

**APPENDIX H**

**TRAFFIC  
ENGINEERING  
REPORT**

21 August 2024

St George Community Housing Limited  
C/- Colab Projects  
36 Warry Street  
Fortitude Valley QLD 4006

Attention: Penny Gill

Dear Penny,

**RE: 41-49 PLAZA PLACE, CARSELDINE  
TRAFFIC ENGINEERING ASSESSMENT**

**INTRODUCTION**

This report has been prepared by Pekol Traffic and Transport (PTT), as requested by Colab Projects, on behalf of St George Community Housing Limited, to assess the traffic engineering aspects of a proposed affordable housing development at 41- 49 Plaza Place, Carseldine.

The aim of this assessment is to review the proposed development in terms of its site access arrangements, parking provision and design, servicing arrangements, pedestrian / cyclist facilities and likely traffic impact, with respect to the Brisbane City Council's (BCC) 2014 City Plan, Australian Standards AS2890.1 Parking Facilities Part 1: Off-Street Car Parking and the Fitzgibbon Urban Development Area Development Scheme.

**EXISTING CONDITIONS**

**SUBJECT SITE**

The subject site is zoned as a emerging community, according to BCC's 2014 City Plan and includes Lots 2049 and 2050 on SP311913. The site is bounded by a new local street to the north (which is currently under construction), Plaza Place to the east, parkland to the south and west.

The surrounding area consists of community and residential uses. It is understood that a local centre is currently being constructed to the north of the site, as shown in Figure 1.

Access to the site is currently provided via a single crossover on Plaza Place.



Figure 1: SITE LOCALITY



## ROAD NETWORK

Plaza Place is a divided road with one lane of traffic in each direction and has a posted speed of 40km/h. It is not included in BCC's Road Hierarchy Overlay. However, based on its cross-section and the scale of the surrounding residential catchment, Plaza Place would likely operate as a neighbourhood road (ie minor road). Indented on-street parking bays are located along the site frontage on Plaza Place.

A new local street with a 5.5m wide carriageway and indented on-street parking bays is currently under construction on the northern site frontage. This new local street intersects Plaza Place at an all-movements T-intersection adjacent to the subject site. It is expected that this new road would also have a 40km/h posted speed.

## PROPOSED DEVELOPMENT

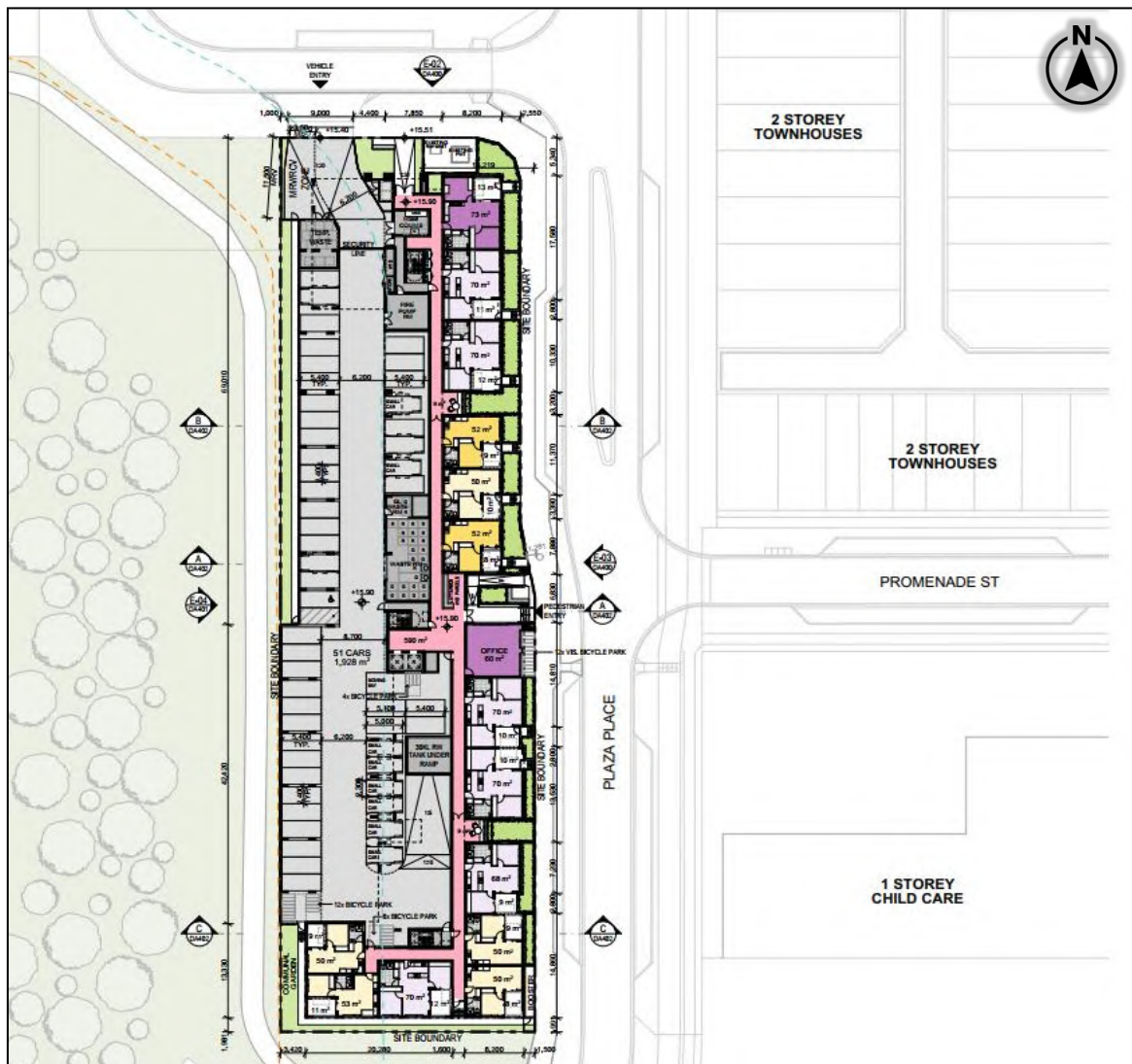
### OVERVIEW

The proposed application seeks approval for a Material Change of Use (MCU) for a social housing development over the site. The proposal comprises:

- 56 one-bedroom units
- 90 two-bedroom units
- six three-bedroom units
- 102 residential parking spaces, over two parking levels
- 63 bicycle parking spaces

The ground floor parking layout is shown in Figure 2, with dimensioned plans attached.

Figure 2: PROPOSED GROUND FLOOR LAYOUT



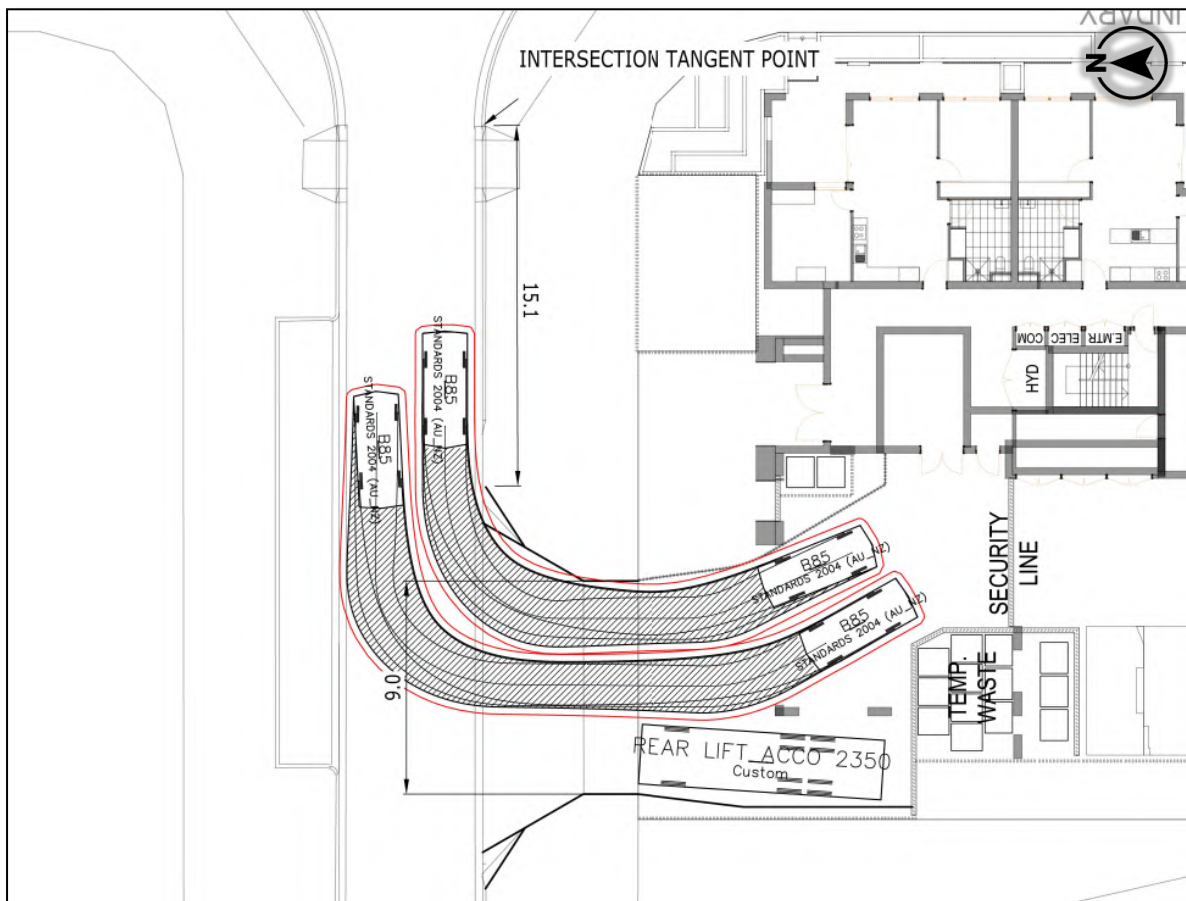
## ACCESS

### Location and Design

Vehicular access to the development is proposed via an all-movements crossover on the new local street, on the northern site frontage. The proposed access location achieves approximately 14.0m separation to the nearby T-intersection (measured to the intersection tangent point), which accords with AS2890.1.

A Type B2 (General Wide Flare) crossover design has been adopted, in accordance with BCC Standard Drawing BSD-2021. The proposed crossover is 9.0m wide and as demonstrated in Figure 3, sufficient width is provided to allow a refuse collection vehicle (RCV) to stand wholly on-site, whilst maintaining two-way light vehicle movements.

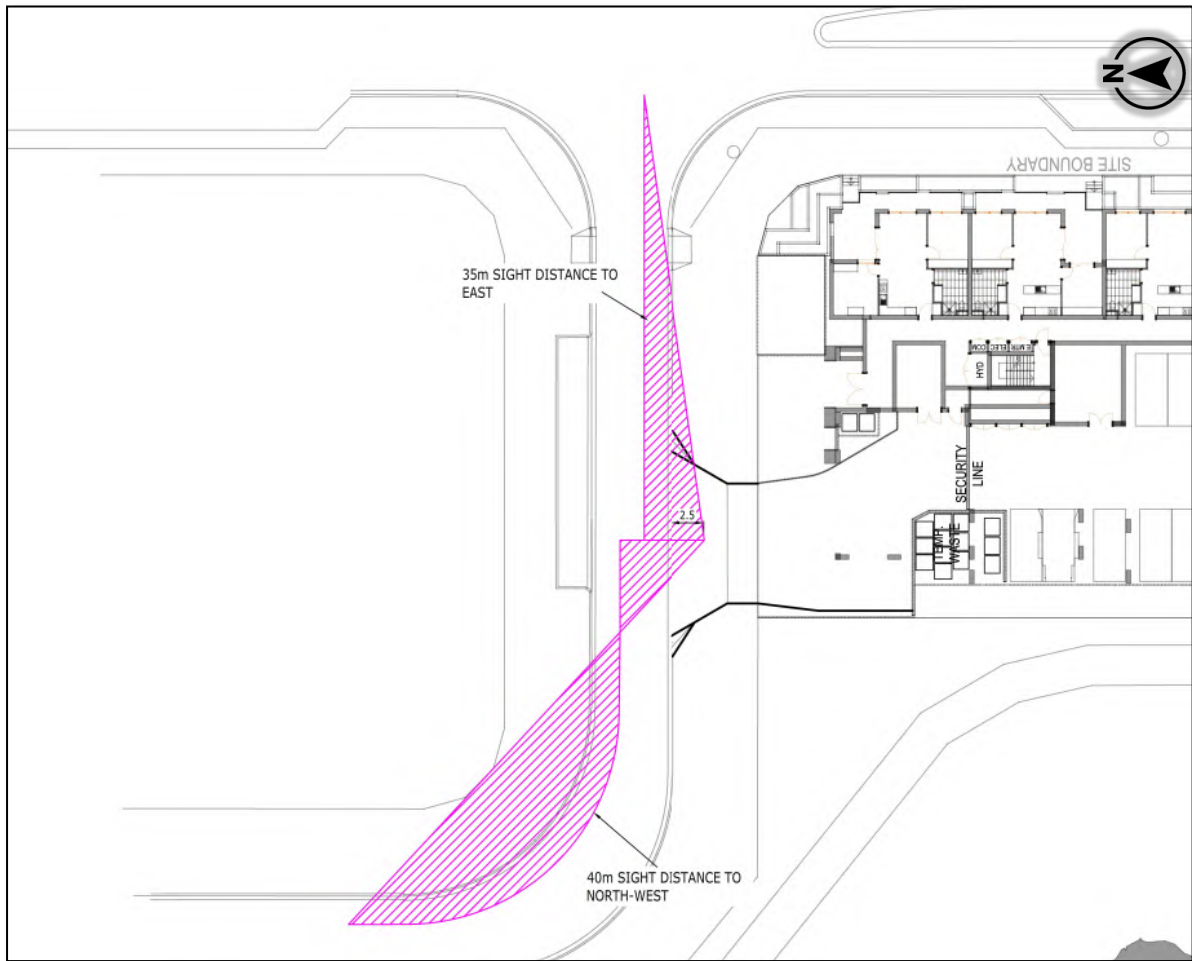
Figure 3: PROPOSED GROUND FLOOR LAYOUT



### Sight Distance

We estimate the proposed access would achieve approximately 35m sight distance of the east (to Plaza Place) and 40m sight distance to the north-west, as shown in Figure 4. It is expected that vehicles approaching the site from the east (having just turning left / right from Plaza Pace) would be travelling at low speeds (ie around 20km/h). Similarly, it is expected that vehicles approaching the site from the north-west on the new road would also be travelling at low speeds, due to the tight horizontal curve on approach to the site access. Accordingly, the available sight distance at the site access is considered adequate.

Figure 4: AVAILABLE SIGHT DISTANCE



### Queuing

BCC's TAPS Policy recommends that sufficient on-site queuing be provided to allow a free influx of traffic which will not adversely impact traffic or pedestrian flows on the frontage road (ie new road). The 99<sup>th</sup> percentile queue at the site access is considered to be an acceptable design queue.

The proposed development is expected to generate around 60 two-way vehicle trips during peak times (ie based on a conservative peak hour trip rate of 0.4 trips per dwelling). The predicted 99<sup>th</sup> percentile queue at the site access has been calculated based on 42 vehicles (ie the predicted peak hour arrivals) arriving during the peak hour, using the queuing theory outlined in the attached Queuing Practice.

The results of the analysis indicate a 99<sup>th</sup> percentile queue of 1.6 vehicles (ie 9.7m). The proposed access provides approximately 16.0m (ie in excess of two car lengths) of queue storage between the new road property boundary and the secure line. Thus, sufficient queue storage is proposed to cater for the expected 99<sup>th</sup> percentile queue.

## PARKING

### *Requirement*

The subject site is located within the Fitzgibbon Priority Development Area and is within 400m walking distance of Carseldine Train Station. The Fitzgibbon Development Scheme requires parking, for residential uses located within 400m of high frequency public transport interchange, be provided at rate of 0.75 spaces per dwelling / unit. A total of 152 units are proposed, and thus the application of this rate equates to a minimum parking requirement of 114 spaces. The Fitzgibbon Development Scheme does not specify a separate visitor parking requirement.

### *Provision*

The current development plans include 101 parking spaces, including one persons with disability (PWD) bay, which results in a shortfall of 13 parking spaces (compared to the minimum parking requirement) and a provision rate of 0.66 spaces per dwelling. However, it is understood that EDQ are supportive of a parking shortfall and provision rate for the subject development.

### *Design*

The proposed parking facilities have been designed generally in accordance with BCC's TAPS Policy and AS2890.1 in terms of bay dimensions, aisle widths, ramp grades, vehicle circulation and manoeuvring. This is typified by:

- residential parking spaces – dimensioned 2.4m wide by 5.4m long
- small residential parking spaces – dimensioned 2.3m wide by 5.0m long
- PWD parking space – dimensioned 2.4m wide by 5.4m long with an adjacent shared bay of equivalent dimensions
- parking aisles – dimensioned 6.2m wide
- parking clearances to adjacent walls / high obstructions – dimensioned 0.3m wide
- columns located a minimum of 0.75m from the open ends of parking spaces
- basement height clearance – minimum 2.3m
- end of parking aisle extension – dimensioned 1.0m wide
- ramp grade – maximum 1:5
- ramp transitions – maximum 1:10

A swept path of two opposing B85 (medium) cars accessing / egress the ramp is attached

## SERVICING

### *Refuse Collection*

A service vehicle loading area is proposed adjacent to the site access crossover and temporary bin store. It is understood that refuse would be managed on-site, with refuse transferred from the main bin store to a temporary bin store on collection days. In accordance with BCC's Refuse Planning Scheme Policy, a

rear-lift RCV would access the site (in a single reverse manoeuvre), stand adjacent to the temporary bin store and then exit the site in a forward gear, as shown in the attached swept path drawing. Accordingly, the proposed refuse collection arrangement is considered appropriate.

### *Deliveries*

Given the small scale of the proposed dwellings, the occasional service vehicle is expected to be a Medium Rigid Vehicle (ie furniture delivery vehicle). This vehicle is expected to follow a similar path to the RCV.

### PEDESTRIANS

Dedicated pedestrian accesses would be provided on both Plaza Place and the new access street frontage. All pedestrian accesses would be separate to the main vehicular driveway and would provide a safe and direct connection between the external pedestrian network and the lift lobbies / building entrances.

### CYCLISTS

The Fitzgibbon Urban Development Area Development Scheme does not specify a minimum bicycle parking requirement. Accordingly, the minimum bicycle parking requirement has been determined based on rates included in Austroads Guide to Traffic Management Part 11: Parking. The following rates apply for a multiple dwelling:

- residents: one space per three dwellings
- visitors: one space per 12 dwellings

The application of these rates equates to a minimum requirement of 51 resident spaces and 12 visitor spaces. The proposed layout provides 63 bicycle parking spaces (ie 51 residential and 12 visitor spaces) which accords with Austroads requirements.

A study undertaken by St George Community Housing across their existing social / affordable housing sites in New South Wales indicates that up to 20% of their tenants own a bicycle. This suggests that utilisation of on-site bicycle parking is expected to be low. On this basis, it is our view that sufficient bicycle parking has been provided.



## CONCLUSION

The proposed development has been evaluated in terms of the site access arrangements, parking provision and design, servicing arrangements and active transport facilities. The main points to note are:

- the development application seeks approval for 152 affordable housing units
- site access is proposed via a new all-movements driveway on the northern site frontage
- the proposed access location and design generally accords with AS2890.1 and BCC's TAPS Policy
- sufficient sight distance and queuing would be achieved at the site access
- a total of 101 parking spaces is proposed, which EDQ consider appropriate for the proposed scale of use
- the proposed on-site parking facilities have been designed generally in accordance with BCC's TAPS Policy and AS2890.1
- a loading area is proposed adjacent to the site access driveway which would adequately cater for on-site RCV and MRV servicing
- a total of 63 bicycle parking spaces are proposed, which accords with Austroads

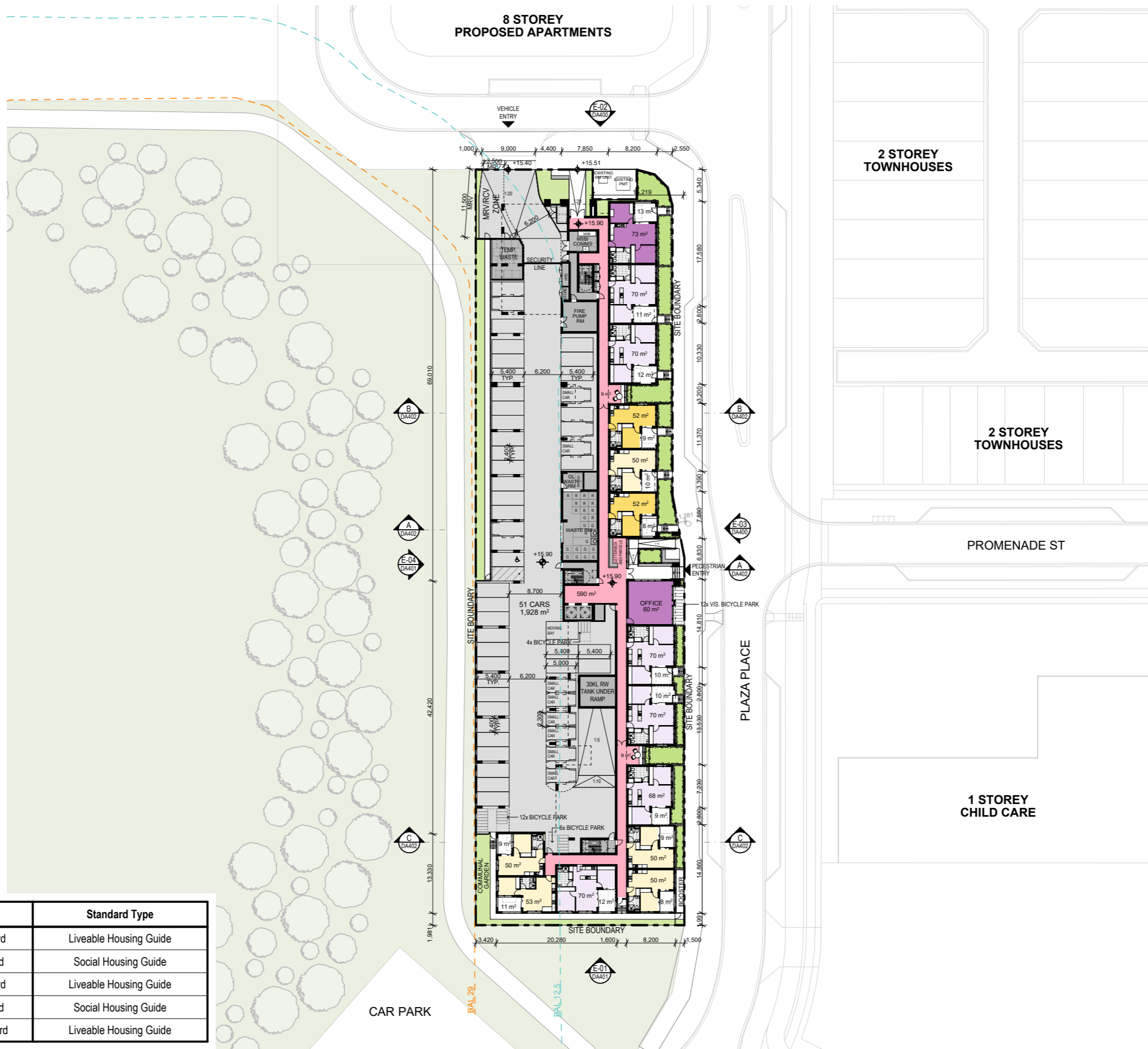
If you have any questions regarding the issues discussed above, please do not hesitate to contact us.

Yours sincerely,

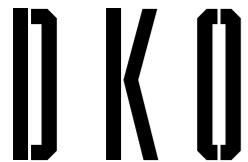


James Gannon  
Director (RPEQ: 22233)

**Plans**  
Ground Floor Plan



Unit Type	Unit Standard	Standard Type
1 Bed 1 Bath	Silver Standard	Liveable Housing Guide
1 Bed 1 Bath	Gold Standard	Social Housing Guide
2 Bed 1 Bath	Silver Standard	Liveable Housing Guide
2 Bed 1 Bath	Gold Standard	Social Housing Guide
3 Bed 1.5 Bath	Silver Standard	Liveable Housing Guide



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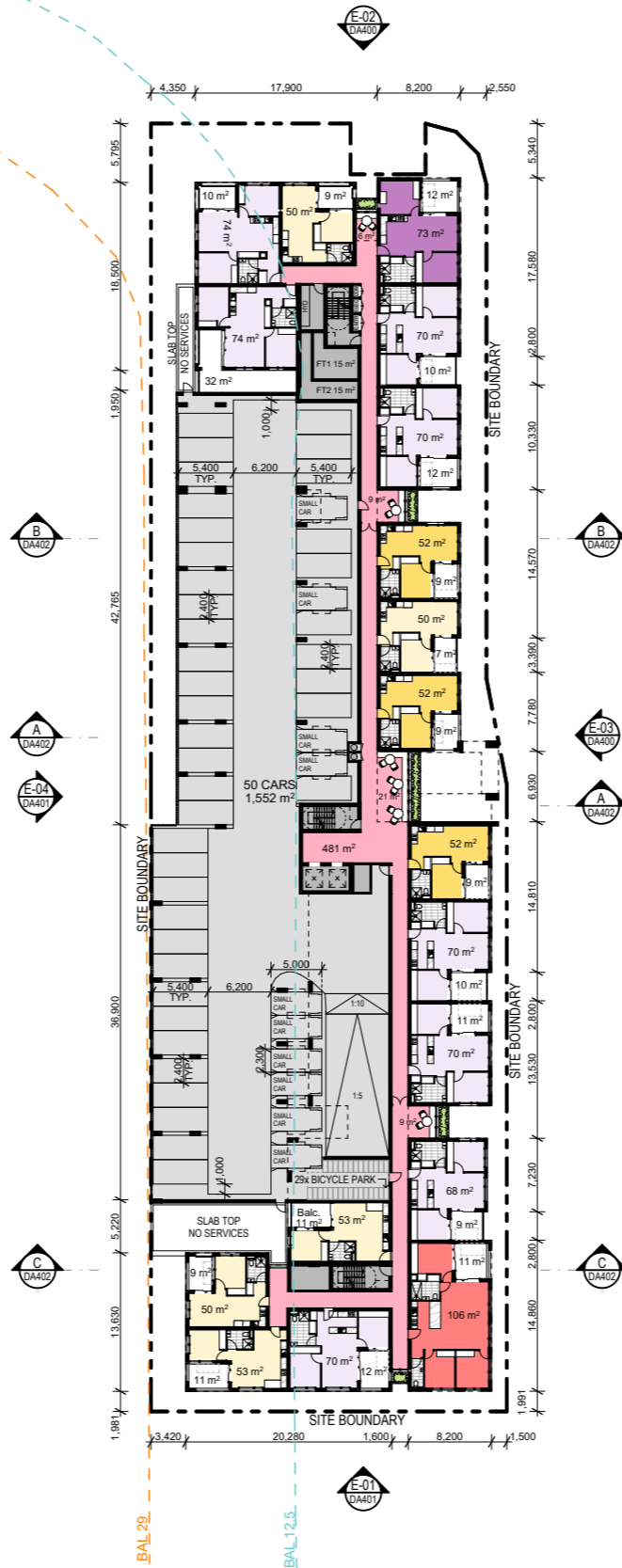
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00013408  
19/08/2024  
1:700, 1:50@A3

Drawing Name  
Drawing Number  
Revision

Ground Floor Plan  
**DA302**  
**A**

Plans  
Level 1 Plan

Unit Type	Unit Standard	Standard Type
1 Bed 1 Bath	Silver Standard	Liveable Housing Guide
1 Bed 1 Bath	Gold Standard	Social Housing Guide
2 Bed 1 Bath	Silver Standard	Liveable Housing Guide
2 Bed 1 Bath	Gold Standard	Social Housing Guide
3 Bed 1.5 Bath	Silver Standard	Liveable Housing Guide



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Drawing Name  
Drawing Number  
Revision

Level 1 Plan  
**DA303**  
**A**

# PRACTICE NOTE

## QUEUING CHARACTERISTICS AT SITE ACCESSSES



### BACKGROUND

On-site queuing areas are required at site access locations to ensure that vehicles do not queue across pedestrian paths or back onto the frontage road.

However, with queuing requirements in planning scheme policies becoming increasingly onerous, the usage of these figures can result in excessive queuing areas which can unnecessarily have an adverse effect on construction costs and development yields.

This practice note demonstrates how conventional queuing theory can be used in traffic engineering to determine the anticipated queue length at access locations as a function of local conditions.

### QUEUING THEORY

To calculate the amount of queuing space required, we must estimate the probability of a number of vehicles in a queue ( $n$ ) exceeding a specified number of vehicles ( $N$ ) at any instant. This is calculated using the following formula:

$$\Pr(n > N) = \rho^{N+1} \leq \alpha$$

Where:

- $\rho$  is the queue utilisation factor
- $\alpha$  is the probability of a queue of  $N$  vehicles being exceeded

Rearranging this formula enables the calculation of the design queue length in terms of the number of vehicles as follows:

$$N = \frac{\log(\alpha)}{\log(\rho)} - 1$$

The **minimum** design queue would be calculated as  $N$  vehicles, which may include a fraction of a vehicle (eg 1.2 vehicles). This

design queue could be applied subject to engineering judgment.

The **desirable** design queue would be the smallest integer which contains the value,  $N$  (ie rounded up to the nearest integer).

Application of a standard vehicle length of 6m per vehicle results in a design queue length in metres.

### QUEUE UTILISATION FACTOR

The utilisation factor,  $\rho$ , is the ratio of the mean arrival rate ( $r$ ) and the mean service rate ( $s$ ), ie:

$$\rho = \frac{r}{s}$$

The mean arrival rate (veh/hr) varies for each situation. It is calculated using the peak hour trip generation for the facility. This is expressed in vehicles per hour.

The mean service rate (veh/hr) is determined by observing the operations of similar facilities.

PTT has calculated the mean service rate for a non-controlled (ie no boom gate) parking facility by surveying the average time taken for cars to enter and leave from visitor parks in a residential development.

This survey was undertaken at a recently approved and constructed mixed use commercial/residential development at Nundah on a Wednesday in July 2014 between 4:30-6:00pm. A minimum of 30 observations were made for both "parking" and "unparking" manoeuvres. The results of this analysis are shown in Table 1.

# PRACTICE NOTE

## QUEUING CHARACTERISTICS AT SITE ACCESSSES



**Table 1: MEAN VEHICLE MANOEUVRING TIME (seconds/vehicle)**

MANOEUVRE	MEAN TIME	STD DEV	MIN	MAX
Parking	12.2	13.8	1.1	69.5
Unparking	14.7	7.1	2.1	37.2

The application of the mean “unparking” value from Table 1 assumes that each vehicle which enters the access will be waiting for a car to “unpark” from the space nearest to the access. This is an extremely conservative assumption, which will result in an over-estimate of queue lengths.

The mean service time for car parks with entrance controls such as boom gates, ticket dispensing machines, car stackers and mechanical parking installations can usually be provided by the supplier of the product.

### PROBABILITY OF EXCEEDANCE

The queuing formula is used to calculate the queue length given a specified probability ( $\alpha$ ).

Generally, the 95<sup>th</sup> percentile queue is considered an adequate measure of an acceptable queue at access driveways. This infers that there is a 5% probability that the queue length will be exceeded (ie  $\alpha=0.05$ ).

Australian Standards, AS2890.1, outlines the requirement to provide a 98<sup>th</sup> percentile queue for situations where mechanical parking installations such as car stackers are used (ie  $\alpha=0.02$ ).

### EXAMPLE

A development with a mean peak hour trip generation of 100 veh/hr and a 80:20 in:out split results in a vehicle arrival rate of 80 veh/hr.

The service rates from Table 1 can be applied to calculate the queue utilisation factor. However common units are required to find a ratio.

Therefore, the service rate,  $s$ , is:

$$\frac{\text{vehicle}}{\text{hour}} = 3,600 \left( \frac{\text{seconds}}{\text{vehicle}} \right)^{-1}$$
$$s = \frac{3,600}{14.7} = 244.9 \text{ vehicles per hour}$$

The queue utilisation factor is:

$$\rho = \frac{r}{s} = \frac{80}{244.9} = 0.327$$

The 95<sup>th</sup> percentile design queue:

$$N = \frac{\log(\alpha)}{\log(\rho)} - 1$$
$$N = \frac{\log(0.05)}{\log(0.327)} - 1$$
$$N = 1.68 \text{ vehicles}$$

Therefore, desirably, the development should be designed to allow for an entrance queue of two vehicles (ie 12m). However, an available queuing distance of 1.68 vehicles (ie 10.1m) would be considered acceptable to cater for the 95<sup>th</sup> percentile queue, subject to engineering judgment.

# PRACTICE NOTE

## QUEUING CHARACTERISTICS AT SITE ACCESSSES



### CONCLUSION

Conventional traffic engineering queuing theory can be used to determine the anticipated queue length at access locations. This ensures that queuing does not adversely impact on nearby traffic or pedestrian flows whilst ensuring that the queuing area is not excessive.

### REFERENCES

Bennett, DW and Rose, G (1988), *Unsignalised Intersection Analysis*, University of Melbourne

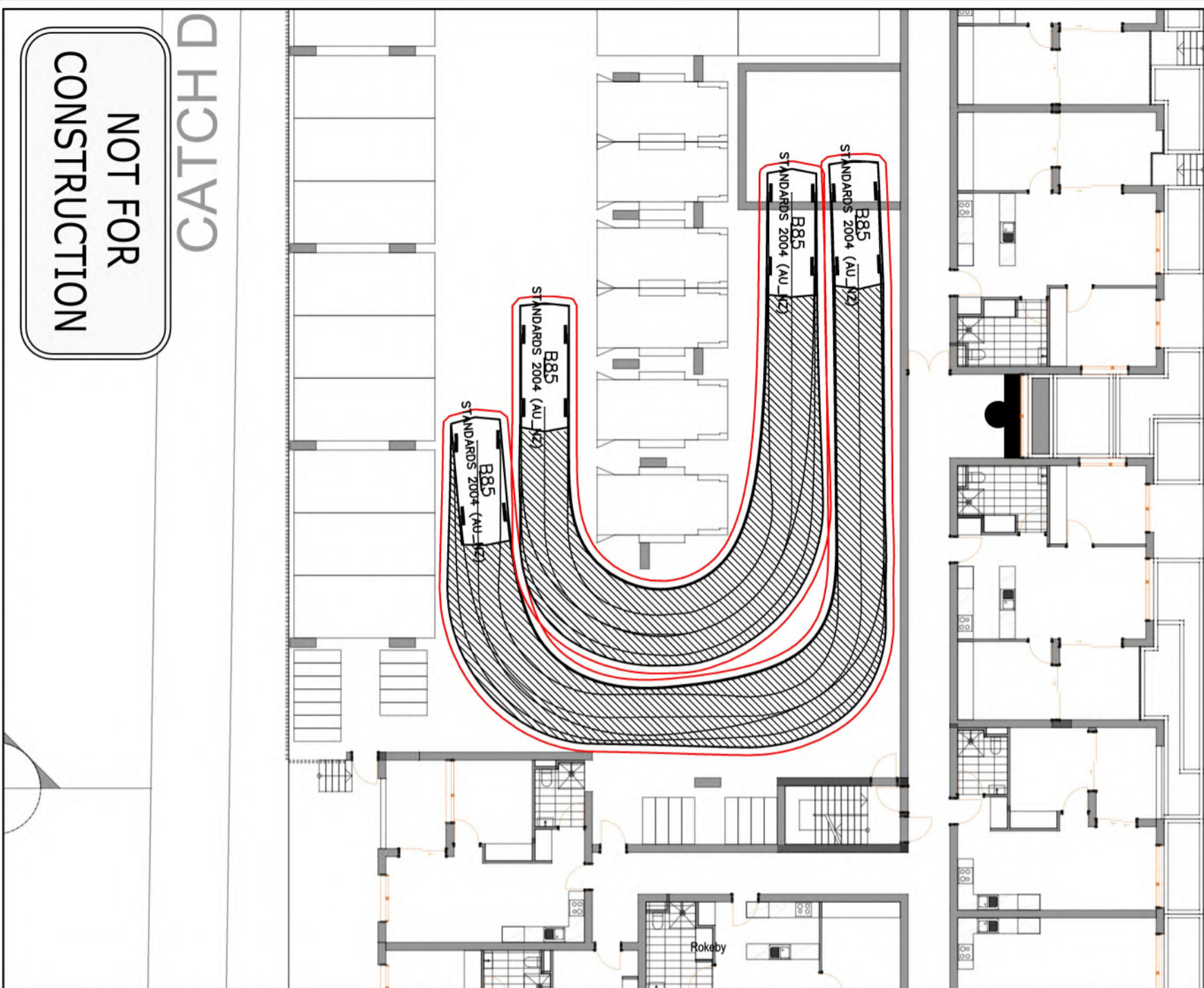
Institute of Transport Studies Monash University (2003), *Traffic Engineering and Management*, Volume 2, Caulfield East

Standards Australia (2004), *AS2890.1:2004 Parking facilities Part 1: Off-street car parking*, Sydney

### DISCLAIMER

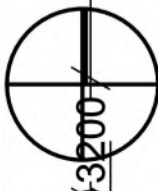
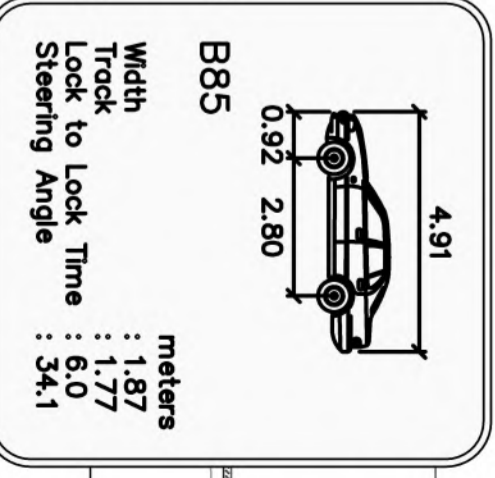
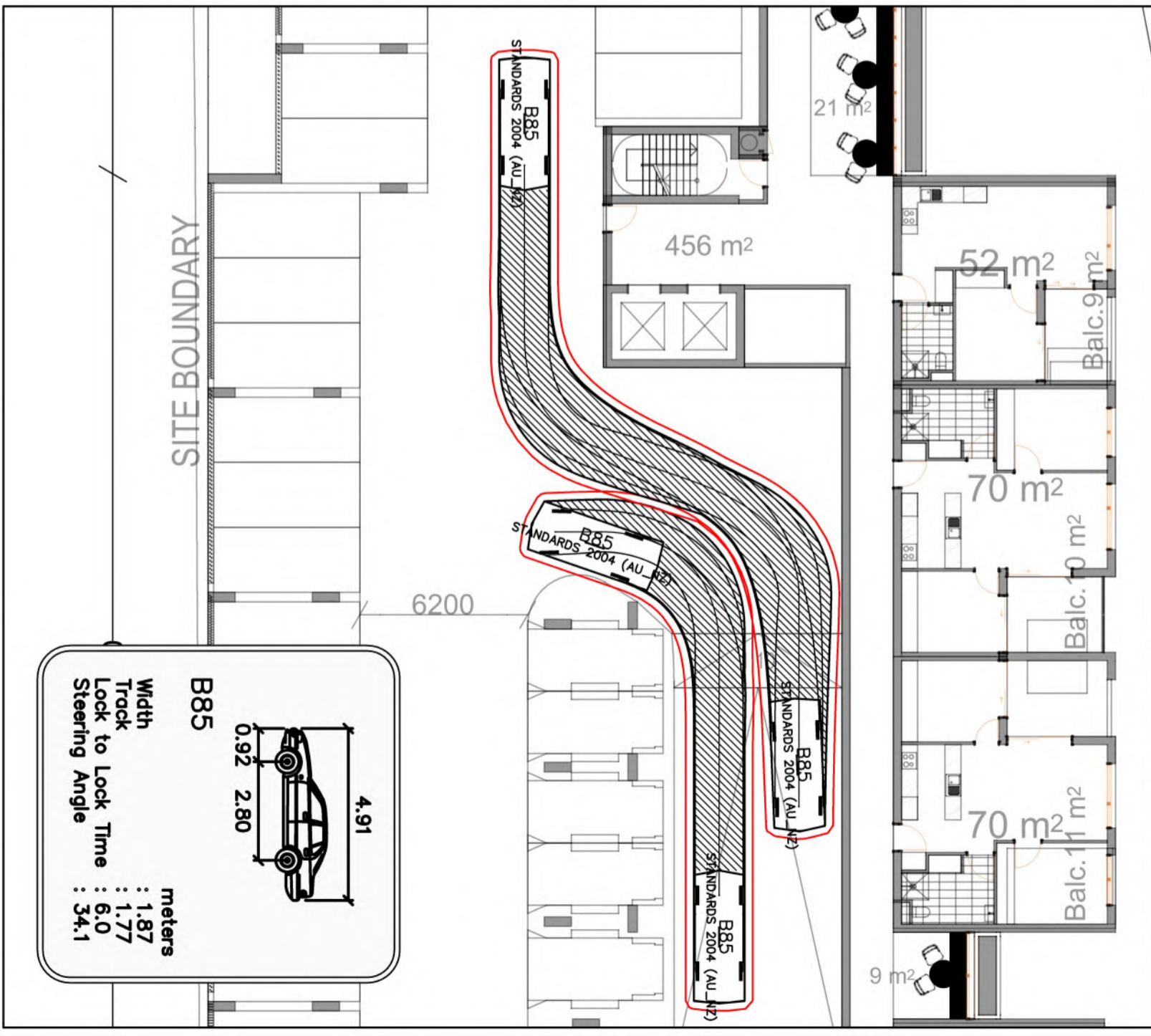
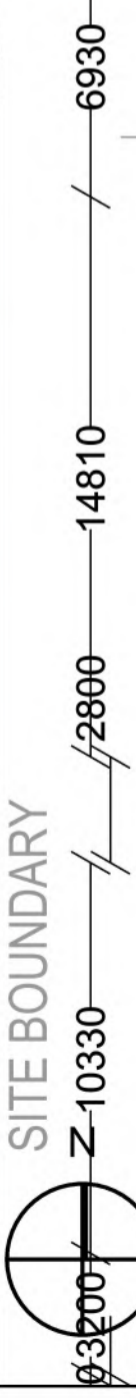
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SITE BOUNDARY

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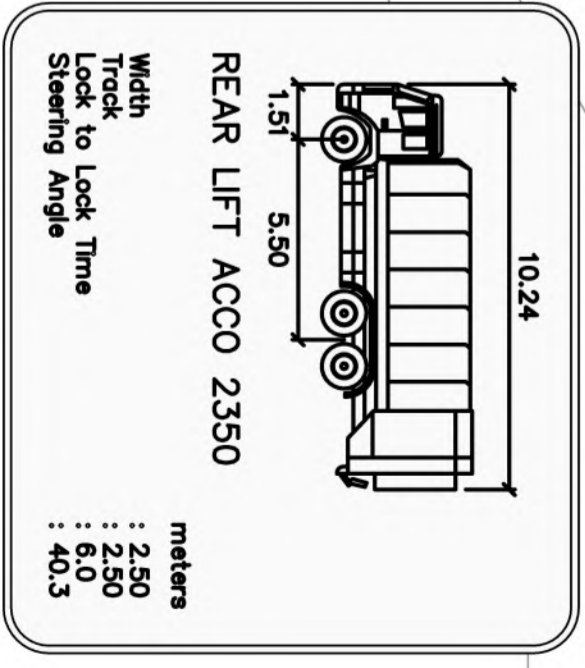
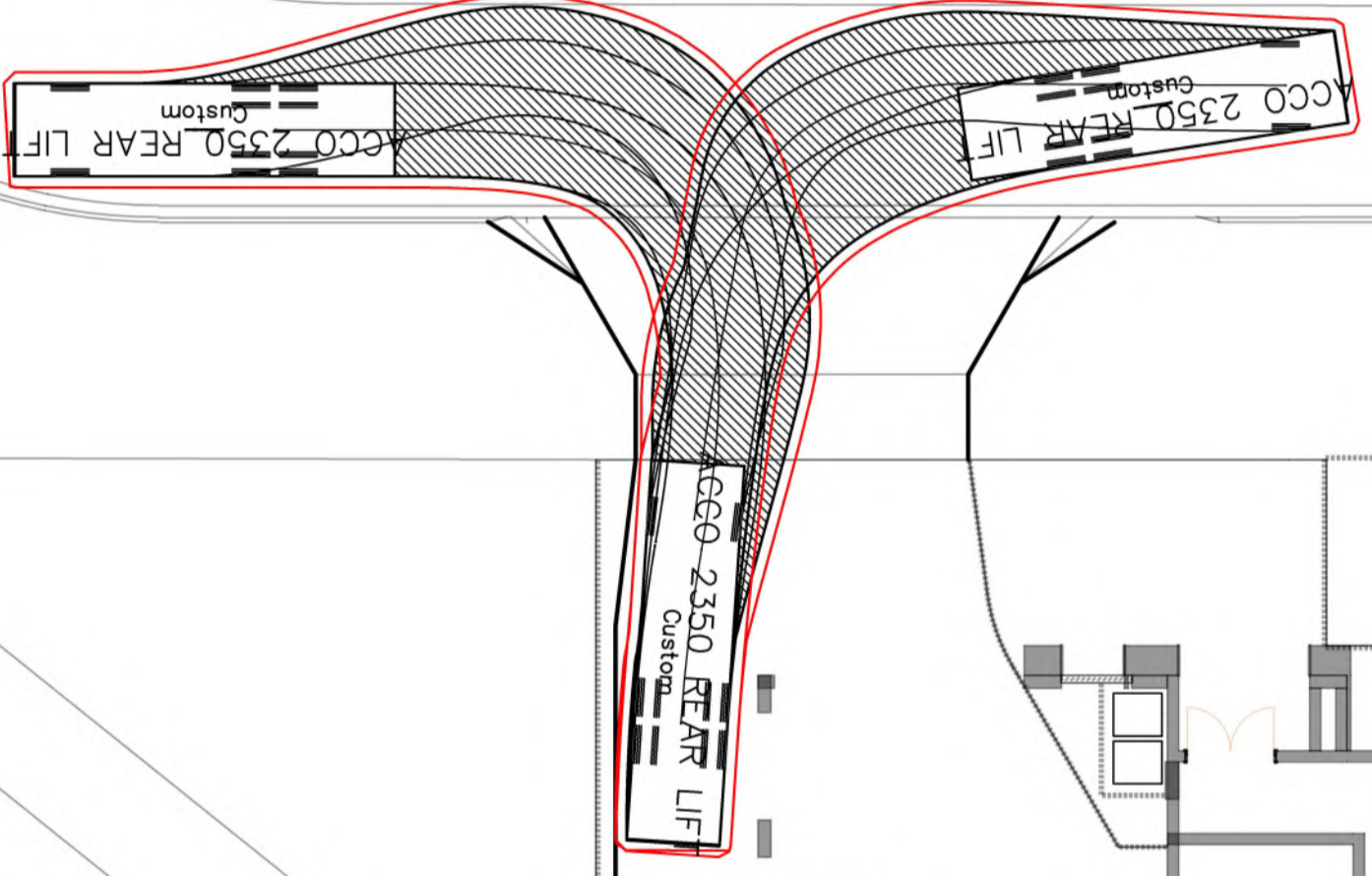
REV.	AMENDMENTS	DRN	DATE

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 41-49 PLAZA PL, CARSELDINE  
 DRAWING TITLE:  
 RAMP CIRCULATION

CLIENT:  
 ST GEORGE COMMUNITY HOUSING  
 DATE:  
 13/08/2024  
 SCALE:  
 1:200@A3  
 DRAWING NO.  
 24-555-001  
 REV  
 -  
 JOB NO.  
 24-555

APPROVED:  
 JPG  
 RPEQ 22233

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CONSTRUCTION**



REV.	AMENDMENTS	DRN	DATE

PROJECT TITLE:  
**41-49 PLAZA PL, CARSELDINE**

DRAWING TITLE:  
**RCV SERVICING**

CLIENT:  
**ST GEORGE COMMUNITY HOUSING**

DATE: 13/08/2024 SCALE: 1:200@A3

DRAWING NO. 24-555-002 REV. - JOB NO. 24-555

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