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Project title	Barangaroo Precinct Demand	Job number
		231051-00
cc	Abbey Johnson	File reference
		002-C Barangaroo Pedestrian Walkway Evaluation
Prepared by	Andrea Dowling Marc Caplan	Date
		2 April 2014
Subject	Barangaroo Pedestrian Walkway Evaluation	

1 Introduction

Arup was commissioned to evaluate whether the proposed pedestrian walkway and retail seating layout for the Barangaroo South Precinct is appropriate with regards to the estimated future pedestrian demand.

This note briefly summarises the inputs, methodology and outputs of the evaluation. Full street-by-street Level of Service (LoS) outputs can be found in the appendix.

2 Inputs

2.1 Pedestrian Walkway Layout

The pedestrian walkway and retail seating layout evaluated is:

- 20140326_Retail Dimensions reduced.pdf (email Abbey Johnson - Paul Stanley 26/03/2014).

The relevant accessible walkway widths have been extracted from this document. The appendix details the 32 Barangaroo Precinct walkway segments Arup has used in order to undertake the evaluation.

2.2 Estimated Pedestrian Demand

The pedestrian demand was estimated as part of a previous pedestrian planning study for Lend Lease known as the Barangaroo Precinct Demand Study (Outlined in report 001-C Barangaroo Pedestrian Demand Precinct Study Final Report, 6th September). Assumptions are outlined in detail within this report.

This study developed a dataset in collaboration with Lend Lease and the Barangaroo Delivery Authority (BDA) which estimates expected weekday, weekend, and event populations across the development site for an end state (full build out, i.e. ~2025) scenario. The dataset has been made available in a GIS format enabling the design team to independently interrogate the data, as well as providing an improved means of presentation.

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3 Approach

The evaluation was undertaken for the following time periods:

- Weekday AM Peak – 08:00 – 09:00;
- Weekday Midday Peak – 12:00 - 14:00; and
- Weekend Daytime – 10:00 – 18:00.

Note that an event period (i.e. New Year's Eve) has not been considered and it would be expected that an event management overlay (which may include removal of outdoor seating) is applied to the Precinct during such occasions to provide appropriate pedestrian access to the foreshore.

For each time period the Fruin walkway LoS was calculated based on the peak 15 minute flow. It was assumed that:

- The peak 15 minutes is 30% of the 1 hour flow;
- The peak 1 hour weekday midday flow was 60% of the 2 hour period;
- The peak 1 hour weekend daytime flow was 25% of the 8 hour period.

For the purposes of this evaluation, it has been assumed that as a worst case all foreshore pedestrian movement along Waterfront Place (links 26 and 27) would use the 2.0m pedestrian walkway adjacent to retail areas rather than the wider (5.0m+) foreshore areas.

4 Outcomes

The LoS outcomes shown in the appendix demonstrates that the majority of pedestrian walkways across the Barangaroo South Precinct are estimated to perform at walkway LoS A in all peak periods. Walkway LoS C or above (i.e. A, B, or C) is deemed an appropriate level of performance for the Precinct to allow for bi-directional movements.

The following sections of walkway are estimated to perform at below LoS A:

- Weekday AM:
 - a) Shelley Lane between Union Walk and Transport Place (LoS C);
- Weekday Midday:
 - a) Shelley Lane between Union Walk and Transport Place (LoS B);
 - b) Lime Street (eastern footpath) between Upper Globe shops and City Walk (LoS C);
 - c) Waterfront Place between City Walk and Transport Place (LoS B).
- Weekend Daytime:
 - a) Waterfront Place between City Walk and Transport Place (LoS C).

All of the above sections still operate at LoS C or above. This allows for bi-directional flow along the walkways. Each of the above sections is a key retail activation area within the Precinct, where a degree of 'busyness' may actually be preferable. It is recommended that the circulation spaces in these areas are kept free of other street furniture or activities (such as retail carts, street performances, queuing, etc.) which may impact upon this pedestrian performance.

Overall, the provision of pedestrian walkway space within the Barangaroo South Precinct, and the allowance for retail activity and seating adjacent to these spaces is deemed to be appropriate for the estimated pedestrian demand during peak periods.



File Note

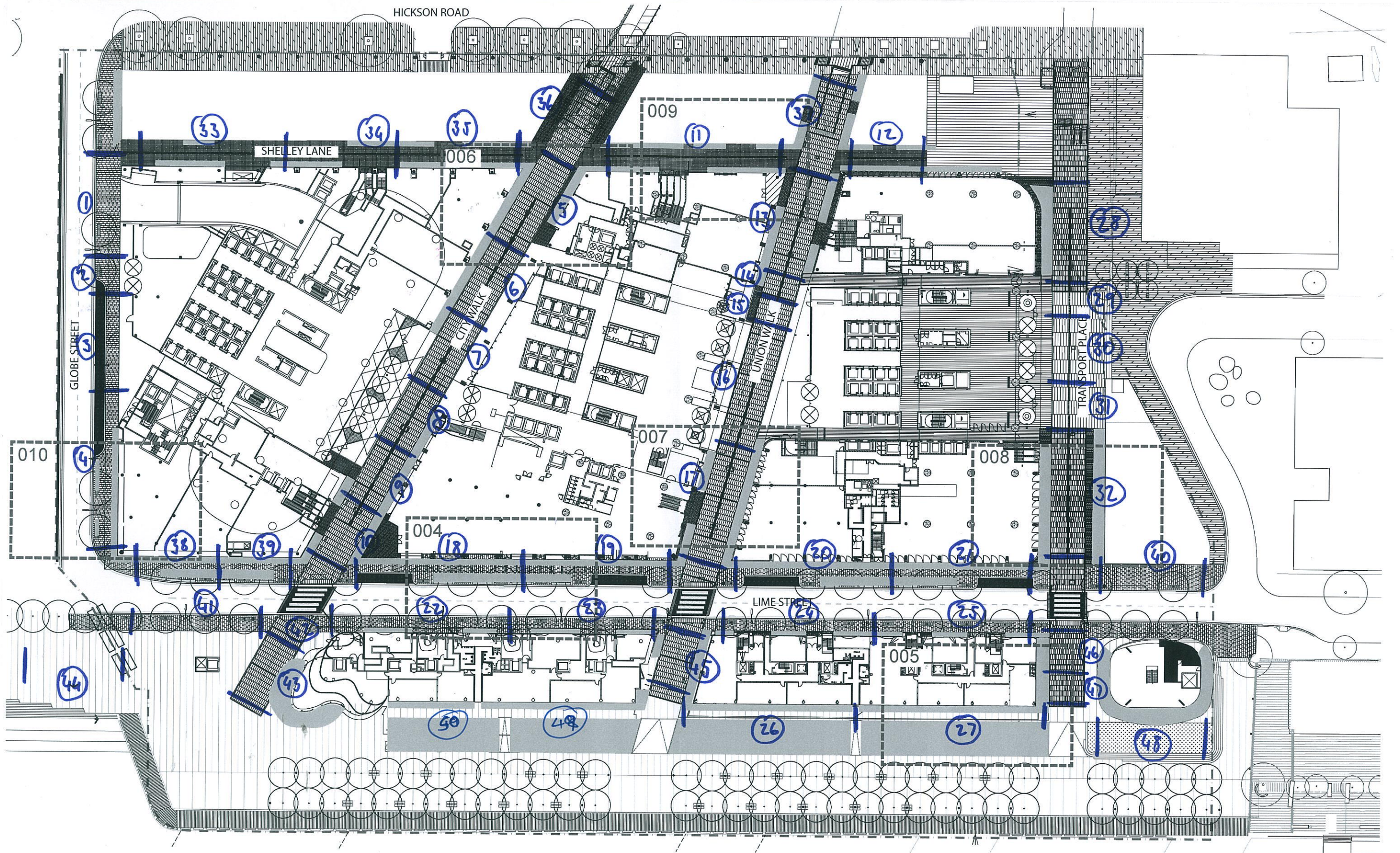
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Attached:

- Reference Precinct Plan;
- LoS Outputs.

DOCUMENT CHECKING (not mandatory for File Note)

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Barangaroo South - Public Domain

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DRAWING
Stage 1A RETAIL AREA

DRAWING DATE
26 / 03 / 2014

DRAWING NO.
LA_MP_A0_SK_003

P:\000_Barangaroo\INTERIOR\Design\CONCEPT\Plan\LA_Marketplace\Sketch Files\LA_MP_A0_SK_003_Stage 1A.dwg

Barangaroo South - Public Domain

Weekday AM Flow

Peak 15 minute factor 30%

Link Number	Link Name	Description	Clear Width (m)	Flow (peds/hr)	Peak 15min Flow	Flow Vol (ped/m/min)	LOS
1	Globe St North	Shelley Ln to crossing	2	147	44	1.5	A
2	Globe St North	Crossing to C3 lobby	2	419	126	4.2	A
3	Globe St North	C3 lobby to C3 cross route	2	484	145	4.8	A
4	Globe St North	C3 cross route to Lime St	2	484	145	4.8	A
5	City Walk	Shelley Ln to C4 cross route (northern)	8	4,693	1,408	11.7	A
6	City Walk	C4 cross route to City Walk dest.	8	5,127	1,538	12.8	A
7	City Walk	City Walk Dest. to C4 Nth	8	5,081	1,524	12.7	A
8	City Walk	C4 Nth to C3	8	4,637	1,391	11.6	A
9	City Walk	C3 to C3 cross route	8	2,699	810	6.7	A
10	City Walk	C3 cross route to Lime St	8	2,724	817	6.8	A
11	Shelley Lane	City Walk to Union Walk	2	901	270	9.0	A
12	Shelley Lane	Union Walk to Hickson Pl	2	3,339	1,002	33.4	C
13	Union Walk	Shelley Ln to C5 cross route	8	2,428	728	6.1	A
14	Union Walk	C5 cross route to Union Walk Dest.	8	4,336	1,301	10.8	A
15	Union Walk	Union Walk Dest. To C4 cross route	8	4,276	1,283	10.7	A
16	Union Walk	C4 cross route to C4 entry	8	3,463	1,039	8.7	A
17	Union Walk	C4 entry to Lime St	8	2,522	757	6.3	A
18	Lime St East	City Walk to the Common	2	1,340	402	13.4	A
19	Lime St East	The Common to Union Walk	2	2,202	661	22.0	A
20	Lime St East	Union Walk to Lime St local shops	2	530	159	5.3	A
21	Lime St East	Lime St local shops to Transport Pl	2	653	196	6.5	A
22	Lime St West	City Walk to R8	1.7	447	134	5.3	A
23	Lime St West	The Common to Union Walk	1.7	468	140	5.5	A
24	Lime St West	Union Walk to R9	1.7	469	141	5.5	A
25	Lime St West	R9 to Transport Pl	1.7	478	143	5.6	A
26	Waterfront Pl	Union Walk to Waterfront Pl A	2	405	122	4.1	A
27	Waterfront Pl	Waterfront Pl A to Transport Pl	2	658	197	6.6	A
28	Transport Pl	Shelley Ln to C5 cross route	10	5,465	1,640	10.9	A
29	Transport Pl	C5 cross route to route south	10	6,328	1,898	12.7	A
30	Transport Pl	Route south to C5 entry	10	5,342	1,603	10.7	A
31	Transport Pl	C5 entry to Transport Pl Dest.	10	3,012	904	6.0	A
32	Transport Pl	Transport Pl Dest. To Lime St	10	2,927	878	5.9	A
33	Shelley Lane	Globe St North to Metropole Hotel	2	418	125	4.2	A
34	Shelley Lane	Metropole Hotel to Shelley Lane Dest.	2	425	128	4.3	A
35	Shelley Lane	Shelley Lane Dest. to City Walk	2	808	242	8.1	A
36	City Walk	Hickson Blvd to Shelley Ln	8	3,918	1,175	9.8	A
37	Union Walk	Hickson Blvd to Shelley Ln	8	102	31	0.3	A
38	Lime St East	Globe St North to Upper Globe	2	445	134	4.5	A
39	Lime St East	Upper Globe to City Walk	2	1,041	312	10.4	A
40	Lime St East	Transport Pl to Lime St Dest.	2	1,344	403	13.4	A
41	Lime St West	Globe St North to path west	2.7	826	248	6.1	A
42	City Walk	Lime St crossing	8	1,600	480	4.0	A
43	City Walk	Lime St to Waterfront Pl	8	774	232	1.9	A
44	Waterfront Pl	West of Globe St North	8	688	206	1.7	A
45	Union Walk	Lime St to Waterfront Pl	8	883	265	2.2	A
46	Transport Pl	Lime St to R1	10	2,366	710	4.7	A
47	Transport Pl	R1 to Waterfront Pl	10	2,075	623	4.2	A
48	Waterfront Pl	Transport Pl to Foreshore South dest.	8	60	18	0.2	A
49	Waterfront Pl	Union Walk to Waterfront Pl B	2	748	224	7.5	A
50	Waterfront Pl	City Walk to Waterfront Pl B	2	313	94	3.1	A

Barangaroo South - Public Domain

Weekday Midday Flow

Peak hour factor 60%
Peak 15 minute factor 30%

Link Number	Link Name	Description	Clear Width (m)	Flow (peds/2 hr)	Peak Hour Flow	Peak 15min Flow	Flow Vol (ped/m/min)	LOS
1	Globe St South	Shelley Ln to crossing	2	354	212	64	2.1	A
2	Globe St South	Crossing to C3 lobby	2	1,730	1,038	311	10.4	A
3	Globe St South	C3 lobby to C3 cross route	2	2,489	1,493	448	14.9	A
4	Globe St South	C3 cross route to Lime St	2	100	60	18	0.6	A
5	City Walk	Shelley Ln to C4 cross route (northern)	8	8,507	5,104	1,531	12.8	A
6	City Walk	C4 cross route to City Walk dest.	8	8,873	5,324	1,597	13.3	A
7	City Walk	City Walk Dest. to C4 Nth	8	8,803	5,282	1,585	13.2	A
8	City Walk	C4 Nth to C3	8	9,852	5,911	1,773	14.8	A
9	City Walk	C3 to C3 cross route	8	11,062	6,637	1,991	16.6	A
10	City Walk	C3 cross route to Lime St	8	11,122	6,673	2,002	16.7	A
11	Shelley Lane	City Walk to Union Walk	2	2,349	1,409	423	14.1	A
12	Shelley Lane	Union Walk to Hickson Pl	2	4,582	2,749	825	27.5	B
13	Union Walk	Shelley Ln to C5 cross route	8	2,372	1,423	427	3.6	A
14	Union Walk	C5 cross route to Union Walk Dest.	8	8,577	5,146	1,544	12.9	A
15	Union Walk	Union Walk Dest. To C4 cross route	8	8,683	5,210	1,563	13.0	A
16	Union Walk	C4 cross route to C4 entry	8	6,210	3,726	1,118	9.3	A
17	Union Walk	C4 entry to Lime St	8	8,247	4,948	1,484	12.4	A
18	Lime St East	City Walk to the Common	2	5,858	3,515	1,054	35.1	C
19	Lime St East	The Common to Union Walk	2	6,746	4,048	1,214	40.5	C
20	Lime St East	Union Walk to Lime St local shops	2	1,554	932	280	9.3	A
21	Lime St East	Lime St local shops to Transport Pl	2	1,260	756	227	7.6	A
22	Lime St West	City Walk to R8	1.7	2,131	1,279	384	15.0	A
23	Lime St West	R8 to Union Walk	1.7	2,122	1,273	382	15.0	A
24	Lime St West	Union Walk to R9	1.7	1,272	763	229	9.0	A
25	Lime St West	R9 to Transport Pl	1.7	1,243	746	224	8.8	A
26	Waterfront Pl	Union Walk to Waterfront Pl A	2	3,873	2,324	697	23.2	B
27	Waterfront Pl	Waterfront Pl A to Transport Pl	2	3,335	2,001	600	20.0	A
28	Transport Pl	Shelley Ln to C5 cross route	10	6,328	3,797	1,139	7.6	A
29	Transport Pl	C5 cross route to route south	10	5,132	3,079	924	6.2	A
30	Transport Pl	Route south to C5 entry	10	4,288	2,573	772	5.1	A
31	Transport Pl	C5 entry to Transport Pl Dest.	10	4,464	2,678	804	5.4	A
32	Transport Pl	Transport Pl Dest. To Lime St	10	4,175	2,505	752	5.0	A
33	Shelley Lane	Globe St North to Metropole Hotel	2	1,685	1,011	303	10.1	A
34	Shelley Lane	Metropole Hotel to Shelley Lane Dest.	2	1,845	1,107	332	11.1	A
35	Shelley Lane	Shelley Lane Dest. to City Walk	2	3,188	1,913	574	19.1	A
36	City Walk	Hickson Blvd to Shelley Ln	8	5,254	3,152	946	7.9	A
37	Union Walk	Hickson Blvd to Shelley Ln	8	395	237	71	0.6	A
38	Lime St East	Globe St North to Upper Globe	2	2,060	1,236	371	12.4	A
39	Lime St East	Upper Globe to City Walk	2	3,972	2,383	715	23.8	B
40	Lime St East	Transport Pl to Lime St Dest.	2	1,828	1,097	329	11.0	A
41	Lime St West	Globe St North to path west	2.7	4,374	2,624	787	19.4	A
42	City Walk	Lime St crossing	8	7,347	4,408	1,322	11.0	A
43	City Walk	Lime St to Waterfront Pl	8	2,973	1,784	535	4.5	A
44	Waterfront Pl	West of Globe St North	8	4,265	2,559	768	6.4	A
45	Union Walk	Lime St to Waterfront Pl	8	3,355	2,013	604	5.0	A
46	Transport Pl	Lime St to R1	10	3,718	2,231	669	4.5	A
47	Transport Pl	R1 to Waterfront Pl	10	2,682	1,609	483	3.2	A
48	Waterfront Pl	Transport Pl to Foreshore South dest.	8	1,319	791	237	2.0	A
49	Waterfront Pl	Union Walk to Waterfront Pl B	2	4,182	2,509	753	25.1	B
50	Waterfront Pl	City Walk to Waterfront Pl B	2	3,660	2,196	659	22.0	A

Barangaroo South - Public Domain

Weekend Daytime Flow (10am-6pm)

Peak hour factor 25%
Peak 15 minute factor 30%

Link Number	Link Name	Description	Clear Width (m)	Flow (peds/8 hr)	Peak Hour Flow	Peak 15min Flow	Flow Vol (ped/m/min)	LOS
1	Globe St South	Shelley Ln to crossing	2	540	135	41	1.4	A
2	Globe St South	Crossing to C3 lobby	2	72	18	5	0.2	A
3	Globe St South	C3 lobby to C3 cross route	2	66	17	5	0.2	A
4	Globe St South	C3 cross route to Lime St	2	62	16	5	0.2	A
5	City Walk	Shelley Ln to C4 cross route (northern)	8	14,136	3,534	1,060	8.8	A
6	City Walk	C4 cross route to City Walk dest.	8	14,041	3,510	1,053	8.8	A
7	City Walk	City Walk Dest. to C4 Nth	8	14,017	3,504	1,051	8.8	A
8	City Walk	C4 Nth to C3	8	14,017	3,504	1,051	8.8	A
9	City Walk	C3 to C3 cross route	8	14,019	3,505	1,051	8.8	A
10	City Walk	C3 cross route to Lime St	8	14,019	3,505	1,051	8.8	A
11	Shelley Lane	City Walk to Union Walk	2	2,674	669	201	6.7	A
12	Shelley Lane	Union Walk to Hickson Pl	2	3,907	977	293	9.8	A
13	Union Walk	Shelley Ln to C5 cross route	8	1,227	307	92	0.8	A
14	Union Walk	C5 cross route to Union Walk Dest.	8	2,271	568	170	1.4	A
15	Union Walk	Union Walk Dest. To C4 cross route	8	2,213	553	166	1.4	A
16	Union Walk	C4 cross route to C4 entry	8	2,207	552	166	1.4	A
17	Union Walk	C4 entry to Lime St	8	2,293	573	172	1.4	A
18	Lime St East	City Walk to the Common	2	1,431	358	107	3.6	A
19	Lime St East	The Common to Union Walk	2	1,515	379	114	3.8	A
20	Lime St East	Union Walk to Lime St local shops	2	1,509	377	113	3.8	A
21	Lime St East	Lime St local shops to Transport Pl	2	1,339	335	100	3.3	A
22	Lime St West	City Walk to R8	1.7	2,757	689	207	8.1	A
23	Lime St West	R8 to Union Walk	1.7	2,785	696	209	8.2	A
24	Lime St West	Union Walk to R9	1.7	2,014	504	151	5.9	A
25	Lime St West	R9 to Transport Pl	1.7	1,820	455	137	5.4	A
26	Waterfront Pl	Union Walk to Waterfront Pl A	2	14,867	3,717	1,115	37.2	C
27	Waterfront Pl	Waterfront Pl A to Transport Pl	2	13,793	3,448	1,034	34.5	C
28	Transport Pl	Shelley Ln to C5 cross route	10	6,328	1,582	475	3.2	A
29	Transport Pl	C5 cross route to route south	10	7,852	1,963	589	3.9	A
30	Transport Pl	Route south to C5 entry	10	6,886	1,722	516	3.4	A
31	Transport Pl	C5 entry to Transport Pl Dest.	10	6,348	1,587	476	3.2	A
32	Transport Pl	Transport Pl Dest. To Lime St	10	6,347	1,587	476	3.2	A
33	Shelley Lane	Globe St North to Metropole Hotel	2	1,604	401	120	4.0	A
34	Shelley Lane	Metropole Hotel to Shelley Lane Dest.	2	1,880	470	141	4.7	A
35	Shelley Lane	Shelley Lane Dest. to City Walk	2	2,383	596	179	6.0	A
36	City Walk	Hickson Blvd to Shelley Ln	8	12,963	3,241	972	8.1	A
37	Union Walk	Hickson Blvd to Shelley Ln	8	6	2	0	0.0	A
38	Lime St East	Globe St North to Upper Globe	2	3,970	993	298	9.9	A
39	Lime St East	Upper Globe to City Walk	2	3,170	793	238	7.9	A
40	Lime St East	Transport Pl to Lime St Dest.	2	1,913	478	143	4.8	A
41	Lime St West	Globe St North to path west	2.7	9,400	2,350	705	17.4	A
42	City Walk	Lime St crossing	8	15,165	3,791	1,137	9.5	A
43	City Walk	Lime St to Waterfront Pl	8	5,765	1,441	432	3.6	A
44	Waterfront Pl	West of Globe St North	8	22,488	5,622	1,687	14.1	A
45	Union Walk	Lime St to Waterfront Pl	8	1,628	407	122	1.0	A
46	Transport Pl	Lime St to R1	10	6,075	1,519	456	3.0	A
47	Transport Pl	R1 to Waterfront Pl	10	5,675	1,419	426	2.8	A
48	Waterfront Pl	Transport Pl to Foreshore South dest.	8	11,008	2,752	826	6.9	A
49	Waterfront Pl	Union Walk to Waterfront Pl B	2	16,195	4,049	1,215	40.5	C
50	Waterfront Pl	City Walk to Waterfront Pl B	2	17,069	4,267	1,280	42.7	C