



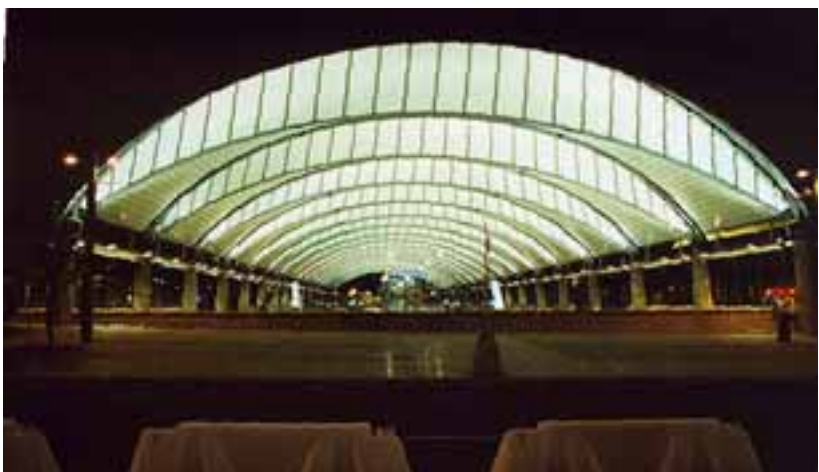
The Times

September 2006

A journal of transport timetable history and analysis



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Going for gold at the Sydney Olympics: how did transport perform?



Inside: Going for Gold- Sydney Olympic transport
Snakes in the timetables
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It is probably true to say that AATTC left a bit to be desired in the attention we paid to transport timetables for the Sydney 2000 Olympic Games. Which is funny, when you consider that John Fahey opined that the three biggest problems facing Games organisers were “*Transport, transport and transport*”. We hope to make up for some of this with the current series of articles of how the big task was organised and how the system performed. After starting out with transport being the big unknown and the possible biggest problem, transport came in as the Games’ biggest success. It was all controlled from ORTA’s Transport Management Centre, seen here. On page 3 begins a comprehensive review of how well the timetables worked.



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David A. Hensher, Ann M. Brewer, Geoff Lambert, Victor Isaacs welcomes articles and letters. Send paper manuscripts or word-processor files on disk or via e-mail to the editor at the address below. Illustrations should be submitted as clean sharp photocopies on white paper or scanned GIF or TIF format images with at least 300 dpi resolution on disk or via e-mail.

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Going for gold at the Sydney Olympics: how did transport perform?

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The Sydney Olympics held in September 2000 provided an opportunity to monitor the planning of transport provision for the world's greatest sporting spectacular. As the single largest major event, the pressures on a city's transport system are enormous, as witnessed by the previous Games in Atlanta and Barcelona. This paper takes a value-chain approach to assess transport performance as a crucial element in the delivery of the Sydney Olympic Games. We begin with a brief overview of strategic value, highlighting some generic aspects of value chains followed by the transport delivery system that came to the fore as significant 'drivers' in the value chain. This is followed by a summary of the effectiveness of the buses, trains, taxis, roads and the airport. A more detailed look is provided of the private bus sector where the problems leading up the opening of the Games received a great deal of media attention. The paper concludes with two stories, one good, one not so good, about transport and the Olympic Games.

1. Introduction¹

Sydney came into the Olympic Games with a transport system that typifies many major metropolitan hubs, plenty of traffic congestion in the peaks and shoulders on the roads, in public transport and at the airport. All of the major transport infrastructure and services were expected to be tested to the limit, a prejudgement passed on from one Games to another almost as sacred as the Olympic Flame itself.

The paper is based on a qualitative analysis of interviews with transport researchers, advisers to the Olympics and Road Transport Authority (ORTA), Bus 2000 (the company set up to coordinate private bus services for the Olympics), spectators at various venues and residents of Sydney who chose to continue commuting during the games with a slight increase in telecommuting.

The paper is written in a style that can usefully assist the next generation of Olympiad hosts.² There is often so little recorded of strategic value with a loss of corporate memory as the event fades away and officials move on. In the staging of any major event, members of a diverse array of organizations are frequently required to address complex issues, particularly in situations of high uncertainty such as the Olympic Games. The process of putting on the Olympic Games is essentially that knowledge creation process, which is becoming an integral part of organizational learning and value management in all businesses.

The paper takes a value chain approach to assess the transport performance as a crucial element in the delivery of the Sydney Olympic Games. We begin with a brief

overview of strategic value, highlighting some generic aspects of value chains followed by the transport delivery system that came to the fore as significant 'drivers' in the value chain. This is followed by a summary of the effectiveness of the buses, trains, taxis, roads and the airport. A more detailed look is provided of the private bus sector where the problems leading up the opening of the Games received a great deal of media attention. The paper concludes with two stories: one good, one not so good, about transport and the Olympic Games.

2. Strategic value and its delivery

Before the question of how well Sydney performed is addressed, it is important to understand some criteria by which the performance can be assessed. Performance criteria have to be aligned to the anticipated value delivered to customers and most significantly in this case to the end-customer, the spectator at any particular event. 'Value ... is the worth in monetary terms of the technical, economic, service and social benefits a customer... receives in exchange for the price it pays' (Anderson and Narus 1998). In conceptualizing the Olympic Games as a value chain, there are key elements of value that need to be considered including the relationship management between the key stakeholders (ministers, suppliers, buyers, service providers) service management of all the processes in the chain itself, demand and flow (material and information) management, cycle time, site-based management and the links (physical and communication) between these. Further, for future planners several issues need to be raised including the following.

- Who are the key providers (deliverers) of

transport value? What are their goals?

- Who are the end-customers of transport value? What are their goals?
- What are the key modes of transport delivery and how did they perform?
- How is transport value to be managed, including gaps and by whom?
- What is the delivered value, i.e. the actual performance of transport at the Olympic Games?

2.1. *Who are the key providers (deliverers) of transport value? What are their goals?*

Somewhere in the Sydney bid office archives is a note of one of the first planning sessions by the then fledgling organisation. As with many momentous tasks, the words are deceptively simple and straightforward. The aim, as written down, was to develop an Olympic Plan which was equal to or better than any other. (North 2000)

When asked before the Games what he regarded as the most challenging and uncertain aspect in delivering the Games, the Premier of NSW stated 'transport and transport'.³ He singled out the private bus operators and advised and required that the Minister of Transport was to keep him informed, almost by the hour, throughout the Games.

2.2. *Who are the end-customers of transport value? What are their goals?*

Spectators, athletes, officials and workers travelling to and from the main Games complex at Homebush Bay daily were expected to total in excess of 500,000 with a further 100,000 requiring passage to Darling Harbour at the southern end of the city and other venues located around the

Sydney Area (figure 1).

3. What are the key modes of transport delivery and how did they perform?

The transport system was expected to respond by ensuring that this record attendance was duly delivered well in time to all events. How did it perform? Each main transport challenge will be looked at in turn. The five transport pressure points have always been: buses, trains, taxis, the airport, and roads and parking.

3.1. Buses and trains

As my bus cruised into the city this week in record time, I found myself wishing the Olympics would go on forever. Commuting has never been so pleasant: nor the city so delightful a destination, full of people, but mercifully emptied of cars. (Horin 2000)

On the day of the Opening Ceremony, trains carried over 55,000 spectators up to 4 pm (with the ceremony starting at 7 pm), and buses carried 15,000 (across 13 spectator routes). At the conclusion of the evening, over 90,000 spectators left Olympic Park by train with a further 24,500 departing by bus. On the first full day of the Games (16 September) over 900 train services passed through Olympic Park station delivering 30,000 spectators by 10 am, 75,423 by mid-afternoon, with 23,602 by bus. Friday 22 September was the busiest day with the commencement of athletics and the continuation of all the other major sports at the major Olympic venue (figure 2). The movement of people to and from the Olympics Centre throughout the day is shown in figure 1. By 5 pm, 307,139 people had been transported to the stadium, 217,953 by train and 89,186 by bus. Around 6 pm, queues for trains from Central Station in the city to Olympic Park were up to 800 metres long with passenger waiting times as long as 45 minutes. An additional 120,954 people left the stadium to travel back to the city.

Bus and coach services were provided by the government operator (State Transit Authority [STA]) and Bus 2000. The latter organization was set up to coordinate the provision of private buses, sourced from throughout the nation (disbanded in April 2001). STA capacity was directed to Olympic support services rather than to spectator routes. Olympic support services included the Athletes' Village bus service using 26 new Mercedes Benz 0405 low-floor air-conditioned CNG vehicles (as part of the green Games theme). In addition, the STA operated under contract a free loop service in the centre of Sydney using 24 buses as well as its regular inner metropolitan area services out of its 11 depots. The STA radically altered some of its regular services (Stott 2000).~ Most notably, its Newcastle division (serving a regional city 200 km north of Sydney)

converted to a Sunday timetable releasing 50% of its capacity (80 buses, 140 drivers) to the Sydney operators. In addition, the Airport express and Tourism services were suspended and alternative services, for 20 regular routes, were provided.

Bus 2000 operated three Olympic-specific depots; one at Greystanes in the West primarily for spectator buses, which required relatively low security clearance; another at Randwick in the East with the focus on coaches for IOC sponsors; and the main site at Regent's Park (a disused defence force base) a few kilometres from the main Olympic precinct at Homebush Bay. Regent's Park housed buses used for the athletes, media, IOC and the Games workforce. Over 1000 buses were based there with a high level of security checking. The Regent's Park depot was in theory three sub depots: 350 buses for the media, 450 buses for the athletes and IOC members, and 200 buses for the Olympic workforce. Separate rostering, fleet allocation and staff administration were in place with shared areas for maintenance, washing and refuelling. Full details of the Bus 2000 task is summarized in Appendix 1.

The good news is that Sydney coped very well with the movement of passengers by bus and train to/from major Games locations.⁵ There were, however, some notable shortages of passengers. Typical of this is the two hourly coach services that took athletes on a 90 km return journey from the Olympic village to one of the specially provided training venues at the Campbelltown athletics track on the southern outskirts of Sydney. One driver had been on the route since day 1 and failed to have a passenger. Similarly, the shuttle buses around the main Homebush precinct catering solely for IOC delegates were not well utilized at all. Games officials are much more accustomed to chauffeur-driven VIP cars.

3.1.1. STA Buses

The data system showed about 3.4 million boardings per week in August 2000, with 3.2 million boardings per week during the Olympics.⁶ This adds up to more than 5.5 million, which is the publicly released figure. Patronage overall did not increase much (if at all) during the Olympics. STA lost some patronage due to school holidays, extended university holidays, commuters on leave or different work patterns, and gained some due to increased tourists, but not all Olympic ticket holders bought bus tickets on the STA route services, as was expected (Stott 2000). It is difficult to compare the September holidays the previous year owing to different circumstances plus annual growth. STA did not experience the high loadings predicted by the ORTA model on some corridors (although that was a 'worst-case' planning scenario).

3.1.2. Trains

The trains excelled throughout the games, although patronage was well below forecasts (table 1 and figure 2) except for Sunday 1 October where actual passenger journeys exceeded the initial and revised forecasts by 2.4% and 12.2% respectively. The use of volunteers on stations provided a level of customer support that has never before been available. It improved the through flow of passengers substantially. The normal rail services were largely unaffected although some stations were classified as through-train stations such that one needed to know the new timetable well in advance. This did not cause any noticeable problems.

3.2. Taxis

The taxis were mooted as a potentially major problem, especially at the airport, not only for the lack of supply, but also for the generally poor communication and customer service skills of many existing drivers. The outcome was a surprise, not

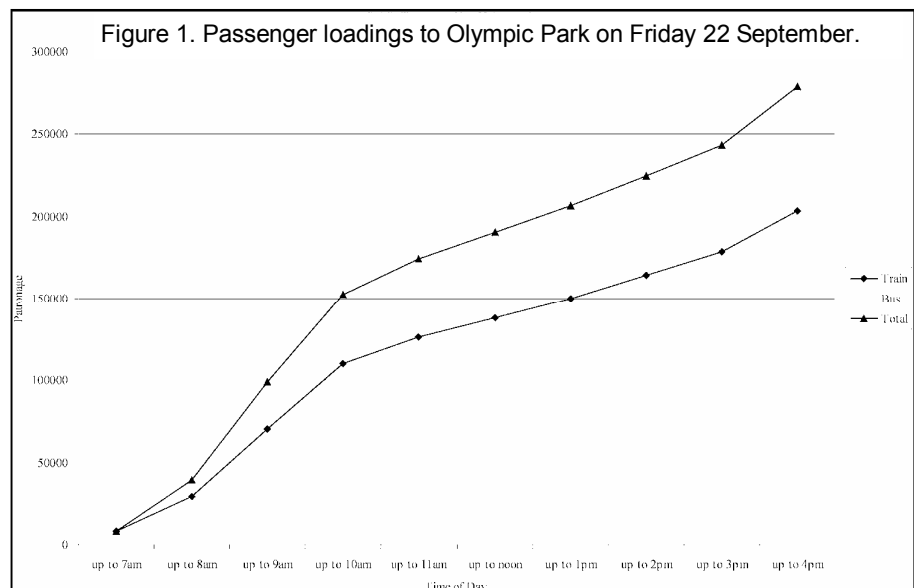


Table 1

Date September	Journeys	Initial forecast	Revised forecast	Olympic Park* journeys	Cumulative Olympic Park journeys	
Wednesday	13	1126000	1336000	169900	169900	
Thursday	14	1252000	1536000	91600	261500	
Friday	15	1264000	1515700	182000	443500	
Saturday	16	1089000	1705800	223000	666500	
Sunday	17	1178000	1600100	1332000	315000	981500
Monday	18	1394000	1824600	1674600	235200	1216700
Tuesday	19	1495000	1858400	1450000	295200	1511900
Wednesday	20	1511000	1799000	1400000	314500	1826400
Thursday	21	1588000	1770600	1594000	293800	2120200
Friday	22	1918000	2104300	1894000	584200	2704400
Saturday	23	1767000	2063900	1858000	596800	3301200
Sunday	24	1719000	1863500	1677000	557700	3858900
Monday	25	1775000	1928800	1736000	508100	4367000
Tuesday	26	1639000	1790100	1522000	253900	4620900
Wednesday	27	1839000	1986200	1788000	508200	5129100
Thursday	28	1741000	1971300	1774000	495700	5624800
Friday	29	1882000	1966600	1770000	516600	6141400
Saturday	30	1675000	1841900	1658000	522000	6663400
Sunday	1 Oct	1628000	1588300	1429000	289700	6953100
Total		29480000				

only did the taxis handle the demand very well, but also they found a distinct lack of demand away from the airport. It was described as one of the quietest times ever for taxis, attributed to the success of the bus and train system in meeting traveller demand. The 10% surcharge during the Games on all taxi trips may have contributed to this as well as the packaging of 'free' bus and train use upon evidence that one has an Olympic ticket.⁷ Interestingly, the daily advertisement in the major press about the 10% surcharge begins by stating 'To maximize taxi availability during the Olympic period (13 September to 4 October) a 10% tariff will apply for journeys in the Sydney Metropolitan Area.' This indicated a plan to maximize supply with little consideration about demand.

3.3. Airport

The airport experienced problems with its new \$43 million baggage handling system in the 4 weeks leading up to the Games, but the problems were alleviated about 1 week before commencement of the Games. Alleviation, however, came in the form of the more traditional manual handling and checks known as pier tagging⁸ and some outbound flight delays.⁹ An interesting consequence of this was the system-wide adjustments required in locations such as Bangkok and Heathrow where thousands of bags arrived from Sydney without a 'computer history'.

Table 2 summarizes the profile of daily arrivals and departures at the domestic and international terminals at Sydney Airport. To capture the impact of the Olympics, traffic movements for the same period in 1999 are reported.¹⁰ The forecasts of passenger activity undertaken by Tourism

Futures for the Sydney Airports Corporation Ltd were grossly high, some have suggested they were contingency forecasts. The pressures on the airport were far less, even on the busiest day (2 October) when the bulk of the athletes and officials departed Sydney.

The anticipated Olympic flight bonanza did not happen, with over 60% of initial bookings, more than 2,200 flights, cancelled. Domestic tourism was the major casualty with 800 flights cancelled over the Games' 14-day period. The optimism in January 2000 when there were bookings for 3,700 flights evaporated to 1,400 flights. Almost all the cancelled flights were domestic, with the initial bookings of 3,150 reducing to 2,300. International

flights and business jets were as expected at 330 and 220 respectively. On the peak incoming days—1, 5 and 15 September—bookings fell from 958 and 949 to 899 and 873.

The busiest arrivals days were Friday and Saturday, 22 and 23 September, with domestic arrivals totalling 26,607 and international arrivals totalling 16,446. These days did not coincide with the beginning of the Games as one would expect given the higher numbers of arrivals for the same period in 1999. Total figures showed a greater difference between 1999 and 2000 than the September total. In September, both arrivals and departures recorded higher figures than for the same period in the previous year. This changed in October where domestic departures increased and arrivals decreased compared with the 1999 figures. For international visitors, departures and arrivals were greater than for the same period the previous year. The busiest departure day was Monday 2 October with 52,323 international and domestic passengers departed Sydney.

A possible lesson for the future had the traffic been excessive was to introduce staggered preplan departure days or half days for each country over 3 days instead of most leaving in 1 day. An unexpected outcome, however, was the provision of evidence that Sydney Airport can cope with a much greater increase in traffic than had been thought so before and that there is a weaker case for another major Sydney airport, a topic that has been on the agenda since the early 1970s. There is plenty of extra capacity at the existing airport that can be harnessed more efficiently for many more years. In mid-December (post-Olympics), the Federal government announced that it would not proceed with a second major airport in Sydney but would work to expand the capacity of the existing

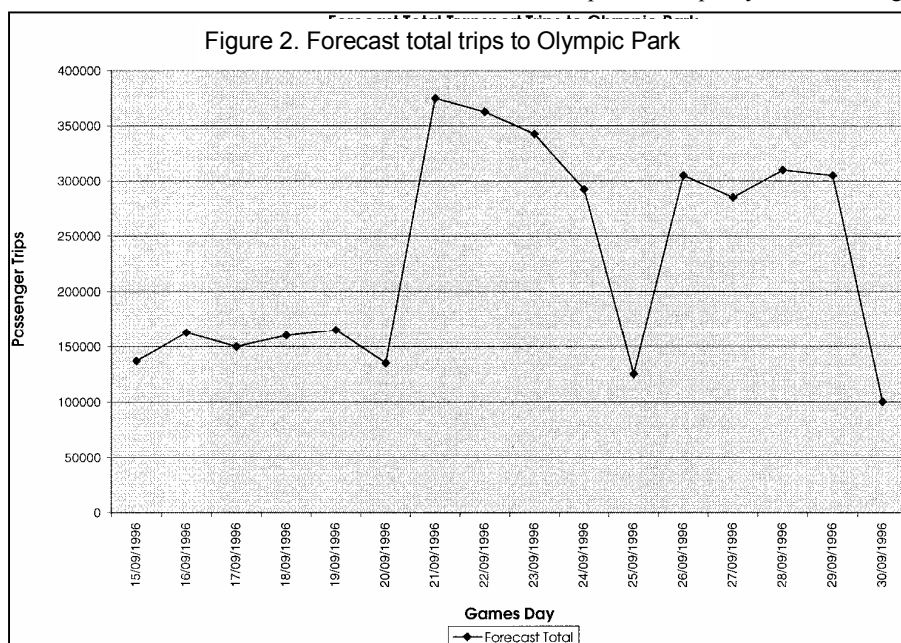


Table 2. Daily profile of passenger activity at Sydney Airport for September-October 1999 and 2000.

September	Domestic				International			
	Departures		Arrivals		Departures		Arrivals	
	1999	2000	1999	2000	1999	2000	1999	2000
Total	295557	314128	309817	273636	147651	202994	188513	202996
1	22136	24810	19154	15948	10959	15313	13481	15220
2	20017	28242	24941	17341	10633	24081	12214	17184
3	18585	25562	21551	17832	8965	16531	12486	12732
4	18113	24718	20082	17248	9164	14660	11640	13688
5	18568	23762	21568	19805	7848	12692	11532	11857
6	22815	25118	24663	22342	9948	13304	13524	14153
7	16050	16304	18161	16156	12045	15163	14713	14062
8	21585	21028	23182	22483	10298	13916	14859	14491
9	19294	17919	21034	18722	9704	12252	12227	14174
10	17822	16551	18001	16700	8625	9783	11685	10608
11	19472	18870	19250	17240	8423	10110	10776	12597
12	21181	19416	19421	18059	7994	9363	10627	11174
13	24098	21149	22460	19073	9941	10419	12029	13144
14	15198	13595	15380	14703	12192	13268	13009	13663
15	20623	17084	20969	19984	10282	12139	13711	14249
16	15373	17743	18488	19048	13942	13115	13155	13938
17	20274	20998	20025	21263	12281	12863	13058	13763
18	18471	20278	21059	23205	10623	12367	10028	12538
19	18002	18207	18444	22232	9164	10254	10045	10791
20	19810	19621	18744	23815	10188	11738	10085	15052
21	22803	18374	20510	25629	10742	9699	10451	11630
22	25619	20879	23951	26607	14064	10521	11742	14493
23	19001	18581	17689	20766	15871	13695	12177	16446
24	23252	22904	21728	22559	13471	13232	12638	15032
25	23983	25037	20113	22319	12005	11747	10160	13099
26	21978	24759	17853	22095	10947	12134	10387	13120
27	22835	24013	19292	22986	10473	12526	10365	15089
28	24801	24126	20802	23381	9859	10614	10648	12620
29	27672	25824	227.3	24084	13080	13085	12530	14434
30	21114	20254	16573	17643	14059	13454	12722	14768
October								
Total	295557	314128	309817	273636	147651	202994	188513	202996
1	22136	24810	19154	15948	10959	15313	13481	15220
2	20017	28242	24941	17341	10633	24081	12214	17184
3	18585	25562	21551	17832	8965	16531	12486	12732
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13	24098	21149	22460	19073	9941	10419	12029	13144
14	15198	13595	15380	14703	12192	13268	13009	13663
15	20623	17084	20969	19984	10282	12139	13711	14249

airport by a range of measures including a mix of large aircraft and runway development. A coincidence maybe, but some supportive evidence for this had in part been delivered during the Olympics.

3.4. Roads

Travel times have never been as good as those experienced during the Games. Typically, any trip time in the peak was halved: 60 minutes became 30, 10 became 5. The National Roads and Motorists Association (NRMA) monitored a number of key arterials and toll roads; M4/Parramatta Road, Victoria Road and Cumberland Highway, on 5 days (18, 19, 22, 25 and 26 September) (NRMA 2000). The travel time survey was terminated well before the planned date because it was found that travel times improved substantially without exception, with free flow speeds almost always offered (table 3).

The M2 toll-road reported a 4.5% drop in revenue, while the Eastern Distributor

(linking the city to the airport and eastern suburbs) reported a 2% revenue drop. Examples in the 1984 Los Angeles Olympics show that a 4% reduction in background car traffic was enough virtually to eliminate congestion on the highways serving the Olympics. During the 1992 Barcelona Games, a 15—20% reduction was actually achieved (Richmond 1996), which shows that it is possible to change people's behaviour (at least in the short-term) if the alternatives offered are attractive enough.

3.5. Parking in the central business district (CBD)

Parking off-street in the CBD recorded a large drop in business over the Games. Four years of promotion by ORTA encouraging people not to drive in the city has hurt the parking business. A typical example is a reduction from 180 to 20 spots per day being occupied. The combination of free public transport to Olympics events and a huge public perception that it is ille-

gal to drive anywhere in the city was argued by parking station owners as the reasons for their downturn in business. It should be noted, however, that parking at the periphery (e.g. at Darling Harbour) had been plentiful and expensive with the usual \$8 per weekend day flat fee being graduated with a \$16.50 all day fee.

3.6. General comments

With so many changes made in normal services and the Olympic commitments at the last minute, it is very difficult to assess patronage levels relative to forecasts.

What should be noted is that bus patronage specific to the Olympics was greater than predicted, but rail use was down. The airport was also well down on forecasts as was the general view about the demand for taxi use (although no forecasts were provided). The roads were so free of traffic that free-flow conditions existed almost everywhere. A typical comment was: 'We did such a great job in promoting the use of buses and trains, and in having Sydney residents taking holidays and leaving Sydney, that we got our forecasts hopelessly wrong, in the right direction for a change.'

The rail network prepared itself to handle about 31 million passenger journeys in the 17 days of the Games, a 250% increase on the 12 million journeys it copes with under normal business. An additional 3800 buses and 5000 extra drivers were recruited, supporting 26 park-and-ride areas located strategically close to public transport facilities. To allow for the unexpected, Olympic bus services had a viable alternative route, athlete bus service schedules had potential delay factors written in, emergency road patrols were doubled and over 80 tow-trucks were on standby around the road network, with 10 heavy-duty tow-trucks ready to shift large, disabled vehicles. Helicopters were used to supervise road and traffic control. On-street parking was banned in the CBD with tow-away and \$300 fines.

4. How is transport value to be managed, including gaps in service delivery and breakdowns of vehicles, and by whom?

The management structures during the Games played a significant role. The Games Co-ordination Group (GCOG), comprising senior Sydney 2000 executives, met each morning during the Games before daily meetings with the IOC. The management team responded immediately to any issues and sought to remedy them as soon as possible.

The need to cooperate is essential to the Olympics if the speed of delivery and customer response time is to be maximized. Two weeks before the Olympics opened, the hard work in integrating private bus and coach operators under Bus 2000

started to crack at the pinnacle of the operations. It (together with rail derailments) became a major worry for the Olympics Authority and the NSW government. ORTA responded by imposing strong demands on the management of Bus 2000 as it became apparent that the preparations were not delivering adequately on key resources—such as drivers, vehicles, and expertise in rostering and scheduling of over 3000 buses and staff (Australasian Bus and Coach 2000).

4.1. Organizational logistics

Regent's Park was the designated main depot for 1000 of Bus 2000 vehicles. There were also regional depots that were currently working as operational facilities¹¹. There was a lot of concern about the size of the main depot, suggesting that a large depot was deemed to be more efficient and effective. Under normal circumstances, smaller depots are used, leading to the general opinion that Regent's Park was too large and would create diseconomies of scale. Moreover, it was established from the ground up and did not have an integrated approach to service delivery. Some lessons from this include the following.

- The extensive procedures manuals were essentially ignored in the 'panic' before commencement of the Games.
- There was no tracking of who was driving which bus operator's vehicle or when such vehicles left the depot.
- Drivers from small towns need much more acclimatization to city traffic than the 2 days of real road experience. Even though traffic was much lighter than usual during the Games, it was very busy leading up to the Games. In addition, non-Sydney-based orientation training using maps and videos is only useful if drivers actually operate on their intended routes. A higher level of organization at depots is required to implement plans.
- Information systems need to be implemented.
- More attention needed to be given to the proximity of accommodation (run by ORTA and not Bus 2000). In the case of the Sydney Games, it needed to be either on site or much closer to the depot. If temporary facilities are provided for the athletes, then this needs to be considered for drivers and staff.

4.2. Human resource management

The real lessons relate to the scoping of the project, human resource management and lead-time to allow for training and coordination between drivers, depot managers and, indeed, the Executive of Bus 2000 and ORTA. The human resource management issues cannot be overstated. The

selection process for employing drivers and other staff established by Bus 2000 did not allow for last-minute problems and changes. The lengthy administrative process of reviewing expressions of interest meant that employees would not receive critical information (commencement date, where employed and travel/ accommodation arrangements) until July at the earliest (Bus 2000, 1999). Over 400 drivers did not turn up initially because ORTA had failed to advise them by mail of the final arrangements. An ability to handle late changes is crucial—it is a major source of panic if not well orchestrated. For example, all drivers were contacted 10 days prior to the commencement of the Games and some had pulled out, some called in sick in the first week and others did not complete their accreditation forms properly (adding a security risk on occasion). The Transport Workers Union was capitalizing on this as part of a union membership drive. However, the problem was resolved within 2 days (with political intervention) and from then on all went extremely smooth.

The lateness in recruiting the full complement of drivers by Bus 2000 created a major problem with uniforms and pay that ended up in the NSW Industrial Commission on 26 September. The events leading up to the Commission hearing were attributable to the difficult administrative task of Bus 2000 which did not have full information from drivers in respect of bank accounts for direct payment and properly completed tax forms. In addition, however,

the lateness in finalizing recruitment meant that some drivers' expectations of working hours were not fulfilled with complaints about reduced hours and pay. Bus 2000 had also underestimated the administrative task required to manage over 3000 drivers who were living away from home.

Unknown to the media, there was a major incident with four coaches 'stolen' by 'new' drivers from the Regent's Park Bus 2000 hub just before the commencement of the Games. The coaches were retrieved after 5 days. In addition to a large number of insurance claims of damage to buses and coaches, most occurring at the regional hub, the issue of appropriate driver training and attitude emerged. The training scheme set up for 'other' employees such as depot managers and mechanics was limited. Training in operational procedures was undertaken by employees in their local area, while only a minor amount of time (around 2 days) was allocated to visiting the depots and other work sites (Bus 2000, 1999). Peter Connor, one of the Industrial Commissioners who visited Regent's Park summed it in a newspaper article, where he was quoted as saying 'It's [the transport] like a swan gliding gracefully on the water, but there's a lot going on under that water' (Wainwright 2000).

4.3. Pairing of locals and out-of-towners

The most publicized pre-Games problem was with the private buses, coordinated through Bus 2000. The issue of concern was the lack of locational training and poor

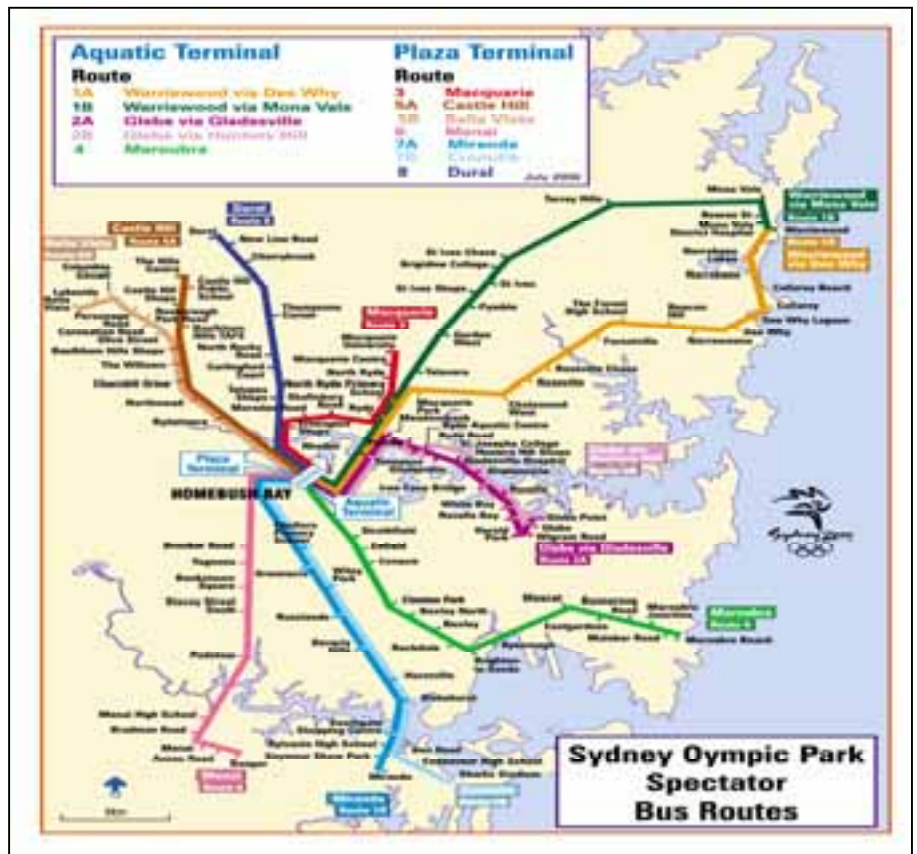


Table 3. Summary of the 1999 and 2000 average travel times for each of the monitored roads

Road/time	AM		PM	
	1999	2000	1999	2000
M4/Parramatta	64	33	56	33
Victoria Road	57	28	45	35
Cumberland	80	57		

accommodation for bus drivers. Imagine the following scenario. A bus driver with 20 years' of experience in driving a bus in a small regional town with a population of 85000 chooses to take his holidays and move to Sydney to participate in the delivery of transport services for the Olympics. Sydney has a population of 4 million with an additional 800 000 expected throughout the period of the Games. The bus driver is to operate on Route SB that serves the

Olympic precinct at Homebush bay on a 10-minute timetable over 12 hours. The driver has never driven a bus in Sydney but has visited occasionally on holiday. Accommodation is provided and a video is sent out to provide all the necessary details of the route to be covered and the procedures for handling passengers. All passengers travel for 'free' as part of the cost of purchasing an Olympic ticket so the focus is strictly on driving the route and main-

taining the timetable. The driver is advised of his accommodation during the period, the location of the depot from which he will operate and the conditions of pay. There is no time for local route acclimatization other than 2 days before the Games commence. Upon arrival in Sydney, he is introduced to his new team at the depot and is given a roster and sent on the first test run along the route. The traffic is worse than he expected, the other road users are more erratic than one is used to and there are now two or three lanes in each direction. In a regional town one often switched lanes with relative safety or operated on a single-lane road each way.

The accommodation has not been well planned and is quite substandard (examples of a stretcher to sleep on are not uncommon), the food is quite inadequate and the lodgings are quite a long way from the depot (often up to 2-3 hours). This was despite early assurances made by Bus 2000

Passengers and fleet

<i>Fleet description</i>	<i>Passengers</i>	<i>Service</i>	<i>Fleet numbers</i>
'Olympic Family' Travelling on dedicated, scheduled, prebooked and on-demand services within a secure environment from a depot at Regents Park in Western Sydney	Athletes, team officials, accredited media, workforce	All competitors coaches, managers, etc., locals and overseas press, volunteer workforce	Approximately 1000 buses all sizes large to small, mainly from NSW regional areas; fleet to be generally the better class of school/route bus; one depot at Regents Park
'Spectator' Travelling on a dedicated network of nominated routes and shuttle services including park-and-ride transfers	Persons who hold an Olympic ticket travelling free within the Olympic transport network	Access to ALL Olympic and Paralympic Games venues will be by public transport; services will operate on nine regional routes and nine shuttle routes	Approximately 1750 buses all sizes large to small, from NSW metropolitan, regional and interstate areas; fleet to be generally wider entry/lower step type route bus for fast on/off access; multiple depots utilizing Sydney Operators and other existing facilities
Sponsor High-quality coach services for the conveyance of sponsors and their guests	Olympic and Paralympic sponsors and their guests	Services to and from venues and other tourist sites	Approximately 650 high-quality coaches all sizes large to small from all around Australia; fleet to be best quality, A/C, coach seats; multiple depots utilizing Sydney Operators and other existing facilities
Existing route services Services required to operate under contract	Existing and potential bus service	Services throughout NSW and Australia required to convey passengers on unrelated Olympic transport route services	School holiday fleet operating from existing depots on required service levels/demands
Other work Services for all other customers	Customers with bus/coach needs who are not covered above	Services for other unrelated Olympic work/rail replacement, regional airport transfers, ground transport for inbound tour operators	All other available buses/coaches operating from own depot or from allocated facilities

that every effort would be made to accommodate drivers close to their work sites to minimize travel (Bus 2000, 1999). Having local drivers support a visiting driver and inviting them to stay at their house was never considered. It may have helped enormously. Ironically, employees were not permitted to stay outside of allotted accommodation 'in order to ensure adequate care and rest' (Bus 2000, 1999). The strategic lesson is termed *the pairing of the local and the out-of-towner*. The call for retired drivers or other people familiar with the routes to accompany the out-of-towners was made on 14 September 2000. While additional support was being harnessed, the Minister of Transport responded in less than 12 hours by calling in the Army. Within 12 hours the Army input was limited to six 'volunteers' with navigational skills, with a further 500 civilians participating as road guides to accompany drivers until they were familiar with the routes. It worked. Within 24 hours, the potential problem (referred to as the 'Atlanta disease') had dissipated. The government bus operator was then called in to provide assistance with depot management.

5. What is the delivered value at the Olympic Games?

The miraculous turnaround of transport services is one of the great successes of the Olympics. Trains falling off tracks, station skipping, general delays and the disappearance of an entire bus fleet exposed transport as the weak link in the Olympic build-up. But instead of derailing the Games, the system performed better with a million extra people riding on its back.—Sydney Morning Herald, 1 October 2000)

With over 90% of tickets sold, an all-time record, the Sydney Games is seen as having delivered a very attractive sporting event to Australia and the World. There are many lessons to be learned from the Sydney Olympics. However, the most powerful one is the apparent willingness of individuals, *under special circumstances*, to

Category	Estimated passengers	Olympic buses at peak	Paralympic buses at peak
Athletes and team officials	15 600	470	150
Technical officials	2500	100	45
Accredited media	15000	300	50
Sponsors and Workforce	15000	650	150
Spectators	80000	130	45
	up to 500,000	1750	400

use public transport and leave their cars at home. But why is this? Is it simply a consideration of levels of service that public transport can provide in normal circumstances relative to the car? Individuals appear to be willing to wait on average 20 minutes (and up to 45 minutes) for a bus or train to go to/from the Olympics. But are we willing to wait so long to get to and from work? Sydney certainly has the capacity to make a switch to public transport. The challenge is to see whether this can be sustained long-term. Another important finding is that Sydney can cope with a major move away from the car and that the service capacity on public transport can be harnessed as a contingency plan to cater for any adverse implications of automobil-ity. This has been an ideal test to demonstrate how much public transport capacity is required to move so many people.

Moreover, despite the special circumstance, transport planners have demonstrated a capability to implement a coordinated approach to a large event. Attempts in the past to integrate bus—ferry—train tickets across private and public providers during normal times have not been successful, yet in contrast it should be so much easier than coordinating over 4000 buses from over 100 operators as part of the Olympics task. Another revealing test has been the use of telecom-

muting and staggered shifts. As one journalist quoted, 'Capitalism survived the demise of the bundy clock, and it will survive the shock of the flexible workplace' (Horin 2000).

The demonstration of the viability of 'capacity' is a good result but it is not sufficient in itself. In transport terms, short-term coping strategies do not translate into long-term behavioural change without the ongoing incentives established during the Games. These incentives are problematic to maintain under normal conditions, although every attempt needs to be made to do so. Both the knowledge value and the intangible value (commuter loyalty) gained from staging the Games should not vanish.

6. Conclusion: what have we learnt from staging a major event from a value chain perspective?

The value chain is not only an important process for changing the way businesses are delivering value to customers, but also has a key role in the staging of major events. Since the staging of major events is characterized by novel pressures and uncertainties, it forms an ideal approach to ensure their effectiveness. Embracing a value chain strategy and aligning this to value delivery to the customer, in this case the Olympic spectator, was the key to a successful performance. Price, quality and delivery performance are central elements of the value proposition. Further, while clear goals are paramount, Olympic organizers need to decide what value exchanges to focus on or what to disregard. It is only in having clear performance goals and associated activities that potential gaps can be identified and evaluated. A process needs to be established to ensure that a system is in place to deal with misadventure that is associated with every aspect of service delivery.

So what is the verdict? A gold medal was the outcome, a low placing was the forecast. The Sydney Games gave both the spectator and the commuter an augmented service beyond their expectations that optimized their Olympic experience. However, the reality of 2 weeks of commuting bliss is now but a dream. However, there are



Timetable for the Sydney 2000 Olympic Games

Olympic Games	Village opens	Saturday 2 September 2000
	Opening Ceremony	Friday 15 September
	Closing Ceremony	Sunday 1 October
	Village closes	Wednesday 4 October
Paralympic Games	Village opens	Wednesday 11 October
	Opening Ceremony	Wednesday 18 October
	Closing Ceremony	Sunday 29 October
	Village closes	Wednesday 1 November

simply not enough incentives to learn from the experience beyond the Games. The only real possibility for change is the increased interest in telecommuting, but it is still too early to see if it is sustainable. It is noteworthy that a city with over 4 million residents can cope with major stresses and this should hold the city in good stead when and if another major event, be it a sporting activity, or a shortage of key fuels or whatever occurs. The physical capacity is proven, the behavioural response is recorded and the city is well prepared for change, albeit short-term.

An interesting reflection is why do people behave differently under these circumstances? Work crews emptying rubbish bins greet businessmen in shirtsleeves, exchanging news on the latest gold medal or close finish. Pedestrians flock down main streets normally jammed with cars. As one commentator from *The Far Eastern Economic Review* stated, 'By early next month though, as the Olympics draws to a close, the inflated taxi fares will go down, city stores will close before midnight again and office workers will be back at their desks' (September 28, p. 82). The city will have reverted to ordinariness as indeed it has.

Acknowledgements

The authors thank members of ITS (especially Philip Bullock and Hermann Buken) and Robert Wainwright (journalist for the *Sydney Morning Herald*) who became our ears and eyes in capturing the unfolding transport saga. They also thank various individuals who made available data on modal performance, in particular Ian Kearns (CityRail), Darren Suiva (NRMA), Rhonda Daniels (STA) and Barrie McAdie (Avstats and Department of Transport and Regional Services). The detailed comments of two referees and David Banister have materially improved this paper.

Appendix 1: Bus 2000, the task and key dates

Size and scope of the transport task: the bus and coach fleet for the Sydney 2000 Olympic and Paralympic Games is Australia's largest bus operation and comprises vehicles from all over Australia.

Schedule of bus rates

Bus—daily hire conditions

BUS 2000 Ltd will (at no cost to the operator):

- Comprehensively insure the fleet from the time of home depot departure to return (minimize impact on operator).
- Fuel and oil fleet at no cost to operator (while in Bus 2000 fleet excludes relocation).
- Undertake daily checks to ensure the vehicle is operational.
- Undertake minor repairs and maintenance up to \$200 (parts and wages).
- Arrange for any major repairs to be undertaken by experienced repairers (at cost to the operator).
- Arrange for tyre repairs and maintenance.
- Clean vehicle internally and externally.
- Employ and pay all staff (relocation excluded).
- Arrange and operate on road support and towing/recovery facilities.
- Provide adequate safe/secure depot and parking facilities.

The operator will (at cost to themselves):

- Provide a vehicle in a good, clean condition.
- Provide a vehicle with a recent major service (oil change, good tyres).
- Ensure the vehicle is registered and carries a current CTP policy.
- Agree to vehicle wrapping where required.

- Be responsible for repairs costing in excess of \$200.
- Be responsible to pay for tyre replacement, and for major repairs.
- Agree to enter into a contract with Bus 2000.

Bus—relocation rate

Rates shown are payment for one-way travel based on an acceptable travel/driving time (in accord with driving hours laws) undertaken at an acceptable average travel speed.

Determination of applicable rates will be advised before contract completion and will not be subject to variation.

The relocation rate provides for:

- Payment of drivers wages by the operator at casual rate of hire.
- Includes a component for variable operating costs.
- Costs of fuel, oil, tyres repairs and maintenance in getting to the site to be paid by the operator.
- Rate will be paid in advance before departure from the home depot and before departure from the Sydney depot.

Bus—daily rate

Large bus seating more than 30 adults: \$390 per day.

Small bus seating up to 29 adults: \$270 per day.

Notes

1. A draft of the paper was commenced on 15 September 2000, the day of the Opening Ceremony of the XXVII Olympiad. The weather was overcast with periods of sunshine and it was 22°C. It was completed as a first draft soon after the conclusion.



To relocate a bus to and from Sydney, the operator will be paid in accordance with the following scale of travel hours from Sydney.

Hour	1	2	3	4	5	6	7	8	9	10	11	12
Fee(\$)	56	112	169	225	281	337	393	449	510	571	640	709



sion of the Games. During the Games, there was only one period of inclement weather (high winds and light rain: from 5pm until 10pm on Sunday 24 September, up to 8am on Wednesday 27th).

2. We resisted requests leading up to and during the Games from the media to comment on what they always describe as 'problems with the transport'. Such commentary would not aid a resolution of any problems and only fuel a media frenzy such as happened in Atlanta in 1996. Interestingly, the major newspapers throughout the world praised the planning and transport in Sydney with the notable exception in the first few days of the Games of newspaper in Atlanta and Athens. During the week before the commencement of the Games, these two cities were lampooning the bus services, the pre-Olympic problems with train derailments and the fact that the President of the International Organising Committee's (IOC) coach did not arrive at his hotel on his first full day in Sydney.

3. Radio 2BL 14 September 2000.

4. Services cancelled during the Olympics: 100 (Dee Why to the airport), 140, 200 (Chatswood to Bondi Junction), 321, 322, 335, 353 (Bondi Junction to the airport), 365, 366, 370 (Coogee to Leichhardt), 520 (Parramatta to Circular Quay). Tourism services cancelled (Airport Express, Sydney Explorer, Bondi Explorer). Twenty-four-hour services during the Olympics: North (Pittwater Road, northern beaches, Epping Road, Eastern Valley Way, Willoughby Road); South West (Victoria Road, Glebe Pt Road, Parramatta Road, Abbotsford, Parramatta Road, Strathfield, City Road, Enmore Road). East (Botany Road, Anzac Parade, Alison Road, Randwick, Oxford Street, New South Head Road).

5. Volunteers (46,000 in total for all activities) made a huge difference to the efficient

delivery of transport. The IOC Director-General Francois Carrard spent time at the Central Station on the late afternoon leading up to the Closing Ceremony to observe the performance of the train system. One of the most impressive things was the scores of volunteers singing during one hour 'If you want a train to here'.

6. However, in reporting on State Transit patronage during the Olympics, the following points should be noted. *Scheduled route services*: negative impacts on services that may have reduced patronage include: State Transit cancelled many route services during the Olympics at short notice to provide buses and drivers to Bus 2000; city terminuses were relocated and bus stops closed during the Olympics. Circular Quay and Carrington Street, Wynyard, were closed to buses, with eastern services departing from Martin Place and northern services from York or Clarence Streets. The ticket and information kiosk at Loftus Street, Circular Quay, was closed. Route services were disrupted at several times due to Olympic events including eastern services during road cycling events, city services during the men's and women's marathon, and northern services across the Harbour Bridge during the marathon and Closing Ceremony. Ticket-dip data may underestimate patronage as some Olympic ticket holders travelled for free on State Transit services, even though State Transit services were not part of the Olympic transport network. State Transit operated 24-hour services on 14 major corridors. *City Loop*: State Transit operated the free City Loop shuttle bus under contract to ORTA. The free City Loop service ran for 21 days from Wednesday 13 September to Tuesday 3 October, from 9.30am to lam. With 48 shifts per day (24 in each direction), and assuming about 10 loops per shift, City Loop patronage is estimated at about 180,000. State Transit operated 24 low-floor buses on the service,

many wheelchair accessible. *In Village Transport System*: State Transit provided the In Village Transport System under contract to ORTA. The IVTS ran 24 hours a day during the Olympics. The service operated in a loop on internal roads in the Village with 18 stops including the Dining Hall, Polyclinic, the Village's main entertainment and retail area, and the Transport Mall. A fleet of 24 air-conditioned, natural gas-powered, low-floor buses was used. *Spectator routes to Olympic Park*: State Transit provided buses to transport spectators to Olympic Park on Routes 2A (Glebe), 4A (Maroubra) and 1. State Transit also provided services as requested from Park and Ride sites. *Other Olympic services*: State Transit contributed buses to other Olympic duties including: Sydney Football Stadium shuttle from Chalmers Street, Central, Beach volleyball shuttle from Bondi Junction to Bondi Beach, Ryde Aquatic Centre shuttle from West Ryde station, Media Bus shuttle, Workforce shuttle, Accessible bus shuttle around Olympic Park (for people with mobility problems, Services to Olympic venues, e.g. Penrith lakes. *Regents Park*: State Transit provided senior management and operations staff at very short notice to assist in the operation of Regents Park, the home of Bus 2000.

7. It became evident that many people were using an Olympic ticket unrelated to an event they were travelling to, taking advantage of the hospitality of the bus and train services. Even a used ticket seemed to provide free entry to the services. This must have affected the taxis that provided no such 'free' service.

8. Pier tagging bypasses computer software but requires each bag to be manually handled. It is worth noting, however, that there are many more items of unusual shape and size compared with normal luggage activity, and many of these typically are handled manually.

9. There were 19 such delays on 26—27 September, some up to 45 minutes.

10. Barrie McAdie of Avstats tracked forecasts against actual passenger and plane movements from early August to the end of October, comparing them with the previous year. This was input into the post-Olympics report being prepared for the IOC.

11. For example, Glenorie Buses for North West had its own 80 buses plus a number of extra 65 buses. The Glenorie regional hub operated without a hitch, and its size was argued to be about right, in contrast to the very large Regent's Park complex.

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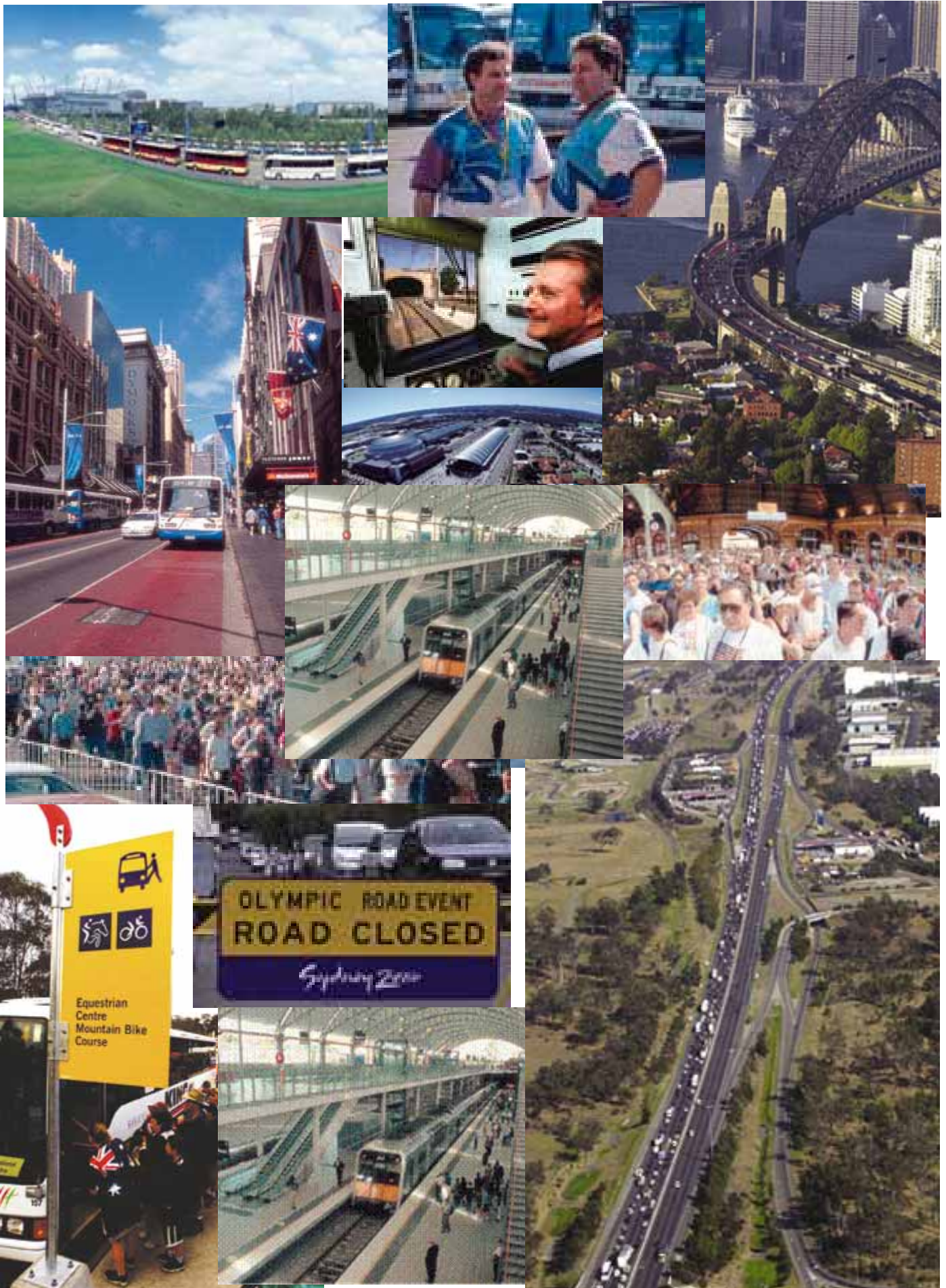
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The snake diagram timetable

GEOFF LAMBERT recently flushed this peculiar creature out of the long grass at Sydney Olympic Park

In doing the research for the recent articles on the Sydney Olympic timetables and in trying to find the quickest way to the Sydney Royal Easter Show from Manly, I stumbled across the Snake Diagram Timetable. A sample appears at right.

This is a very curious creature and it appears that the basic premise behind it is to cater for the horariophobe (look it up in your Funk and Wagnall's) and to present a set of times that are not constrained by the corrals of the usual timetable display. It might be thought that this is some kind of graphic timetable, akin to that described by Geoff Mann in our July 2006 issue. But it's not one of those either, because there is no logical connection between the route followed by the bus and the snake's anatomy.

The organisation responsible for this slippery fellow is the Transport Infoline, at <http://www.131500.info>, but finding him is a work of art, even at the best of times—which is to say, when a major event is actually impending or in progress. On searching for timetables for the specific route (in this case "1A"), one should get a screen that looks like the following:



This is a fairly conventional timetable, with service departures spaced horizontally and stops arranged vertically, more like a train timetable than the usual Sydney Buses arrangement. Then, one clicks on the route number above the service of interest and the snake diagram is apparently built in real time, rather than being fetched as a pre-prepared diagram.



Outside of Special Event Times, the best one can achieve is **ADODB.Field error '800a0bcd' Either BOF or EOF is True, or the current record has been deleted. Requested operation requires a current record**, which is fairly discouraging.

The service is actually provided by Sydney Buses, but it does not seem possible to access the timetables through Sydney Buses own timetable site. The Sydney Olympic Park Authority, in conjunction

Route

You selected:

Route: 1A Route Name: Sydney Olympic Park to Warrivoy Rd (via Dee Why (Route 1A))
 When: 17-Apr-2008 Operator: Major Event Buses

12:20pm Sydney Olympic Park, Stand 1A 212766	12:27pm *1 Rhodes, Concord Rd Nr Mary St 213842	12:32pm *1 Ryde, Devlin St Nr Blaxland Rd 2112247
12:41pm *1 North Ryde, Delhi Rd Nr Plassey Rd 2113385	12:39pm *1 Macquarie Park, Epping Rd Nr Wicks Rd 2113307	12:37pm *1 North Ryde, Lane Cove Rd Nr North Ryde Primary 2113303
12:44pm *1 Chatswood West, Fullers Rd Nr Greville St 205741	12:52pm *1 Roseville, Boundary St Nr Archbold Rd 2069114	12:54pm *1 Roseville Chase, Babbage Rd Nr Duntroon Av 2069115
1:06pm *1 Beacon Hill, Warringah Rd Nr Willandra Rd 2100160	1:01pm *1 Frenchs Forest, Warringah Rd Nr Forest High School 2086107	12:58pm *1 Forestville, Warringah Rd Nr Starkey St 208757
1:09pm *1 Narrawona, Warringah Rd Nr Alfred St 209833	1:12pm *1 Dee Why, Pittwater Rd Nr Howard Av 2099129	1:15pm *1 Dee Why, Pittwater Rd Nr Dee Why Lagoon 2099220
1:21pm *1 Narrabeen, Pittwater Rd Nr Goodwin St 2101109	1:19pm *1 Collaroy, Pittwater Rd Nr Collaroy Beach S.L.S.C. 209788	1:17pm *1 Collaroy, Pittwater Rd Nr Ocean Gr 209743

with the organisations which run events, such as the Royal Agricultural Society, usually provide a link on their web-sites to these timetables.

As indicated in recent articles about Olympic timetables in The Times, the special bus services proved so popular and reliable at the time of the Olympics that they became a permanent part of Sydney's transport scene.

On the day that we travelled to the show, buses were comfortably full, the trip was

fast, the driver cheerful and informative and the passengers happy with what they were getting for their money— they pay the bus-driver for a ShowLink Ticket, which includes travel and admission to the Show.

Both the bus stops and the buses display prominent signs during major events, the services are frequent and it is probably therefore unnecessary to produce any sort of timetable, much less a snake diagram—a blessed relief for an ophidiophobe.

Change at Manly— timetable coordination in 1934



MANLY BEACH Steamer Time Table. SUMMER SERVICE

MON. to FRI.		SATURDAYS		SUNDAYS	
From Sydney	From Manly	From Sydney	From Manly	From Sydney	From Manly
6.0	6.0	6.0	6.0	6.0	6.10
6.25	6.25	6.25	6.30	6.30	6.40
6.40	6.40	7.10	7.0	7.0	7.10
7.10	7.10	7.30	7.30	7.30	7.40
7.30	7.35	7.40	8.0	8.0	8.10
7.50	7.45	8.5	8.15	8.30	8.40
8.5	7.55	8.35	8.25	9.0	9.10
8.35	8.10	9.5	8.65	9.30	9.40
9.0	8.30	9.30	9.15	10.0	10.10
9.30	8.50	10.0	9.45	10.20	10.40
10.0	9.45	10.30	10.10	10.40	11.0
10.30	9.15	11.0	10.40	11.0	11.20
11.0	9.40	11.30	11.10	11.30	11.40
11.30	10.10	12.5	11.40	11.40	12.0
12.0	10.40	12.55	12.10	12.0	12.30
12.30	11.10	12.40	12.40	12.30	12.40
1.0	11.40	1.0	1.0	1.0	1.10
1.30	12.10	1.30	1.30	1.30	1.40
2.0	12.40	1.40	1.40	2.0	2.10
2.30	1.10	2.0	2.0	*2.15	2.40
3.0	1.40	2.30	2.30	2.30	*3.0
3.30	2.10	3.0	2.40	*3.45	3.15
4.0	2.40	3.30	3.10	3.0	*3.30
4.30	3.10	4.0	3.40	*3.15	3.45
4.55	3.40	4.20	4.10	3.30	*4.0
5.10	4.10	4.40	4.40	*3.45	4.15
5.20	4.40	5.0	5.0	4.0	*4.30
5.30	5.10	5.20	5.20	4.20	4.45
5.40	5.30	5.40	5.40	4.40	5.0
5.55	5.45	6.0	6.0	5.0	5.30
6.10	6.0	6.30	6.20	5.20	5.40
6.30	6.20	7.0	6.40	6.40	6.0
7.0	6.40	7.30	7.10	6.0	6.20
7.30	7.0	8.0	7.40	*6.30	6.40
8.0	7.15	8.30	8.10	*6.45	7.10
8.30	7.40	9.0	8.40	7.0	*7.30
9.0	8.10	9.30	9.10	7.30	7.40
9.30	8.40	10.0	9.40	8.0	8.10
10.0	9.10	10.30	10.10	*8.15	8.40
10.30	9.40	11.0	10.40	8.30	*9.0
11.0	10.10	11.25	11.10	9.0	9.15
11.35	10.40	12.0	11.40	9.30	9.40
12.0	11.10			10.0	10.10
	11.40			10.30	10.40
	12.4			11.0	11.10
				11.30	11.45

* Optional.

The Company reserves the right to alter or suspend this Time-table without notification, if occasion arises.

Note: On Public Holidays, weather permitting, Steamers will leave as follows:—

From Sydney: 6.0, 6.30, 7.0, 7.30, 8.0, 8.30, 9.0, 9.30 a.m.

From Manly: 6.0, 6.40, 7.10, 7.45, 8.15, 8.45, 9.15, 9.45, 10.15 a.m., and then as per usual Holiday Time Table.

MANLY BEACH Steamer Time Table. WINTER SERVICE.

COMMENCING THURSDAY, 11th APRIL, 1935.

MON. to FRI.		SATURDAY.		SUNDAY.	
From Sydney.	From Manly.	From Sydney.	From Manly.	From Sydney.	From Manly.
—	—	—	—	6.0	6.10
—	6.20	—	—	6.30	6.40
6.0	6.40	6.0	7.0	6.50	7.10
6.30	7.10	6.35	7.30	7.0	7.40
6.45	7.30	7.10	8.0	7.30	8.10
—	7.55	7.30	8.15	8.0	8.40
7.15	8.10	7.40	8.25	8.30	9.10
7.35	8.20	8.5	8.45	9.0	9.40
7.45	8.30	8.35	9.15	9.30	10.10
8.5	8.45	9.5	9.45	10.0	10.40
8.55	9.15	9.30	10.10	10.30	11.10
9.0	9.40	10.0	10.40	11.0	11.40
9.30	10.10	10.30	11.10	11.30	12.10
10.0	10.40	11.0	11.40	12.0	12.40
10.30	11.10	11.30	12.10	12.30	1.10
11.0	11.40	12.0	12.40	1.0	1.40
11.30	12.10	12.20	1.0	1.30	2.10
12.0	12.40	12.40	1.20	2.0	2.40
12.30	1.10	1.0	1.40	2.30	3.0
1.0	1.40	1.30	2.0	3.0	3.40
1.30	2.10	2.0	2.40	3.30	4.0
2.0	2.40	2.30	3.0	4.0	4.40
2.30	3.10	3.0	3.40	4.30	5.0
3.0	3.40	3.30	4.0	5.0	5.40
3.30	4.10	4.0	4.40	5.30	6.0
4.0	4.40	4.30	5.0	6.0	6.40
4.30	5.10	5.0	5.40	6.30	7.0
4.55	5.40	5.30	6.0	7.0	7.40
5.10	6.10	6.0	6.40	7.30	8.0
5.20	6.40	6.30	7.0	8.0	8.40
5.30	7.10	7.0	7.40	8.30	9.10
5.40	7.40	7.30	8.0	9.0	9.40
5.55	8.10	8.0	8.40	9.30	10.10
6.10	8.40	8.30	9.10	10.0	10.40
6.30	9.10	9.0	9.40	10.30	11.10
6.45	9.40	9.30	10.10	11.0	11.45
7.0	10.10	10.0	10.40	11.35	—
7.15	10.40	10.30	11.10	—	—
7.30	11.10	11.0	11.40	—	—
7.45	11.40	11.25	12.4	—	—
8.0	—	12.0	—	—	—

The Company reserves the right to alter or suspend this Time Table without notification if occasion arises.

Note: On Public Holidays, weather permitting, Steamers will leave as follows:—

From Sydney: 6.0, 6.30, 7.0, 7.30, 8.0, 8.30, 9.0, 9.30 a.m.

From Manly: 6.0, 6.40, 7.10, 7.45, 8.15, 8.45, 9.15, 9.45, 10.15 a.m., and then as per usual Holiday Time Table.

TRAM TIME TABLES.

MANLY—BROOKVALE—NARRABEEN

Connecting with steamers at Manly Wharf, to and from Sydney.

MONDAYS TO FRIDAYS

From Manly Pier (Down).—For Narrabeen.
15.5w, 15.19w, 15.39w, 15.59w, 6.13w, 6.37w, 17.3w, 7.9, 7.22, 7.55, 8.7, 8.43, 9.15, 9.39 a.m., and at 9 and 39 mins. past each hour to 4.39, 5.7, 5.28, 5.46, 5.57, 6.7, 6.17, 6.32, 6.48, 7.7, 7.39, and at 9 and 39 mins. past each hour to 11.39 p.m.—D12.3, D12.38 a.m.

For Manly Pier (Up).—From Narrabeen.
5.38w, 5.58w, 6.25w, 6.42w, 7.3, 7.14, 7.26, 7.38, 7.48, 8.0, 8.12, 8.32, 8.54 a.m., and at 26 and 56 mins. past each hour to 4.26, 4.50, 5.19, 5.31, 5.52, 6.7, 6.28, 6.52, 7.12, 7.34, 7.55, and at 26 and 56 mins. past each hour to 10.56, 11.28, 11.56 p.m.—D12.28, D12.47, D11.16 a.m.

DEE WHY 16 minutes later. BROOKVALE 21 minutes later.

SATURDAYS

* For Dee Why only.

From Manly Pier (Down).—For Narrabeen.
15.12w, 15.43w, 6.1w, 6.37w, 6.58w, 17.6w, 7.12, 7.47, 8.8, 8.18, 8.42, 9.16, 9.45, 10.9, 10.39, 11.9, 11.37 a.m., 12.8, 12.42, 12.57, 1.17, 1.38, 1.58, 2.18, 2.38, 3.7, 3.37, 3.49, 4.7, 4.38, 4.58, 5.18, 5.38, 5.58, 6.18, 6.38, and at 9 and 39 mins. past each hour to 11.39 p.m.—D12.3, D12.38 a.m.

For Manly Pier (Up).—From Narrabeen.
5.48w, 6.18w, 6.48w, 7.17, 7.30, 7.42, 8.3, 8.12, 8.33, 8.47, 8.59, 9.28, 9.56, 10.26, 10.56, 11.26, 11.54 a.m., 12.15, 12.48, 1.17, 1.29, 1.55, 2.23, 2.41, 2.55, 3.24, 3.54, 4.18, 4.36, 4.55, 5.15, 5.35, 5.55, 6.24, 6.55, and at 26 and 56 minutes past each hour to 10.56, 11.20, 11.56 p.m.—D12.28, D12.47, D11.16 a.m.

DEE WHY 16 minutes later. BROOKVALE 21 minutes later.

SUNDAYS

From Manly Pier (Down).—For Narrabeen.
16.23, 6.39, and at 9 and 39 mins. past each hour to 9.39, 9.51, 10.9, 10.25, 10.39, 10.59, 11.19, 11.39, 11.59 a.m., 12.19, 12.39, 1.9, 1.39, 1.51, and at 9.24, 39 and 54 mins. past each hour to 4.39, 4.59, 5.19, 5.39, 5.59, 6.19, 6.39, and at 9 and 39 mins. past each hour to 11.39 p.m.—D12.8 a.m.

For Manly Pier (Up).—From Narrabeen.
6.56, 7.26, 7.56, 8.26, 8.56, 9.26, 9.56, 10.26, 10.54, 10.54, 11.15, 11.55 a.m., 12.7, 12.24, 12.44, 12.56, 1.26, 1.56, 2.26, 2.34, 2.49, 3.4, 3.19, 3.54, 3.49, 4.4, 4.19, 4.54, 4.49, 5.8, 5.28, 5.48, 6.8, 6.24, 6.44, 6.54, and at 36 and 56 mins. past each hour to 11.26, 11.56 p.m.—D12.19, D12.47 a.m.

DEE WHY 16 minutes later. BROOKVALE 21 minutes later.

MANLY-HARBORD LINE

MONDAYS TO FRIDAYS

From Manly (Down).—For Harbord.
6.2, 6.37, 7.4, 7.22, 7.39, 7.59, 8.8, 8.26, 8.42, 9.11, 9.37 a.m., and at 7 and 37 mins. past each hour to 5.7, 5.28, 5.47, 5.58, 6.17, 6.33, 6.48, 7.7, 7.22, 7.37, 8.7, 8.37, 9.7, 9.37, 10.7, 10.37, 11.7, 11.36 p.m.—D12.4, D12.37 a.m.

For Manly (Up).—From Harbord.
5.59, 6.21, 6.50, 7.5, 7.25, 7.37, 7.53, 8.4, 8.23, 8.42, 8.55, 9.24, 9.52 a.m., and at 22 and 52 mins. past each hour to 4.52, 5.27, 5.42, 6.1, 6.18, 6.32, 6.51, 7.7, 7.22, 7.37, 7.52, and at 22 and 52 mins. past each hour to 10.52, 11.21, 11.50 p.m.—D12.19 a.m.

SATURDAYS

From Manly Pier (Down).—For Harbord.
6.36, 6.55, 7.12, 7.25, 7.46, 7.56, 8.13, 8.23, 8.41, 9.12, 9.41, 10.8, 10.37, 11.7, 11.56 a.m., 12.9, 12.43, 12.58, 1.18, 1.38, 1.57, 2.17, 2.37, 2.52, 3.7, 3.22, 3.37, 3.52, 4.7, 4.22, 4.37, 4.57, 5.17, 5.37, 5.57, 6.17, 6.37, 6.49, 7.7, 7.22, 7.37, and at 9 and 37 mins. past each hour to 11.7, 11.56 p.m.—D12.4, D12.37 a.m.

For Manly Pier (Up).—From Harbord.
6.10, 6.39, 6.52, 7.10, 7.26, 7.39, 7.59, 8.9, 8.26, 8.41, 8.56, 9.25, 9.54, 10.22, 10.52, 11.22, 11.52 a.m., 12.23, 12.40, 1.0, 1.20, 1.40, 2.0,

2.20, 2.35, 2.50, 3.5, 3.20, 3.35, 3.50, 4.5, 4.20, 4.40, 5.0, 5.20, 5.40, 6.0, 6.20, 6.32, 6.52, 7.3, 7.22, 7.37, 7.52, and at 22 and 52 mins. past each hour to 10.52, 11.21, 11.50 p.m.—D12.19 a.m.

SUNDAYS

From Manly (Down).—For Harbord.
7.7, 7.37, and at 7 and 37 mins. past each hour to 10.37, 10.57, 11.17, 11.37, 11.57 a.m., 12.17, 12.37, 1.7, 1.37, 2.7, 2.37, 2.57, 3.7, 3.27, 3.37, 3.57, 4.8, 4.23, 4.37, 4.57, 5.17, 5.37, 5.57, 6.17, 6.37, 6.52, 7.7, 7.22, 7.37, 7.52, 8.7, 8.22, 8.37, 8.52, 9.7, 9.37, 10.7, 10.37, 11.7, 11.37 p.m.—D12.6 a.m.

For Manly (Up).—From Harbord.
6.52, and at 22 and 52 mins. past each hour to 10.22, 10.40, 11.0, 11.20, 11.40 a.m., 12.0, 12.20, 12.32, 1.22, 1.52, 2.22, 2.37, 2.52, 3.7, 3.22, 3.37, 3.52, 4.7, 4.22, 4.40, 5.0, 5.20, 5.40, 6.0, 6.20, 6.36, 6.52, 7.7, 7.22, 7.37, 7.52, 8.7, 8.22, 8.37, 8.52, 9.7, 9.22, 9.52, 10.22, 10.52, 11.22, 11.52 p.m.

MANLY—THE SPIT

Connecting with steamers to and from Sydney, at Manly Wharf.

MONDAYS TO FRIDAYS

From Manly Pier (Down).—For Ethel Street and The Spit.
5.23, 5.50, 6.19, 6.35, 6.51, 7.4, 7.20, 7.28, 7.58, 7.51, 7.57, 8.6, 8.14, 8.27, 8.41, 8.58, 9.15, 9.38, 9.54 a.m., and at 8, 24, 38, and 54 mins. past each hour to 4.8, 4.23, 4.37, 4.54, 5.9, 5.28, 5.48, 5.58, 6.8, 6.18, 6.33, 6.49, 7.7, 7.18, 7.38, 8.8, 8.38, 9.8, 9.38, 10.8, 10.38, 11.8, 11.38 p.m.—D12.3, D12.38 a.m.

For Manly Pier (Up).—From The Spit.
5.53, 6.14, 6.42, 6.59, 7.19, 7.29, 7.43, 7.55, 8.6, 8.28, 8.35, 8.41, 8.49, 9.13, 9.39, 9.45 a.m., and at 3, 15, 33 and 45 mins. past each hour to 9.15, 9.32, 9.46, 4.7, 4.15, 4.31, 4.45, 5.2, 5.18, 5.35, 5.55, 6.12, 6.29, 6.33, 6.48, 6.58, 7.12, 7.42, and at 12 and 42 mins. past each hour to 11.12, 11.37 p.m.—D12.10, D12.18, D12.6 a.m.

For Manly Pier (Up).—From Ethel Street.
5.59, 6.20, 6.49, 7.5, 7.25, 7.35, 7.49, 7.59, 8.12, 8.26, 8.34, 8.41, 8.47, 8.56, 9.19, 9.39, 9.51 a.m., and at 9, 21, 39, and 51 mins. past each hour to 3.21, 3.38, 3.52, 4.7, 4.21, 4.37, 4.51, 5.8, 5.24, 5.41, 6.1, 6.18, 6.29, 6.39, 6.54, 7.4, 7.18, 7.35, 7.49, and at 18 and 48 mins. past each hour to 11.18, 11.43 p.m.—D12.16, D12.44, D12.12 a.m.

From Manly Pier (Down).—For Ethel Street and The Spit.
5.41, 6.5, 6.35, 7.11, 7.24, 7.39, 7.52, 8.6, 8.18, 8.33, 8.46, 9.12, 9.21, 9.43, 9.54, 10.8, 10.24, 10.38, 10.54, 11.8, 11.24, 11.38, 11.54 a.m.—D12.8, 12.25, 12.42, 12.58, 1.17, 1.29, 1.40, 1.58, 2.8, 2.19, every 10 mins. to 6.39, 6.52, 7.8, 7.24, 7.39, 8.8, 8.38, 9.8, 9.38, 10.8, 10.38, 11.8, 11.38 p.m.—D12.3, D12.38 a.m.

For Manly Pier (Up).—From The Spit.
6.4, 6.54, 7.4, 7.15, 7.48, 8.1, 8.20, 8.33, 8.47, 9.0, 9.17, 9.45 a.m., and at 3, 15, 33 and 45 mins. past each hour to 12.3, 12.17, 12.35, 12.51, 1.7, 1.20, 1.37, 1.55, 2.13, every 10 mins. to 6.55, 7.8, 7.55, 7.29, 7.44, and at 12 and 42 mins. past each hour to 11.12, 11.38 p.m.—D12.10, D12.38, D12.6 a.m.

For Manly Pier (Up).—From Ethel Street.
6.10, 6.40, 7.10, 7.39, 7.54, 8.7, 8.26, 8.39, 8.53, 9.6, 9.23, 9.36, 9.51 a.m., and at 9, 21, 39 and 51 mins. past each hour to 12.5, 12.23, 12.41, 12.57, 1.19, 1.36, 1.57, 1.45, 2.1, 2.19, every 10 mins. to 6.59, 7.7, 7.21, 7.35, 7.50, and at 18 and 48 mins. past each hour to 11.18, 11.44 p.m.—D12.16, D12.44, D12.12 a.m.

SUNDAYS

From Manly Pier (Down).—For Ethel Street and The Spit.
6.39, 7.9, 7.59, 7.53, 8.7, 8.24, 8.37, 8.52, 9.7, 9.20, 9.37, 9.50, 9.59 a.m., every 10 minutes to 3.29, 3.37, 3.51, 3.59, 4.8, 4.21, 4.29, every 10 mins. to 6.49, 7.9, 7.51, 7.57, 7.50, and at 7, 20, 37 and 59 mins. past each hour to 10.37, 11.7, 11.37 p.m.—D12.8 a.m.

For Manly Pier (Up).—From The Spit.
(From Ethel Street, 6 minutes later.)
7.15, 7.44, 8.2, 8.15, 8.30, 8.45, 8.59, 9.14, 9.29, 9.44, 9.59, 10.13 a.m., every 10 mins. to 3.13, 3.20, 3.30, 3.43, 3.51, 4.3, 4.13, 4.22, 4.30, 4.43, every 10 mins. to 7.13, 7.29, 7.44, 7.59, and at 14, 29, 44 and 59 mins. past each hour to 10.44, 11.14, 11.36 p.m.—D12.6, D12.25 a.m.



THE SPIT 1149
MANLY TRAM LINE

BROADHURST
M.A.B. PHOTO