 2025

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



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
01	NA	Waterloo Road | Boronia Road | Juno Parade
02	NA	Waterloo Road | Chiswick Road

MOVEMENT SUMMARY

Site: 01 [Waterloo Road | Boronia Road | Juno Parade (Site Folder: Existing Development - AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N01 [AM Peak (Network Folder: Existing Development)]

AM Peak 8:00am - 9:00am
Site Category: Year 2025
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterloo Road (S)															
1	L2	All MCs	139	2.3	139	2.3	0.639	30.8	LOS C	10.4	74.5	0.84	0.76	0.84	33.6
2	T1	All MCs	236	2.2	236	2.2	0.639	58.4	LOS E	10.4	74.5	0.84	0.76	0.84	24.4
3	R2	All MCs	106	0.0	106	0.0	* 0.662	74.5	LOS F	3.8	26.5	0.98	0.85	1.06	27.0
Approach			481	1.8	481	1.8	0.662	54.0	LOS D	10.4	74.5	0.87	0.78	0.89	23.7
East: Juno Parade (E)															
4	L2	All MCs	81	2.6	81	2.6	0.656	62.6	LOS E	4.9	43.0	1.00	0.84	1.04	26.7
5	T1	All MCs	56	69.8	56	69.8	0.656	53.4	LOS D	4.9	43.0	1.00	0.84	1.04	30.3
6	R2	All MCs	185	1.1	185	1.1	* 0.681	59.6	LOS E	6.5	46.2	1.00	0.84	1.04	20.5
Approach			322	13.4	322	13.4	0.681	59.3	LOS E	6.5	46.2	1.00	0.84	1.04	24.4
North: Waterloo Road (N)															
7	L2	All MCs	111	2.9	111	2.9	0.568	29.9	LOS C	9.3	66.6	0.80	0.73	0.80	32.0
8	T1	All MCs	348	2.4	348	2.4	0.568	45.9	LOS D	9.3	66.6	0.84	0.74	0.84	26.3
9	R2	All MCs	58	5.5	58	5.5	0.568	79.0	LOS F	5.4	38.7	0.93	0.78	0.93	26.5
Approach			517	2.9	517	2.9	0.568	46.2	LOS D	9.3	66.6	0.84	0.75	0.84	24.2
West: Boronia Road (W)															
10	L2	All MCs	42	0.0	42	0.0	* 0.668	50.3	LOS D	10.9	80.1	0.95	0.82	0.95	25.3
11	T1	All MCs	551	7.1	551	7.1	0.668	41.6	LOS C	11.0	81.5	0.95	0.82	0.95	35.2
12	R2	All MCs	89	7.1	89	7.1	0.668	47.4	LOS D	11.0	81.5	0.95	0.82	0.95	30.4
Approach			682	6.6	682	6.6	0.668	42.9	LOS D	11.0	81.5	0.95	0.82	0.95	34.1
All Vehicles			2002	5.6	2002	5.6	0.681	49.1	LOS D	11.0	81.5	0.91	0.79	0.92	27.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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	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: Waterloo Road (S)											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91

East: Juno Parade (E)										
P2	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
North: Waterloo Road (N)										
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
West: Boronia Road (W)										
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
All Pedestrians		211	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91

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

MOVEMENT SUMMARY

Site: 02 [Waterloo Road | Chiswick Road (Site Folder: Existing Development - AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N01 [AM Peak (Network Folder: Existing Development)]

AM Peak 8:00am - 9:00am
Site Category: Year 2025
Stop (Two-Way)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterloo Road (S)															
1	L2	All MCs	40	0.0	40	0.0	0.225	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	55.8
2	T1	All MCs	396	1.9	396	1.9	0.225	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.2
Approach			436	1.7	436	1.7	0.225	0.5	NA	0.0	0.0	0.00	0.05	0.00	58.8
North: Waterloo Road (N)															
8	T1	All MCs	459	3.0	459	3.0	0.257	0.2	LOS A	0.1	0.8	0.07	0.08	0.07	58.9
9	R2	All MCs	23	0.0	23	0.0	0.257	7.5	LOS A	0.1	0.8	0.07	0.08	0.07	52.5
Approach			482	2.8	482	2.8	0.257	0.5	NA	0.1	0.8	0.07	0.08	0.07	58.2
West: Chiswick Road (W)															
10	L2	All MCs	37	0.0	37	0.0	0.118	9.3	LOS A	0.2	1.2	0.55	0.92	0.55	45.6
12	R2	All MCs	36	0.0	36	0.0	0.118	13.7	LOS A	0.2	1.2	0.55	0.92	0.55	39.1
Approach			73	0.0	73	0.0	0.118	11.5	LOS A	0.2	1.2	0.55	0.92	0.55	43.2
All Vehicles			991	2.1	991	2.1	0.257	1.3	NA	0.2	1.2	0.07	0.13	0.07	56.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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: 01 [Waterloo Road | Boronia Road | Juno Parade (Site Folder: Existing Development - PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [PM Peak (Network Folder: Existing Development)]

PM Peak 16:00pm - 17:00pm
Site Category: Year 2025
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterloo Road (S)															
1	L2	All MCs	93	1.1	93	1.1	0.527	29.4	LOS C	7.4	53.8	0.84	0.74	0.84	32.6
2	T1	All MCs	193	5.5	193	5.5	0.527	60.8	LOS E	7.4	53.8	0.85	0.74	0.85	22.7
3	R2	All MCs	72	1.5	72	1.5	* 0.527	80.4	LOS F	3.2	22.7	0.97	0.79	0.97	26.9
Approach			357	3.5	357	3.5	0.527	56.6	LOS E	7.4	53.8	0.87	0.75	0.87	22.8
East: Juno Parade (E)															
4	L2	All MCs	63	3.3	63	3.3	0.538	59.9	LOS E	4.4	36.2	0.97	0.79	0.97	27.5
5	T1	All MCs	69	37.9	69	37.9	* 0.538	50.9	LOS D	5.2	37.0	0.97	0.79	0.97	31.3
6	R2	All MCs	149	0.7	149	0.7	0.538	56.7	LOS E	5.2	37.0	0.97	0.80	0.97	21.2
Approach			282	10.4	282	10.4	0.538	56.0	LOS D	5.2	37.0	0.97	0.80	0.97	25.8
North: Waterloo Road (N)															
7	L2	All MCs	94	2.2	94	2.2	0.548	34.2	LOS C	8.3	59.2	0.84	0.75	0.84	30.1
8	T1	All MCs	311	2.7	311	2.7	0.548	52.3	LOS D	8.3	59.2	0.88	0.76	0.88	25.0
9	R2	All MCs	45	0.0	45	0.0	0.548	83.6	LOS F	5.1	36.5	0.95	0.78	0.95	25.7
Approach			449	2.3	449	2.3	0.548	51.7	LOS D	8.3	59.2	0.88	0.76	0.88	23.0
West: Boronia Road (W)															
10	L2	All MCs	49	0.0	49	0.0	* 0.536	43.0	LOS D	9.8	70.2	0.87	0.76	0.87	27.9
11	T1	All MCs	531	3.4	531	3.4	0.536	34.6	LOS C	10.0	71.3	0.87	0.76	0.87	37.7
12	R2	All MCs	100	1.1	100	1.1	0.536	40.4	LOS C	10.0	71.3	0.87	0.77	0.87	32.2
Approach			680	2.8	680	2.8	0.536	36.1	LOS C	10.0	71.3	0.87	0.77	0.87	36.3
All Vehicles			1768	4.0	1768	4.0	0.548	47.4	LOS D	10.0	71.3	0.89	0.77	0.89	28.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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	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: Waterloo Road (S)											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91

East: Juno Parade (E)										
P2 Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
North: Waterloo Road (N)										
P3 Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
West: Boronia Road (W)										
P4 Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
All Pedestrians	211	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91

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

MOVEMENT SUMMARY

Site: 02 [Waterloo Road | Chiswick Road (Site Folder: Existing Development - PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [PM Peak (Network Folder: Existing Development)]

PM Peak 16:00pm - 17:00pm
Site Category: Year 2025
Stop (Two-Way)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterloo Road (S)															
1	L2	All MCs	87	1.2	87	1.2	0.230	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	55.0
2	T1	All MCs	356	2.4	356	2.4	0.230	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.4
Approach			443	2.1	443	2.1	0.230	1.1	NA	0.0	0.0	0.00	0.12	0.00	57.7
North: Waterloo Road (N)															
8	T1	All MCs	471	1.6	471	1.6	0.269	0.2	LOS A	0.2	1.1	0.10	0.11	0.10	58.5
9	R2	All MCs	33	0.0	33	0.0	0.269	7.6	LOS A	0.2	1.1	0.10	0.11	0.10	52.4
Approach			503	1.5	503	1.5	0.269	0.7	NA	0.2	1.1	0.10	0.11	0.10	57.7
West: Chiswick Road (W)															
10	L2	All MCs	24	0.0	24	0.0	0.099	9.0	LOS A	0.1	1.0	0.56	0.92	0.56	45.4
12	R2	All MCs	33	0.0	33	0.0	0.099	13.9	LOS A	0.1	1.0	0.56	0.92	0.56	38.8
Approach			57	0.0	57	0.0	0.099	11.8	LOS A	0.1	1.0	0.56	0.92	0.56	42.5
All Vehicles			1003	1.7	1003	1.7	0.269	1.5	NA	0.2	1.1	0.08	0.16	0.08	56.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.

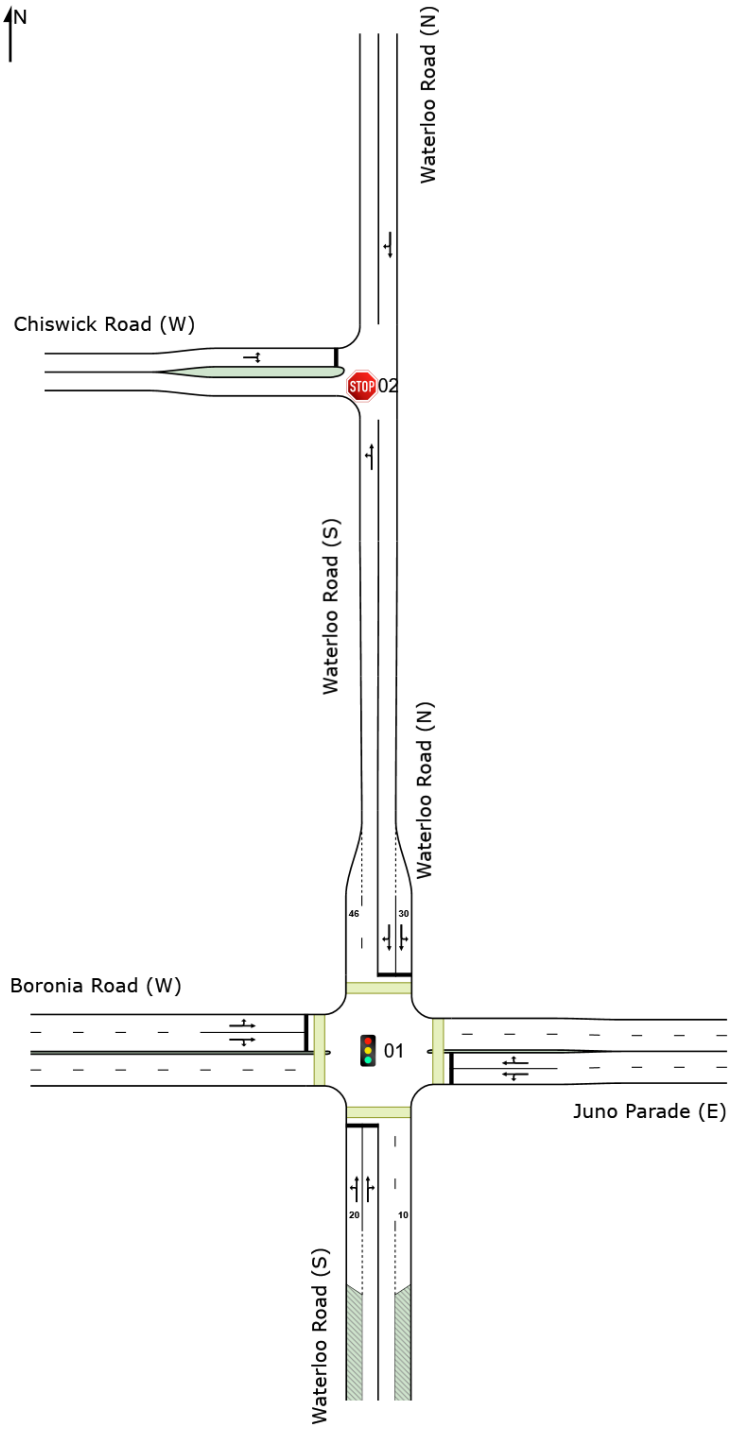
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

NETWORK LAYOUT

Network: N101 [PM Peak (Network Folder: Existing Development)]

PM Peak 16:00pm - 17:00pm
Network Category: Year 2025

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



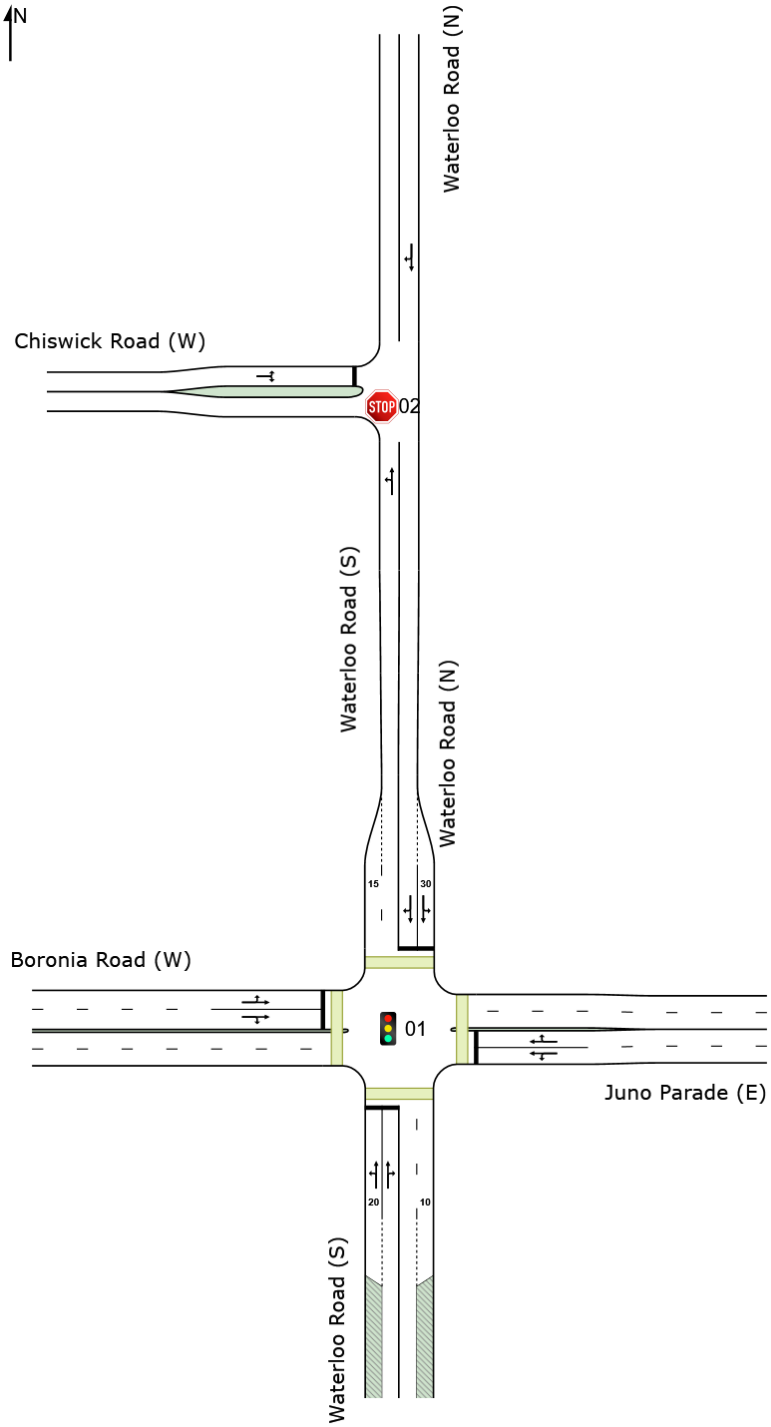
SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
01	NA	Waterloo Road | Boronia Road | Juno Parade
02	NA	Waterloo Road | Chiswick Road

NETWORK LAYOUT

Network: N01 [AM Peak (Network Folder: Post Development)]

AM Peak 8:00am - 9:00am
Network Category: Year 2025

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



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
01	NA	Waterloo Road | Boronia Road | Juno Parade
02	NA	Waterloo Road | Chiswick Road

MOVEMENT SUMMARY

Site: 01 [Waterloo Road | Boronia Road | Juno Parade (Site Folder: Post Development - AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N01 [AM Peak (Network Folder: Post Development)]

AM Peak 8:00am - 9:00am
Site Category: Year 2025
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterloo Road (S)															
1	L2	All MCs	139	2.3	139	2.3	0.644	30.9	LOS C	10.6	75.3	0.84	0.76	0.84	33.6
2	T1	All MCs	239	2.2	239	2.2	0.644	58.6	LOS E	10.6	75.3	0.84	0.76	0.84	24.4
3	R2	All MCs	106	0.0	106	0.0	* 0.674	75.0	LOS F	3.8	26.7	0.98	0.86	1.08	26.9
Approach			484	1.7	484	1.7	0.674	54.3	LOS D	10.6	75.3	0.87	0.78	0.89	23.7
East: Juno Parade (E)															
4	L2	All MCs	81	2.6	81	2.6	0.656	62.6	LOS E	4.9	43.0	1.00	0.84	1.04	26.7
5	T1	All MCs	56	69.8	56	69.8	0.656	53.4	LOS D	4.9	43.0	1.00	0.84	1.04	30.3
6	R2	All MCs	188	1.1	188	1.1	* 0.693	59.9	LOS E	6.7	47.2	1.00	0.84	1.05	20.4
Approach			325	13.3	325	13.3	0.693	59.5	LOS E	6.7	47.2	1.00	0.84	1.05	24.3
North: Waterloo Road (N)															
7	L2	All MCs	117	2.7	117	2.7	0.605	31.3	LOS C	10.0	71.6	0.82	0.74	0.82	31.8
8	T1	All MCs	355	2.4	355	2.4	0.605	47.5	LOS D	10.0	71.6	0.86	0.76	0.86	26.2
9	R2	All MCs	64	4.9	64	4.9	0.605	79.4	LOS F	5.5	39.4	0.94	0.79	0.94	26.3
Approach			536	2.8	536	2.8	0.605	47.8	LOS D	10.0	71.6	0.86	0.76	0.86	23.9
West: Boronia Road (W)															
10	L2	All MCs	45	0.0	45	0.0	* 0.671	50.3	LOS D	10.9	80.5	0.95	0.82	0.95	25.2
11	T1	All MCs	551	7.1	551	7.1	0.671	41.6	LOS C	11.0	82.0	0.95	0.82	0.95	35.2
12	R2	All MCs	89	7.1	89	7.1	0.671	47.4	LOS D	11.0	82.0	0.95	0.82	0.95	30.4
Approach			685	6.6	685	6.6	0.671	43.0	LOS D	11.0	82.0	0.95	0.82	0.95	34.0
All Vehicles			2031	5.5	2031	5.5	0.693	49.6	LOS D	11.0	82.0	0.91	0.80	0.93	27.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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	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: Waterloo Road (S)											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91

East: Juno Parade (E)										
P2 Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
North: Waterloo Road (N)										
P3 Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
West: Boronia Road (W)										
P4 Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
All Pedestrians	211	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91

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

MOVEMENT SUMMARY

Site: 02 [Waterloo Road | Chiswick Road (Site Folder: Post Development - AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N01 [AM Peak (Network Folder: Post Development)]

AM Peak 8:00am - 9:00am
Site Category: Year 2025
Stop (Two-Way)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterloo Road (S)															
1	L2	All MCs	40	0.0	40	0.0	0.228	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	55.8
2	T1	All MCs	402	1.8	402	1.8	0.228	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.2
Approach			442	1.7	442	1.7	0.228	0.5	NA	0.0	0.0	0.00	0.05	0.00	58.9
North: Waterloo Road (N)															
8	T1	All MCs	462	3.0	462	3.0	0.258	0.2	LOS A	0.1	0.8	0.07	0.08	0.07	58.9
9	R2	All MCs	23	0.0	23	0.0	0.258	7.6	LOS A	0.1	0.8	0.07	0.08	0.07	52.5
Approach			485	2.8	485	2.8	0.258	0.5	NA	0.1	0.8	0.07	0.08	0.07	58.2
West: Chiswick Road (W)															
10	L2	All MCs	37	0.0	37	0.0	0.119	9.3	LOS A	0.2	1.2	0.56	0.92	0.56	45.6
12	R2	All MCs	36	0.0	36	0.0	0.119	13.8	LOS A	0.2	1.2	0.56	0.92	0.56	39.0
Approach			73	0.0	73	0.0	0.119	11.6	LOS A	0.2	1.2	0.56	0.92	0.56	43.2
All Vehicles			1000	2.1	1000	2.1	0.258	1.3	NA	0.2	1.2	0.07	0.13	0.07	56.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.

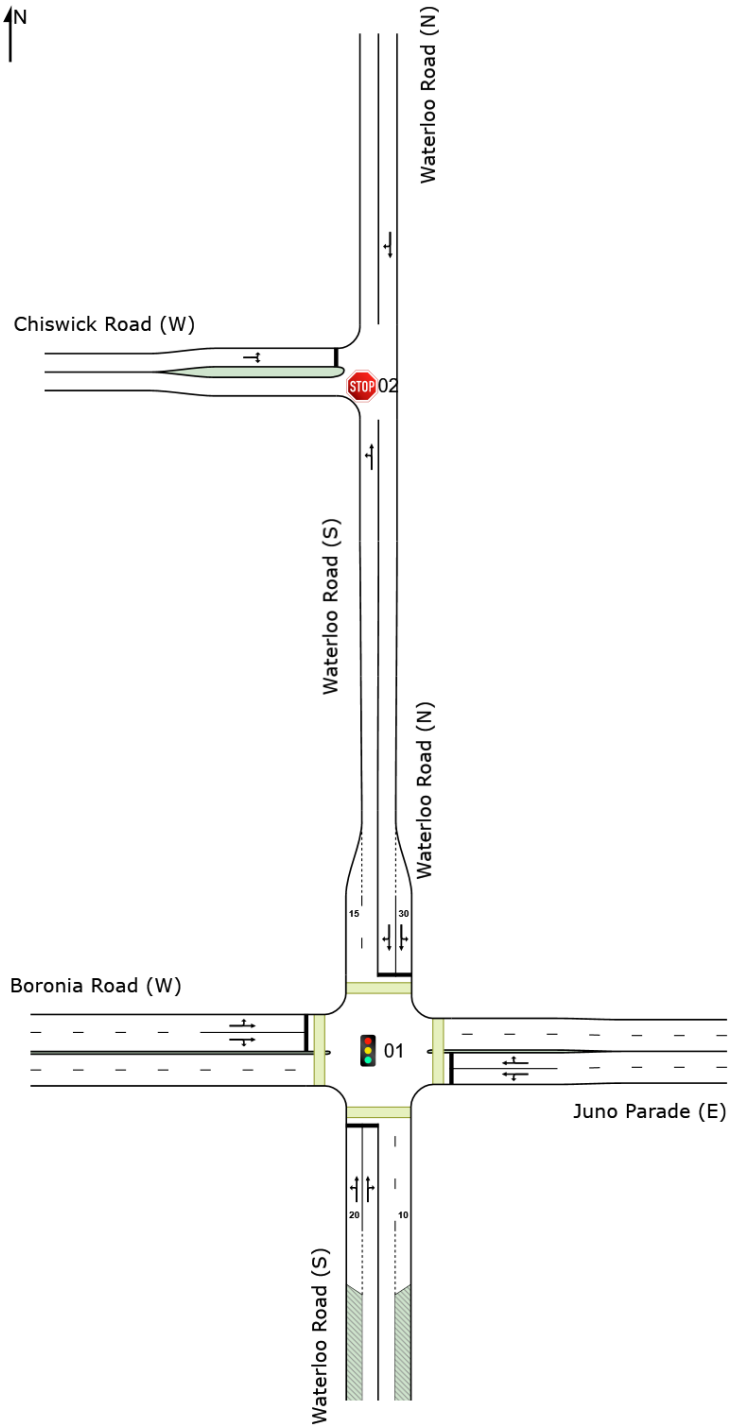
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

NETWORK LAYOUT

Network: N101 [PM Peak (Network Folder: Post Development)]

PM Peak 16:00pm - 17:00pm
Network Category: Year 2025

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



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
01	NA	Waterloo Road | Boronia Road | Juno Parade
02	NA	Waterloo Road | Chiswick Road

MOVEMENT SUMMARY

Site: 01 [Waterloo Road | Boronia Road | Juno Parade (Site Folder: Post Development - PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [PM Peak (Network Folder: Post Development)]

PM Peak 16:00pm - 17:00pm
Site Category: Year 2025
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterloo Road (S)															
1	L2	All MCs	93	1.1	93	1.1	0.518	29.1	LOS C	7.5	54.3	0.82	0.73	0.82	33.1
2	T1	All MCs	200	5.3	200	5.3	0.518	57.9	LOS E	7.5	54.3	0.83	0.73	0.83	23.2
3	R2	All MCs	72	1.5	72	1.5	0.518	79.9	LOS F	3.1	22.0	0.97	0.78	0.97	26.9
Approach			364	3.5	364	3.5	0.518	54.9	LOS D	7.5	54.3	0.85	0.74	0.85	23.0
East: Juno Parade (E)															
4	L2	All MCs	63	3.3	63	3.3	0.550	60.1	LOS E	4.5	37.2	0.97	0.79	0.97	27.5
5	T1	All MCs	69	37.9	69	37.9	* 0.550	51.0	LOS D	5.4	37.8	0.97	0.79	0.97	31.3
6	R2	All MCs	157	0.7	157	0.7	0.550	56.8	LOS E	5.4	37.8	0.97	0.81	0.97	21.1
Approach			289	10.2	289	10.2	0.550	56.1	LOS D	5.4	37.8	0.97	0.80	0.97	25.6
North: Waterloo Road (N)															
7	L2	All MCs	98	2.2	98	2.2	0.560	33.3	LOS C	8.8	63.0	0.84	0.75	0.84	30.6
8	T1	All MCs	315	2.7	315	2.7	0.560	51.3	LOS D	8.8	63.0	0.88	0.76	0.88	25.2
9	R2	All MCs	49	0.0	49	0.0	* 0.560	89.3	LOS F	5.0	35.3	0.97	0.79	0.97	24.9
Approach			462	2.3	462	2.3	0.560	51.5	LOS D	8.8	63.0	0.88	0.76	0.88	23.0
West: Boronia Road (W)															
10	L2	All MCs	57	0.0	57	0.0	* 0.572	44.9	LOS D	10.2	72.9	0.89	0.78	0.89	27.0
11	T1	All MCs	531	3.4	531	3.4	0.572	36.5	LOS C	10.4	74.4	0.89	0.78	0.89	36.9
12	R2	All MCs	100	1.1	100	1.1	0.572	42.3	LOS C	10.4	74.4	0.89	0.79	0.89	31.7
Approach			687	2.8	687	2.8	0.572	38.1	LOS C	10.4	74.4	0.89	0.78	0.89	35.5
All Vehicles			1803	4.0	1803	4.0	0.572	47.8	LOS D	10.4	74.4	0.89	0.77	0.89	27.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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	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: Waterloo Road (S)											
P1	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91

East: Juno Parade (E)										
P2	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
North: Waterloo Road (N)										
P3	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
West: Boronia Road (W)										
P4	Full	53	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91
All Pedestrians		211	54.3	LOS E	0.2	0.2	0.95	0.95	220.9	200.0	0.91

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

MOVEMENT SUMMARY

Site: 02 [Waterloo Road | Chiswick Road (Site Folder: Post Development - PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [PM Peak (Network Folder: Post Development)]

PM Peak 16:00pm - 17:00pm
Site Category: Year 2025
Stop (Two-Way)

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	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waterloo Road (S)															
1	L2	All MCs	87	1.2	87	1.2	0.232	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	55.0
2	T1	All MCs	360	2.3	360	2.3	0.232	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.4
Approach			447	2.1	447	2.1	0.232	1.1	NA	0.0	0.0	0.00	0.12	0.00	57.7
North: Waterloo Road (N)															
8	T1	All MCs	478	1.5	478	1.5	0.273	0.2	LOS A	0.2	1.2	0.09	0.10	0.09	58.5
9	R2	All MCs	33	0.0	33	0.0	0.273	7.6	LOS A	0.2	1.2	0.09	0.10	0.09	52.4
Approach			511	1.4	511	1.4	0.273	0.7	NA	0.2	1.2	0.09	0.10	0.09	57.7
West: Chiswick Road (W)															
10	L2	All MCs	24	0.0	24	0.0	0.101	9.1	LOS A	0.1	1.0	0.56	0.92	0.56	45.4
12	R2	All MCs	33	0.0	33	0.0	0.101	14.0	LOS A	0.1	1.0	0.56	0.92	0.56	38.7
Approach			57	0.0	57	0.0	0.101	11.9	LOS A	0.1	1.0	0.56	0.92	0.56	42.4
All Vehicles			1015	1.7	1015	1.7	0.273	1.5	NA	0.2	1.2	0.08	0.16	0.08	56.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.

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