



**TRAFFIC AND TRANSPORT STUDY
FOR A PLANNING PROPOSAL (REZONING FROM R2 TO R4)
No. 169 PENNANT HILLS ROAD, CARLINGFORD NSW 2118**

Property address	169 Pennant Hills Road, Carlingford NSW 2118
Client	Acon Projects Pty Ltd
Prepared by	O. Sannikov, MEngSc (Traffic Engineering), MIEAust, PEng, FAITPM
Date	24/12/21
Job No.	21125
Report No.	21125 Rep 01

Item	Report
Site location	<ul style="list-style-type: none">• Refer to Figure 1.
Existing land use	<ul style="list-style-type: none">• R2 Low Density Residential• Vacant site
Proposed land use	<ul style="list-style-type: none">• R4 High Density Residential<ul style="list-style-type: none">◦ Indicative development<ul style="list-style-type: none">▪ Residential flat building<ul style="list-style-type: none">• 48 units◦ 103 car parking spaces

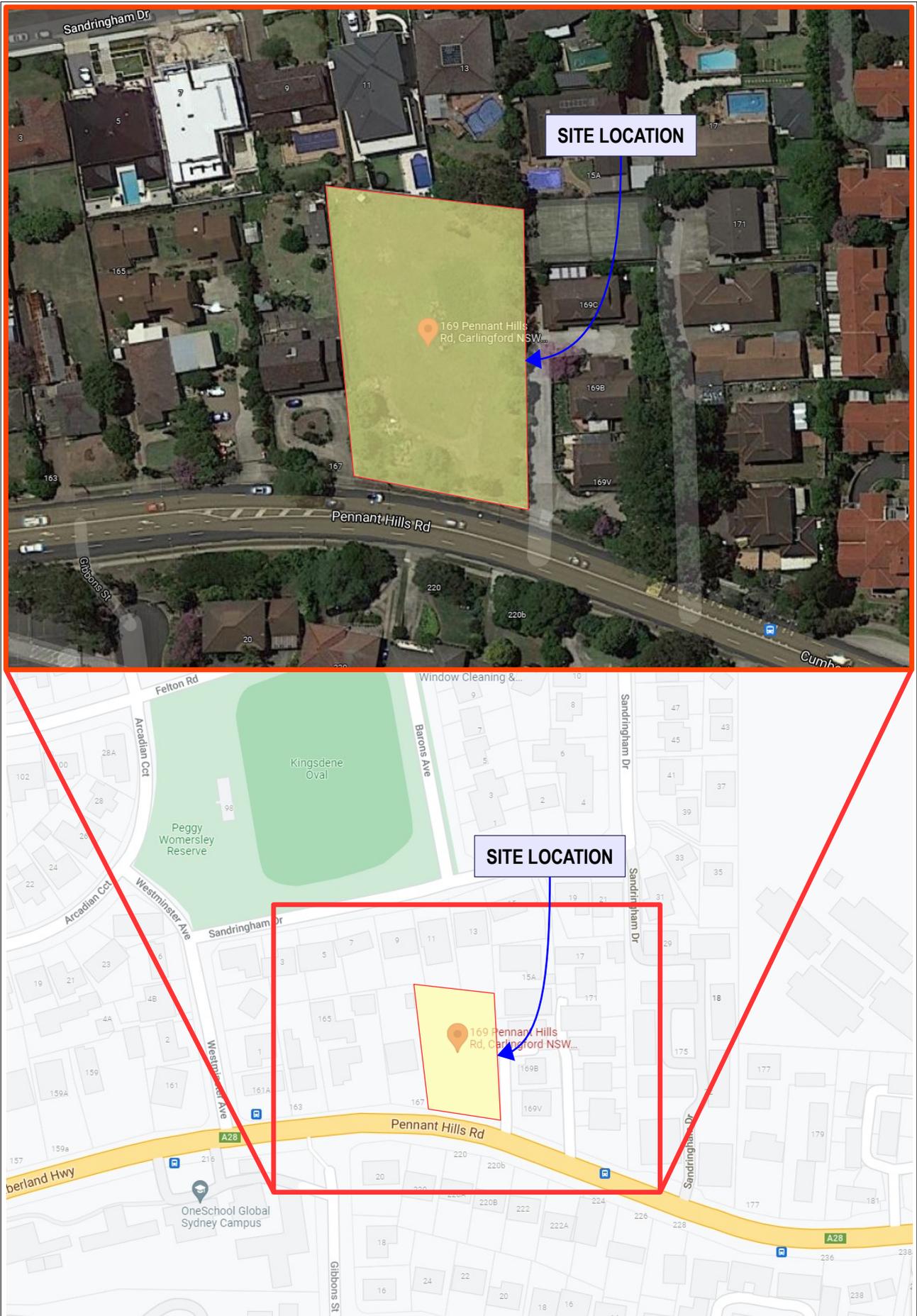


Figure 1. Site location.

Item	Report
Street characteristics	<p>Existing traffic and parking situation</p>
	<ul style="list-style-type: none"> • Refer to Figure 2. • The key roads surrounding the proposed development are described below. <ul style="list-style-type: none"> ◦ Pennant Hills Road <ul style="list-style-type: none"> ▪ Arterial Road (State Road 13) ▪ 4-5 travel lanes and no parking opportunities ◦ Sandringham Drive <ul style="list-style-type: none"> ▪ Local Road ▪ 2 travel lanes and parking opportunities on both sides of the street ◦ Westminster Avenue <ul style="list-style-type: none"> ▪ Local road ▪ 2 travel lanes and no parking opportunities on both sides of the street ◦ Gibbons Street <ul style="list-style-type: none"> ▪ Local Street ▪ 2 travel lanes and parking opportunities on both sides of the street ◦ Other streets in the surrounding area are local/local collector roads. Street conditions are typical for a mixed residential /commercial / light industrial area, with low to moderate traffic volumes. <ul style="list-style-type: none"> ▪ General speed limit is 50 km/h on local streets around the site.
Bus	<p>Public Transport</p>
	<ul style="list-style-type: none"> • There are 4 bus stops within short walking distance (approximately 90, 100, 170 and 200 m) from the site. The site is well serviced by public transport. Refer to Figure 3. <ul style="list-style-type: none"> ◦ Bus route 550 <ul style="list-style-type: none"> ▪ Macquarie Park to Parramatta Via Epping <ul style="list-style-type: none"> • 18 services operate during the morning peak. • 19 services operate during the afternoon peak. ▪ Parramatta to Macquarie Park Via Epping <ul style="list-style-type: none"> • 18 services operate during the morning peak. • 18 services operate during the afternoon peak. ◦ Bus route 625 <ul style="list-style-type: none"> ▪ Parramatta to Pennant Hills <ul style="list-style-type: none"> • 5 services operate during the morning peak. • 6 services operate during the afternoon peak. ▪ Pennant Hills to Parramatta <ul style="list-style-type: none"> • 6 services operate during the morning peak. • 5 services operate during the afternoon peak. ◦ Bus route 546 <ul style="list-style-type: none"> ▪ Epping to Parramatta Via North Rocks & Oatlands <ul style="list-style-type: none"> • 6 services operate during the morning peak. • 7 services operate during the afternoon peak. ▪ Parramatta to Epping Via Oatlands & North Rocks <ul style="list-style-type: none"> • 6 services operate during the morning peak. • 5 services operate during the afternoon peak. • The morning peak was considered to be between 6:30 a.m. and 9:30 a.m. and the afternoon peak was considered to be between 3:30 p.m. and 6:30 p.m.



Figure 2. Street characteristics.

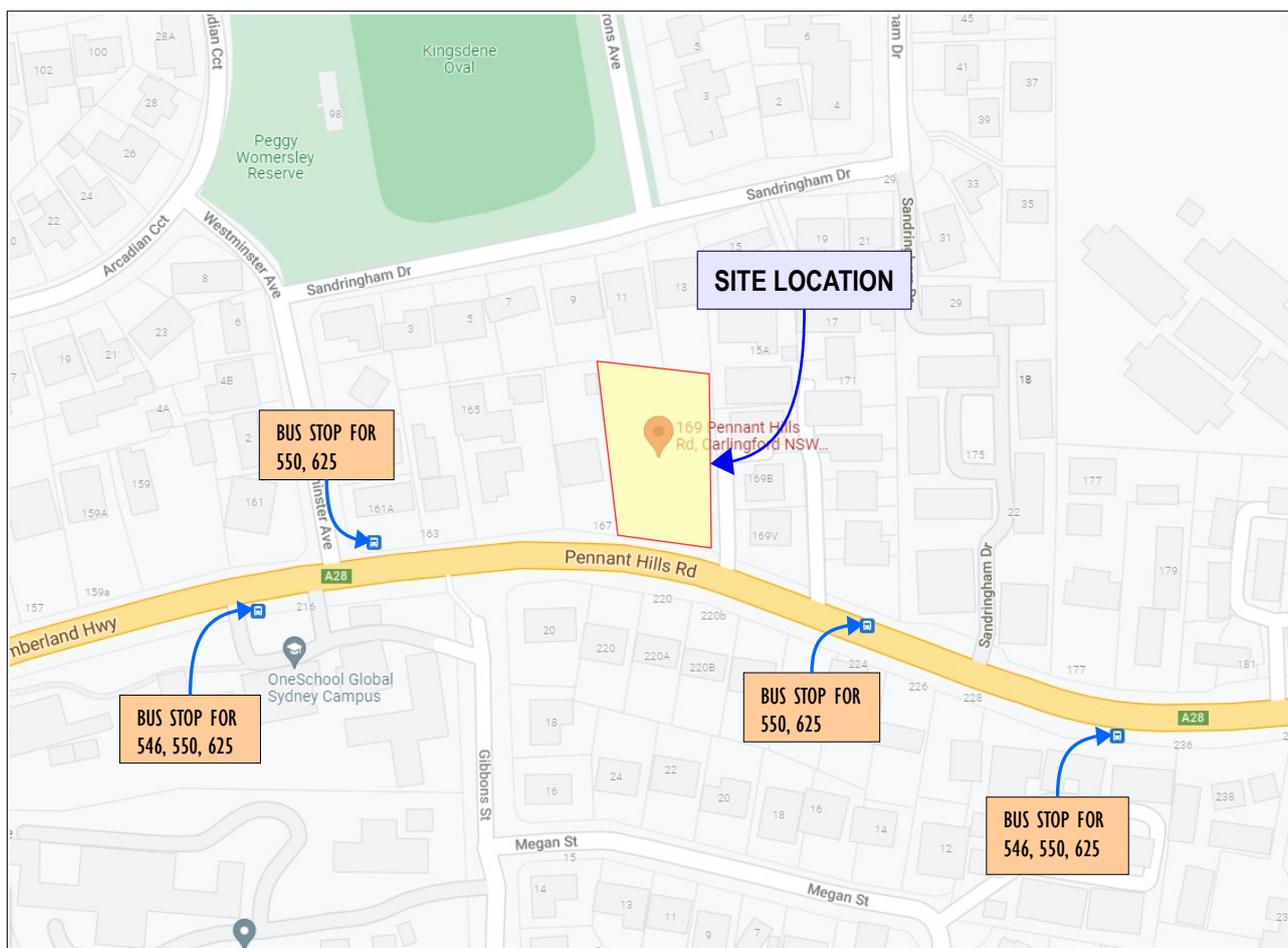


Figure 3. Public transport.

Item	Report
	Public transport
Parramatta Light Rail	<ul style="list-style-type: none"> The Parramatta Light Rail (PLR), from Westmead to Carlingford, is expected to open in 2023. Major construction is currently underway. Refer to Figures 4 and 5 overleaf. <ul style="list-style-type: none"> Stage 1 route is approximately 12 kilometres in length. It will utilise the existing T6 Carlingford Line, replacing current heavy rail services. The subject site is located approximately 1.2 km from the proposed Carlingford Station. Regular bus services (routes 550 and 625) run every 10 minutes between the site and the future station. The trip duration is only 8 minutes. The site will, therefore, be well serviced by the proposed PLR, particularly in the view of the following. <ul style="list-style-type: none"> The PLR Statement of Environmental Effects states that: <p>The PLR “project would provide a catalyst for changes to the bus network to support an integrated transport network and the broader needs of the Greater Parramatta to the Olympic Peninsula (GPOP) priority growth area. Initial work carried out by Transport for NSW has identified the following focus areas for the bus network:</p> <p>[...]</p> <ul style="list-style-type: none"> Introduce new routes to meet existing and future customer travel patterns. Optimise services that access the Parramatta CBD to balance demand and customer travel patterns with effective operations, particularly during peak periods.”

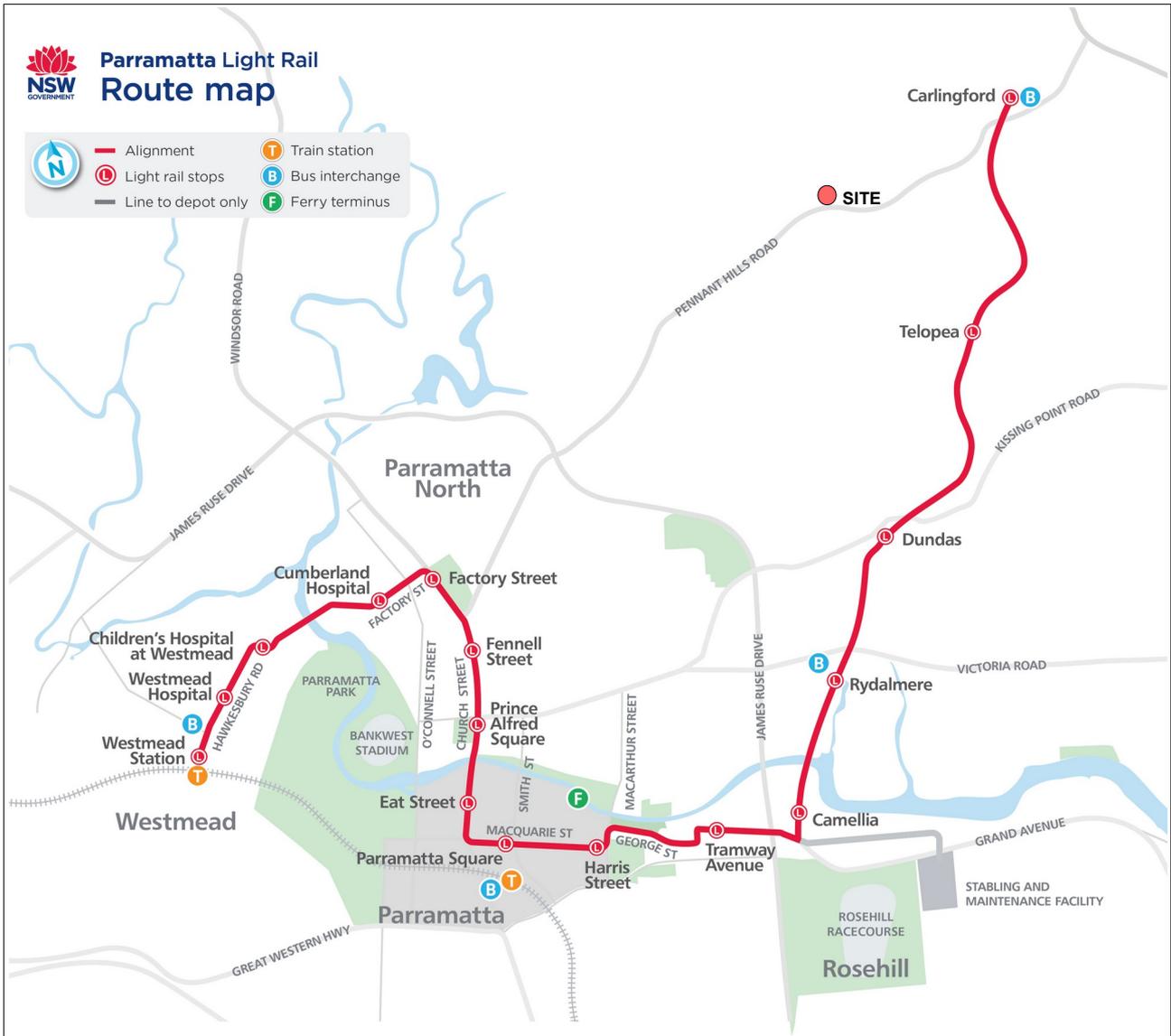


Figure 4. Parramatta Light Rail – Stage 1 route map.

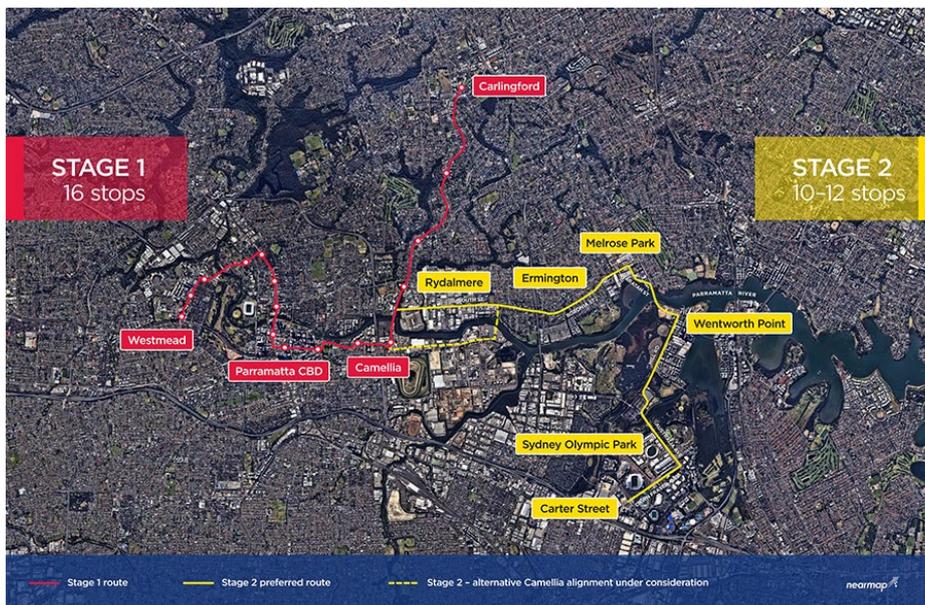


Figure 5. Parramatta Light Rail – Stages 1 and 2 route map.

Item	Report
Bicycle network	<ul style="list-style-type: none"> ◦ The Planning Approval for PLR project requires the preparation of a Pedestrian and Cyclist Network and Facilities Strategy (Condition E14), “to improve walking and cycling access to and from light rail stops, to enhance walking and cycling safety in the vicinity of the light rail and to facilitate the provision of an active transport link along or near the PLR corridor.” ▪ The City of Parramatta Council’s Bike Plan was reviewed to respond to the above requirements. The proposed plan includes many new cycling paths. As may be seen in Figure 6, the subject site is very close to the proposed dedicated on-road and off-road paths which would provide connections to work, retail and transport hubs. ◦ The site will be well serviced by the proposed cycling network.

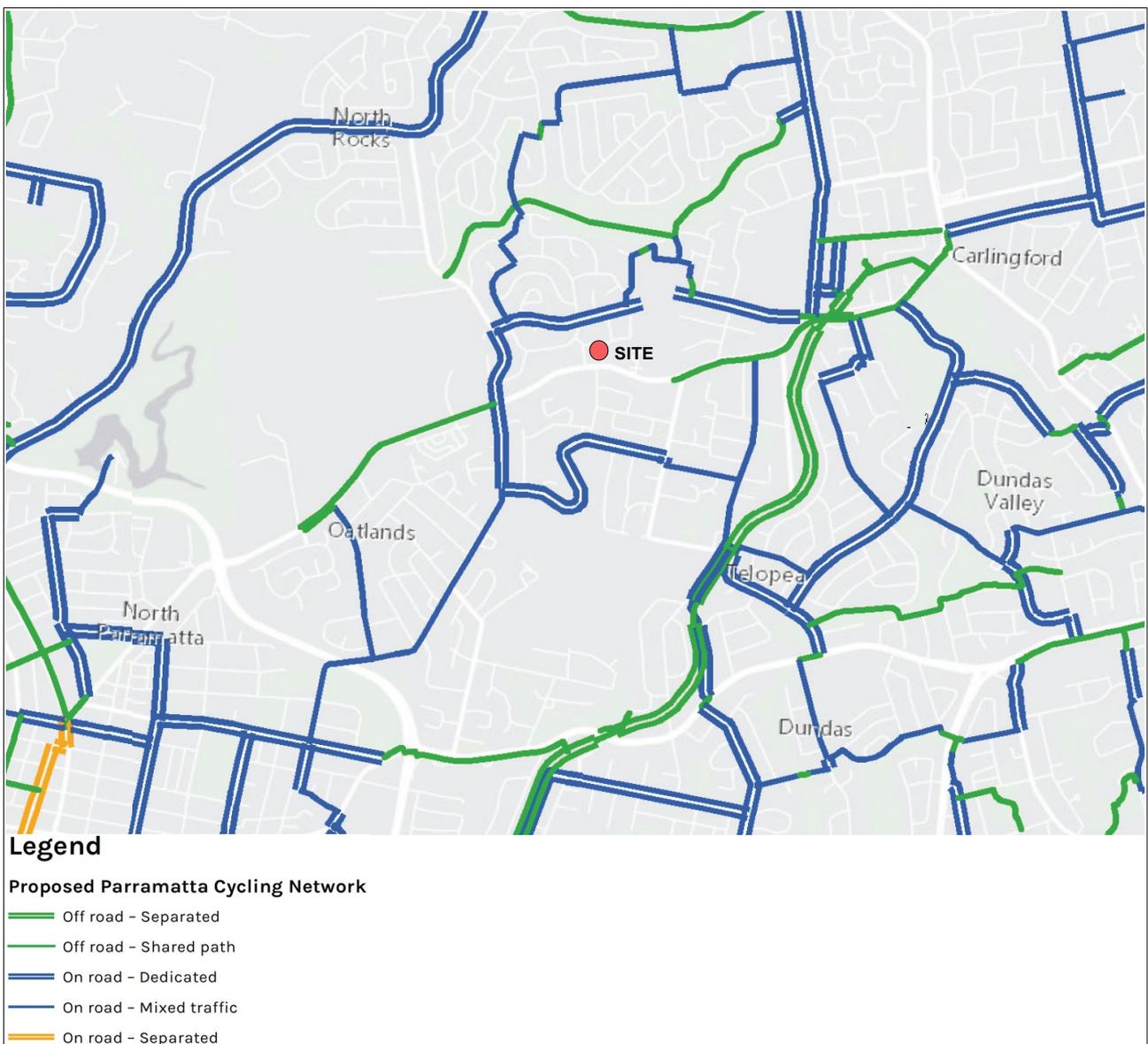


Figure 6. City of Parramatta Bike Plan (City of Parramatta Council, September 2019).

Item	Report
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- Planning control document 1**
- City of Parramatta
 - The Hills Development Control Plan 2012 applies to the area which Parramatta (former The Hills) Local Environment Plan 2012 applies
 - Part C Section 1 – Parking

Requirement	Compliance
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SUBMISSION REQUIREMENTS

Parking calculations – number of spaces provided for the proposed development using Table 1. Any part spaces must be rounded up to the nearest whole number.

Land Use	Required Minimum Provision
Residential Flat Buildings and Multi Dwelling Housing	1 space per 1 bedroom unit 2 spaces per 2 or 3 bedroom unit 2 visitor spaces per 5 units

The indicative plans include a residential flat building with

- 6 studio apartments
- 30 two-bedroom apartments
- 12 three-bedroom apartment

a total of 48 apartments

Parking required

- $6 \times 1 = 6$ (studios)
- $30 \times 2 = 60$ (2-bedroom apartments)
- $12 \times 2 = 24$ (3-bedroom apartments)
- $48 / 5 \times 2 = 19.2$ (visitor spaces)
- **Total:** $6+60+24+19.2= 109.2$, say **110 spaces**

The plans are not detailed yet (not required for a rezoning application), however, the preliminary design indicates that the complying on-site provision of 110 car parking spaces is achievable.

Item	Report
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Traffic generation

Traffic impacts

- **Base traffic generation rates**

- From TfNSW/RMS (2002) Guide to Traffic Generating Developments
 - Updated statistics from TDT 2013 / 04a

- **Existing traffic generation**

- Currently, the site is vacant and does not generate any traffic.

- **Traffic generation by a potential development under the existing R2 zoning**

- If this site was to be developed to the maximum density under the existing R2 zoning, it could yield a maximum of four (4) dwelling houses.
- TfNSW trip generation rates for low density residential developments are follows.

Daily vehicle trips = 10.7 per dwelling in Sydney, 7.4 per dwelling in regional areas
 Weekday average evening peak hour vehicle trips = 0.99 per dwelling in Sydney (maximum 1.39), 0.78 per dwelling in regional areas (maximum 0.90).
 Weekday average morning peak hour vehicle trips = 0.95 per dwelling in Sydney (maximum 1.32), 0.71 per dwelling in regional areas (maximum 0.85).
 (The above rates do **not** include trips made internal to the subdivision, which may add up to an additional 25%).

- For 4 dwelling houses, the resulting trip generation would be as follows.

Table 1: Estimated trip generation - low density residential.

	Number of dwellings		4	
	morning peak hour	afternoon peak hour		
trips per unit	0.95	0.99		
number of trips	3.8	4.0		
distribution	IN	OUT	IN	OUT
%	26%	74%	66%	34%
number of trips	0.99	2.81	2.61	1.35
rounded	1	3	3	1

- **Traffic generation by a potential development under the R3 zoning (optional)**

- If this site was to be developed to the maximum density under the R3 Medium Density Residential zoning, it could yield, for example, 17 townhouses (refer to architectural plans attached in the Appendix to this report).
- TfNSW trip generation rates for medium density residential developments are follows.

3.3.2 Medium density residential flat building.

Rates.

Smaller units and flats (up to two bedrooms):

Daily vehicle trips = 4-5 per dwelling
 Weekday peak hour vehicle trips = 0.4-0.5 per dwelling.

Larger units and town houses (three or more bedrooms):

Daily vehicle trips = 5.0-6.5 per dwelling
 Weekday peak hour vehicle trips = 0.5-0.65 per dwelling.

- For 17 three-bedroom townhouses, the resulting trip generation would be as follows.

Table 2: Estimated trip generation - medium density residential.

	Number of units (three or more bedrooms)		17	
	morning peak hour	afternoon peak hour		
trips per unit	0.65	0.65		
number of trips	11.1	11.1		
distribution	IN	OUT	IN	OUT
%	26%	74%	66%	34%
number of trips	2.87	8.18	7.29	3.76
rounded	3	8	7	4

Item	Report
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- **Traffic generated by the proposed development under the proposed R4 zoning**
 - TfNSW trip generation rates for high density residential developments are follows.

Weekday Rates	Sydney Average	Sydney Range
AM peak (1 hour) vehicle trips per unit	0.19	0.07-0.32
AM peak (1 hour) vehicle trips per car space	0.15	0.09-0.29
AM peak (1 hour) vehicle trips per bedroom	0.09	0.03-0.13
PM peak (1 hour) vehicle trips per unit	0.15	0.06-0.41
PM peak (1hour) vehicle trips per car space	0.12	0.05-0.28
PM peak (1 hour) vehicle trips per bedroom	0.07	0.03-0.17

- Normally, the average trip rates per unit from the above table would be used to estimate the trip generation. In this case, to account for the worst-case scenario, the highest rates from the Sydney range were utilised.
- For 48 apartments, the resulting trip generation would be as follows.

Table 3: Estimated trip generation - high density residential.

	Number of units			
	48		48	
	morning peak hour		afternoon peak hour	
trips per unit	0.32		0.41	
number of trips	15.4		19.7	
distribution	IN	OUT	IN	OUT
%	26%	74%	66%	34%
number of trips	3.99	11.37	12.99	6.69
rounded	4	11	13	7

- **Additional traffic generation**
 - Additional traffic generation, as a result of the rezoning from “R2 Low Density Residential” to “R3 Medium Density Residential” (optional) or “R4 High Density Residential” (proposed) is shown in **Table 4**.

Table 4: Estimated additional trip generation due to rezoning from R2 to R3 or R4 .

R2 to R3				R2 to R4			
morning peak hour		afternoon peak hour		morning peak hour		afternoon peak hour	
IN	OUT	IN	OUT	IN	OUT	IN	OUT
2	5	4	3	3	8	10	6

- It is evident that the difference between additional traffic generation for the “R2 to R3” or “R2 to R4” zoning options for the subject lot is very low. Yet, the R4 option yields more than double the number of dwellings compared with the R3 alternative. In traffic engineering terms total traffic generation for all of these options is insignificant in relation to the traffic flows on the frontage road.

• **Impact on traffic system operation**

- The impact on the intersection operation of the potential development was assessed based on the maximum potential trip generation (high density residential option).

Exiting traffic

- Traffic volume counts were carried out on Wednesday 17 November 2021 from 06:30 to 09:30 and from 15:30 to 19:00.
- Refer to **Figure 7**.

Traffic distribution

- Trip generation and attraction are assumed to be equal in all directions, with trip distribution taking into account the surrounding street network, connections, and turn restrictions.
- Refer to **Figure 8**.

Traffic impacts

- The additional traffic will constitute a very minor proportion of the existing traffic, less than 1%. It will have no noticeable effect on the existing traffic conditions.

Conclusion

- The proposed rezoning and the potential development will have no negative (or even noticeable) impacts on the existing road network operation. There will be no requirement for road or intersection upgrades as a result of this development. Both the proposed rezoning and the potential development are supported on traffic grounds.

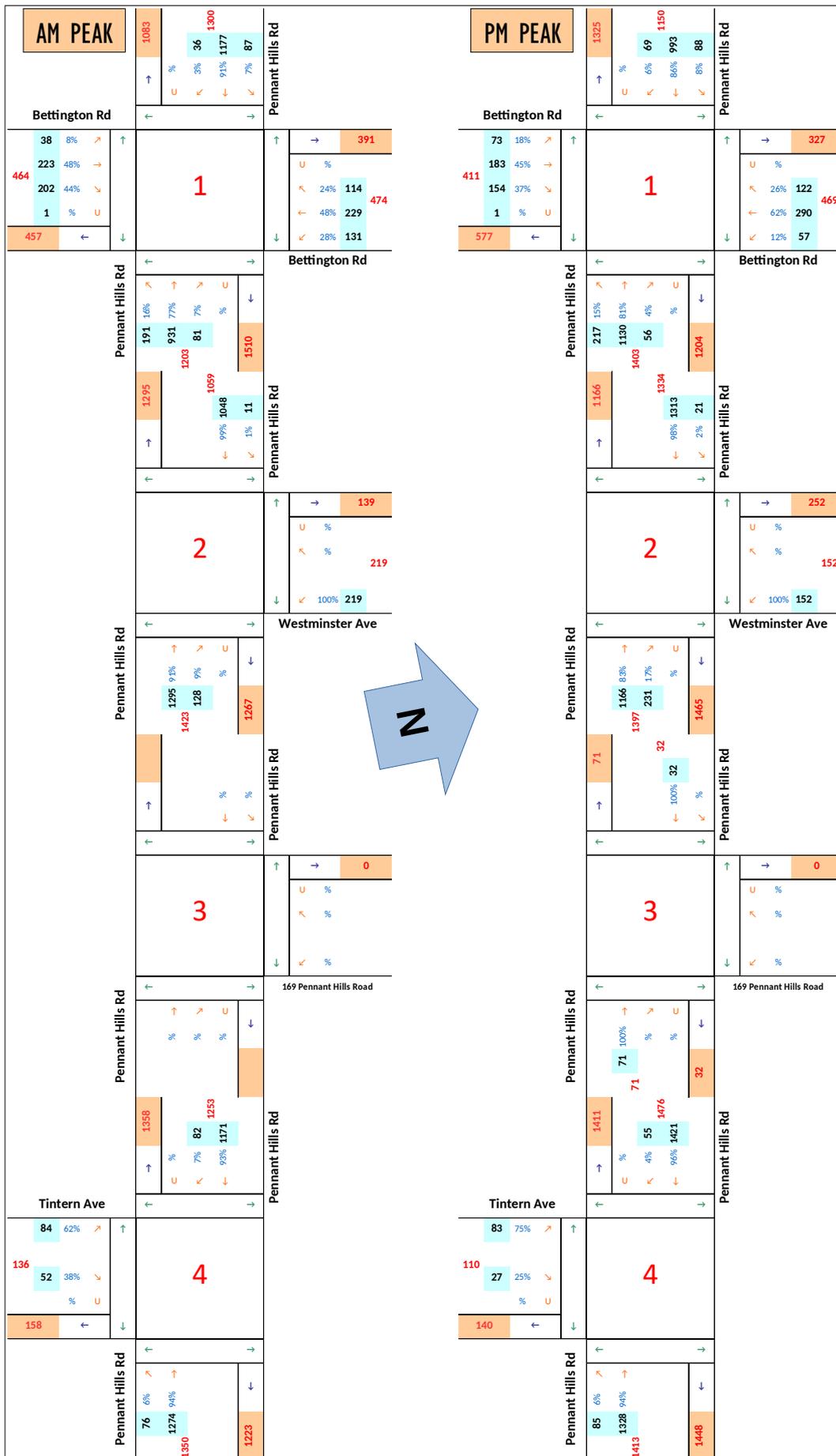


Figure 7. Existing traffic volumes.

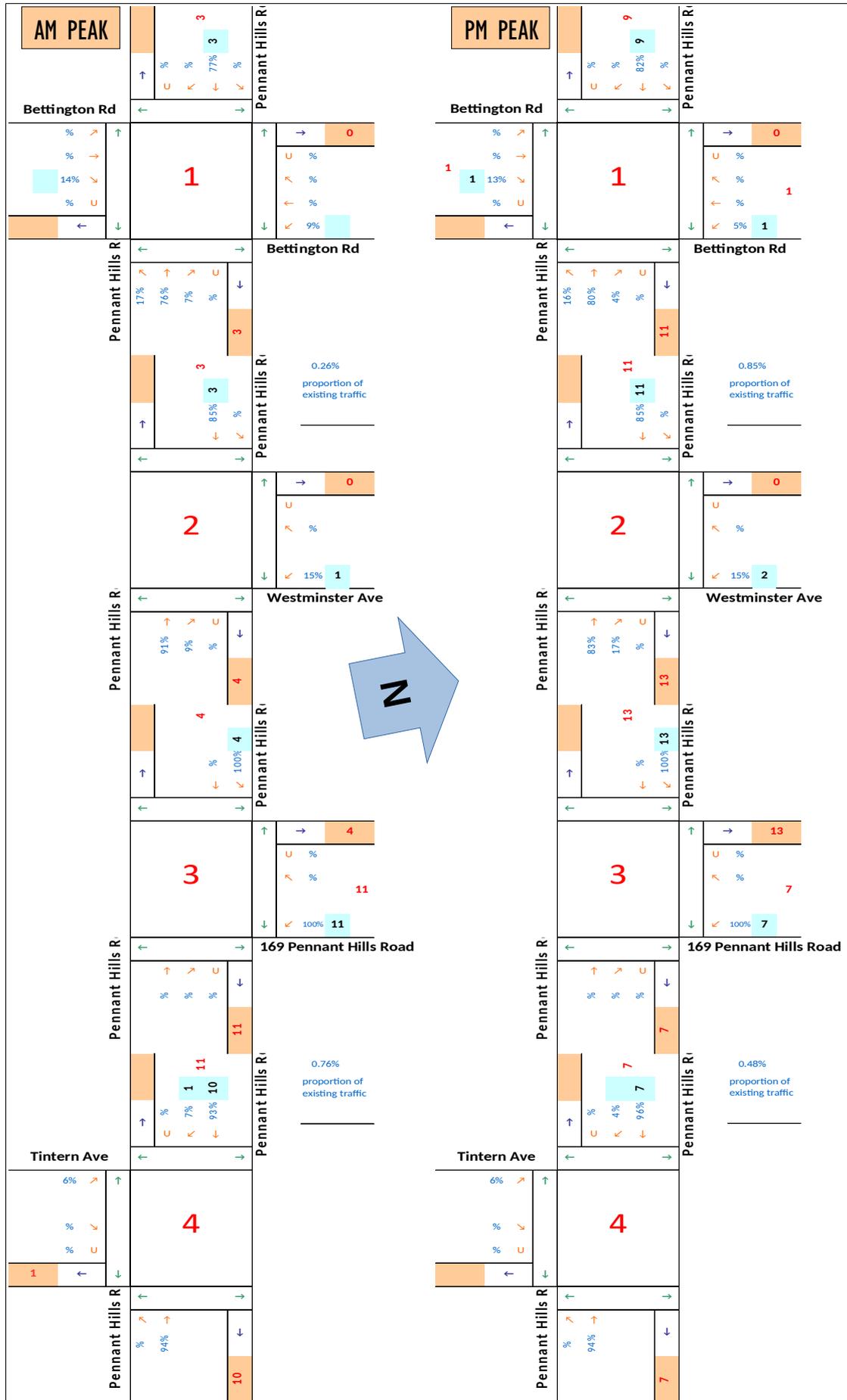


Figure 8. Estimated trip generation and distribution for the potential development after R4 rezoning.

Conclusions

- Parking impacts
 - The proposed indicative development is capable of complying the DCP requirements for off-street car parking provision.
- Traffic impacts
 - The proposed rezoning and the potential development will have no negative (or even noticeable) impacts on the existing road network operation.
 - There will be no requirement for road or intersection upgrades as a result of the proposed development (under any scenario considered in this report).
 - The site is very well serviced by buses, the new Light Rail and the planned bicycle oath network.
- Both the proposed rezoning and the potential development are supported on traffic and parking grounds.



Oleg I. Sannikov
Director
MEngSc (Traffic Engineering)
MIEAust, PEng
FAITPM



References:

- City of Parramatta, The Hills Development Control Plan 2012
- RMS (2002) Guide to Traffic Generating Developments

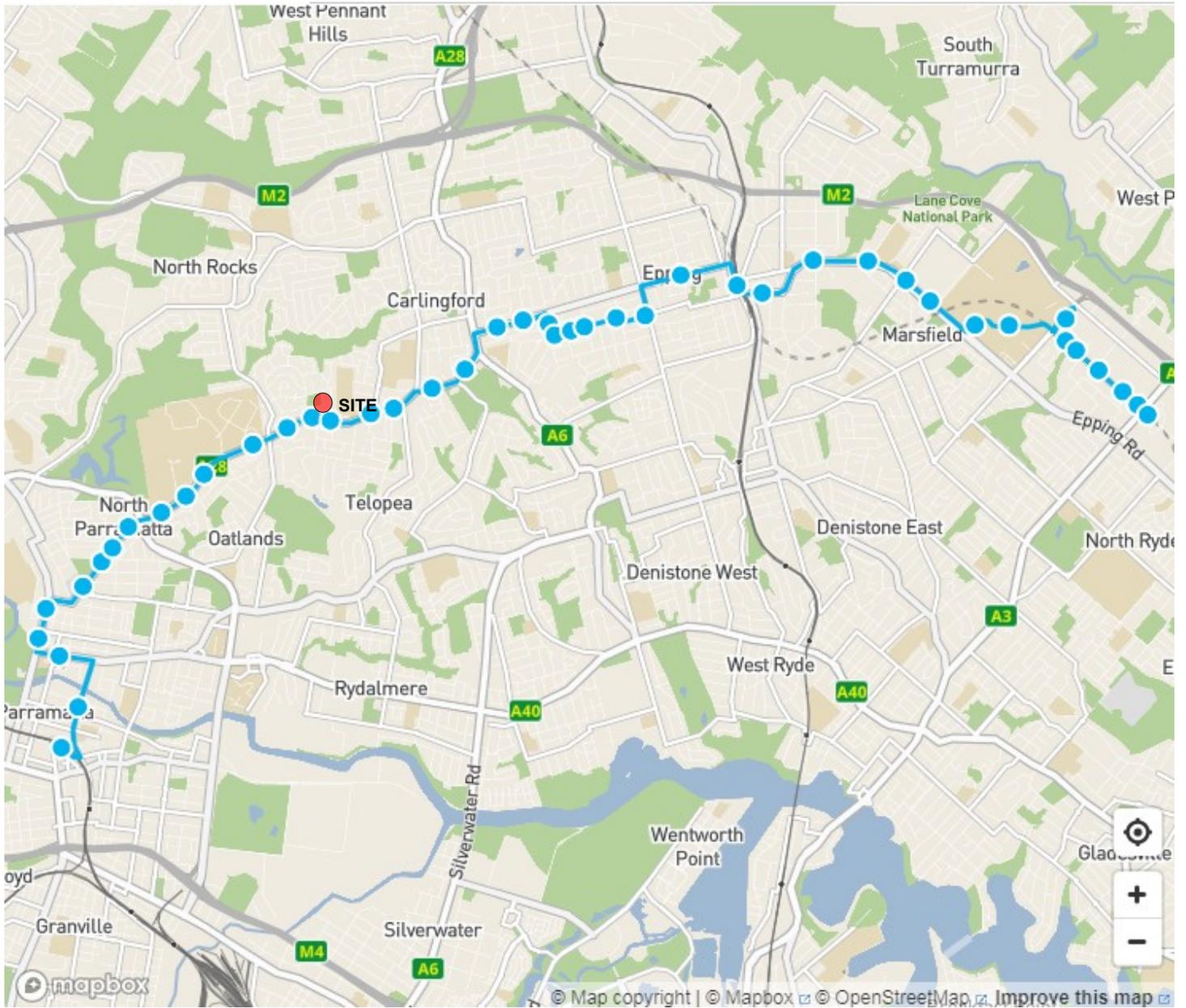
Appendix

Bus routes

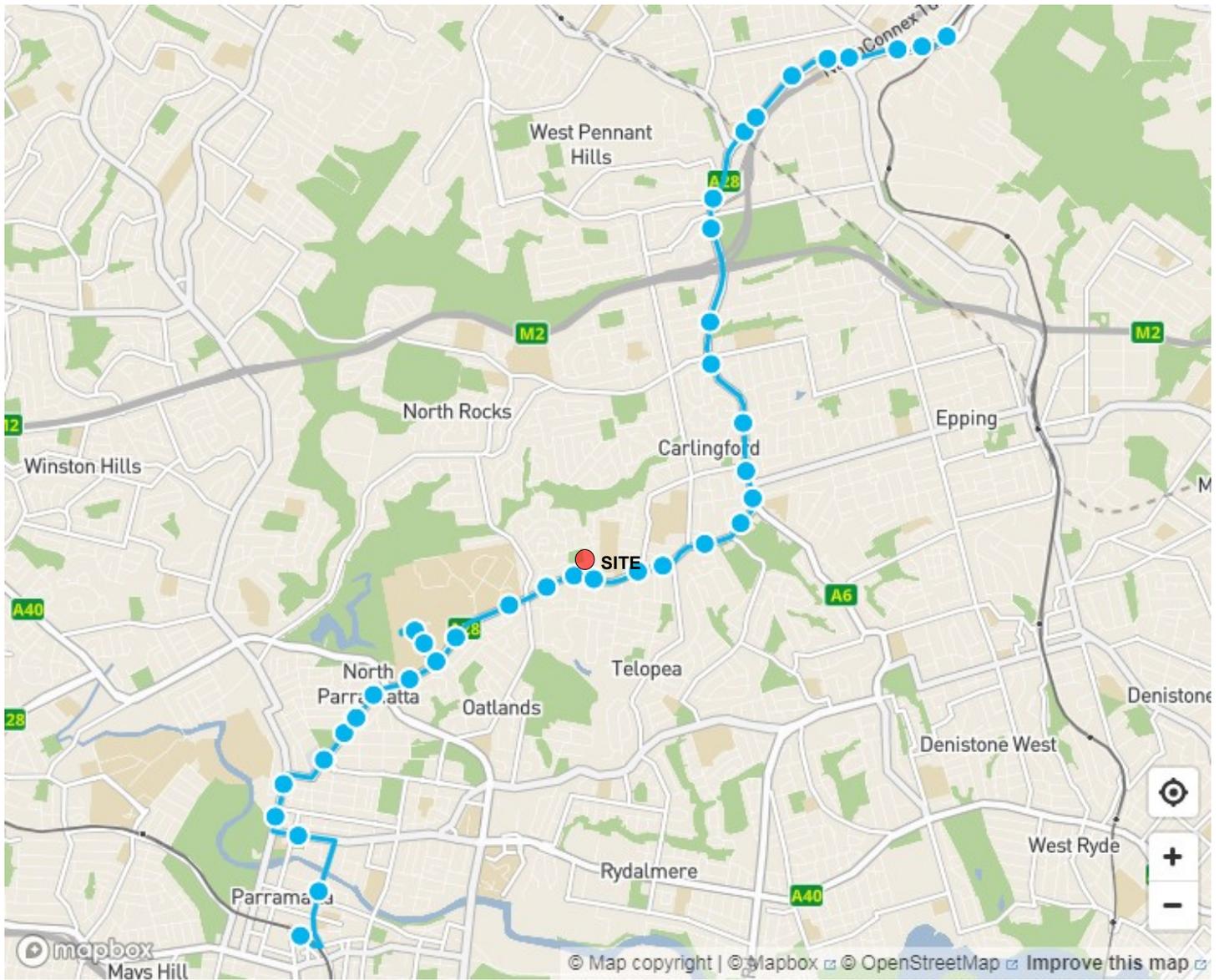
Potential development under R3 zoning

Proposed development under R4 zoning

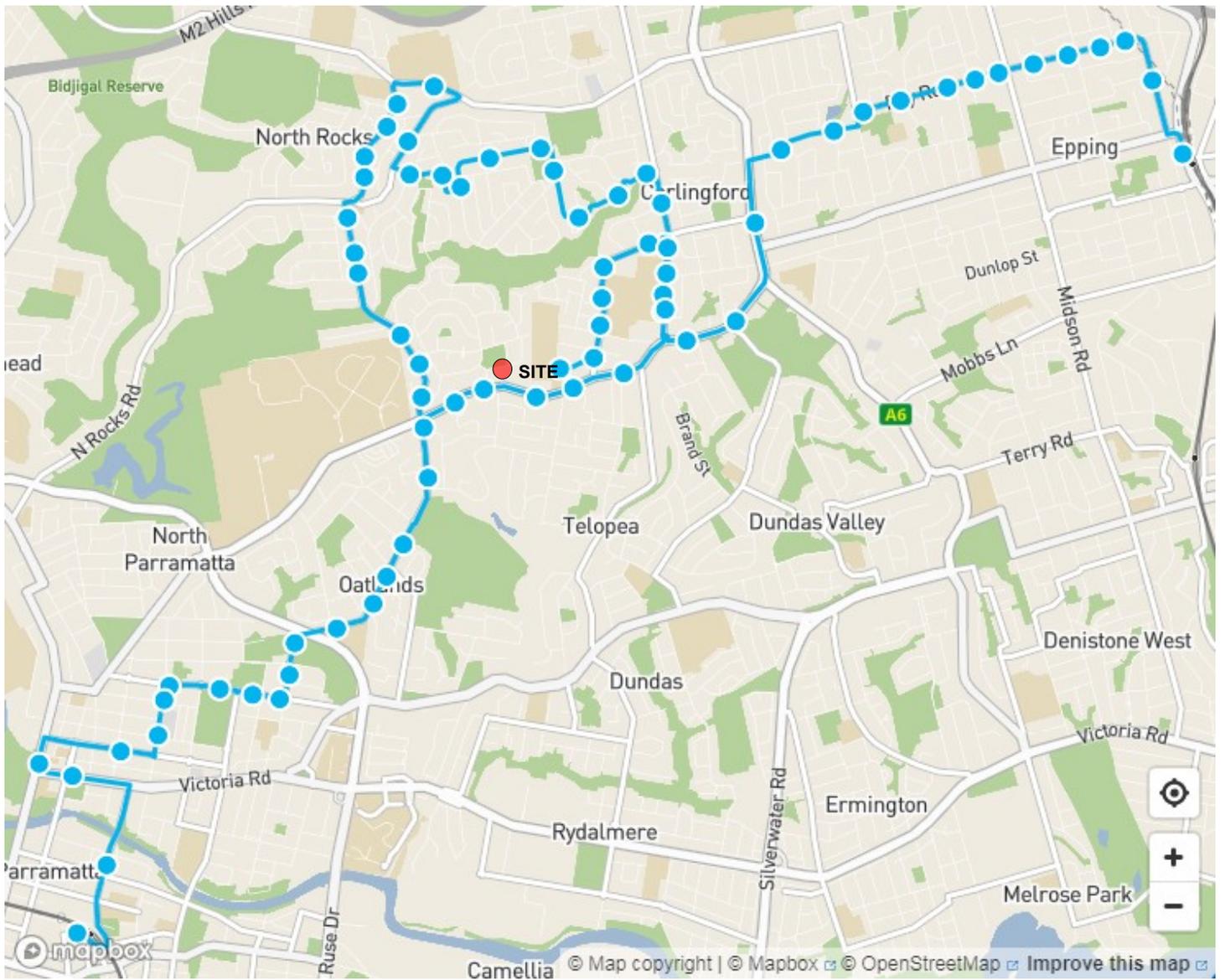
Bus Route 550



Bus Route 625



Bus Route 546



Illustrative Concept - TOWNHOUSE



Yields & Calculations - TOWNHOUSE

Townhouse numbers

Building	Unit Type	Studio	1B	2B	3B	Total
	Townhouse	0%	0.0%	0%	100%	100%
		0	0	0	17	17

Car parking rates

Apartment type	Min. spaces/unit
Studio	1.00
1B	1.00
2B	2.00
3B	2.00
Visitor	0.25
Carshare	1 space

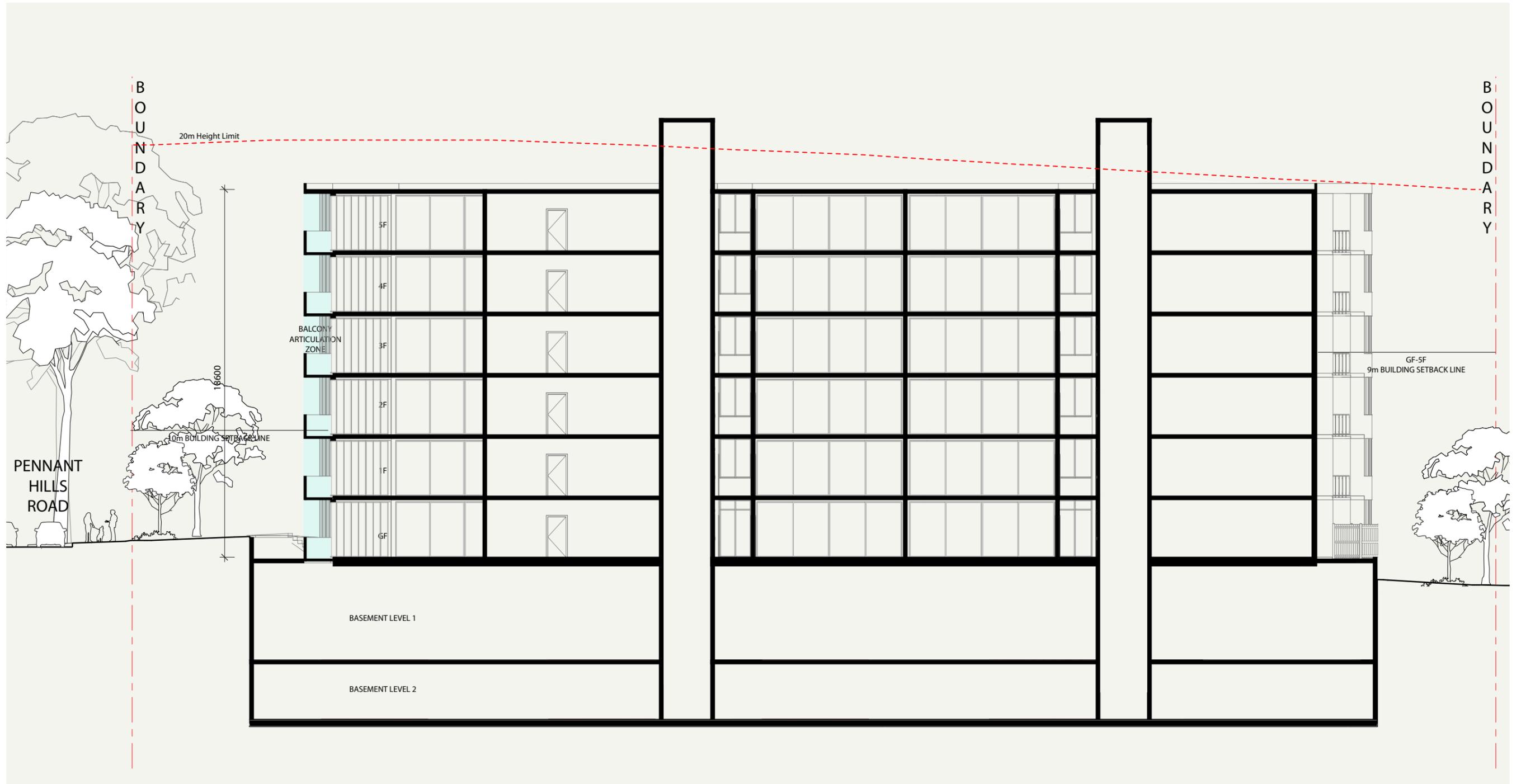
Site Summary

Total GFA	2,194
Site Area - Total	2,910 m ²
Gross FSR	0.75:1
No. of Townhouse	17
No. of cars	40
Site coverage	944 m ²

Definitions

- FSR is Floor Space Ratio = GFA (LEP)/Site Area
- GFA is Gross Floor Area measured as defined by the governing Local Government Authority
- Site Coverage is the Building Footprint plus basements extending beyond the footprint
- all areas are measured in square metres
- all numbers are calculated with decimal places and then rounded up or down to be stated as whole numbers

Section A



Yields & Calculations

Residential numbers and mix

Building	Unit Type	Studio	1B	2B	3B	Total
	Mix	12.5%	0.0%	62.5%	25.0%	100%
		6	0	30	12	48

Car parking rates

Apartment type	Min. spaces/unit
Studio	1.00
1B	1.00
2B	2.00
3B	2.00
Visitor	0.25
Carshare	1 space

Site Summary

Total GFA	5,571
Site Area - Total	2,910 m ²
Gross FSR	1.9:1
No. of apartments	48
No. of cars	103
Site coverage	1,009

Definitions

- FSR is Floor Space Ratio = GFA (LEP)/Site Area
- GFA is Gross Floor Area measured as defined by the governing Local Government Authority
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