BUS PRIORITY: A STRATEGY PERSPECTIVE

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1. INTRODUCTION

In Adelaide, the vast majority of trips are made by car. It is a convenient means to get to work and to take our children to school. The car makes recreational travel easy and is the most flexible way of "getting around". Given that it is easy to travel around Adelaide by car it will most certainly continue to dominate as the preferred means of travel well into the future.

While the car provides flexibility, convenience and safety, motor vehicle travel has major social, financial and environmental impacts. However, this is often not readily noticed because:

- Private travel is not seen as a return on subsidy or investment in infrastructure. The running costs of a motor vehicle and its supporting infrastructure are often hidden and considered a necessity. This is worsened by the fact that the cost of providing a road system is becoming more expensive as Adelaide continues to grow. The number of people sharing car rides is continually decreasing and is a waste in resource terms, both in car running costs and road space.

- The environmental problems created by cars, such as air and noise pollution and greenhouse gases, are sometimes not immediately apparent or are assumed to be an accepted outcome of car use. Traffic delay and congestion is detrimental to individual lifestyles and to business efficiency.

- The social costs of car use such as accidents, social severance and transport disadvantage are either longer-term or are accepted as outcomes of people's demographic situation (low income, aged, single parents). It is difficult to travel between some areas of Adelaide for people who do not have a car. As a result, some groups of people may find it difficult to gain employment, to get to education or health services or simply to access various activities.

In developing a Metropolitan Transport Strategy for Adelaide, these real needs and issues have been taken into account through engaging key sectors of the community and industry.

The strategy will assist in determining where investment is most strategically needed and ensure the provision of appropriate transport services which are accessible within the Adelaide metropolitan area over the next ten to twenty years.

2. TRANSPORT STRATEGY PERSPECTIVE

A metropolitan transport strategy will be developed in an extended form to take account of all modes including rail, sea and air. It will be integrated in the sense that current urban planning initiatives such as urban regeneration and all modes of travel are incorporated.

In developing the Strategy the aim has been to:

- increase the number of private car users sharing a ride;
- achieve greater use of alternative modes of travel other than the private car, such as public transport, walking, cycling, motor cycling and taxis;
- deliver better urban planning which gives the potential for reductions in car trip numbers and trip length;
- achieve 'smart' use of our roads (including the use of Intelligent Transport Systems) so that when people choose to travel by vehicle they can do so in a manner that is safe and efficient for all road users; and
- ensure efficient transport of goods and services, particularly between places of economic importance and road, rail, sea and air transport hubs.

This will be done by:

- targeting investment to maximise industry opportunities;
- a targeting infrastructure projects at inefficient and unsafe 'hot spots';
- promoting low cost/high benefit investments that utilise existing assets as efficiently as possible;
- producing a passenger transport framework;
- incorporating bicycle lanes and pedestrian walkways in road works where possible;
- using initiatives such as the 'living neighbourhood' concept to empower people to reduce the impact of the car by making small changes that benefit themselves and fit into their lifestyles; and
- developing road transport plans that promote the City centre as the focus of business, social and political life of the State.

3. PUBLIC TRANSPORT

About 5 % of people in Adelaide currently use public transport on most days of the week, and a little under 20% use it at least once each week. A third of people never use public transport. In 1997/98 student tickets accounted for approx 10.52m (23.9%) journeys, concession tickets accounted for 19.381 m (44%) journeys and regular tickets accounted for 14.18m (32.2%) journeys.

Demand for Public Transport Services
The demand for public transport is considerably higher during the morning and evening peak periods. The morning peak period coincides with travel to school, and is more concentrated.

Demand for public transport is at its lowest in January as a result of the Christmas break and summer holidays. Demand peaks in March which coincides with the beginning of the academic year.

Between 1980 and the present time, the length of public transport route in Adelaide rose from about 1,100 km to almost 1,300 km as services were extended to new suburbs and additional services introduced.

Changes in land use and travel patterns have resulted in the average length of trips by public transport rising by 50 percent since the late 1970s, while the average length of car trips has remained constant. Apart from very short trips, public transport fares do not increase with the distance travelled.

Public transport in Adelaide fulfils many functions:

- **Social safety net.** Public transport provides accessibility for people who do not have a drivers licence or access to a car for mobility. These people account for two-thirds of current public transport users. They include school students, tertiary students, people with disabilities and older people. About 13% of households in Adelaide do not own a car, while about 330 000 people do not have a drivers licence.

- **Travel to the CBD.** Slightly more than 40% of public transport trips are made to or from the CBD, which is four times the number made by car. Public transport carries about one-fifth of the people who visit the CBD each day.

- **Travel to major suburban centres.** Four or more public transport routes serve a total of 35 of Adelaide's suburban centres. 1 0 or more routes serve thirteen.

- **Other travel and community needs.** Public transport also meets other community needs, including acting as a contingency for occasions when people do not wish to use a private car or for mass transit to special events such as Sky Show.

The private cost of Public Transport

A comparison between the average annual recurrent costs of travelling to work each day by car and bus indicates that use, of public transport is more cost-efficient to individuals. The following table outlines the annual cost of a 2Okm round trip to the CBD each workday by car, based on the RAA's 1997 private car running costs and parking costs of $4.00 per day. In comparison, the annual cost of travelling to the city each workday using an All-Times Regular Multitrip ticket is $877.

	Mazda 121	Commodore 3.8L	Mazda 121	Commodore 3.8L
Car running costs	$655	$724		
Car buying and running costs			$1,866	$2,220
Parking @) $4.00 per day	$924	$924	$924	$924
TOTAL	**$1,579**	**$1,648**	**$2,790**	**$3,747**

p.a figures based on average $15,00Okms. 231 working days and 2Okm round trip per workday. Depreciation at market rates: Up to 160Occ 15.34% (1-3yrs) 6.58% (3yrs & over), 1600-200Occ 15.63% (1-3yrs) 6.83%(3 yrs &over), over 200Occ 15.34% (1-3yrs) 6.03% (3yrs & over). Calculation period: costs have been calculated from new to five years at $l5,000 km per year. Interest: loan based on 75% of purchase cost over a 5 year period at 13%. Insurance based on estimated residual value for each year. Fuel figures from Fuel Consumption Guide 1996/97 Edition for city cycle and inflated by 16% with fuel cost at 76.9 cents per litre. Maintenance Costs based on manufacturers schedules with labour at $58.00 per hour.

There above information shows that there are various ways in which the rising use of private car use can be tackled. One issue is obviously the average person's perception of the cost of private travel versus public transport travel. One way to address this will be better information dissemination and an education campaign about the real costs of travel. In response to the decline in use of public transport over the past twenty years the strategy will focus on:

- maximising the use of the current fixed public transport corridors;
- being careful not to duplicate the road based system with, additional capacity where it may undermine existing services;
- developing a hierarchy of services and interchanges to improve the frequency and reliability of passenger travel;
- providing better interconnectivity between services, improved security and information;
- focussing public transport on the city as the centre of cultural, economic and social activity; and
- developing a bus priority system that takes advantage of under utilised road space.

It is the latter that this paper focuses on as part of Transport SA's core business.

4. BUS PRIORITY

The proportion of people who travel on metropolitan arterial roads by bus rather than car is considerably lower than the number found travelling by bus on many CBD streets. However, there are some exceptions such as Hackney Road where about 40% of people are travelling in buses. Buses are adversely affected by traffic congestion, particularly in proportion to the number of passenger movements that they accommodate.

There is a real need to consider the flow of people rather than cars. A look at the number of passengers per lane per hour rather than vehicles per hour, shifts transport strategy to a different perspective.

Vehicle occupancy, particularly for travel to and from work, has been decreasing over the years. At present, home to work car occupancy has decreased to approximately 1.1 5 persons per car. The average occupancy for all car trip's is currently about 1.25 compared to 1.41 in 1965. Conversely, buses are carrying approximately 50 passengers per bus in peak periods. Given that one bus full of passengers is equivalent to 43 cars, there is significant potential to increase the average occupancy through priority systems.

To date, there have been a number of priority measures for buses on Adelaide's roads, including special traffic signals for priority movement or bus lanes. These have been applied in an opportunistic way and a more concerted effort is now being pursued through a plan for bus priority. This could include an improvement in ACTS (Adelaide Coordinated Traffic System) as well as through. Automatic Vehicle Location (AVL) technology which gives priority to buses which have been delayed in their journey. Exclusive bus priority lanes and clearways will ensure better travel times.

5. THE OPTIONS

Four broad approaches can be used to provide priority to buses. The approaches, which, embody an increasing level of sophistication of bus priority that is broadly linked to the extent of ITS (intelligent Transport Systems) incorporated into them, include:

Bus lanes, which are most effective at congested intersections where they allow buses to bypass traffic queues. Bus lanes can broadly involve three degrees of sophistication:

- Instances where a bus lane on the approach to an intersection has a departure lane on the opposite of the intersection. This could occur at an unsignalised intersection.

- At signalised intersections, a detector at the intersection stop line is used to trigger the green signal for buses, and traffic in adjacent lanes, as soon as possible.

- Cases where bus lanes on the approach to intersections do not have a departure lane on the other side of the intersection, and which therefore need a "B" signal to allow the buses to enter the intersection in advance of neighbouring traffic.

- Bus lanes that terminate before an intersection, but no more than the queue of traffic that can pass through the intersection on the next green phase. This increases intersection capacity by allowing other traffic to also use the kerbside lane in the vicinity of the intersection. Traffic signals can be pre-empted using simple ITS technology to either advance or hold a green light to allow buses to pass through the intersection at the earliest possible time. This approach, like the previous one, provides indiscriminate assistance to buses.

These approaches provide explicit priority to buses, but also provide priority to buses, irrespective of whether they are ahead or behind schedule.

Traffic management measures, including clearways (to allow buses to avoid mid-block obstructions to traffic in the kerbside lane), and removal of conflicting traffic movements, additional traffic signals and other devices (to provide buses easier movement through specific difficult locations). In respect of the latter, a review is needed of current warrants for traffic signals to allow installation of signals specifically designed to assist buses. Consideration of other innovative practices is also required, for example to use pedestrian signals on arterial roads, such as Portrush Road near Grant Avenue, to facilitate bus movement onto the arterial road.

Queue relocation whereby bus priority is provided at an upstream intersection to give buses an initial advantage. In addition, through traffic is restricted so that congestion at downstream intersections is reduced, which should ensure that buses are able to pass through them with little or no need for additional priority measures at them. The means to implement this approach exists at present, but require that a corridor approach be taken to planning such schemes and that broader network effects are taken into account.

Signal intervention based on sophisticated use of ITS to provide selective priority. This can be used to modify signal settings to expedite or delay buses depending on schedule differences, eg to give no priority to early buses, and substantial priority to late buses. Bus lanes are not needed at intersections, but can be used prior to them to facilitate bus movement. This approach allows priority to be provided to buses at a lower unit cost and with less impact on other road traffic than is possible with traditional bus lanes.

The approach requires the integration of three technical systems, ie for bus location, schedule adherence, and intervention in traffic signal settings. Most of the physical technology for such a system exists, but detailed work is required to determine the most appropriate technologies to be used, to develop the individual systems, and for systems integration.

The last two of these approaches provide priority to buses that is generally. less obvious to observers, but which nevertheless can provide significant advantage to buses and their passengers. Implementation of the last approach provides the greatest potential to improve schedule adherence and passenger information systems.

5. CONCLUSION

Experience has shown traffic engineers that it is the sum of the "little things" relating to traffic management and intelligent transport systems that can improve bus priority significantly. Bus priority can improve the reliability of services significantly, which will have a marked effect on the number of people that use these services. However, it is not just bus service reliability but information about the personal costs of using public transport versus that of cars that will educate the community about the benefits of "getting out of our cars" and using public transport as a viable alternative. An integrated transport strategy for the metropolitan area will go some way to address these issues. It will also be up to the community to play a role in participating directly in public transport initiatives including cultural change.