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Sustainable Transport and Canberra – Challenges and Opportunities

ACT Planning and Land Authorities Sustainable Communities Program
Transport Workshop

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1. INTRODUCTION

This paper addresses how Canberra’s sustainability might be improved with regards to transport. It is developed as part of the Sustainable Communities Program (SCP), a three year strategic review of planning policies aimed at delivering more sustainable urban communities for the ACT. The paper feeds into a workshop on Transport and Communications which aims to develop issue papers concerning sustainability issues and Canberra’s future. The program and the workshop are being developed by the ACT Government Planning and Land Authorities.

An issues brief for the workshop has been developed (dated 18th September, 2008) which sets out the context for the workshop and the supporting expert papers. This suggests that each paper must address the common themes of:

- Accessibility (including social inclusion)
- Affordability (including housing)
- Community Health and Well Being

This note is structured as follows:

2. Existing Transport in the ACT – presents a series of facts about existing ACT transport and considers how these relate to sustainability issues

3. The Drivers of Change – describes likely future changes which will affect the transport system and the impacts this will have on sustainability

4. The Transport Sustainability Problem – summarises the key sustainability problem which need to be addressed in transport

5. Solutions for Sustainable Transport – presents a series of actions which can be undertaken to address the problems identified.

6. The Accessibility, Affordability and Health and Well Being Framework – examines the issues within the common theme framework identified for the Sustainable Communities Program (SCP) workshops.

2. EXISTING TRANSPORT IN THE ACT

Mode Share
Figure 1 shows existing travel habits in the ACT [1]. This indicates that:

- The ACT is highly car dependent (74% of trips are by car)
- Only 4.75% of trips are by public transport
- Walking is the most effective ‘green’ mode (19%)
- Cycling is only 3% of travel.

Figure 1 also shows that trips to/from Civic and Woden have the highest shares of bus travel and walk travel. However even for travel to/from Civic, car access represents over 50% of travel.
Traffic Congestion

Urban traffic congestion is estimated to cost Canberra $100M p.a. (2005, [2]). About half of these costs are incurred by the businesses in Canberra and hence are passed on in terms of higher costs of goods and services. By 2005 the costs of congestion are expected to almost double to $200M p.a. in ACT.

The costs of congestion are higher in Australia than in most developed countries when considered relative to the scale of the economy. As a share of GDP, congestion costs were estimated to be 2.6% of GDP in Australia [3]. This compares to only 1.5% for the United States, 1.9% for Western Europe and 2% for the OECD average.

Urban Sprawl

Figure 2 illustrates two factors which explain the high congestion costs in the ACT and Australia.

Australia has very high car ownership and very low urban density. The ACT is particularly poorly placed in this regard. It has a car ownership level much higher than European countries [4, 5] and the lowest relative urban density in the Australian cities measured in Figure 2 [5, 6]. In broad terms the ACT is about 10 times less dense than Brisbane, Melbourne and Sydney.
One aspect of the problem of low density which is not well understood is the relative scale of Canberra in terms of city size. Figure 3 shows a scale plot of Canberra and compares it with Greater London.

**Figure 3 : Relative Scale of the ACT and Greater London**

![Scale plot of Canberra and Greater London](image)

**Australian Capital Territory = 0.3 M pop**  **Greater London = 7.2M pop**

The relative sizes of these cities is broadly comparable certainly from a north - south perspective. While London has about 3 times the spatial area of ACT it has 24 times the population.

Because Canberra’s public transport system shares the road with passenger vehicles, congestion contributes to slow and unreliable services. An ABC news report (October 10th 2007) found that:

- More than 30 per cent of Canberra drivers would support tolls on new and existing roads to reduce traffic congestion
- The main reason commuters shunned public transport was because trips took too long and were unreliable.

While ACT public transport is known to have a poor share of travel (Figure 1, 5%) the service level supplied in terms of vkms per head of population is one of the highest in Australia and comparable to major international cities including Paris and Amsterdam (Figure 4) [7].

**Figure 4 : Relative Public Transport Vkms Supplied per Capita (All Modes)**

![Public Transport Vkms per capita chart](chart)
Yet the service supplied is known to be low[8]:
- 40% of routes have less than 6 bus vehicle trips per day
- 90% of routes have less than 20 bus vehicle trips per day

Assuming a 12 hour day, a 15 minute service would equate to 48 buses a day. Only one bus route has this frequency (route 38). Again based on a 12 hour day, the average frequency of service are:
  - Weekday = 53 mins
  - Saturday = 58 mins/ Sunday = 75.8 mins

Based on the review of public transport in 2004 [8], only 51% of bus service on weekdays also operate on Saturday while only 46% provide services on Sundays.

So how can Canberra have one of the highest relative per capita service levels in urban Australia yet very low service frequencies and low weekend service? The answer is its very low urban density. Effectively the high per capita service is spread very thinly over a very large area making the provided service level very low on any particular route. This is an expensive and ineffective way of providing public transport.

The 2004 review of ACT public transport [8] also found the following key problems with Canberra public transport:
- Network designed around ‘forced’ interchange (30% of patronage is lost due to enforced transfers)
- Information at stops considered poor
- Interchanges considered poorly designed and perceived as a safety concern

**KEY CONCLUSIONS – EXISTING TRAVEL AND TRANSPORT**
- ACT transport is car based – public transport represents only 5% of travel
- Congestion costs are high and growing considerably
- ACT has very high car ownership and one of the lowest urban densities in the world. It covers an enormous area for a city of its size.
- Although it has a higher relative per capita supply of public transport, usage is low and provided service level is low. The reason for this is the spreading out of service over a massive service area
- Overall Canberra has a very poor transport system from a sustainability viewpoint.

**3. THE DRIVERS OF CHANGE**

Travel is forecast to grow considerably in the ACT (Figure 5). By 2020 road traffic is expected to grow by a further 20% while truck traffic will grow by 90% in the larger vehicle categories [2].

*Figure 5 : Forecast Growth in ACT Road and Freight Traffic to 2020*

<table>
<thead>
<tr>
<th>Mode</th>
<th>% Change in Vkms 2005-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars</td>
<td>18%</td>
</tr>
<tr>
<td>Light Commercial</td>
<td>84%</td>
</tr>
<tr>
<td>Rigid Trucks</td>
<td>28%</td>
</tr>
<tr>
<td>Artic. Trucks</td>
<td>67%</td>
</tr>
</tbody>
</table>

There is evidence that bus use is growing in the ACT and doing well compared to other capital cities (Figure 6). However mode share change in bus use is modest. The share of bus travel in 2006 is only slightly above the level in 1991 for census journey to work figures.

**Figure 6 : Change in Bus Use – Total and Census Journey to Work**

Some good trends have emerged from a sustainable transport viewpoint with regard to share of travel to work:
- Cycling as a share of travel has increased consistently (by over 160% between 1991 and 2006)
- Walking has followed a similar trend.

However car driving to work, the most dominant form of work travel, has also consistently increased its share of travel over time (by over 30% since 1991). Sharing cars, an efficient way to travel, has declined by about 8% between 2006 and 1991.

Congestion acts to create a poor environment for inner city livability. Yet at the same time inner city living is increasing in the ACT. This is unfortunate since traffic can generate local environmental air emission problems. In 2000 motor vehicle air pollution was found to cause 2,700 cases of morbidity in Australia and 1,400 cases of premature death. These figures are higher than relative road accident deaths.

Obesity of the Australian population and particularly young Australians is known to be increasing. Increased car dependence and lower rates of walking and cycling in the community are a major cause of this.

Road travel now dominates growth in Australian greenhouse gas emissions with 89% of transport emissions being from the road transport sector [9]. Sir Nicholas Stern has suggested that emissions need to reach 70% below current levels by 2050 to avoid dangerous climate change. As figure 7 shows emissions are currently continuing to grow not decline. A considerable change in direction is required to achieve safe climate change targets.

The price of road transport fuels has risen considerably in Australia and also worldwide. These patterns are consistent with the theory that oil reserves are finite and that demand will soon outstrip the supply of new oil. ITS research has established that the ‘peak oil’ theory is robust but there is much debate regarding the date when peak oil will be reached [10].
ITS research has also established social problems associated with Australian cities and transport. There is a trend towards lower income families living on the fringe of Australian cities [11-13]. Unfortunately fringe locations are also very poorly serviced by Australian public transport [12, 13]. This results in a high degree of car dependence amongst low income families. There is evidence that this creates a high degree of expenditure on travel for low income families [11]. These problems are exacerbated as fuel prices rise and as they push up home loan interest rates[14]. A range of social issues associated with poor access to activities and limitations on life opportunities can emerge for young people, older people and low income groups in general [15].

4. THE SUSTAINABILITY PROBLEM

Figure 8 illustrates the transport sustainability problem of Canberra. This is a multi-faceted problem where Canberra’s existing position with transport and travel is being exacerbated by significant drivers of change. These problems are getting worse not better.

Figure 8: The ACT Transport Sustainability Problem
5. SOLUTIONS FOR SUSTAINABLE TRANSPORT

Sustainability means ensuring the ability of future generations to reach their full potential by having access to sufficient and diverse resources passed on by current generations. A shorter version of saying this is “don’t cheat the kids”. The focus of sustainability is to concentrate policy on future options and to manage existing resources with a view to ensure they are available tomorrow. In transport sustainability also concerns itself with the following commonly used terms:

- Safe and healthy access
- Promoting equity
- Affordable, fair and efficiency transport
- Integrated planning
- Providing choice and diversity of modes
- Limiting emissions and waste
- Using renewable resources
- Minimizing impact on land.

There are three major solutions or ‘levers’ which must be used to improve the ACT transport sustainability problem:

- Land use
- Infrastructure Improvement; and
- Pricing.

LAND USE
The ACT needs to follow a ‘smart growth’ strategy which stops sprawl and actively seeks to infill gaps between existing settlements particularly around transport corridors. The major aim is to increase land use density. Key strategies are to:

- Confine growth within defined boundaries
- Encourage high and medium density development in selected nodes
- Provide in-fill development
- Higher density development around transport nodes.

ACT must adopt transit-oriented development (TOD) principles including the TOD key drivers of:

- Density – higher density around transit notes
- Design – quality and attractive design to encourage livable communities and walking
- Diversity – of land uses associated with low emission transport and transit use.

INFRASTRUCTURE IMPROVEMENT
The ACT must:

- Encourage low impact transport modes such as public transport, walking and cycling
- Discourage high impact transport modes such as car driving alone and encourage more effective uses of the car such as car sharing and limiting car travel
- Encourage integrated travel so that all transport modes work better together.

Encouraging Low Impact Transport Modes
In congested urban areas public transport priority makes economic sense since it is possible to carry far more travelers in buses and trams than in the traffic stream. Figure 9 shows an example of a bus lane in Melbourne. The few buses in this picture are carrying more passengers than all the cars in all lanes shown throughout this diagram. Each Melbourne tram carries the equivalent of over 1km of traffic. Public transport priority makes absolute sense in congested inner areas.

There is a need to considerably upgrade the quality of public transport provided in Canberra. Key requirements are:

- Off road uncongested operations
- High capacity, quality vehicles
- Fast level/accessible entry/exit to/from vehicles
- Simple network structure
- Off vehicle ticketing.
The ACT can achieve these objectives by either:
- Implementing a quality Light Rail network
- Providing a quality Bus Rapid Transit system
- Developing an underground Metro system.

A Metro system is going to be hard to justify with Canberra’s low density development. This will also be true of Light Rail. There is much evidence that a high quality transit systems can be provided more efficiently using Bus Rapid Transit. This has been shown to be more cost effective relative to light rail in many conditions similar to the ACT [16, 17]. However a BRT system should be designed to be upgradable to Light Rail in the future.

There is much rationale for increasing fringe area bus frequencies and weekend and evening service level to provide a ‘social transit’ alternative for low income families [15]. In Victoria a 10 year investment of some $1.2B has recently been devoted to enhancing local bus services for social reasons [18]. A review of the impacts of these service developments has shown good social performance [19]. Since 2001, local bus service levels in Melbourne have increased by 19% with growth on the fringe of Melbourne being as high as 40% in some areas.

Cycling and walking are one of the few sustainable transport success stories in the ACT. The ACT should aim to become one of the worlds most successful cycling cities. It can achieve this through investment in a comprehensive network of off road and on road cycling tracks. Tracks should be direct
not circuitous. If necessary road space should be set aside for cycle use using Copenhagen style cycling lanes to protect cyclists from traffic.

Similar investments in pedestrian planning is necessary. Road crossing raised to the pavement level create traffic speed humps which increase pedestrian safety. They also send a message that pedestrians are more important than traffic. Quality and direct walking desire lines (high volume walk paths) should be catered for. Shade, lighting and watering areas should be provided.

**Encouraging More Efficient High Impact Travel Modes**

Car pooling, car share schemes, high occupancy vehicle lanes and priority car share parking plus volunteer driving schemes are all ways of increasing car occupancy. These alternatives needs to be examined seriously and with investment to improve car occupancy.

Vehicle efficiency and sustainability measures should also be followed. Government subsidies should not support larger 4 wheel drive cars. Priority parking and cheaper road user charges should be incurred by smaller and greener vehicles (e.g. hybrid, smart diesel and electric cars).

**PRICING**

Existing taxes and charges associated with transport encourage inefficiency and unsustainable travel. This should be transformed to generate:
- Behavior change – encouraging good low impact travel
- Funding sources to invest in sustainable transport infrastructure.

The following options should be developed and implemented:
- Congestion charging
- Value capture
- Developer Contributions
- Parking levies
- Carbon prices.

6. **THE ACCESSIBILITY, AFFORDABILITY AND HEALTH AND WELL BEING FRAMEWORK**

The issues brief for the workshop sets out the context for the workshop and the supporting expert papers. This suggests that each paper must address a common theme framework of Accessibility (including social inclusion), Affordability (including housing) and Community Health and Well Being. Table 1 show the major elements identified in this review which fit within this framework.

**Table 1: ACT Sustainable Transport Within The Accessibility, Affordability And Health And Well Being Framework**

<table>
<thead>
<tr>
<th>SCP Framework</th>
<th>Key Issues</th>
<th>Key Sustainability Solutions</th>
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<tbody>
<tr>
<td>Accessibility (Social Inclusion)</td>
<td>• Fringe car dependence</td>
<td>• Smart Growth</td>
</tr>
<tr>
<td></td>
<td>• Poor Public Transport</td>
<td>• Social transit</td>
</tr>
<tr>
<td>Affordability</td>
<td>• Fringe car dependence</td>
<td>• Car occupancy</td>
</tr>
<tr>
<td></td>
<td>• Rising fuel prices</td>
<td>• Bike/Walk Emphasis</td>
</tr>
<tr>
<td>Health &amp; Well Being</td>
<td>• Car dependence</td>
<td>• Quality Transit</td>
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<tr>
<td></td>
<td>• Poor Active Transport</td>
<td></td>
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<tr>
<td>Economic Viability</td>
<td>• Rising Traffic Congestion</td>
<td>• Car Occupancy</td>
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<tr>
<td></td>
<td>• Freight Growth</td>
<td>• Car Vehicle Efficiency</td>
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<tr>
<td></td>
<td>• Urban Sprawl</td>
<td>• Smart Growth</td>
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<td>• Growing Greenhouse Emissions</td>
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<td>• Pricing Schemes</td>
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REFERENCES

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