Genesis Traffic

Traffic Impact Assessment

40-46 Eighteenth Avenue, Sawtell

Proposed Seniors Housing Development - Stage C

GT22011

Prepared for

The NSW Land and Housing Corporation (LAHC)

25 September 2023

Contact Information

Genesis Traffic	Suite 3, 53 Grandview Street, Pymble
	www.genesistraffic.com.au
	ABN 34 660 055 532
Email	projects@genesistraffic.com.au
Approved By	Bernard Lo

Document Information

Report	Traffic Impact Assessment
Client	The NSW Land and Housing Corporation (LAHC)
Proposal	Proposed Seniors Housing Development - Stage C
Architects	Brewster Murray
Project Location	40-46 Eighteenth Avenue, Sawtell
Council	Coffs Harbour City Council
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Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
1	19/05/2023	Draft	Lamone Ng	Bernard Lo
2	19/07/2023	Final	Lamone Ng	Bernard Lo
3	25/09/2023	Final	Lamone Ng	Bernard Lo

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Tables

Figures

1 Introduction

1.1 Background

This report has been prepared in respect to a proposed Seniors Housing development at 40-46 Eighteenth Avenue, Sawtell (Figure 1-1).

Figure 1-1 Site

Source: Mecone (modified by Genesis Traffic)

The proposed development involves a 22-unit Seniors Housing complex with an associated at-grade car park.

1.2 Scope of Works

The purpose of this report is to:

- describe the site and the proposed development scheme
- describe the 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:

- AS2890.1 (Australian/NZ Standards, 2004)
- AS2890.1 (Australian/NZ Standards, 2022)
- SEPP Housing (2021)
- Development Control Plan (Coffs Harbour City Council, 2015)
- RMS Guide to Traffic Generating Developments, RTA, 2002

2 Existing Conditions

2.1 Site and Surrounding Context

The development site (Figure 2-1) is a consolidation of Lots 26, 27, 28 and 29 in DP 240215, located at 40-46 Eighteenth Avenue, Sawtell. The site occupies a rectangular area of 3,058m² and is bounded by Eighteenth Avenue to the south.

Figure 2-1 Site Context

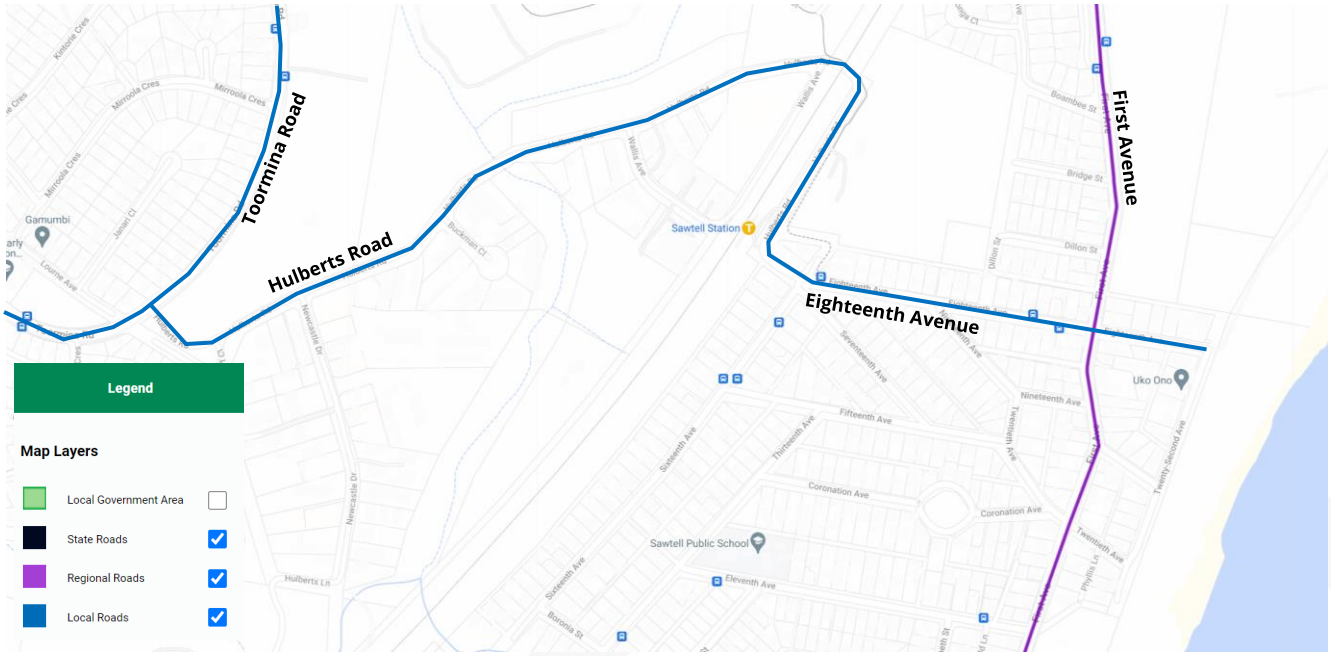
Source: Metromap (Modified by Genesis Traffic)

Four (4) single-storey residential dwellings occupy the site at present with vehicle accesses located at Eighteenth Avenue. The subject site is surrounded by low-density residential developments generally. Richardsons Park adjoins to the north.

2.2 Road Network

The road network serving the site area (Figure 2-2) comprises:

Figure 2-2 Road Network



Source: Mecone (modified by Genesis Traffic)

- First Avenue: A Classified Main Road (MR 540) that traverses north-south between Sawtell Road in the north and Lyons Road in the south. It is subject to a 50km/h speed limit and permits a single traffic lane in either direction within a divided carriageway. On-street parking is generally permitted along both sides of the street near the site.
- Toormina Road: An unclassified collector road that traverses north-south between Sawtell Road in the north and Lyons Road in the south. It generally permits a single traffic lane in either direction with no parking restriction on both sides of the street.
- Hulberts Road: An unclassified local road that traverses east-west between Eighteenth Avenue in the east and Toormina Road in the west. It permits a single traffic lane in either direction with no parking restriction on both sides of the street.
- Eighteenth Avenue: An unclassified local road that traverses east-west between First Avenue in the east and Hulberts Road in the west. It permits a single traffic lane in either direction with a carriageway width of 10m. On-street parking is generally permitted along either side of the street.

2.3 Traffic Controls

The traffic controls on the road system in the vicinity of the site comprise the Give Way priority control at the intersections of:

- First Avenue / Eighteenth Avenue
- Toormina Road / Hulberts Road

2.4 Public Transport Services

The subject site is located within 200m of Sawtell Railway Station, providing connections to Tamworth, Port Macquarie and Brisbane. The North Western NSW line operates at this station.

The subject site is also within walking distance (60m to the nearest bus stop at Eighteenth Avenue after Sixteenth Avenue) of several bus services operating in the locality. These bus services are tabulated in Table 2-1.

Table 2-1 Bus Services Provision

Bus Line	Bus Route
364	Toormina to Coffs Harbour via Sawtell (Loop Service)
370	Toormina to Coffs Harbour via Boambee East & Sawtell (Loop Service)

2.5 Existing Traffic Conditions

Traffic surveys were commissioned as part of this assessment to record the AM peak and PM peak traffic flows at the following relevant intersections:

- First Avenue / Eighteenth Avenue
- Toormina Road / Hulberts Road

The traffic survey data is reproduced in **Attachment 1**.

The existing intersections' operation have 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 number of 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 2-2)

Table 2-2 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 prevailing traffic operations at these intersections is provided in the SIDRA assessment (Table 2-3).

Table 2-3 Existing Intersection Traffic Circumstance

Intersection	AM Peak		PM Peak	
	LOS	**AVD**	**LOS**	**AVD**
First Avenue / Eighteenth Avenue	A (ERT*)	10.0s	A (ERT*)	9.0s
Toormina Road / Hulberts Road	A (ERT*)	13.7s	A (ERT*)	10.9s

Note: (ERT) denotes the worst operating movement – ERT abbreviates 'East approach Right Turn'

Details of SIDRA results are reproduced in **Attachment 2**.

The assessment found the existing road network to be operating with ample spare capacity under existing traffic demand (including the existing traffic movements).

3 Proposed Development

It is proposed to demolish the existing buildings on the site, undertake earthworks to provide a level building platform and construct a two-storey residential complex comprising 22 units in the following composition:

- 10 x one-bedroom units
- 12 x two-bedroom units

A new carpark that accommodates 11 spaces (including five (5) accessible) will be provided at-grade.

A new vehicle access will be provided at Eighteenth Avenue.

Details of the proposal are indicated in the architectural plans prepared by Brewster Murray which accompany the submission and are reproduced in part in **Attachment 3**.

4 Parking Assessment

4.1 Car Parking Requirements

SEPP Housing 2021 provides the relevant car parking criteria for this development. Reference is made to the non-discretionary development standards in Division 6, Part 2 (Development for affordable housing) of SEPP 2021, as follows:

(d) for development on land in an accessible area—the development will result in at least the following parking spaces—

(i) for each dwelling containing 1 bedroom—0.4 parking spaces,

(ii) for each dwelling containing 2 bedrooms—0.5 parking spaces,

(iii) for each dwelling containing at least 3 bedrooms—1 parking space, and

Having regard to the above, the proposal of 22 units indicates a minimum requirement of 10 parking spaces.

For accessible parking space, Division 7, Part 5 (Housing for seniors and people with a disability) of SEPP 2021 specifies as following:

(j) for a development application made by, or made by a person jointly with, a social housing provider—at least 1 parking space for every 5 dwellings

Based on the above assessment, it is proposed to provide 11 parking spaces including five (5) accessible spaces to comply with the SEPP criteria.

5 Access and Circulation Design

A 5.5m wide two-way driveway will be provided at Eighteenth Avenue to provide access to an at-grade carpark. The access driveway has been designed in accordance with the AS2890.1 criteria. Details of a swept path analysis demonstrating a satisfactory provision are provided in **Attachment 4**.

5.1 Internal Circulation

A detailed review of the parking access and arrangement has been undertaken to assess its conformance with the AS2890.1 design criteria.

The assessment found the access and internal circulation to be of an adequate arrangement with provisions meeting the AS2890.1:2004 criteria. Details of a swept path analysis demonstrating satisfactory vehicle access and manoeuvre within the car parking facility are provided in **Attachment 4**.

It is separately noted that space 11 is suitably located and can accommodate entry and exit manoeuvres with no undue difficulty.

5.2 Loading and Servicing Circulation

Refuse collection will occur along the kerb frontage of Eighteenth Avenue. Any occasional loading activities related to deliveries, courier activity, maintenance etc. will rely on the ample on-street parking as is normal for small residential developments of this nature.

5.3 Design Assessment

Table 5-1 shows the minimum parking dimension in parking modules and access driveway requirements in accordance with the User Class 1A of AS2890.1.

Table 5-1 Parking Arrangement Requirement

Features	Requirement	Provision	Compliance	Notes
Access – Category 1				
Access Width	3.0m - 5.5m (combined)	Provided	Yes	
Location (Category 1)	6m from intersection tangent	N/A	Yes	
Sight Distance (50km/h)	Min 45m	Provided	Yes	
Sight Splays (Pedestrian)	2.5m x 2.0m	Provided	Yes	
Driveway / Ramp				
Ramp Grade	Max 25% (1 in 4)	Level	Yes	
Transitions	2.0m	Level	Yes	

Width (One-way)	3.0m	3.0m	Yes	
Gradient for First 6m of Driveway	Max 5% (1 in 20)	Level	Yes	
Height Clearance	2.2m	N/A	Yes	
Parking Modules (User Class 1A)				
Space Dimension	5.4m long x 2.4m wide	5.4m long x 2.4m wide	Yes	
Door Clearance	300mm	Provided	Yes	
Aisle Width	5.8m	6.1m	Yes	
Height Clearance	2.2m	N/A	Yes	
Gradient	Max 5% (1 in 20)	Level	Yes	

6 Traffic Assessment

6.1 Existing Traffic Generation

The RMS Guide to Traffic Generating Development provides a peak hour traffic generation rate of 0.85 vtph for low-density residential dwellings. Application of this rate to the four (4) single dwellings would indicate a traffic outcome of four (4) vtph.

6.2 Development Traffic Generation

The RMS commissioned Hyder to undertake surveys to study the trip generation for Seniors Housing in 2009. The study examined 10 seniors housing in NSW and provided a simple linear regression to determine the trip generation during PM peak periods. It is noted that the trip generation during AM peak (8:00am-9:00am) is not recorded as the peak generation for seniors housing development generally started at noon time.

An extract from the RMS Study is presented in Figure 6-1. It found that the peak hour during weekdays generates a higher traffic outcome in comparison to weekend.

Figure 6-1 Trip Generation for Seniors Housing Development

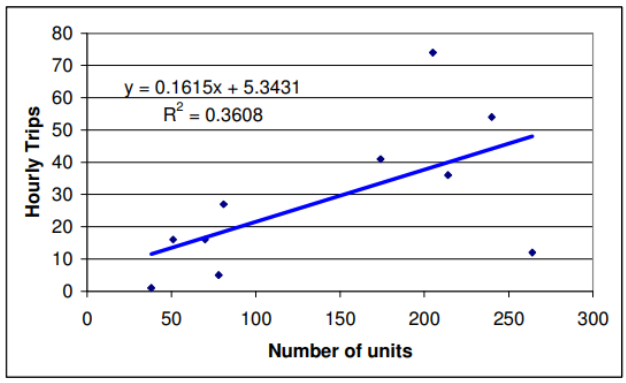


Figure 3-12 Vehicle Trips – Network PM Peak, Weekdays

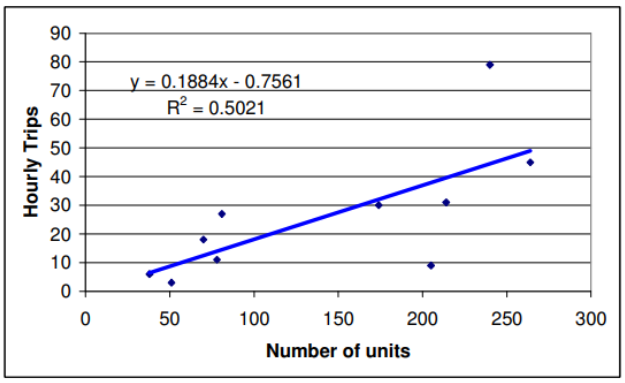


Figure 3-13 Vehicle Trips – Network Peak, Weekend

Source: Hyder Consulting Study, 2009

On this basis, the application of the weekday regression equation to the proposed 22-units development would indicate the following traffic outcome:

$$y=0.1615x + 5.3431$$

where y is the peak hour trip generation and x is the number of units

y=0.1615*(22) + 5.3431

y=8.8961 vtph

The proposed development will generate approximately nine (9) vtph during the PM peak.

6.3 Overall Traffic Generation and Distribution

Having regard to the above, the additional traffic generation outcome is calculated as follows:

Additional Traffic Generation = Development Traffic Generation – Existing Traffic Generation

= 9 vtph - 4 vtph

= 5 vtph

Based on the above, the proposal will likely result in the addition of five (5) vehicle movements per hour during PM peak period. Nonetheless, the existing traffic will not be discounted from the development traffic for a more conservative assessment outcome.

Based on the collected traffic survey data, the majority of the inbound/outbound traffic are from/to north and south via First Avenue an Toormina Road during peak periods. Thus, the expected traffic distributions are illustrated in Figure 6-2.

Figure 6-2 Traffic Distribution

Using the current traffic circumstance as a baseline, the results of the pre-development and post-development traffic operations are compared side-by-side in Table 6-1 overleaf.

Table 6-1 Existing and Post-Development SIDRA Assessment Outcome

Intersection	AM Peak		PM Peak	
	LOS	AVD	LOS	AVD
Pre-Development				
First Avenue / Eighteenth Avenue	A (ERT*)	10.0s	A (ERT*)	9.0s
Toormina Road / Hulberts Road	A (ERT*)	13.7s	A (ERT*)	10.9s
Post-Development				
First Avenue / Eighteenth Avenue	A (ERT*)	10.1s	A (ERT*)	9.0s
Toormina Road / Hulberts Road	A (ERT*)	13.8s	A (ERT*)	11.0s

Note: (ERT) denotes the worst operating movement – ERT abbreviates 'East approach Right Turn'

The SIDRA output is reproduced in **Attachment 2**.

The assessment indicates the existing intersections' LOS will be retained post-development. As such, it is concluded that the development would not adversely impact the existing road network.

7 Conclusion

The traffic and parking assessment undertaken for the proposed Seniors Housing development at 40-46 Eighteenth Avenue, Sawtell has concluded that:

- the traffic generation of the proposed development will not present any adverse traffic implications
- the proposed parking provision will comply with the SEPP criteria and will adequately serve the development
- the proposed access, internal circulation and parking arrangements will comply with AS2890.1 design criteria

Attachment 1

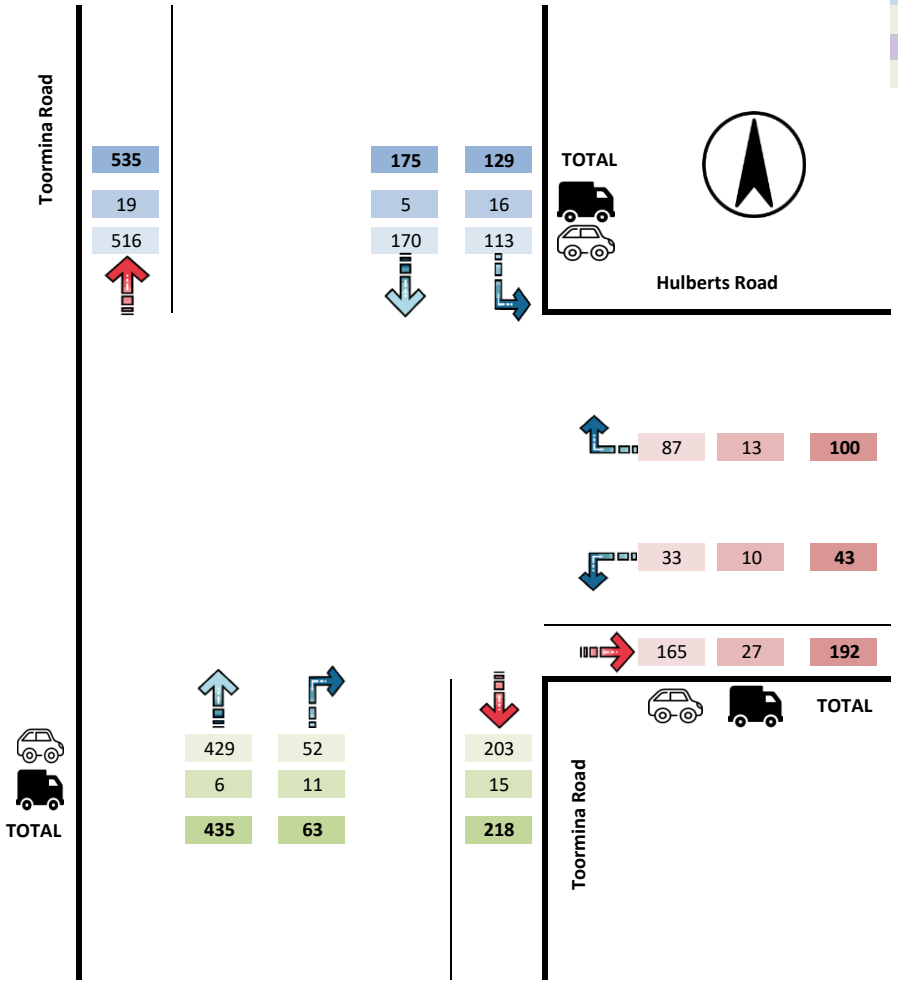
Traffic Surveys

Location	**Toormina Road**	**Duration**	**7:00 - 9:00**
	Hulberts Road		**16:00 - 18:00**
	Toormina Road		**-**
	-	**Day/Date**	**Friday, 5 May 2023**
Suburb	**SAWTELL**	**Weather**	**-**

DATA SELECTION

Select Time: PEAK

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



Traffic Information Specialist

ABN: 42 613 389 923

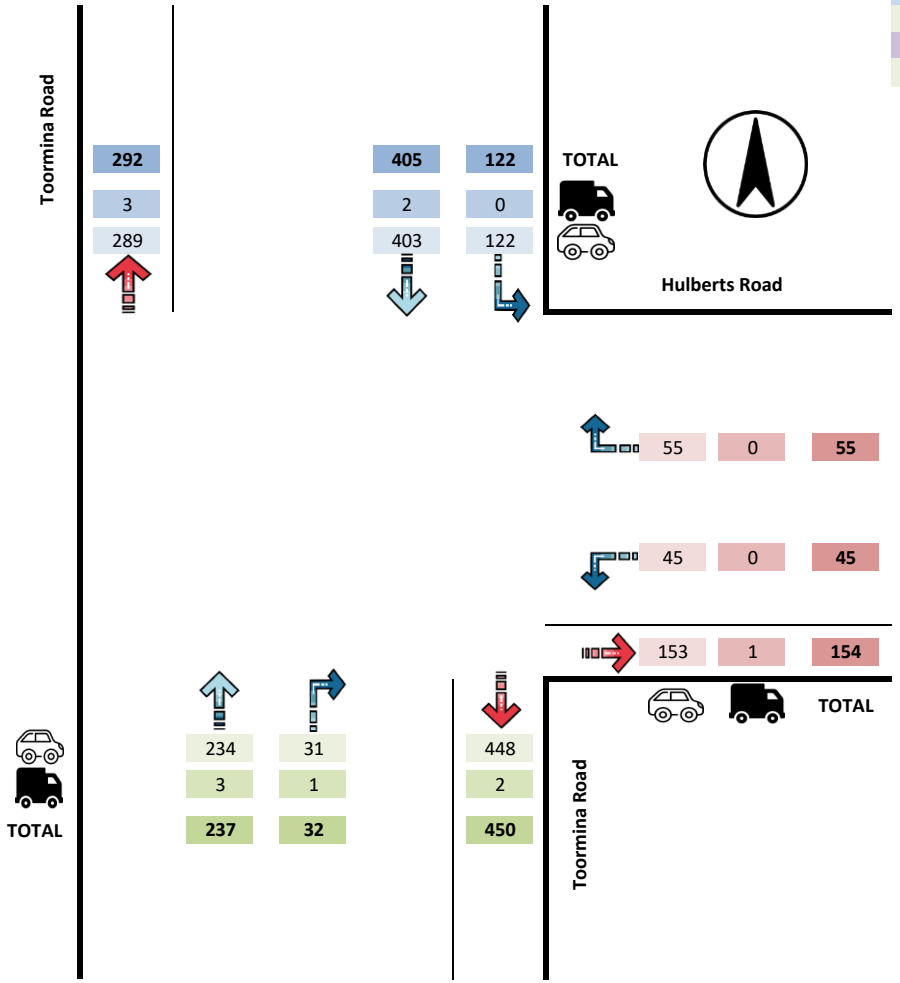
Email info@tistraffic.com.au

Location	**Toormina Road**	**Duration**	**7:00 - 9:00**
	Hulberts Road		**16:00 - 18:00**
	Toormina Road		**-**
	-	**Day/Date**	**Friday, 5 May 2023**
Suburb	**SAWTELL**	**Weather**	**-**

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
16:45	-	17:45



Traffic Information Specialist

ABN: 42 613 389 923

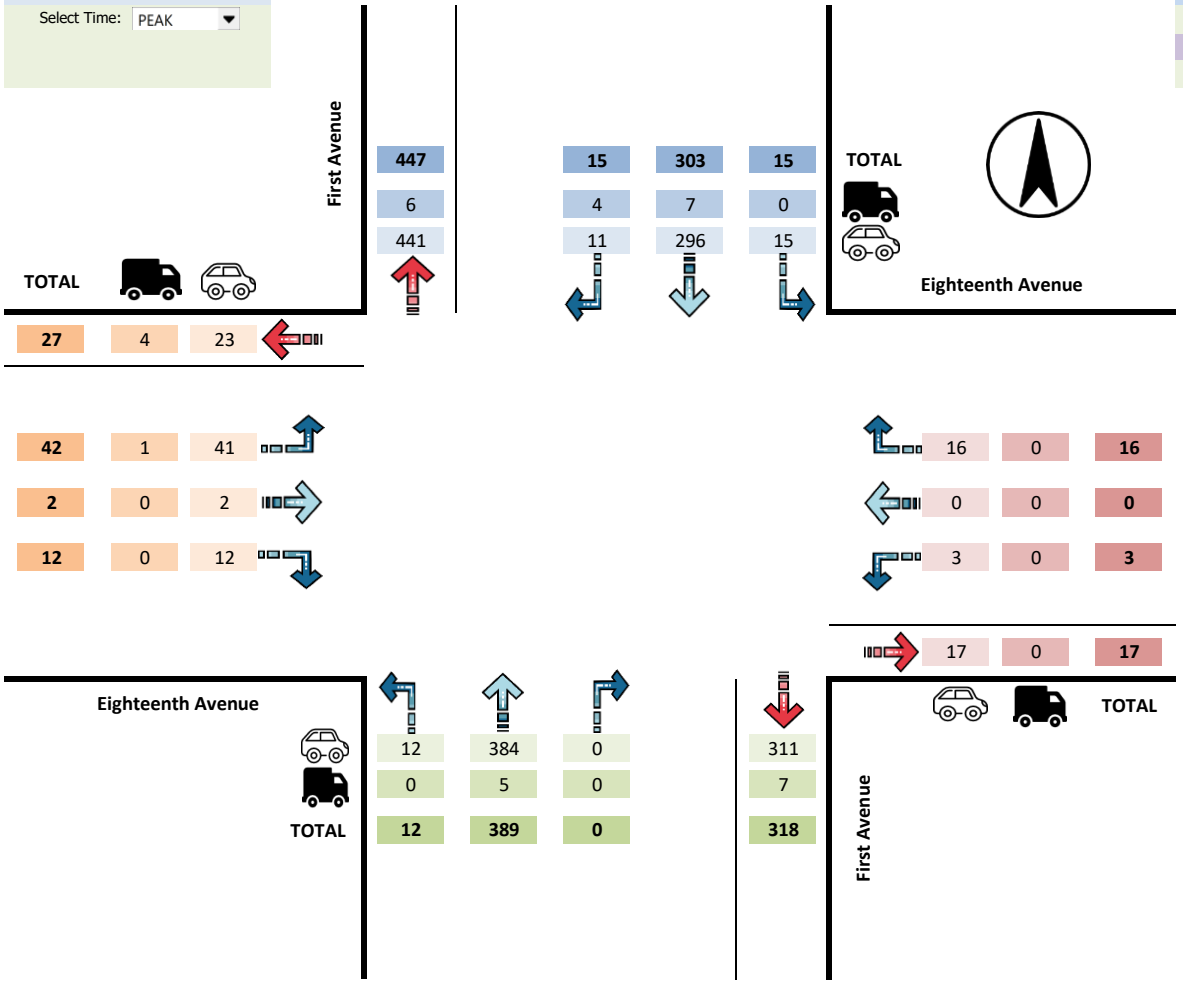
Email info@tistraffic.com.au

Location	First Avenue	Duration	7:00 - 9:00
	Eighteenth Avenue		16:00 - 18:00
	First Avenue		-
	Eighteenth Avenue	Day/Date	Wednesday, 3 May 2023
Suburb	SAWTELL	Weather	-

DATA SELECTION

Select Time: PEAK

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



Traffic Information Specialist

ABN: 42 613 389 923

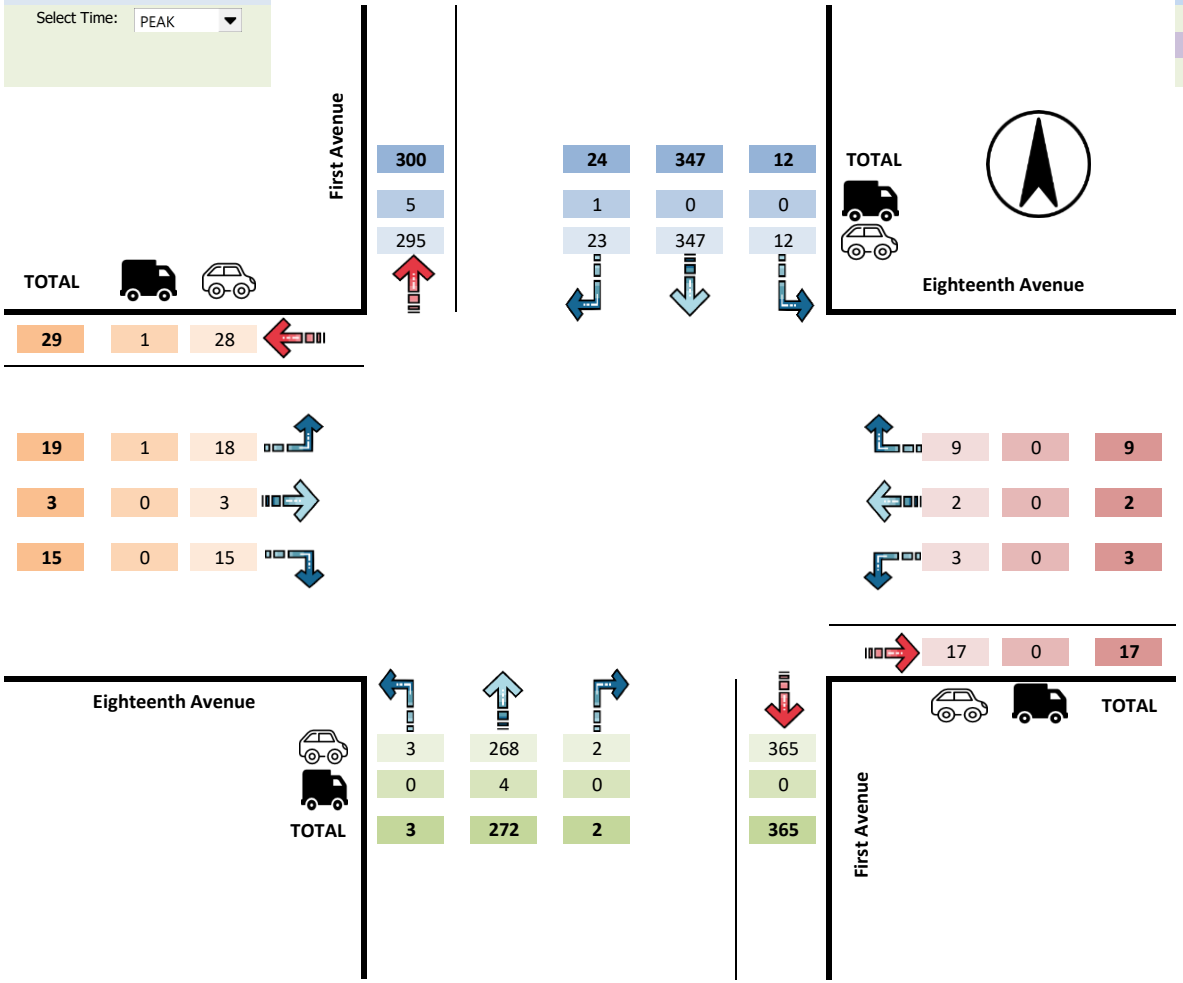
Email info@tistraffic.com.au

Location	First Avenue	Duration	7:00 - 9:00
	Eighteenth Avenue		16:00 - 18:00
	First Avenue		-
	Eighteenth Avenue	Day/Date	Wednesday, 3 May 2023
Suburb	SAWTELL	Weather	-

DATA SELECTION

Select Time: PEAK

TIME RANGE		
PEAK	-	PM
PEAK		
16:15	-	17:15



Traffic Information Specialist

ABN: 42 613 389 923

Email info@tistraffic.com.au

Attachment 2

SIDRA Outputs

MOVEMENT SUMMARY

Site: 102 [Toorimina Road | Hulberts Road (Site Folder: Post Development - PM Peak)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Toorimina Road														
2	T1	237	3	237	1.3	0.166	0.8	LOS A	0.5	3.5	0.19	0.08	0.19	48.9
3	R2	34	1	34	2.9	0.166	7.8	LOS A	0.5	3.5	0.19	0.08	0.19	48.2
Approach		271	4	271	1.5	0.166	1.7	NA	0.5	3.5	0.19	0.08	0.19	48.8
East: Hulberts Road														
4	L2	47	0	47	0.0	0.042	6.0	LOS A	0.2	1.1	0.42	0.60	0.42	45.6
6	R2	58	0	58	0.0	0.124	11.0	LOS A	0.5	3.2	0.64	0.84	0.64	42.9
Approach		105	0	105	0.0	0.124	8.7	LOS A	0.5	3.2	0.54	0.73	0.54	44.1
North: Toorimina Road														
7	L2	125	0	125	0.0	0.067	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
8	T1	405	2	405	0.5	0.208	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		530	2	530	0.4	0.208	1.1	NA	0.0	0.0	0.00	0.12	0.00	49.1
All Vehicles		906	6	906	0.7	0.208	2.2	NA	0.5	3.5	0.12	0.18	0.12	48.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [First Avenue | Eighteenth Avenue (Site Folder: Existing Development - PM Peak)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: First Avenue														
1	L2	3	0	3	0.0	0.144	5.2	LOS A	0.0	0.2	0.01	0.01	0.01	49.4
2	T1	272	4	272	1.5	0.144	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.9
3	R2	2	0	2	0.0	0.144	6.0	LOS A	0.0	0.2	0.01	0.01	0.01	48.9
Approach		277	4	277	1.4	0.144	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.9
East: Eighteenth Avenue														
4	L2	3	0	3	0.0	0.023	5.7	LOS A	0.1	0.5	0.50	0.67	0.50	44.7
5	T1	2	0	2	0.0	0.023	6.5	LOS A	0.1	0.5	0.50	0.67	0.50	44.7
6	R2	9	0	9	0.0	0.023	9.0	LOS A	0.1	0.5	0.50	0.67	0.50	44.3
Approach		14	0	14	0.0	0.023	7.9	LOS A	0.1	0.5	0.50	0.67	0.50	44.4
North: First Avenue														
7	L2	12	0	12	0.0	0.203	5.5	LOS A	0.3	1.8	0.08	0.05	0.08	49.0
8	T1	347	0	347	0.0	0.203	0.1	LOS A	0.3	1.8	0.08	0.05	0.08	49.5
9	R2	24	1	24	4.2	0.203	5.8	LOS A	0.3	1.8	0.08	0.05	0.08	48.5
Approach		383	1	383	0.3	0.203	0.6	NA	0.3	1.8	0.08	0.05	0.08	49.4
West: Eighteenth Avenue														
10	L2	19	1	19	5.3	0.048	5.5	LOS A	0.2	1.2	0.42	0.63	0.42	45.2
11	T1	3	0	3	0.0	0.048	6.7	LOS A	0.2	1.2	0.42	0.63	0.42	45.3
12	R2	15	0	15	0.0	0.048	8.9	LOS A	0.2	1.2	0.42	0.63	0.42	44.8
Approach		37	1	37	2.7	0.048	7.0	LOS A	0.2	1.2	0.42	0.63	0.42	45.0
All Vehicles		711	6	711	0.8	0.203	0.9	NA	0.3	1.8	0.08	0.08	0.08	49.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [Toorimina Road | Hulberts Road (Site Folder: Existing Development - PM Peak)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Toorimina Road														
2	T1	237	3	237	1.3	0.164	0.8	LOS A	0.5	3.3	0.18	0.07	0.18	48.9
3	R2	32	1	32	3.1	0.164	7.8	LOS A	0.5	3.3	0.18	0.07	0.18	48.2
Approach		269	4	269	1.5	0.164	1.6	NA	0.5	3.3	0.18	0.07	0.18	48.8
East: Hulberts Road														
4	L2	45	0	45	0.0	0.040	6.0	LOS A	0.2	1.1	0.42	0.60	0.42	45.6
6	R2	55	0	55	0.0	0.117	10.9	LOS A	0.4	3.0	0.64	0.83	0.64	43.0
Approach		100	0	100	0.0	0.117	8.7	LOS A	0.4	3.0	0.54	0.73	0.54	44.1
North: Toorimina Road														
7	L2	122	0	122	0.0	0.066	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
8	T1	405	2	405	0.5	0.208	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		527	2	527	0.4	0.208	1.1	NA	0.0	0.0	0.00	0.12	0.00	49.1
All Vehicles		896	6	896	0.7	0.208	2.1	NA	0.5	3.3	0.12	0.18	0.12	48.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [First Avenue | Eighteenth Avenue (Site Folder: Existing Development - AM Peak)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: First Avenue														
1	L2	12	0	12	0.0	0.208	4.7	LOS A	0.0	0.1	0.00	0.02	0.00	49.4
2	T1	389	5	389	1.3	0.208	0.0	LOS A	0.0	0.1	0.00	0.02	0.00	49.9
3	R2	1	0	1	0.0	0.208	5.9	LOS A	0.0	0.1	0.00	0.02	0.00	48.9
Approach		402	5	402	1.2	0.208	0.2	NA	0.0	0.1	0.00	0.02	0.00	49.9
East: Eighteenth Avenue														
4	L2	3	0	3	0.0	0.039	5.5	LOS A	0.1	0.9	0.54	0.74	0.54	44.0
5	T1	1	0	1	0.0	0.039	7.3	LOS A	0.1	0.9	0.54	0.74	0.54	44.1
6	R2	16	0	16	0.0	0.039	10.0	LOS A	0.1	0.9	0.54	0.74	0.54	43.6
Approach		20	0	20	0.0	0.039	9.2	LOS A	0.1	0.9	0.54	0.74	0.54	43.7
North: First Avenue														
7	L2	15	0	15	0.0	0.182	6.1	LOS A	0.2	1.7	0.08	0.05	0.08	49.0
8	T1	303	7	303	2.3	0.182	0.2	LOS A	0.2	1.7	0.08	0.05	0.08	49.5
9	R2	15	4	15	26.7	0.182	7.2	LOS A	0.2	1.7	0.08	0.05	0.08	48.1
Approach		333	11	333	3.3	0.182	0.8	NA	0.2	1.7	0.08	0.05	0.08	49.4
West: Eighteenth Avenue														
10	L2	41	1	41	2.4	0.065	6.0	LOS A	0.2	1.7	0.46	0.65	0.46	45.3
11	T1	2	0	2	0.0	0.065	7.4	LOS A	0.2	1.7	0.46	0.65	0.46	45.3
12	R2	12	0	12	0.0	0.065	9.8	LOS A	0.2	1.7	0.46	0.65	0.46	44.9
Approach		55	1	55	1.8	0.065	6.9	LOS A	0.2	1.7	0.46	0.65	0.46	45.2
All Vehicles		810	17	810	2.1	0.208	1.1	NA	0.2	1.7	0.08	0.09	0.08	49.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [Toorimina Road | Hulberts Road (Site Folder: Existing Development - AM Peak)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Toorimina Road														
2	T1	435	6	435	1.4	0.297	0.5	LOS A	0.9	6.2	0.17	0.07	0.17	49.2
3	R2	63	11	63	17.5	0.297	6.9	LOS A	0.9	6.2	0.17	0.07	0.17	48.2
Approach		498	17	498	3.4	0.297	1.3	NA	0.9	6.2	0.17	0.07	0.17	49.1
East: Hulberts Road														
4	L2	43	10	43	23.3	0.035	5.4	LOS A	0.1	1.2	0.28	0.52	0.28	45.6
6	R2	100	13	100	13.0	0.254	13.7	LOS A	1.0	7.9	0.71	0.90	0.79	41.5
Approach		143	23	143	16.1	0.254	11.2	LOS A	1.0	7.9	0.58	0.78	0.64	42.7
North: Toorimina Road														
7	L2	129	16	129	12.4	0.076	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	46.4
8	T1	175	5	175	2.9	0.091	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		304	21	304	6.9	0.091	2.0	NA	0.0	0.0	0.00	0.22	0.00	48.4
All Vehicles		945	61	945	6.5	0.297	3.0	NA	1.0	7.9	0.18	0.23	0.18	47.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [First Avenue | Eighteenth Avenue (Site Folder: Post Development - AM Peak)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: First Avenue														
1	L2	14	0	14	0.0	0.209	4.7	LOS A	0.0	0.1	0.00	0.02	0.00	49.4
2	T1	389	5	389	1.3	0.209	0.0	LOS A	0.0	0.1	0.00	0.02	0.00	49.9
3	R2	1	0	1	0.0	0.209	5.9	LOS A	0.0	0.1	0.00	0.02	0.00	48.9
Approach		404	5	404	1.2	0.209	0.2	NA	0.0	0.1	0.00	0.02	0.00	49.9
East: Eighteenth Avenue														
4	L2	3	0	3	0.0	0.039	5.5	LOS A	0.1	0.9	0.54	0.74	0.54	44.0
5	T1	1	0	1	0.0	0.039	7.3	LOS A	0.1	0.9	0.54	0.74	0.54	44.0
6	R2	16	0	16	0.0	0.039	10.1	LOS A	0.1	0.9	0.54	0.74	0.54	43.6
Approach		20	0	20	0.0	0.039	9.2	LOS A	0.1	0.9	0.54	0.74	0.54	43.7
North: First Avenue														
7	L2	15	0	15	0.0	0.184	6.1	LOS A	0.3	1.9	0.09	0.05	0.09	49.0
8	T1	303	7	303	2.3	0.184	0.2	LOS A	0.3	1.9	0.09	0.05	0.09	49.5
9	R2	17	4	17	23.5	0.184	7.1	LOS A	0.3	1.9	0.09	0.05	0.09	48.1
Approach		335	11	335	3.3	0.184	0.8	NA	0.3	1.9	0.09	0.05	0.09	49.4
West: Eighteenth Avenue														
10	L2	43	1	43	2.3	0.071	6.0	LOS A	0.3	1.8	0.46	0.66	0.46	45.2
11	T1	2	0	2	0.0	0.071	7.5	LOS A	0.3	1.8	0.46	0.66	0.46	45.3
12	R2	14	0	14	0.0	0.071	9.9	LOS A	0.3	1.8	0.46	0.66	0.46	44.8
Approach		59	1	59	1.7	0.071	7.0	LOS A	0.3	1.8	0.46	0.66	0.46	45.1
All Vehicles		818	17	818	2.1	0.209	1.2	NA	0.3	1.9	0.09	0.10	0.09	49.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 102 [Toorimina Road | Hulberts Road (Site Folder: Post Development - AM Peak)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Toorimina Road														
2	T1	435	6	435	1.4	0.299	0.5	LOS A	0.9	6.3	0.17	0.07	0.17	49.1
3	R2	65	11	65	16.9	0.299	7.0	LOS A	0.9	6.3	0.17	0.07	0.17	48.2
Approach		500	17	500	3.4	0.299	1.4	NA	0.9	6.3	0.17	0.07	0.17	49.0
East: Hulberts Road														
4	L2	45	10	45	22.2	0.036	5.4	LOS A	0.1	1.2	0.28	0.52	0.28	45.6
6	R2	103	13	103	12.6	0.262	13.8	LOS A	1.1	8.2	0.72	0.90	0.81	41.4
Approach		148	23	148	15.5	0.262	11.3	LOS A	1.1	8.2	0.58	0.79	0.65	42.6
North: Toorimina Road														
7	L2	132	16	132	12.1	0.077	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	46.4
8	T1	175	5	175	2.9	0.091	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		307	21	307	6.8	0.091	2.0	NA	0.0	0.0	0.00	0.23	0.00	48.4
All Vehicles		955	61	955	6.4	0.299	3.1	NA	1.1	8.2	0.18	0.23	0.19	47.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [First Avenue | Eighteenth Avenue (Site Folder: Post Development - PM Peak)]

New Site
Site Category: Existing Design
Give-Way (Two-Way)

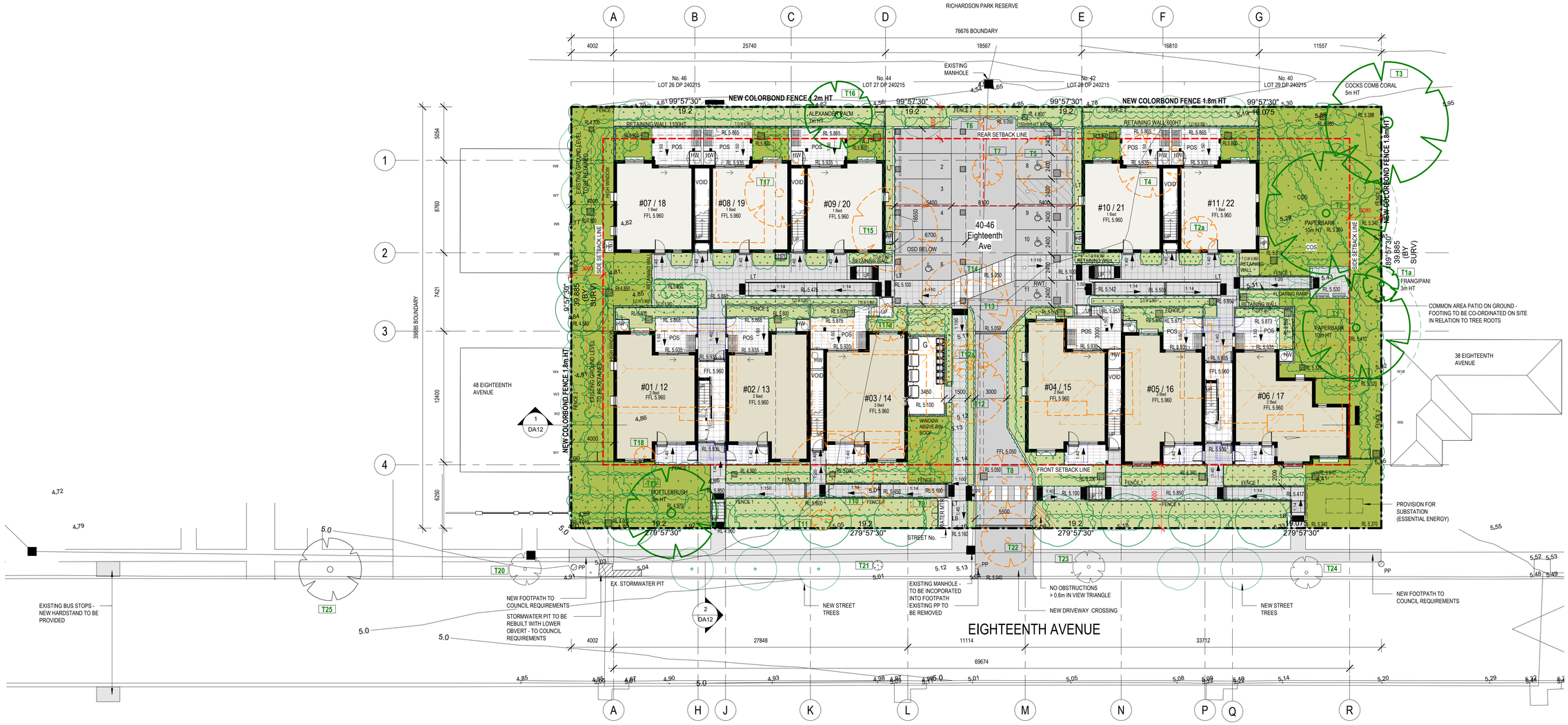
Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND 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	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: First Avenue														
1	L2	5	0	5	0.0	0.145	5.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.4
2	T1	272	4	272	1.5	0.145	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.9
3	R2	2	0	2	0.0	0.145	6.0	LOS A	0.0	0.2	0.01	0.01	0.01	48.9
Approach		279	4	279	1.4	0.145	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.9
East: Eighteenth Avenue														
4	L2	3	0	3	0.0	0.023	5.7	LOS A	0.1	0.5	0.50	0.67	0.50	44.7
5	T1	2	0	2	0.0	0.023	6.6	LOS A	0.1	0.5	0.50	0.67	0.50	44.7
6	R2	9	0	9	0.0	0.023	9.0	LOS A	0.1	0.5	0.50	0.67	0.50	44.3
Approach		14	0	14	0.0	0.023	8.0	LOS A	0.1	0.5	0.50	0.67	0.50	44.4
North: First Avenue														
7	L2	12	0	12	0.0	0.205	5.5	LOS A	0.3	1.9	0.08	0.05	0.08	49.0
8	T1	347	0	347	0.0	0.205	0.1	LOS A	0.3	1.9	0.08	0.05	0.08	49.5
9	R2	26	1	26	3.8	0.205	5.8	LOS A	0.3	1.9	0.08	0.05	0.08	48.4
Approach		385	1	385	0.3	0.205	0.7	NA	0.3	1.9	0.08	0.05	0.08	49.4
West: Eighteenth Avenue														
10	L2	21	1	21	4.8	0.053	5.5	LOS A	0.2	1.3	0.42	0.64	0.42	45.1
11	T1	3	0	3	0.0	0.053	6.8	LOS A	0.2	1.3	0.42	0.64	0.42	45.3
12	R2	17	0	17	0.0	0.053	9.0	LOS A	0.2	1.3	0.42	0.64	0.42	44.8
Approach		41	1	41	2.4	0.053	7.1	LOS A	0.2	1.3	0.42	0.64	0.42	45.0
All Vehicles		719	6	719	0.8	0.205	1.0	NA	0.3	1.9	0.08	0.08	0.08	49.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Attachment 3

Architectural Plans



LEGEND

- COMMON AREA
- 1 BEDROOM UNIT
- 2 BEDROOM UNIT
- BALCONY / PATIO
- CONCRETE / PATHWAY
- DRIVEWAY
- LANDSCAPE AREA
- DEEP SOIL ZONE

P.O.S.	PRIVATE OPEN SPACE
PP	POWER POLE
T	TELSTRA PIT
H	HYDRANT
SW	STORMWATER
RL	INDICATIVE RELATIVE LEVEL
C.O.S.	COMMON OPEN SPACE
G	GARBAGE BINS
LT	EXTERIOR WALL MOUNT LIGHT

- EXISTING TREE TO BE RETAINED MEDIUM RETENTION VALUE (WITH TPZ DASHED)
- EXISTING TREE TO BE RETAINED LOW RETENTION VALUE (WITH TPZ DASHED)
- EXISTING TREE - TO BE DEMOLISHED
- NEW PROPOSED TREES
- NEW PROPOSED LANDSCAPING - REFER TO LANDSCAPE PLAN

GENERAL NOTES:

- REFER TO ENGINEERS DOCUMENTATION FOR PROPOSED STORMWATER
- REFER SURVEY DOCUMENTATION FOR ALL EXISTING SERVICES
- REFER TO LANDSCAPE PLAN FOR PLANTING TYPES
- ALL SLOPE ARROWS SHOW SLOPE UP UNLESS ANNOTATED 'FALL'
- READ IN CONJUCTION WITH CUT & FILL PLAN
- FENCE FEN-1 TYPICAL HEIGHT 1.2m (FRONT FENCE)
- FENCE FEN-1A TYPICAL HEIGHT 1.8m AT WEST (FRONT), 1.6m AT EAST (FRONT), EXCEPT AS NOTED
- FENCE FEN-2 TYPICAL HEIGHT 1.8m (BOUNDARY FENCE), EXCEPT AS NOTED
- FENCE FEN-3 TYPICAL HEIGHT 1.6m (PRIVACY FENCE), EXCEPT AS NOTED
- FENCE FEN-4 TYPICAL HEIGHT 1.4m (BIN AREA BRICK WALLS)

North

NSW GOVERNMENT

LOCKED BAG 5022
PARRAMATTA NSW 2124
Ph 1800 738 718
www.dpie.nsw.gov.au/land-and-housing-corporation

NOMINATED ARCHITECT:	SIGNATURE:
MICHAEL BULLEN	

REV	DATE	NOTATION/AMENDMENT
E	21/09/23	PART 5 FOR REVIEW
D	18/07/23	FOR REVIEW
C	21/06/23	FOR REVIEW
B	26/05/23	FOR REVIEW
A	23/03/23	FOR REVIEW

DO NOT SCALE DRAWINGS. CHECK ALL DIMENSIONS ON SITE. FIGURED DIMENSIONS TAKE PRECEDENCE.

ARCHITECT: BREWSTER MURRAY PTY LTD, PH (02) 9299 0988
CONSULTING ENGINEERS: GREENVIEW CONSULTING
BCA CONSULTANT:
LANDSCAPE CONSULTANT: GREENLAND DESIGN
CLIENT: DEPARTMENT OF PLANNING & ENVIRONMENT LAND & HOUSING CORPORATION
PROJECT: SENIORS HOUSING DEVELOPMENT UNDER NSW HOUSING SEPP 2021
40-46 EIGHTEENTH AVE, SAWTELL, NSW
LOT 26-29 (INCLUSIVE) IN DP 240215
TITLE: SITE PLAN
FILE:
PLOTTED:

STATUS	SKETCH DESIGN		
DATE 21/09/23	SCALE 1:200	PROJ MB	PROJECT No BGYVU
STAGE	SHEET SIZE A1	DESIGNER AG	CHECKED MB
TYPE	SHEET DA04		REV E

Attachment 4

Turning Path Assessments

NEW COLORBOND FENCE 1.2m HT

NEW COLORBOND FENCE 1.8m HT

NEW COLORBOND FENCE 1.8m HT

ALEXANDER PALM 7m HT

RETAINING WALL 1100HT

RETAINING WALL 600HT

EXISTING GROUND LEVEL TO BE RETAINED

HIGH WINDOW

SIDE SETBACK LINE

REAR SETBACK LINE

FRONT SETBACK LINE

40-46 Eighteenth Ave

#07 / 18
1 Bed
FFL 5.960

#08 / 19
1 Bed
FFL 5.960

#09 / 20
1 Bed
FFL 5.960

#10 / 21
1 Bed
FFL 5.960

#11 / 22
1 Bed
FFL 5.960

#01 / 12
2 Bed
FFL 5.960

#02 / 13
2 Bed
FFL 5.960

#03 / 14
2 Bed
FFL 5.960

#04 / 15
2 Bed
FFL 5.960

#05 / 16
2 Bed
FFL 5.960

#06 / 17
2 Bed
FFL 5.960

T1 PAPERBARK 10m HT

T2 PAPERBARK 10m HT

T2a

T4

T5

T6

T7

T8

T9

T10

T11

T12

T12a

T13

T14

T15

T17

T17a

T18

T19 BOTTLEBRUSH 5m HT

T21

T22

T23

T24

WINDOW ABOVE BIN ROOF

WATER MTR

STREET No.

EXISTING MANHOLE - TO BE INCOPORATED INTO FOOTPATH EXISTING PP TO BE REMOVED

EX. STORMWATER PIT

NEW STREET TREES

NEW STREET TREES

NO OBSTRUCTIONS > 0.6m IN VIEW TRIANGLE

NEW DRIVEWAY CROSSING

EIGHTEENTH AVENUE

4002 | 27848 | 11114 | 33712

2
DA12

40-46 EIGHTEENTH AVENUE, SAWTELL
PROPOSED SENIOR HOUSING DEVELOPMENT
COMPLIANCE REVIEW

DRAWING REF NO. GT22011-V1.4-SP

SHEET NO. 01 OF 04

ISSUE DATE 25 September 2023

DESIGNED BY L.NG

REVIEWED BY B.LO

SCALE A3 1:200

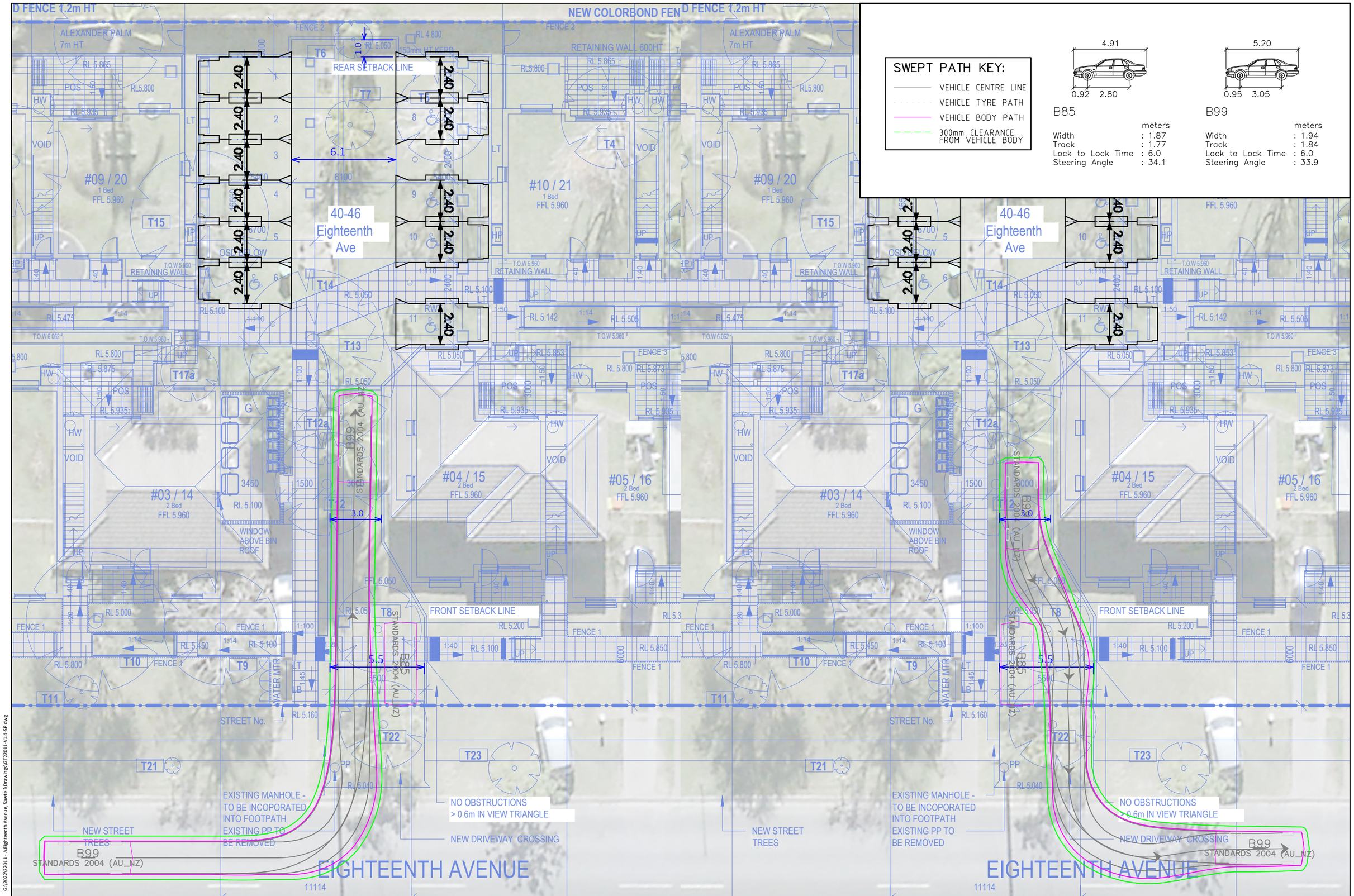
PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY.
THE EXACT LOCATIONS SHALL BE PROVEN ON SITE.
ALL EXISTING SERVICES SHOWN ARE NOT GUARANTEED.

Genesis Traffic

G:\2022\22011 - 4 Eighteenth Avenue, Sawtell\Drawings\GT22011-V1.4-SP.dwg

Plotted by Genesis



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

40-46 EIGHTEENTH AVENUE, SAWTELL
PROPOSED SENIOR HOUSING DEVELOPMENT
SWEPT PATH ASSESSMENT - B99 ENTER AND EXIT THE SITE WHILST PASSING A B85

DRAWING REF NO. GT22011-V1.4-SP SHEET NO. 02 OF 04 ISSUE DATE 25 September 2023

DESIGNED BY L.NG REVIEWED BY B.LO

SCALE A3 0 2.0 4.0 1:200

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY SUBJECT TO CHANGE WITHOUT NOTIFICATION

WARNING
THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY.
THE EXACT LOCATIONS SHALL BE PROVEN ON SITE.
ALL EXISTING SERVICES SHOWN ARE NOT GUARANTEED.

Genesis Traffic

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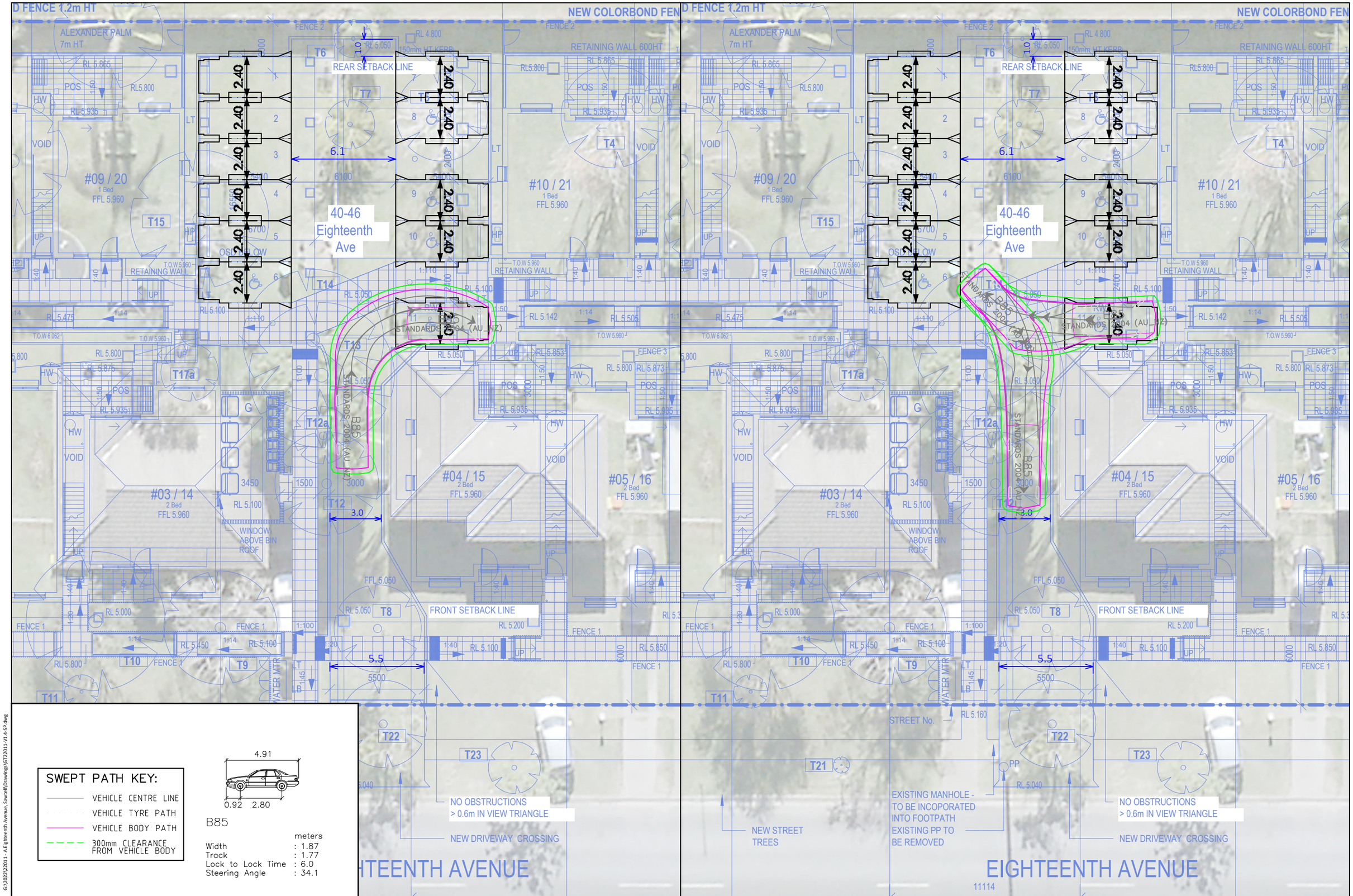
Plotted by Genesis



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

40-46 EIGHTEENTH AVENUE, SAWTELL
PROPOSED SENIOR HOUSING DEVELOPMENT
SWEPT PATH ASSESSMENT - B99 ENTER AND EXIT THE SITE WHILST PASSING A B85

DRAWING REF NO. GT22011-V1.4-SP SHEET NO. 03 OF 04 ISSUE DATE 25 September 2023

DESIGNED BY L.NG REVIEWED BY B.LO

SCALE A3 0 2.0 4.0 1:200

PRELIMINARY PLAN
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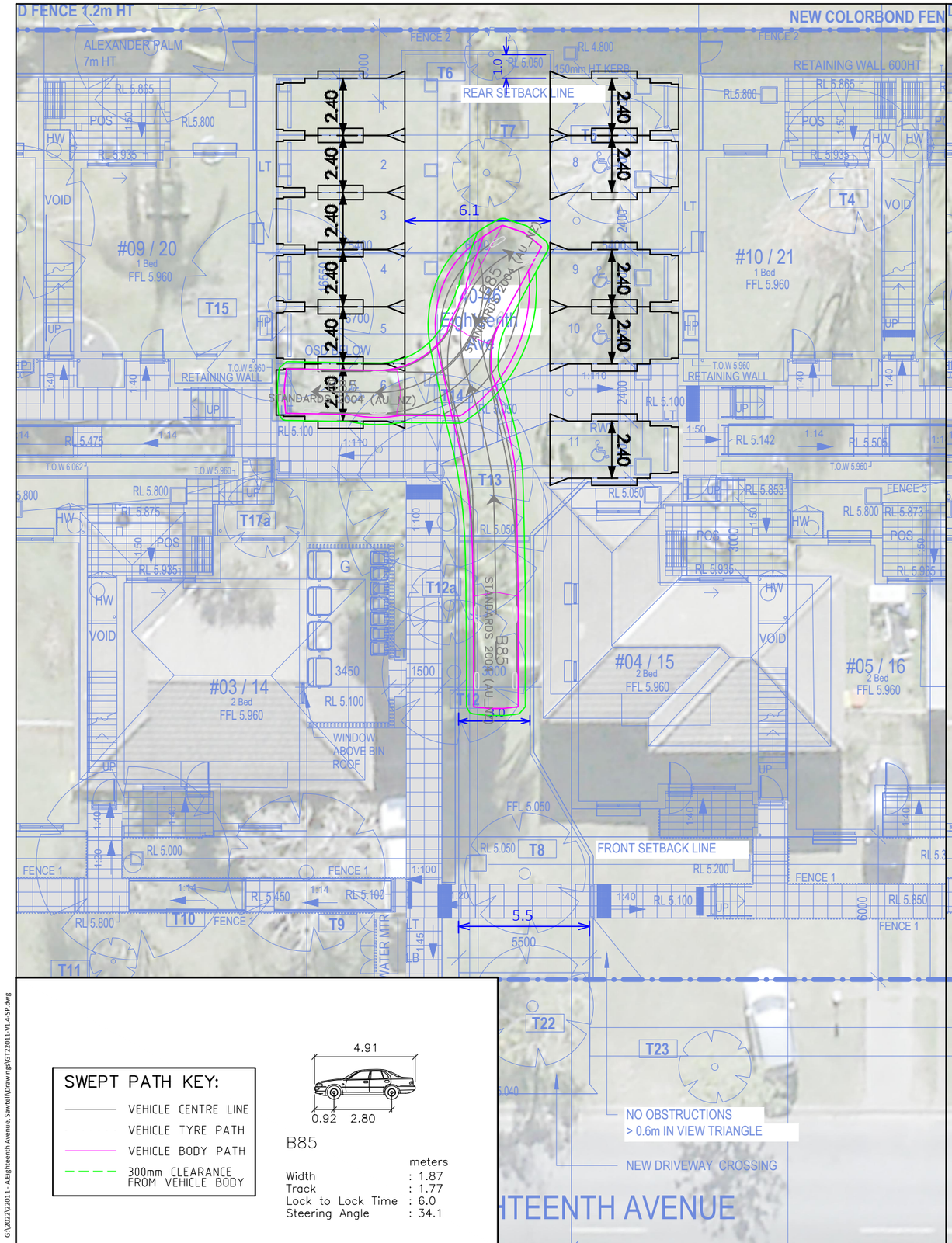

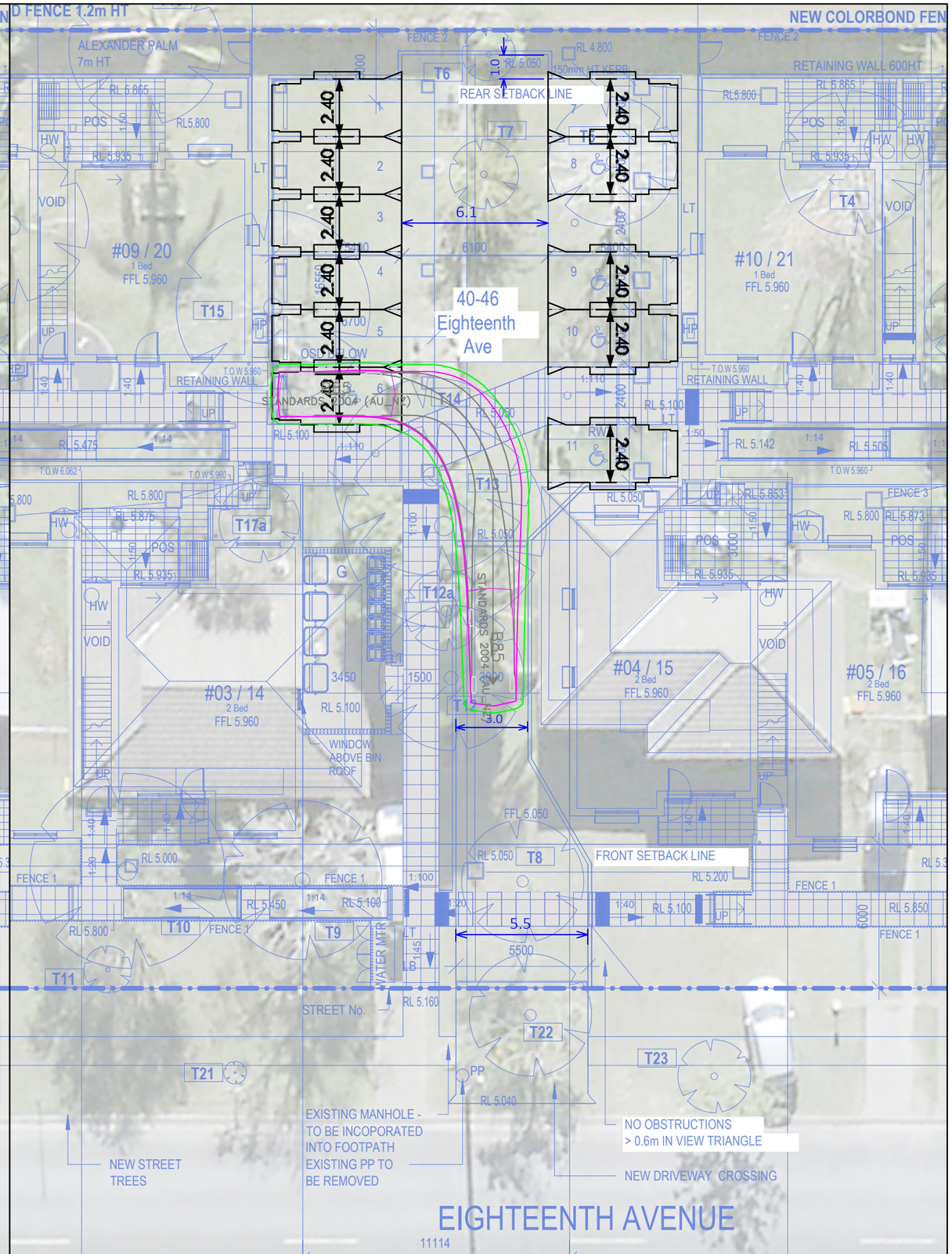

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DRAWING REF NO. GT22011-V1.4-SP | SHEET NO. 04 OF 04 | ISSUE DATE 25 September 2023

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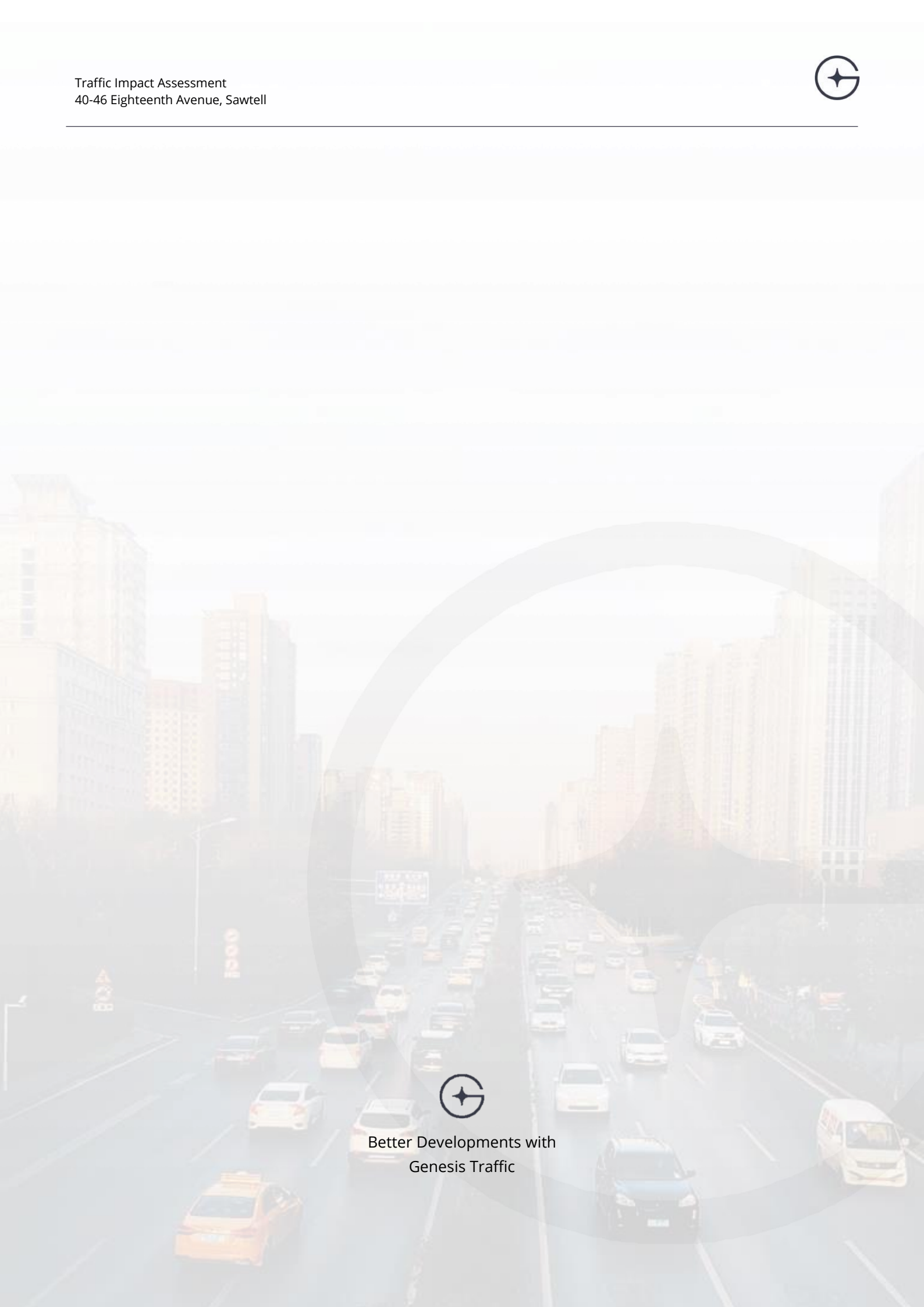

Better Developments with
Genesis Traffic