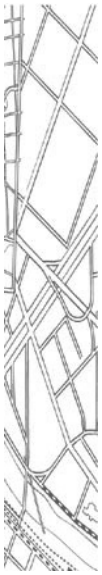
APPENDIX 8.
TRANSPORT REPORT



Transport Report

Barangaroo Part 3A Modification - Headland Park and Northern Cove

November 2008

Prepared for

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Contents

1. Introduction

This report was prepared for the Sydney Harbour Foreshore Authority ("The Authority") by MWT to describe the transport implications of the Barangaroo Part 3A Modification – Headland Park and Northern Cove ("Modified Concept Plan [Headland Park]"). The current modification involves adjustment to the proposed land form and landscape treatment of the northern part of the Barangaroo site to recreate a natural headland.

The Concept Plan for Barangaroo (previously known as East Darling Harbour) was approved by the Minister for Planning ("the Minister") in February 2007. It provides for 11 hectares of foreshore parkland together with a mix of commercial, tourist, retail, residential and community uses. A Consolidated Concept Plan was prepared to incorporate the Minister's conditions into a final document dated October 2007.

In June 2008 the Authority submitted an application under Section 75W of the EP&A Act for the Minister's approval to modify the Approved Concept Plan to allow additional commercial floorspace on Blocks 2, 3, 4 and 5. That modification is designated in this report as "Modified Concept Plan [Commercial Floorspace]".

Specific to this report, the Minister's Terms of Approval and Modifications for the Concept Plan included specific conditions requiring further detailed design for the northern headland and northern cove. In accordance with these requirements the Authority has been recently progressing the more detailed design for the northern part of the Barangaroo site. In light of these changes, the Authority is now seeking the Minister's approval to modify the Approved Concept Plan under Section 75W of the Environmental Planning and Assessment Act, 1979 ("the EP&A Act") to allow for a reconfigured northern headland and northern cove.

The current report describes the transport elements of the proposed Modified Concept Plan [Headland Park] and compares these with the approved Consolidated Concept Plan and the Modified Concept Plan [Commercial Floorspace].

The strategic transport context for the site and the existing conditions, which were described extensively in Chapters 2 and 3 of MWT's Modified Concept Plan Transport

Report (July, 2008) have remained largely unchanged in the last two months and this material has not been included in the current report.

It is stressed that transport plans given in this report are concepts prepared, or described, by MWT for consideration by relevant agencies and do not necessarily represent Government policy.

2. Description of Modified Concept Plan [Headland Park]

2.1 General

The objective of the proposed Modified Concept Plan [Headland Park] is to provide a more natural headland landscape at the northern end of Barangaroo and to restore the shoreline, immediately south of the headland, to an alignment similar to that shown on maps of conditions that prevailed around 1836. Figure 1 shows the proposed northern headland and the cove.

Consequently, the cove that would be created by this new shoreline would result in Globe Street, a north-south street, no longer connecting with the headland area, as well as a reduction in site's proposed land area. Also, the Harbour Control tower would be decommissioned and removed.

2.2 Land use

Changes to development floorspace area under this proposed modification are:

- Development Block 7 – approximately half the proposed floorspace would be removed from the scheme
- Development Block 8 – all the proposed floorspace would be removed from the scheme

The following table compares the floorspace in Blocks 7 and 8 for each of the Approved Consolidated Concept Plan, the Modified Concept Plan [Commercial Floorspace] and the Modified Concept Plan [Headland Park].

HEADLAND PARK AND COVE

BARANGAROO MODIFIED CONCEPT PLAN (HEADLAND PARK)

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Figure 1

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Table 2-1 – Comparison of proposed changes to floorspace under the Modified Concept Plan [Commercial Floorspace] and Modified Concept Plan [Headland Park] application with the approved Consolidated Concept Plan in affected blocks (sqm of GFA)

Block	Total Approved Consolidated Concept Plan	Modified Concept Plan [Commercial Floorspace]	Modified Concept Plan [Headland Park] Change	Resulting Floorpsace (in affected blocks)
8 HEADLAND-PARK-MUNN STREET	5,800	5,800	-5,800	0
7 MUNN - LITTLE CLYDE STREETS	28,000	28,000	-13,000	15,000
Total	***33,800***	***33,800***	***-18,800***	***15,000***

Note – GFA is based on the model LEP provisions

The resulting floorspace by use in development Blocks 7 and 8 is summarised in the table below for the proposed Modified Concept Plan [Headland Park].

Table 2-2 – Proposed Modified Concept Plan [Headland Park] Proposed development mix of floorspace (sqm of GFA)

Block	Commercial	Hotel/ Tourist	Public/ Community	Residential	Retail	Total
8 HEADLAND-PARK-MUNN STREETS						nil
7 MUNN - LITTLE CLYDE STREETS			750	14,000	250	15,000

At this stage of planning there is the prospect that some of the residential floorspace identified in Table 2.2 could be developed as hotel. The transport implications of this potential substitution of 5,800 sqm of hotel floorspace for the same amount of residential floorspace are considered below in relevant sections of this report and this scenario is described as the 'Hotel Option'. A decision as to whether a hotel would actually be incorporated in the scheme is likely to depend on broad considerations at a later stage of the planning process.

For comparative purposes, the following tables summarise floorspace by use for the development for:

- the Approved Consolidated Concept Plan in Table 2-3
- the Modified Concept Plan [Commercial Floorspace] in Table 2-4

Table 2-3 – Approved Consolidated Concept Plan Proposed development mix of floorspace (sqm of GFA)

Block	Commercial	Hotel/ Tourist	Public	Residential	Retail	Total
8 HEADLAND-PARK-MUNN STREETS		5,800				5,800
7 MUNN - LITTLE CLYDE STREETS	1,500		1,000	25,000	500	28,000
6 LITTLE CLYDE-AGAR STREETS	500		2,500			3,000
5 AGAR-HEALY STEETS	17,700			10,000	1,500	29,200
4 HEALY-BULL STREETS	54,500			15,000	5,000	74,500
3 BULL-NAPOLEON STREETS	35,000			10,000	11,000	56,000
2 NAPOLEON-MARGARET STREETS	125,000	30,000		15,000	10,000	180,000
1 MARGARET-SHELLEY STREETS	10,300				1,500	8,500
Cruise Ship Terminal		8,000			500	
Kiosks and Pavillions in Parkland			1,500		1,500	
Total	***244,500***	***43,800***	***5,000***	***75,000***	***31,500***	***399,800***

Table 2-4 – Modified Concept Plan [Commercial Floorspace] Proposed development mix of floorspace (sqm of GFA)

Block	Commercial	Hotel/ Tourist	Public	Residential	Retail	Total
8 HEADLAND-PARK-MUNN STREETS		5,800				5,800
7 MUNN - LITTLE CLYDE STREETS	1,500		1,000	25,000	500	28,000
6 LITTLE CLYDE-AGAR STREETS	500		2,500			3,000
5 AGAR-HEALY STEETS	32,700			10,000	1,500	44,200
4 HEALY-BULL STREETS	101,000			15,000	5,000	121,000
3 BULL-NAPOLEON STREETS	67,250			10,000	11,000	88,250
2 NAPOLEON-MARGARET STREETS	151,250	30,000		15,000	10,000	206,250
1 MARGARET-SHELLEY STREETS	10,300				1,500	8,500
Cruise Ship Terminal		8,000			500	
Kiosks and Pavillions in Parkland			1,500		1,500	
Total	***244,500***	***43,800***	***5,000***	***75,000***	***31,500***	***505,000***

It should be noted that the development mix and areas are indicative for the purposes of calculation. Final GFA and parking numbers per block are subject to future development assessment processes.

Other uses on the site would include passive and active open space.

2.3 Site Population and Employment

The proposed changes to floorspace would result in fewer people working at Barangaroo and fewer residents. The changes are:

- Commercial employees, based on 1 employee per 20 sqm, would reduce by approximately 75.
- Residents of the site, based on 1 unit per 100 sqm of floorspace and 2 persons per unit, would reduce by 110 units and 220 persons. In the Hotel Option, the number of residential units would reduce by 168 units and 336 residents.
- There would be a reduction in workforce due to the removal of the hotel in Block 8 and reduced retail and public floorspace in Block 7. In the Hotel Option, the hotel activity would be relocated to Block 7.

The proposed modification would result in a reduction in activity on the site, albeit a small reduction.

2.4 Car parking provision

The parking rates in the Approved Consolidated Concept Plan were also adopted for the Modified Concept Plan [Commercial Floorspace] and are proposed to remain the same under the current Modified Concept Plan [Headland Park].

For commercial space this rate is 1 space per 600m² commercial floorspace and the existing Sydney City Council Code rates be adopted for other uses (residential and hotel).

Proposed parking provision is summarised by use in the table below.

Table 2-5 – Change in car parking provision compared with Approved Consolidated Concept Plan and Modified Concept Plan [Commercial Floorspace]

Mode	Approved Consolidated Concept Plan	Modified Concept Plan [Commercial Floorspace]	Modified Concept Plan [Headland Park] Spaces (Change)	Modified Concept Plan [Headland Park] – Hotel Option Spaces (Change)
Commercial/mixed use	460	673	-2	-2
Hotel	146	146	-23	No change
Residential*	771	771	-113	-172
Parkland public car park	300	300	No change	No change

Note: the reduced residential floorspace has the average distribution of unit sizes.

In addition, the Approved Consolidated Concept Plan and the Modified Concept Plan [Commercial Floorspace] both had approximately 400 short stay on-street spaces within the site, with the final number depending upon traffic facilities and kerbspace allocation. The site's modified road network proposed in the current Modified Concept Plan [Headland Park] application would result in a reduction in spaces (MWT have assumed this reduction would be approximately 10%).

The proposal under the Approved Consolidated Concept Plan and the Modified Concept Plan [Commercial Floorspace] to rationalise parking along Hickson Road would not alter under the current application. This proposal would convert current all-day car parking to short stay; convert rear to kerb parking to parallel parking; and remove a proportion of on-street spaces to introduce access points and other traffic facilities (e.g., bus stops, coach parking, taxi ranks, etc). In addition, the ability to re-configure Hickson Road's cross section to support future potential light rail should not be precluded.

2.5 Potential travel market

Trip generation for the site has concentrated on estimating peak movements to the site by mode. In addition, an indication of daily movements by transit has also been prepared.

The broad planning estimates of person trip movements do not materially alter as a consequence of the changes proposed in this Modified Concept Plan [Headland Park] application; also they do not materially alter for the Hotel Option. The following tables summarise daily and peak hour volumes and are taken from the Modified Concept Plan [Commercial Floorspace] Transport Report.

Table 2-6 – Comparison of estimated Barangaroo commuter markets by mode, Approved Concept Plan and Modified Concept Plan, daily inbound JTW

Mode	Approved Consolidated Concept Plan	Mode Share	Modified Concept Plan [Commercial Floorspace]	Mode Share
Train	8,900	62%	12,500	62%
Bus	2,900	20%	4,100	20%
Car	535	4%	750	4%
Other	1,800	12%	2,500	12%
Ferry (King St Wharf)	200	1%	280	1%

Note: market shares may not sum to 100% due to loss of numerical precision in rounding; due to the small reduction in floorspace proposed under the Modified Concept Plan [Headland Park], these figures would not alter materially for either of the two cases reported above and would not be evident with rounding.

Table 2-7 – Comparison of estimated peak hour commuter market for train and bus, inbound JTW

Mode	Approved Consolidated Concept Plan	Modified Concept Plan [Commercial Floorspace]
Train	4,300	6,100
Bus	1,400	2,000

Note: Due to the small reduction in floorspace proposed under the Modified Concept Plan [Headland Park], these figures would not alter materially for either of the two cases reported above and would not be evident with rounding.

Table 2-8 – Comparison of approximate daily commuter market for train and bus, (two-way JTW)

Mode	Approved Consolidated Concept Plan (in and out)	Modified Concept Plan [Commercial Floorspace] (in and out)
Train	9,000 to 10,500	12,000 to 13,000
Bus	3,000 to 3,500	4,000 to 4,500

Note: Due to the small reduction in floorspace proposed under the Modified Concept Plan [Headland Park], these figures would not alter materially for either of the two cases reported above and would not be evident with rounding.

2.6 Proposed road network

The changes proposed to the internal road network under this Modified Concept Plan [Headland Park] application are:

- Globe Street would be truncated at a point approximately halfway along the parallel High Street. At this point it would connect with Hickson Road via an east-west road link at a proposed T-intersection (designated here "New Road").
- The proposed Munn Street (an east-west road connecting Globe Street and Hickson Road) would be removed from the scheme, as a result of the introduction of the cove.
- The proposed section of Globe Street, from New Road around to the vicinity of Towns Place would be removed from the scheme.

The proposed truncation of Globe Street and the introduction of New Road are shown conceptually in Figure 2.

Access to the approved headland car park would remain via Towns Place. Direct access from Globe Street would be removed as a result of the truncation of Globe Street.

The remaining road network, as approved in the Consolidated Concept Plan, would remain as previously proposed.

The loss of the connection between Barangaroo south and the headland park and its public car park is unlikely to materially alter the distribution of traffic accessing the site. Sussex Street and Margaret Street/Napoleon Street will remain the preferred approach routes for most site traffic.

Once on Hickson Road, it is expected that traffic wishing to access the southern part of Barangaroo will use the main access at the intersection of Sussex Street, Hickson Road and Napoleon Street, although a small proportion may travel along Hickson Road and access the development via one of the proposed east-west roads.

Traffic accessing the headland park and public car park under the Approved Consolidated Concept Plan and the Modified Concept Plan [Commercial Floorspace] would have used Hickson Road in preference to Globe Street in any case. This is primarily due to Hickson Road's layout reflecting a movement function, rather than Globe Street's calmed environment, which would reflect more of an access function.

2.7 Traffic effects

2.7.1 Traffic Generation

The traffic generation of the site would be reduced as a result of the proposed reduction in floorspace and parking under the Modified Concept Plan [Headland Park].

The reduction in traffic generation due to the reduction in floorspace and car parking is summarised in Table 2-9 below.

PROPOSED AMENDMENTS TO ROAD NETWORK

BARANGAROO MODIFIED CONCEPT PLAN (HEADLAND PARK)

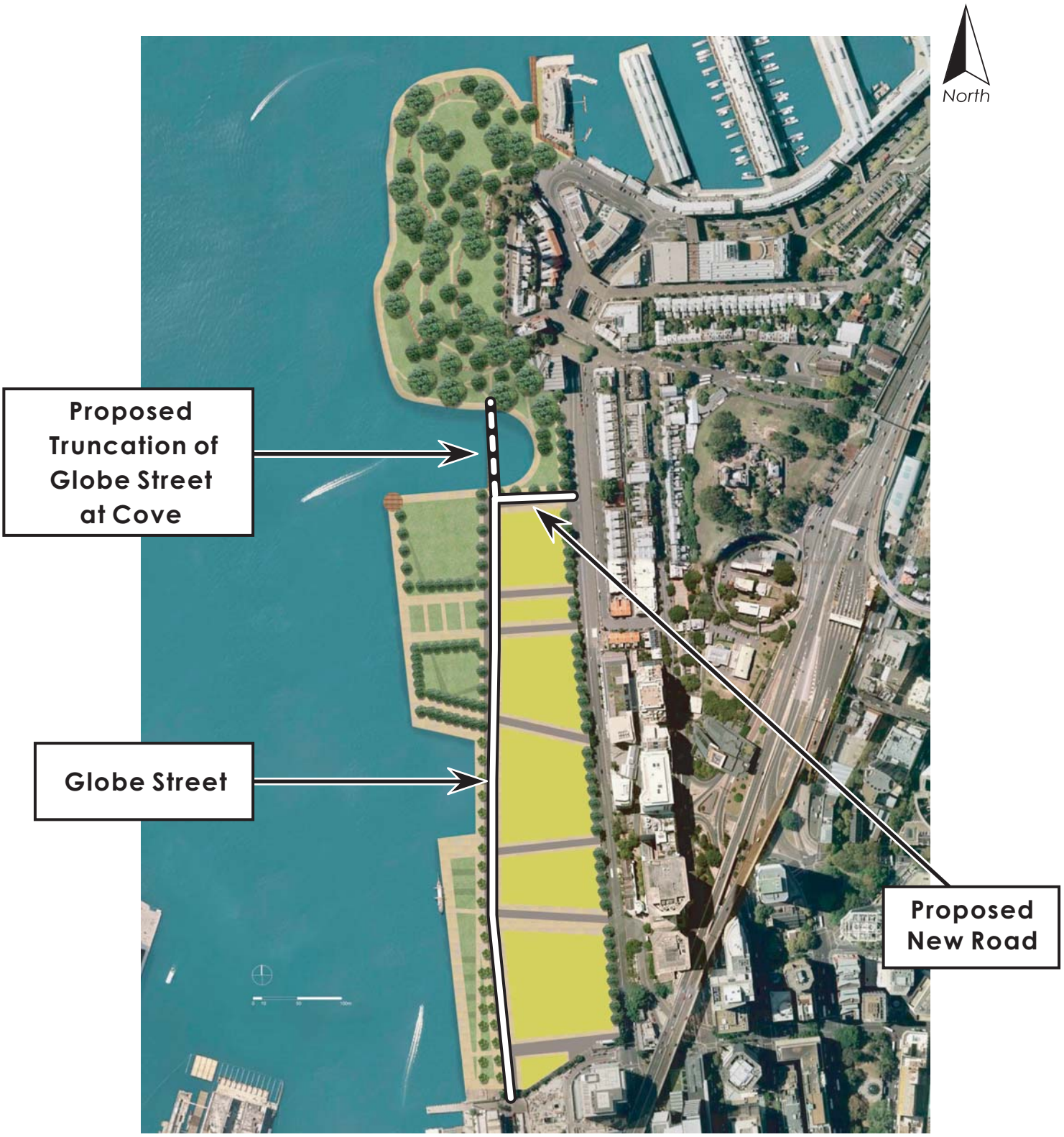

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Figure 2

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Date: 15 September 2008

Table 2-9 – Weekday Peak Hour Traffic Generation Reduction Modified Concept Plan [Headland Park]

Development Block/Element	AM Peak Hour						PM Peak Hour					
	In		Out		Two-way		In		Out		Two-way	
	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
275 short stay on-street spaces*	-9	0	-2	0	-11	0	-9	0	-13	0	-22	0
Block 8 HPM												
Headland Park – Munn Streets	-3	0	-9	0	-12	0	-9	-10	-2	-10	-12	-20
Block 7 ML												
Munn – Little Clyde Streets	-3	-1	-12	-1	-15	-2	-8	0	-2	0	-10	0
Total	**-15**	**-1**	**-23**	**-1**	**-38**	**-2**	**-26**	**-10**	**-17**	**-10**	**-44**	**-20**
Hotel Option												
275 short stay on-street spaces*	-9	0	-2	0	-11	0	-9	0	-13	0	-22	0
Block 8 HPM												
Headland Park – Munn Streets	-3	0	-9	0	-12	0	-9	-10	-2	-10	-12	-20
Block 7 ML												
Munn – Little Clyde Streets add hotel	3	0	9	0	12	0	9	10	2	10	12	20
Less reduced residential	-7	-1	-28	-1	-35	-2	-18	0	-5	0	-23	0
Total	**-16**	**-1**	**-30**	**-1**	**-46**	**-2**	**-27**	**0**	**-18**	**0**	**-45**	**0**

** MWT assume that approximately 10% of on-street parking spaces would be lost within the site.*

This level of traffic generation reduction is compared with total traffic generated under the approved Consolidated Concept Plan and the Modified Concept Plan [Commercial Floorspace] in the table below.

Table 2-10 Comparison of traffic generation Approved Concept Plan and Modified Concept Plan application

	Approved Consolidated Concept Plan				Modified Concept Plan [Commercial Floorspace]			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	In	Out	In	Out	In	Out	In	Out
Development traffic	192	172	173	272	310	232	271	413
Public Transport	50	50	50	50	39	27	27	39
Total	*242*	*232*	*223*	*321*	*449*	*259*	*298*	*452*
Reduction – Modified Concept Plan [Headland Park]	***-16***	***-24***	***-36***	***-27***	***-16***	***-24***	***-36***	***-27***
Modified Total	**226**	**208**	**187**	**294**	**433**	**235**	**262**	**425**
Reduction – Modified Concept Plan [Headland Park]	***-17***	***-31***	***-27***	***-18***	***-17***	***-31***	***-27***	***-18***
Modified Total	**225**	**201**	**196**	**303**	**432**	**228**	**271**	**434**

2.7.2 Future Local Intersection Operation

As part of the analysis for the approved Consolidated Concept Plan and Modified Concept Plan [Commercial Floorspace], the wider external traffic impacts of traffic generated by the proposed development were assessed on an area wide basis using a PARAMICS microsimulation traffic model of the Sydney CBD. The traffic model is owned by the RTA and permission was granted to test the capability of the modelled network to accommodate traffic demands which would include the forecast traffic generated by the proposed development.

The current Modified Concept Plan [Headland Park] would have lower traffic generation, as summarised in Table 2-10 above, than under that scenario. Consequently, the traffic impacts of the current application would be lower.

At a local level, intersection analysis was undertaken for the Approved Consolidated Concept Plan and the Modified Concept Plan [Commercial Floorspace] application. As the current Modified Concept Plan [Headland Park] would reduce traffic generation, including in the Hotel Option, then the performance of the modelled intersections would either improve or remain the same.

Table 2-11 compares the existing and forecast level of intersection performance with the traffic flows from the proposed development included.

Table 2-11 – Results of Intersection Operational Analysis of the Existing Layouts

Intersection	Control	Weekday AM Peak						Weekday PM Peak					
		Existing		Concept Transport Report		Modified Concept Transport Report		Existing		Concept Transport Report		Modified Concept Transport Report	
		Ave. Delay	LoS	Ave. Delay	LoS	Ave. Delay	LoS	Ave. Delay	LoS	Ave. Delay	LoS	Ave. Delay	LoS
Kent St/Napoleon St/ Margaret St	Signals	16.5	B	16.7	B	16.0	B	16.4	B	16.4	B	16.4	B
Sussex St/Erskine St	Signals	25.1	B	28.8	B	27.2	B	22.6	B	25.6	B	28.4	B
Sussex St/Napoleon St	Priority	27.9	B	164.5	F	417.1	F	15.9	B	59.7	E	154.5	**F**
York St /Grosvenor St / Bradfield Highway ramp	Signals	12.6	A	12.7	A	16.9	**B**	12.8	B	12.8	B	12.8	B

Note – where LOS changes between the Approved Consolidated Concept Plan analysis and the Modified Concept Plan [Commercial Floorspace] application analysis, the type face is emboldened and coloured red; refer to Appendix A for intersection operation performance criteria.

All the intersections, apart from the intersection of Sussex Street and Napoleon Street, show only slight differences in delay between existing conditions, the Approved Consolidated Concept Plan and the Modified Concept Plan [Commercial Floorspace]. Also, the performance is satisfactory. Reductions in traffic generation under the current Modified Concept Plan [Headland Park], would not materially affect these results.

Under the Modified Concept Plan [Commercial Floorspace], the intersection of Sussex Street and Napoleon Street would not provide sufficient capacity under priority control to accommodate the forecast traffic demands. This was consistent with the findings of the Approved Consolidated Concept Plan. Consequently, signal control was proposed and intersection performance is shown below for the Modified Concept Plan [Commercial Floorspace].

Table 2-12 – Results of Intersection Operational Analysis of the Proposed Layout from Modified Concept Plan [Commercial Floorspace]

Intersection	Control	At-grade Ped, Crossing Facilities	AM Peak		PM Peak	
			Ave. Delay (s/veh)	Level of Service	Ave. Delay (s/veh	Level of Service
Sussex St/Napoleon St	Signals	Yes	30.1	C	26.8	C

Avg Delay is over all movements at signals, and for the worst movement at priority and roundabouts

With marginal reductions in traffic generation by the site for the Modified Concept Plan [Headland Park], including the Hotel Option, the performance of this intersection would not materially alter from the performance characterised above.

These results are based on the survey of vehicles which were recorded crossing the signal stoplines at the intersections. This does not take account of the actual demand which is constrained by the upstream and downstream intersections. Hence the results may suggest that the intersections operate better than occurs in reality. The PARAMICS model of the Sydney CBD, as discussed above, does provide a better assessment of intersection-level performance and CBD network performance with the inclusion of traffic generated by the proposed development.

The increases in peak hour traffic through the local intersections with the overall development may have the effect of redistributing some of the existing traffic to other competing routes.

The proposed intersection of New Road and Hickson Road would be a T-intersection. It is proposed that this would have priority control, rather than the introduction of a roundabout, to ensure that light rail potentially could be accommodated on Hickson Road, at some later stage.

2.7.3 Bus/Coach/Taxi Parking Facilities

It is proposed to provide a kerbside bus and taxi facility. Provision of bus layover is considered in the Barangaroo Bus Service Strategy. The location of taxi rank(s) within the site would be a matter for consideration at a later stage of the planning process, as details of site designs become available.

Also, the proposed hotel within Barangaroo (located in Block 2, toward the southern end of the site) would be likely, as part of its detailed design, to provide coach access and limited layover. In the Hotel Option, coach access and parking for Block 7 would also need consideration as part of detailed design.

2.8 Public transport strategy

The proposed Modified Concept Plan would still be supported by the concepts developed in the Barangaroo Bus Service Strategy. The detail of bus turnaround and layover arrangements would need to take account of the modified local road network within the site. The implications would be that buses would be able to use Globe Street and New Road as a turnaround facility, with layover on Hickson Road.

2.9 Pedestrian and cycle facilities

The re-alignment of the shoreline proposed under the Modified Concept Plan [Headland Park] would result in an increase in the length of the foreshore promenade as it negotiates the new cove, and a reduction in its length as it goes around the headland. Overall there would be a modest increase in length, although the final alignment and, hence, change in length would be determined in later stages of design.

Appendix A - Intersection operation – level of service criteria

Table 2-13 – Level of Service Criteria

Level of Service	Average Delay per Vehicle (secs/veh)	Signals & Roundabouts	Give Way & Stop Signs
A	less than 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 will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

Adapted from RTA Guide to Traffic Generating Developments, 2002.