FRASERS PROPERTY AUSTRALIA (FPA)
& WINTEN PROPERTY GROUP (WPG)

APRIL 2018

MACQUARIE PARK COMMERCE CENTRE

PEDESTRIAN ANALYSIS

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Macquarie Park Commerce Centre
Pedestrian Analysis

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REV	DATE	DETAILS
A	10/01/2018	Macquarie Park Commerce Centre, Pedestrian Analysis
B	31/01/2018	Final
C	8/02/2018	Revised with comments
D	10/04/2018	Revision to laneways

	NAME	DATE	SIGNATURE
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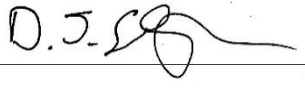
Approved by:	Dan Gallagher	10/04/2018	

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1 PROJECT BACKGROUND

1.1 INTRODUCTION

WSP was engaged by Frasers Property Australia (FPA) & Winten Property Group (WPG) to undertake pedestrian analysis on the public realm areas associated with the redevelopment of the Macquarie Park Commerce Centre located at Waterloo Road, Macquarie Park.

It is understood that FPA & WPG intend to lodge a Section 75W Modification across this site, amending a previous Concept Plan that was awarded Concept Approval on 29th May 2012. The approved scheme is shown below in Figure 1.1.

Figure 1.1 Approved Scheme (May 2012), Macquarie Park

Details of the proposed scheme are shown in Figure 1.2 together with the future pedestrian connections across the site.

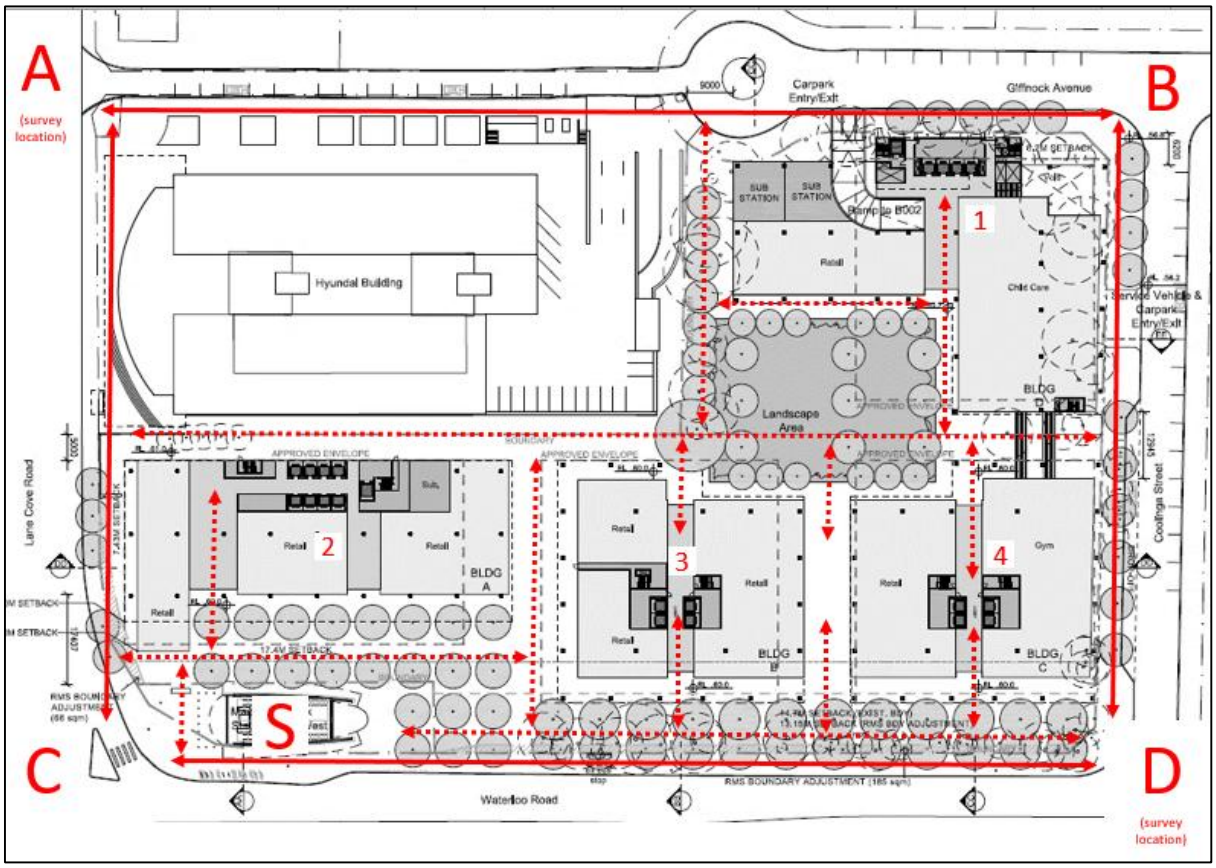


Figure 1.2 Proposed scheme with future pedestrian connections identified

1.2 OBJECTIVES

The objectives of this pedestrian analysis study are to:

1 Assess the pedestrian connections within the site to determine that a suitable level of service is provided.

2 Ensure the proposal aligns with the local DCP in terms of pedestrian connectivity and show that the proposal matches or improves upon the existing approved design in this regard.

2 APPROACH

2.1 METHODOLOGY

The following approach, as shown in Figure 2.1 has been used to undertake pedestrian modelling of the ground floor areas:

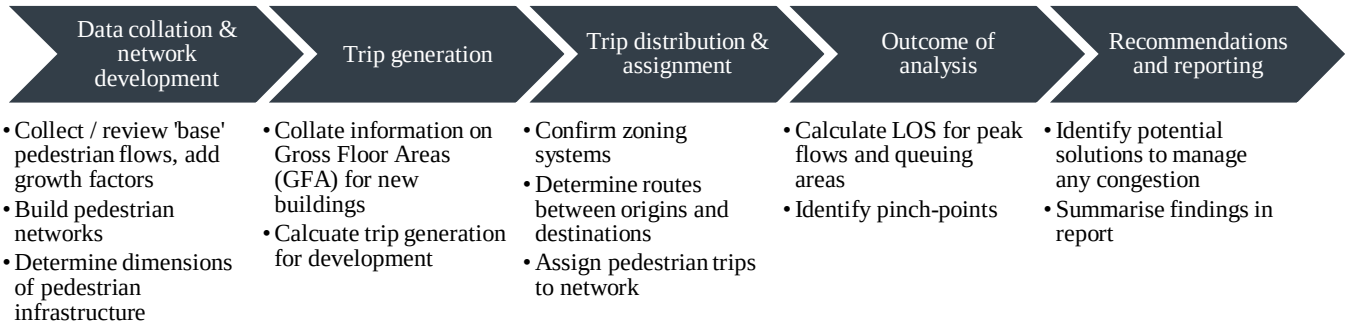


Figure 2.1 Methodology

2.2 LEVEL OF SERVICE (LOS)

Pedestrian crowding is measured in pedestrians per metre of clear footway width per minute. This is calculated from data on pedestrian activity and the street environment. The Fruin scale has been used for the purpose of this assessment to set and define pedestrian Levels of Service (LOS), with LOS A being best and LOS F being worst. Fruin based the thresholds on the ability of pedestrians to move at their desired speed, overtake others, and maintain a comfortable personal space.

The flow analysis compares projected pedestrian flows by link to the flow capacity of that link. The capacity of a link in terms of pedestrian flow is dependent on the width of the link at its narrowest point and the desired Level of Service that the link is expected to achieve. A series of widths have then been measured along each footway zone across the study area to understand the existing useable clear width available. The useable clear width discounts components of the footway that cannot be used for movement, such as street furniture including benches and trees, the kerb edge, and shop facades and their associated buffers.

Figure 2.2 below provides an example of how useable clear width on a footway section is measured.

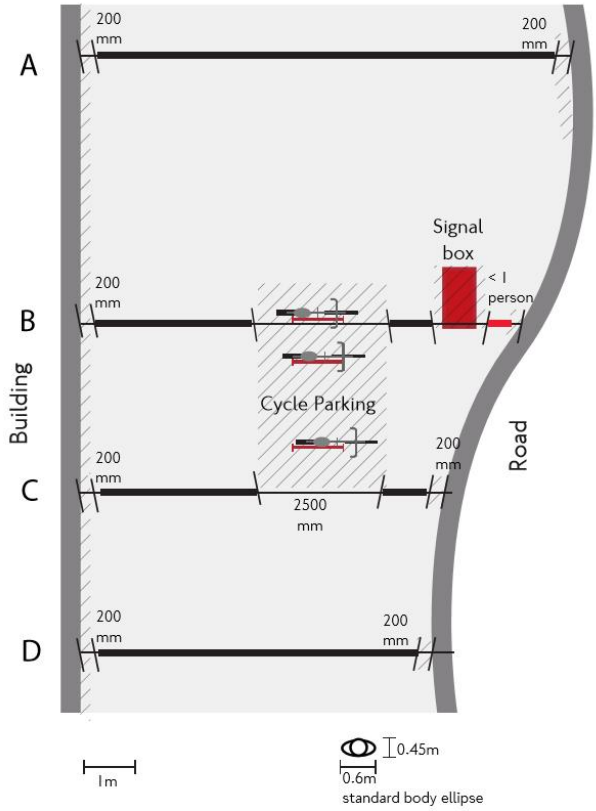


Figure 2.2 Usable clear width on a footway section

Source: Pedestrian Comfort Guidance for London, TfL (2010)

2.2.1 LEVEL OF SERVICE (LOS) TARGETS

For the purpose of this assessment Table 2.1 describes the Level of Service targets that define 'acceptable' performance of pedestrian infrastructure.

Table 2.1 Target Level of Service

	WALKWAYS	CROSSINGS	QUEUING	STAIRWAYS
Target Level of Service (LOS)	B	D*	D	B
Description	Allows pedestrians to move at 'normal speed' through the area. Contraflow will cause minor conflicts and slightly lowered speed and flow	People walk in platoons upon green signal	Circulation is severely restricted. There is enough space for people to stand without touching each other. It is not recommended for long term waiting	It may be difficult to overtake slower movers

** - Note Crossing LOS is based on D as a safe outcome, LOS B provides the same level of comfort as walkways*

3 BASE TRAFFIC

3.1 SURVEYS

In total, four 15-minute spot surveys were conducted at two locations at the Macquarie Park project site. These locations are the corners of Coolinga St and Waterloo Rd, and Hyundai Dr and Lane Cove Rd. At each location, one 15-minute spot survey was taken for each peak period, where pedestrian counts were conducted in the North-South and East-West directions. Figure 3.1 below illustrates survey locations and associated pedestrian movements. Pedestrian movements A & B are in the North-South and East-West directions respectively, on the corner of Coolinga St and Waterloo Rd. Pedestrian movements D & C are in the North-South and East-West directions respectively, on the corner of Hyundai Dr and Lane Cove Rd.

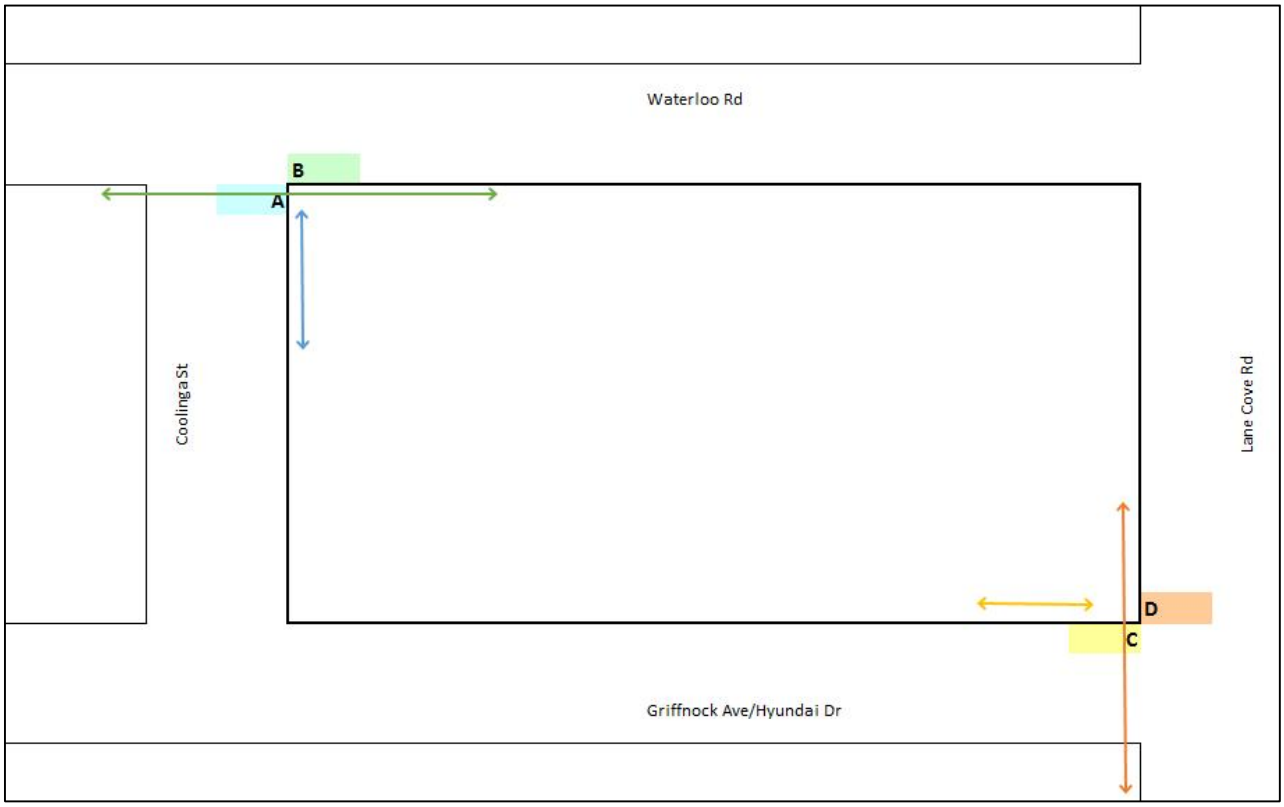


Figure 3.1 Survey Locations and Pedestrian Movements

All surveys were conducted on the same day – Tuesday 19 December 2017. The methodology was as follows:

- Survey 1 captured pedestrian movements A & B during the Tuesday AM Peak, from 8:23 AM to 8:38 AM. This corresponded to trains from the city arriving at Macquarie Park station depositing passengers at 8:20 AM, 8:26 AM and 8:35 AM.
- Survey 2 captured pedestrian movements C & D during the Tuesday AM Peak, from 8:52 AM to 9:07 AM. This corresponded to trains from the city arriving at Macquarie Park station depositing passengers at 8:50 AM, 8:56 AM and 9:05 AM.
- Survey 3 captured pedestrian movements A & B during the Tuesday PM Peak, from 5:10 PM to 5:25 PM. This corresponded to a number of trains arriving and departing Macquarie Park station.
- Survey 4 captured pedestrian movements C & D during the Tuesday PM Peak, from 5:35 PM to 5:50 PM. This corresponded to a number of trains arriving and departing Macquarie Park station.

3.2 GROWTH AND REDISTRIBUTION

In order to assess the 10-year design horizon of the development (2029) a compounding growth rate of 3% per year has been used to growth the surveyed background pedestrian flows.

The factored (2029) background pedestrian flows have been redistributed through the proposed site layout to account for new routes between origin and destination points created by the development.

The redistributed background flows (between B-C and C-B) through the proposed site layout (key internal movements) can be seen in Figure 3.2 below. The redistribution of background flows assumes a 50/50 split across the two key internal movement routes shown.

It should be noted that routes include 'stop off' trips to the area between Buildings 3 and 4 accounting for 5% of total pedestrians through this area in the AM and PM peaks. This is to account for those stopping in the area for retail, food and beverages.

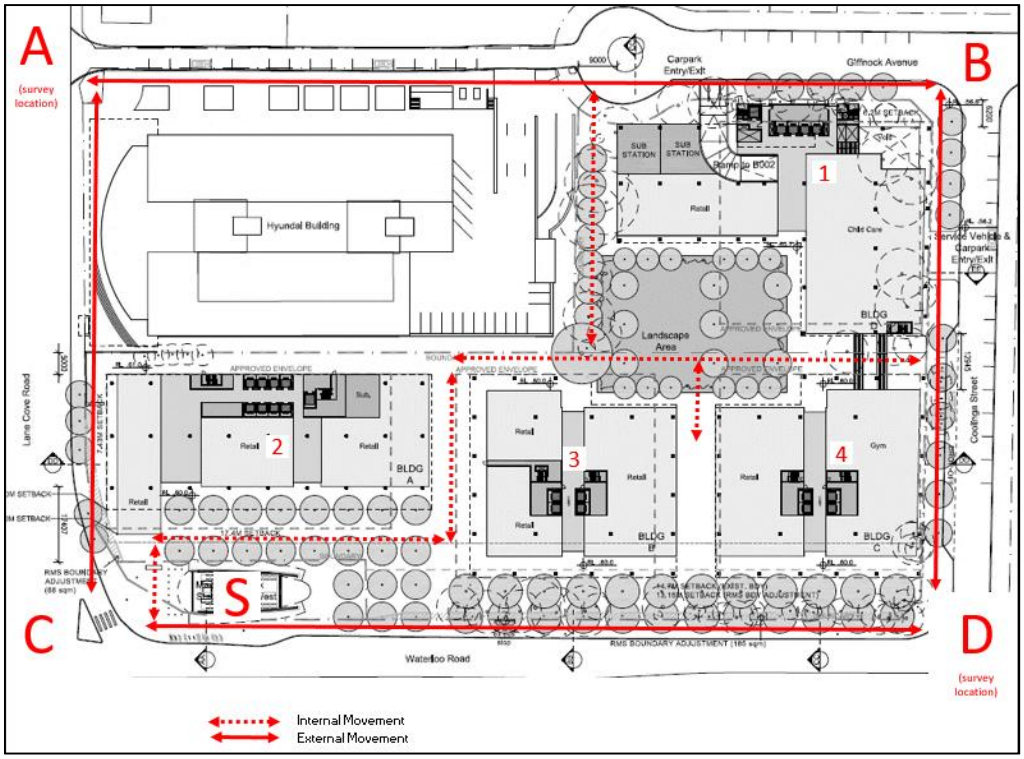


Figure 3.2 Redistribution of background flows through the site

4 TRIPS GENERATION, DISTRIBUTION AND ASSIGNMENT

The expected peak hour trip generation of the proposed development was based on the expected total building population, derived from the total Net Lettable Area (NLA) of the office space. The following details the assumptions made:

- the Net Lettable Area of the office floors of the new buildings was divided by a density of one employee per 12sqm to determine the maximum building population
- the building population on any given day is on average 85% of the total possible population
- 60% of the population on any given day arrive or depart during the morning peak period
- 95% of those are arriving and 5% departing in the morning peak hour
- 10% of those employees drive to work and get from their cars to their area of work via the lifts from the basement, therefore not appearing as a pedestrian movement at ground level
- the remaining 90% are assigned to the rail station for the purposes of this study as a conservative approach
- PM flows are equal to 75% of AM flows.

Table 4.1 below shows the resulting number of development trips generated by each building.

Table 4.1 Development Trip Generation

BUILDING	NLA	AM IN	AM OUT	PM IN	PM OUT
A	29,521	933	49	37	700
B	12,214	386	20	15	289
C	13,299	420	22	17	315
D	17,193	543	29	21	407

5 ASSESSMENT

5.1 LEVEL OF SERVICE (LOS)

A series of widths have been measured across each footway zone in the study area to understand the existing clear width available and the resulting pedestrian volumes expressed as the value of persons per metre per minute (PPMM) together with and the resulting LOS as can be seen in tabular format in Table 5.1 and diagrammatically in Figure 5.1.

Table 5.1 Recorded Widths, Demand and LOS

ID	WIDTH (M)	CLEARANCE (M)	EFFECTIVE WIDTH (M)	AM PPMM	PM PPMM	LOS AM	LOS PM
E_1	3.5	0.2	3.3	0.0	0.0	A	A
E_2	3.5	0.2	3.3	2.1	1.5	A	A
E_3	3.5	0.2	3.3	2.1	1.5	A	A
E_4	2.9	0.4	2.5	2.7	2.0	A	A
E_5	2.9	0.4	2.5	2.7	2.0	A	A
E_6	2.9	0.4	2.5	0.0	0.0	A	A
E_7	3.2	0.2	3	1.7	0.7	A	A
E_8	3.2	0.2	3	9.5	1.3	A	A
E_9	2.1	0.2	1.9	3.2	3.2	A	A
I_1	6.7	0.4	6.3	1.1	0.8	A	A
I_1a	6.7	0.4	6.3	1.1	0.8	A	A
I_1b	6.7	0.4	6.3	1.1	0.8	A	A
I_2	0.6	0	0.6	19.1	1.4	B	A
I_3	3.5	0.4	3.1	7.4	0.6	A	A
I_4	3.5	0.4	3.1	7.4	0.6	A	A
I_5	3.5	0.4	3.1	3.7	0.3	A	A
I_6	7.4	0.8	6.6	0.0	0.0	A	A
I_7	7.4	0.8	6.6	5.5	1.7	A	A
I_8	7.4	0.8	6.6	5.5	1.7	A	A
I_9	7.4	0.8	6.6	5.5	1.7	A	A
I_10	7.4	0.8	6.6	5.5	1.7	A	A
I_11	7.4	0.8	6.6	2.8	0.9	A	A
I_12	7.4	0.8	6.6	2.8	0.9	A	A
I_13	7.4	0.8	6.6	1.0	0.7	A	A
I_14	7.4	0.8	6.6	1.0	0.7	A	A
I_15	6.3	0.2	6.1	1.6	0.1	A	A
I_16	4	0.4	3.6	10.1	3.2	A	A

ID	WIDTH (M)	CLEARANCE (M)	EFFECTIVE WIDTH (M)	AM PPMM	PM PPMM	LOS AM	LOS PM
I_17	3.8	0.4	3.4	0.0	0.0	A	A
I_18	4	0.4	3.6	0.7	0.2	A	A
I_19	3.8	0.4	3.4	0.0	0.0	A	A
I_20	6.3	0.4	5.9	7.8	2.1	A	A
I_21	15	0.8	14.2	2.6	0.8	A	A
I_22	15	0.8	14.2	2.6	0.8	A	A
I_23	10	0.4	9.6	3.8	1.2	A	A
I_24	3.8	0.4	3.4	3.0	0.2	A	A
I_25	3.8	0.4	3.4	3.9	0.3	A	A
I_26	6	0	6	11.6	2.3	A	A
I_27	7	0.8	6.2	3.8	0.3	A	A
I_28	10	0	10	2.4	0.2	A	A
I_29	7	0.8	6.2	3.8	0.3	A	A
I_30	7	0.8	6.2	3.8	0.3	A	A
I_31	7	0.8	6.2	2.2	0.2	A	A
I_32	7	0.8	6.2	2.2	0.2	A	A
I_33	7	0.8	6.2	2.2	0.2	A	A
I_34	7	0.8	6.2	2.2	0.2	A	A
I_35	7	0.8	6.2	0.0	0.0	A	A

Detailed drawings including the footway widths for footway zones I_16 and I_18 were provided in *Macquarie Park Commerce Centre, Waterloo Road, Section 75w Response to NSW Department to Planning Queries, S10758, March 2018* as shown in Appendix A. As such these measurements were used in this analysis. It should be noted that the measurement for footway zone I_16 encompasses only the 4m footway between the dining areas, excluding the additional 2.75m width provided in the adjacent colonnade, as shown in Appendix A and as reflected in Table 5.1.

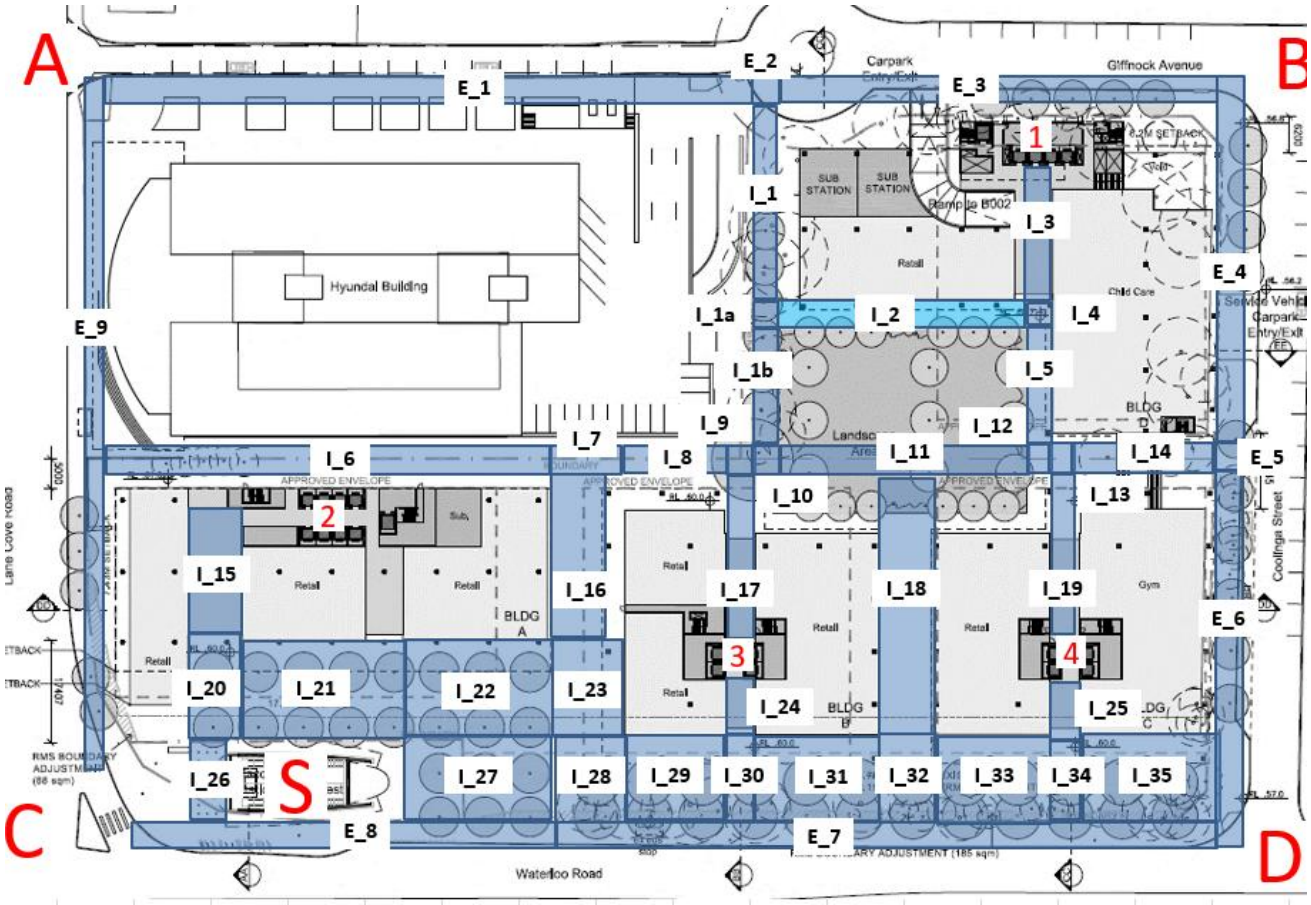


Figure 5.1 Static Pedestrian Analysis – LOS

As can be seen in Table 5.1 and Figure 5.1 all areas within the assessment are LOS A during the 2029 AM with development scenario, with the exception of link 'I_2' which may be used as a restaurant and café seating area in the future, thus reducing the effective width of the area for pedestrians and as such producing LOS B. However, LOS B is still an acceptable LOS for a walkway, as shown in Table 2.1.

5.2 COMPLIANCE WITH DEVELOPMENT CODE

The Development Control Plan (DCP) for the Macquarie Park Corridor outlines certain requirements for new development to ensure the appropriate level of connectivity to and through the sites contained within the precinct.

In terms of compliance with Section 4.2 b of the DCP, it is noted that the footpaths align with the intent of Figure 4.1.1. In terms of compliance with Section 4.2 c, the following are noted:

— footpaths of minimum 4 m in width have been provided across the site

— clear sightlines are present in plan form across each of the footways through the opening and set back of buildings to the footpath currently running on the each of the adjacent roads

— active frontages are significant with mainly retail uses at ground level of the new buildings.

5.3 COMPARISON TO APPROVED LAYOUT

The proposed layout has been compared with the previous approved scheme. The following is noted:

- the accessibility of the park has been maintained when comparing walking distances from the road frontages to the new park
- although frontage of the park to Giffnock Avenue has reduced, the visibility of the park from the other, busier streets is improved, including a clear sightline from Lane Cove Road, Waterloo Road, and Coolinga Street
- frontage of the surrounding retail uses, as well as a potential new child care centre and gym, to the park has increased, improving integration and safety of the park
- it is supportable to reduce the width of the laneways between Buildings A and B, and Buildings B and C from 15 m to 9 m.

6 SUMMARY

An assessment of the future pedestrian movements across the proposed Macquarie Park Commerce Centre was undertaken to ensure that the proposed facilities would provide a convenient and comfortable environment for pedestrians and to ensure compliance with the relevant code contained within the local Development Control Plan. The following was identified:

- the assessment considered existing surveyed movements that may reroute across the site and also accounted for growth over a 10 year design horizon
- a trip generation, distribution and assignment exercise was undertaken to determine the number of development related pedestrian movements that would utilise the future site
- all footway connections were shown to comply with the target Level of Service B, with almost all links performing at Level of Service A. This demonstrates a good provision of pedestrian space
- compliance against the relevant sections of the local Development Control Plan was achieved
- in comparison with the approved May 2012 scheme, the new proposal showed better connections across the site and a safer pedestrian environment due to better sightlines through to the park and increased integration with active frontages within the development.

7 LIMITATIONS

7.1 SCOPE OF SERVICES

This report (the report) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the client and WSP (scope of services). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

7.2 RELIANCE ON DATA

In preparing the report, WSP has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, WSP has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WSP will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

7.3 OTHER LIMITATIONS

WSP will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in the report nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

APPENDIX A

LANEWAY DRAWINGS

MACQUARIE PARK COMMERCE CENTRE

WATERLOO RD

SECTION 75W RESPONSE TO
NSW DEPARTMENT OF PLANNING QUERIES

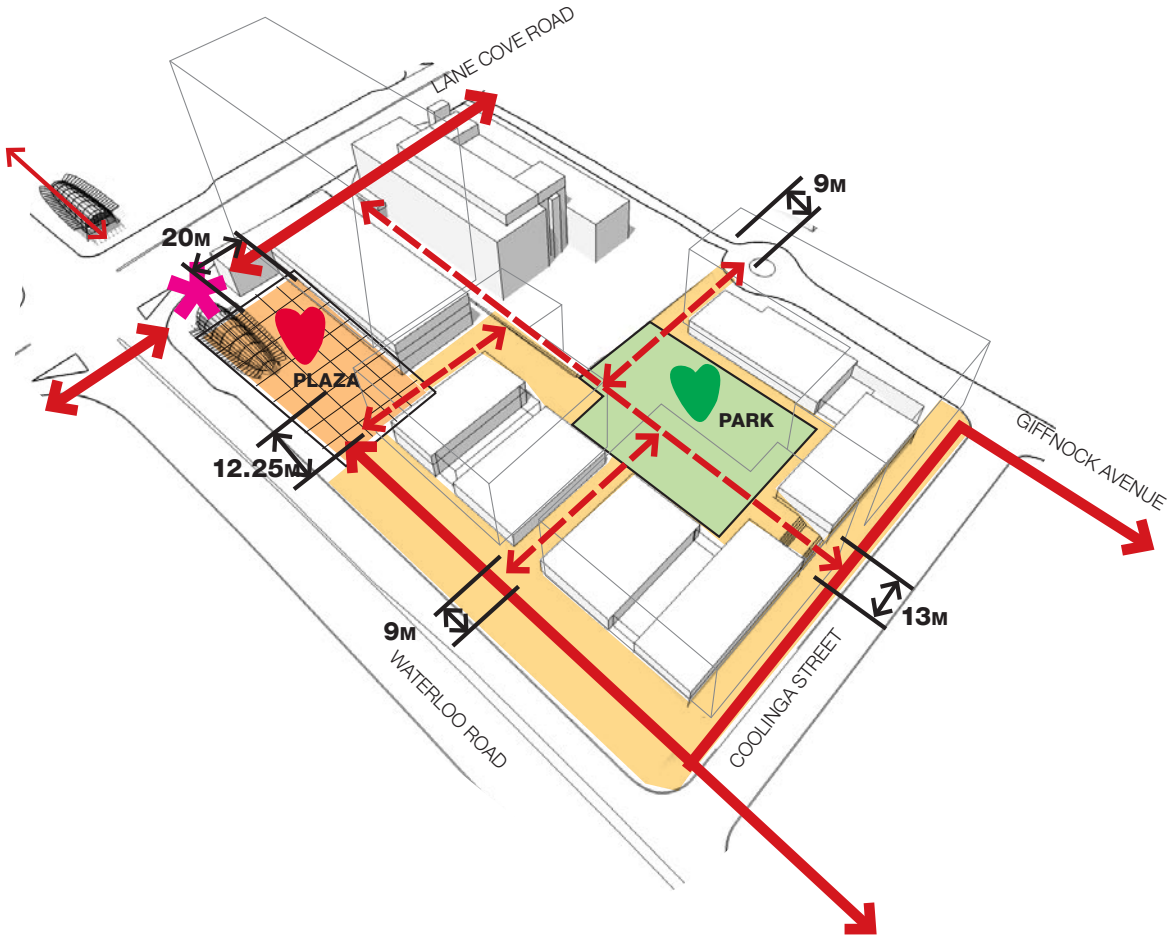
S10758
MARCH 2018

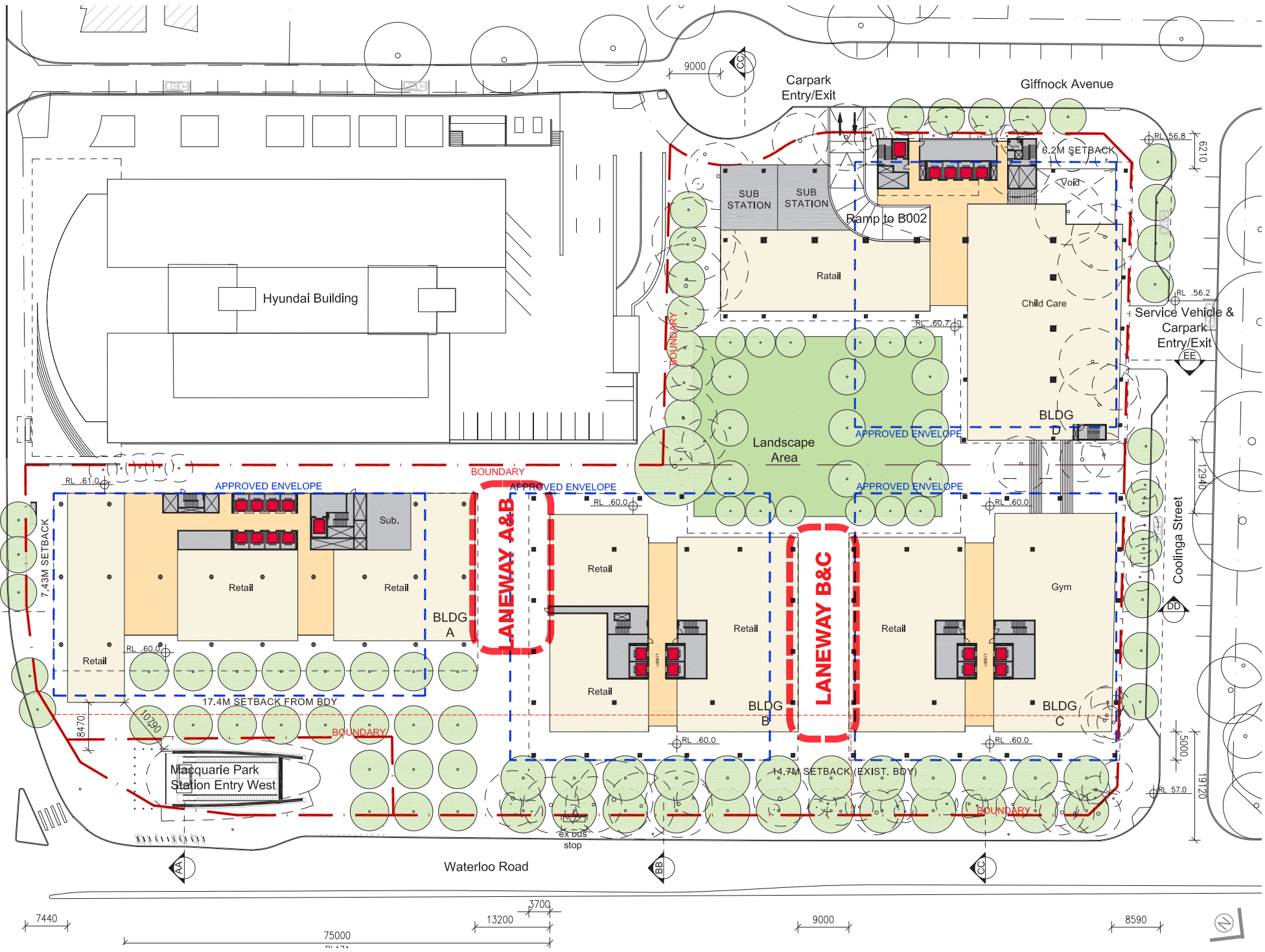
BATESSMART™

1.0 LANEWAYS

Laneways
1. *Provide further consideration of the adequacy of the proposed laneway widths to accommodate pedestrian movements, as well as seating, landscaping and other elements. This should include an indicative layout of the laneways with dimensions.*

The following diagrams highlight the conceptual approach for the laneways to ensure clear visual links with highly active retail is achieved through the site.





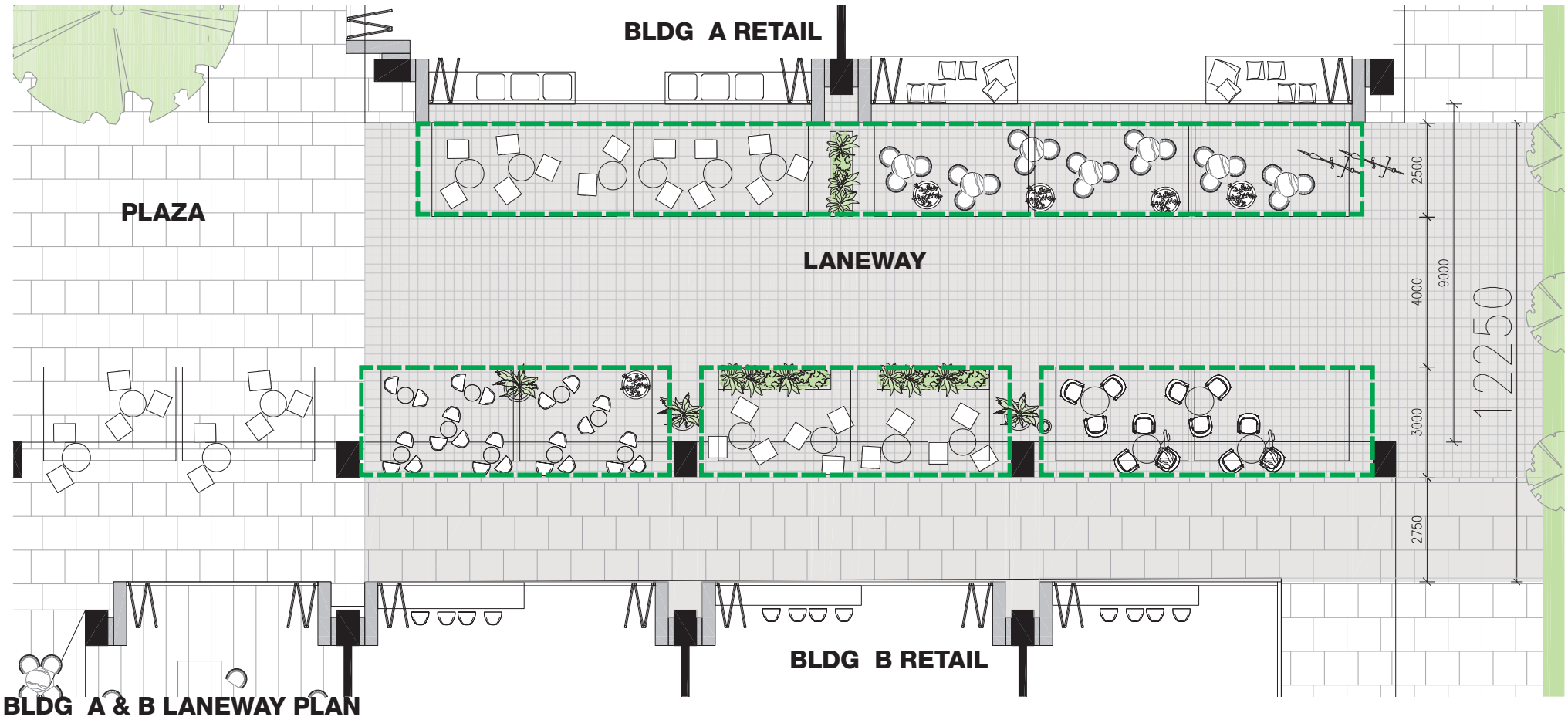
1.0 LANEWAYS
BLDG A&B

Laneways

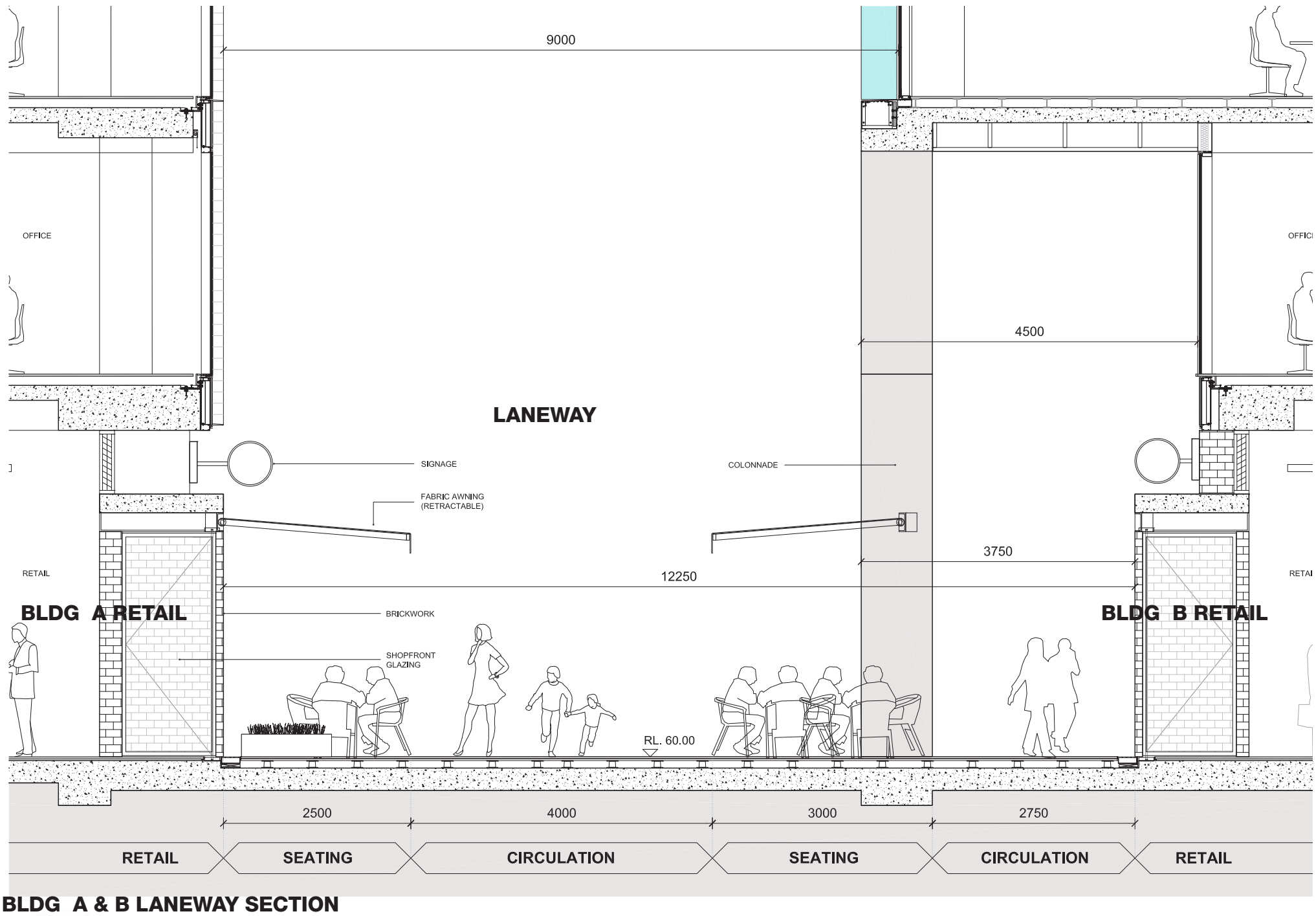
1. *Provide further consideration of the adequacy of the proposed laneway widths to accommodate pedestrian movements, as well as seating, landscaping and other elements. This should include an indicative layout of the laneways with dimensions.*

The laneway between Bldg A& B has been designed to achieve a clear width of 12.25m between glazing lines & a physcial 9m from colonade to glass line. This dimension consists of a 4m unobstructed circulation with minimum 2.5m seating zone on each side. This overall width balances the need for ground level activation against provision for clear unencumbered circulation between the station plaza and park. The 4m deep colonade also provides sheltered access in adverse weather conditions.

External seating zone



BLDG A & B LANEWAY PLAN



BLDG A & B LANEWAY SECTION

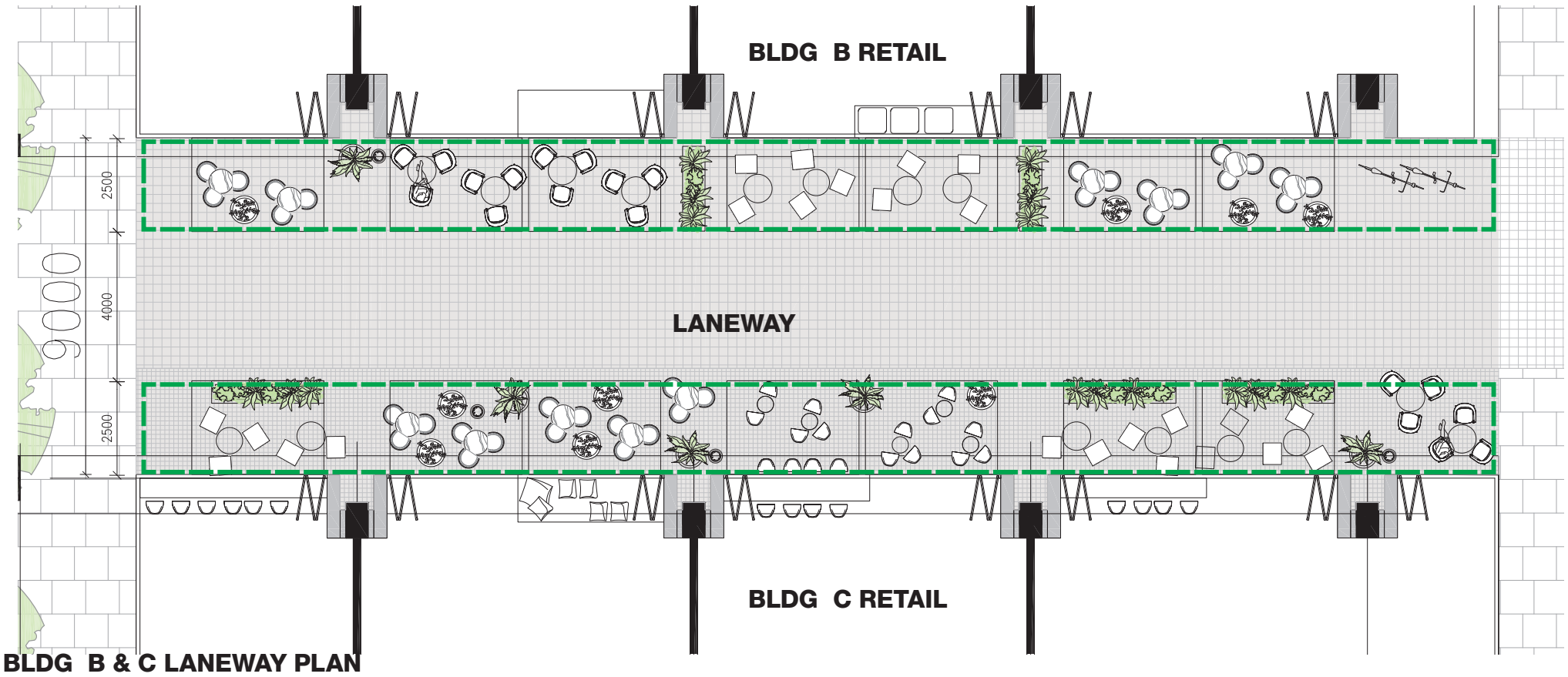
WINTEN PROPERTY GROUP FRASERS PROPERTY BATESSMART

1.0 LANEWAYS
BLDG B&C

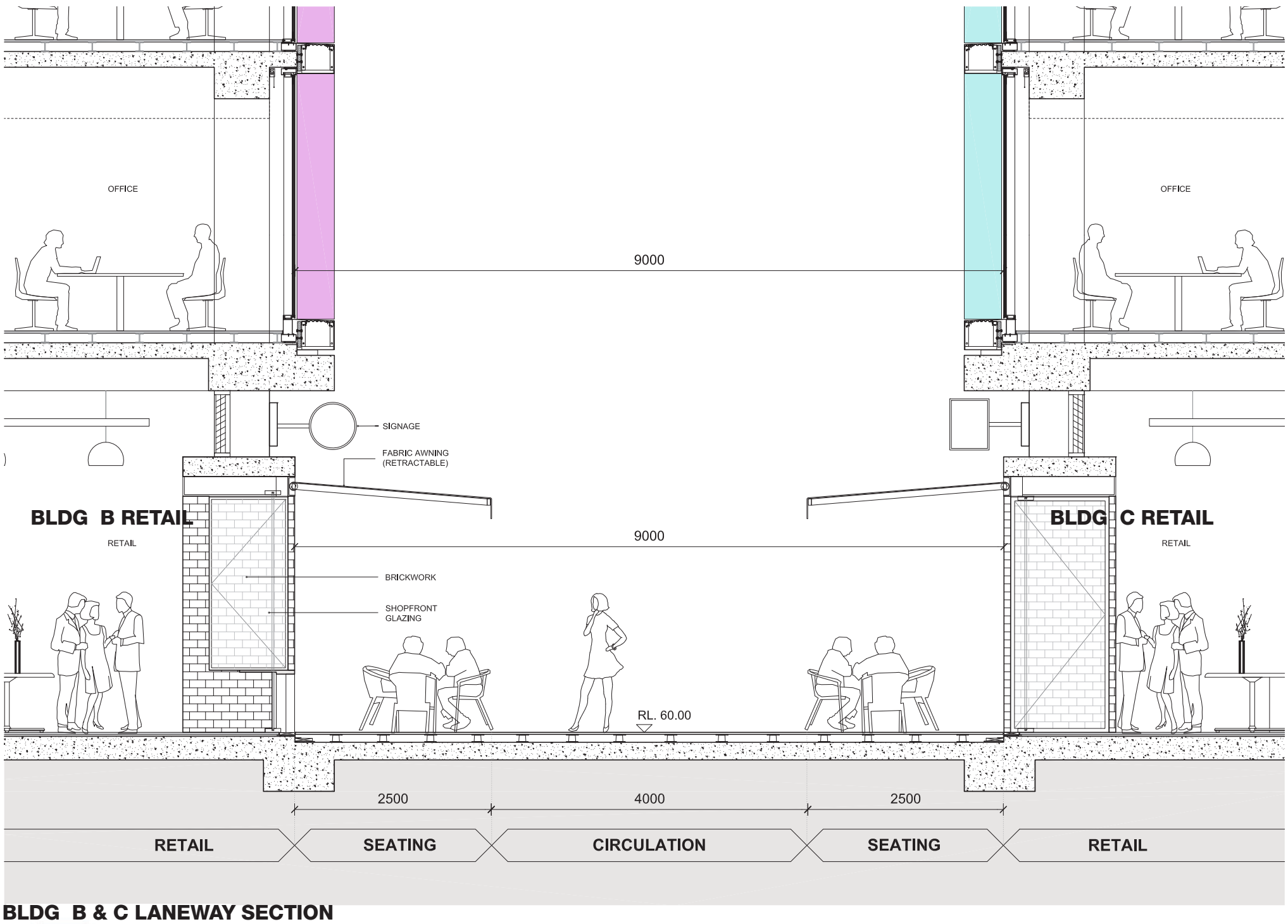
Laneways
The laneway between Bldg B & C has been designed to achieve a clear width of 9m. This dimension will accommodate 2.5m external seating zone against the facade line with 4m clear unimpeded width for pedestrian circulation.

As described further in this report this design approach is consistent with many examples of narrow laneways throughout Sydney & Melbourne CBD. These laneways are considered as highly successful examples of urban laneway spaces that promote retail activation & areas for social gathering.

External seating zone



BLDG B & C LANEWAY PLAN



BLDG B & C LANEWAY SECTION

WINTEN PROPERTY GROUP FRASERS PROPERTY BATESSMART

1.0 LANEWAYS
VIEW COMPARISON BLDG A&B

Laneways
2. Clarify the location of existing views and provide additional views through the laneways, particularly between Buildings A & B, comparing the approved and proposed scheme.

The following diagrams highlight the differences between the approved and proposed schemes.
Whilst the dimensions of laneway widths have reduced the openness and visual links between buildings have significantly improved due to the deletion of the trees and planting. The change in use at ground level is to be majority retail (food & beverage) has vastly improved the activation and ground level amenity of the precinct. The approved scheme had a large proportion of commercial office allocation at ground level.

APPROVED_LANEWAY BLDGS A & B

PROPOSED_LANEWAY BLDGS A & B

VINTEN PROPERTY GROUP FRASERS PROPERTY BATESSMART

1.0 LANEWAYS
VIEW COMPARISON
BLDG B&C

APPROVED_LANEWAY BLDGS B & C

PROPOSED_LANEWAY BLDGS B & C

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