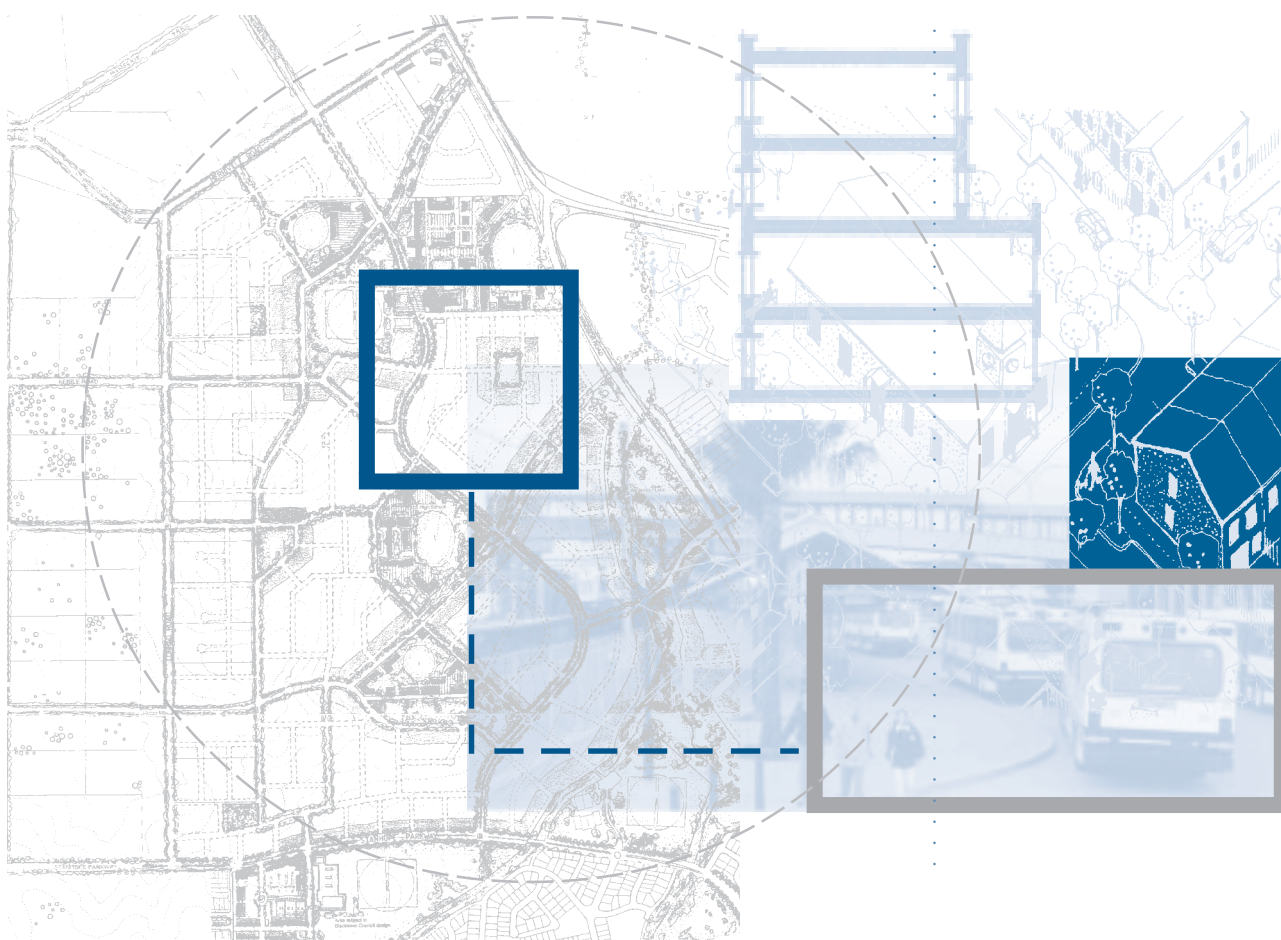


# INTEGRATING LAND USE AND TRANSPORT

**Improving Transport Choice** — Guidelines for planning and development



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Printed August 2001

99/77

ISBN 0 7347 0076 8

NSW Department of Urban Affairs and Planning  
[www.duap.nsw.gov.au](http://www.duap.nsw.gov.au)

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## FOREWORD

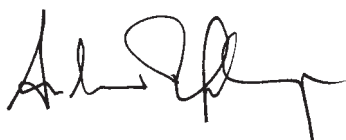
*Improving Transport Choice* is an important part of the state government's commitment to promote urban areas in NSW as attractive and convenient places in which to live and work.

The government is seeking to direct growth and change in our cities and towns in ways that are economically, socially and environmentally sustainable. One area is our travel and transport patterns. We are making more trips and covering longer distances to go about our daily activities. Most of the increased travel is by private car.

These guidelines are part of a package of initiatives to improve the integration of land use and transport planning. The guidelines provide principles, initiatives and best practice examples for locating land uses and designing development that encourages viable and more sustainable transport modes than the private car, such as public transport, walking and cycling. In encouraging these modes, our demand for travel will also be moderated.

The guidelines apply across the state, to help everyone involved in land use planning and development decisions to create healthy and accessible towns and cities. Importantly, as part of the government's commitment to implementing its planning and transport strategies for the Greater Metropolitan Region, the principles in these guidelines will form the basis for decisions on land use plans and development projects.

Providing people with a choice in transport is a major investment in the future of NSW. It requires action from which we will all benefit, in partnership with communities, industry and all spheres of government.



**The Hon. Andrew Refshauge**  
**Deputy Premier**  
**Minister for Urban Affairs and Planning**  
**Minister for Aboriginal Affairs**  
**Minister for Housing**



**The Hon. Carl Scully**  
**Minister for Transport**  
**and Minister for Roads**



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# INTRODUCTION

Transport choice means choosing how we travel. People should be able to walk, cycle and use public transport, and not rely solely on private cars. A choice of transport helps the environment, provides more equitable access, and improves the livability of our urban areas.

The way we plan for land uses and transport can increase the proportion of trips that can be taken by foot, bicycle and public transport as people go about their daily tasks. When we plan for transport choice, we also help manage the demand for travel by minimising the number and length of individual trips people need to make.

## Background

The NSW government is committed to a sustainable future. In the last two years it has released a series of plans and strategies to implement this commitment through a clear planning framework and specific action programs. The government's major plans and strategies include the 25-year air quality management plan, *Action for Air*, the integrated transport plan, *Action for Transport 2010*, and the planning strategy for the Greater Metropolitan Region, *Shaping Our Cities*.

These embody the critical objectives of:

- reducing the growth in vehicle kilometres travelled (VKT)
- improving air quality and reducing greenhouse gas emissions
- building more compact cities
- promoting economic development and creating jobs.

Local action is required if these objectives are to be realised. Councils in particular, have a major role in applying these broader strategies for land use and transport issues, in ways appropriate to their local conditions.

Achieving sustainability in transport requires us to look differently at travel. We need to focus on:

- the movement of people and of goods, rather than the movement of vehicles, and
- maximising **accessibility** (the ability to undertake a range of daily activities with a minimum of travel), rather than **mobility** (the ability to move freely).

This raises the challenge not only to make better transport and land use planning decisions, but also to better integrate these decisions for sustainable outcomes.

## What do you think?

As new information, research and practices come to hand, these guidelines will benefit from periodical review and updating. Feedback on the application of the guidelines, best practice examples and local initiatives is welcomed at [metro@duap.nsw.gov.au](mailto:metro@duap.nsw.gov.au).

## Purpose

These guidelines help to translate broad sustainability objectives into outcomes at the local level. They provide advice on how local councils, the development industry, state agencies, other transport providers, and the community can:

- better integrate land use and transport planning and development
- provide transport choice and manage travel demand to improve the environment, accessibility and livability.

More specifically, they will help:

- reduce growth in the number and length of private car journeys
- make walking, cycling and public transport use more attractive.

The guidelines will help state government agencies and councils improve public facilities and services. They will help industry to better locate and design trip generating development. They will also help inform the community and promote awareness of the need to moderate car use and travel demand.

## Application

The guidelines apply to the urban areas of NSW and to all stages of planning and development.

They focus on creating areas, land uses and development designs that support more sustainable transport outcomes. They complement changes to planning policies and statutory provisions promoting integrated land use and transport planning in the state.

They replace and substantially expand upon Technical Bulletin 19 — Planning for Bus Services, 1989, and should be considered as the relevant reference document for the s. 117 Direction G 27 — Bus Services. They also replace the Department of Urban Affairs and Planning (DUAP) circulars D15 and F2.

## How to use the guidelines

**Part 1** sets out ten principles for accessible development. These provide the framework for the location, design and implementation of urban development, which will support transport choice

**Part 2** outlines the relevance of these principles to all stages in the planning process

**Part 3** provides locational and design criteria for a range of specific land uses or areas, applying the principles to particular circumstances

**Part 4** discusses issues and initiatives relevant to implementing the guidelines and aspects of policy and practice development.

Case studies and examples are provided to illustrate good practice. These are by no means exhaustive and may not be the best approach in all situations. However, they provide a basis for encouraging innovative thinking and outcomes.



## **We are travelling more**

In 1991, Sydney residents made an average of 3.7 trips each week day. By 1997, the number made had increased by 14 percent to 3.9 trips.

The distances travelled also increased, from 23 to 25 kilometres per day — a 10 percent increase, while the time spent travelling increased from 73 to 81 minutes per day — an 11 percent increase.

Source: Transport Data Centre, 1999, Household Travel Survey Data, Department of Transport

# IMPROVING TRANSPORT CHOICE

## **Why is transport choice important?**

Urban structure and transport systems shape each other. The community is increasingly aware of the social, environmental and economic costs of growing car use in urban areas. Traffic congestion is increasing, air quality is under threat, and time, land and money are being consumed at ever increasing rates as people carry out their daily activities predominantly via car trips.

Roads play a critical role in meeting the transport needs of NSW residents and the state's economy. However, urban areas dominated by road infrastructure to accommodate high car usage generally suffer poor amenity and congestion. Allowing high dependency on private cars for travel often reduces accessibility and significantly impacts on the environment.

More sustainable modes — walking, cycling and public transport — can be more effective and efficient ways of moving people in urban areas, especially when all costs are considered. For example, public transport can make more efficient use of space and energy, and be more cost effective than private cars. It also provides mobility for a wider range of people, including young and older people without cars.

To improve transport choice, we need to create an environment that is friendly to pedestrians, cyclists and public transport users, including people with disabilities. We need to make land use and development decisions that encourage people to use sustainable modes of transport for one or more trips per day. We must also ensure that people can reduce their travel needs by allowing several purposes to be served by one trip.



### Did you know?

- The most striking feature of Sydney's travel patterns is the growth of private car use.
- From 1981 to 1997, the population increased by 20 percent but car ownership increased by about 47 percent, car trips increased by about 34 percent and car use jumped by 58 percent, measured in vehicle kilometres travelled (VKTs).
- While the number of people using public transport increased, the share of trips remained relatively stable.
- Work and work-related trips comprise about 18 percent of trips.
- Between 1991 and 1997, people made more trips for recreational, entertainment and sport purposes. The overall kilometres travelled for these purposes increased by 40 percent.
- There was an increase of 25 percent in the distances travelled for passenger-related trips.
- For shopping trips, while the number of trips increased by less than 5 percent, the distances travelled increased by about 13 percent.
- The NSW Government's air quality management plan, *Action for Air*, has set a target for Sydney of zero growth in VKT by 2021.

Source: Transport Data Centre, 1997, Household Travel Survey Data, Department of Transport.

<sup>1</sup> *Road Transport: Future Directions*, the study undertaken for the NSW Roads and Traffic Authority in 1991, found that if the existing trends of car use continued there would be significant environmental, operational and financial impacts 20 years hence.

## The need to manage travel demand

Forecast levels of travel demand in urban areas cannot be met by new and upgraded roads for private cars. The economic, social and environmental costs are too great<sup>1</sup>. Therefore, metropolitan, regional and transport plans and strategies are focusing on the need to manage travel demand by:

- influencing the location of urban development
- expanding public transport networks
- improving the quality of public transport services
- expanding cycle and pedestrian facilities and making them more attractive to use
- investigating strategies to encourage shifts in travel from the private car to other modes.

Application of these guidelines will support these principles.

## The role of land use planning

At all stages planning has a crucial role in providing transport choice and managing travel demand.

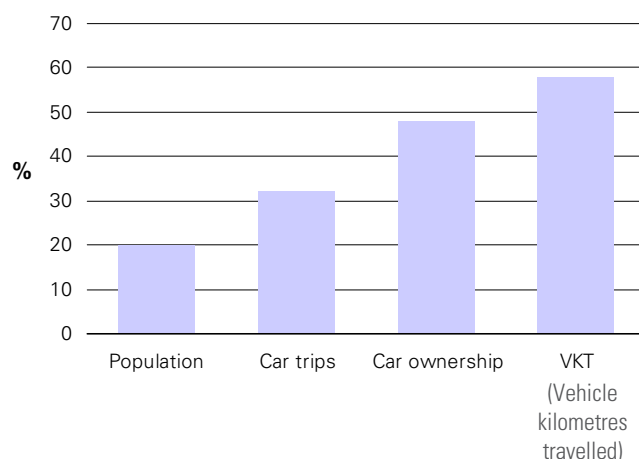
Planning can open up opportunities to use viable alternatives to the private car and improve transport choice. Conversely, planning can reduce transport choice and, as a consequence, encourage greater car reliance.

If urban development and change encourage car reliance, other measures to reduce car use and the environmental impact of transport will be less effective or be more expensive.

Planning and development must consider all relevant transport modes. Improving access by walking, cycling and public transport must receive equal consideration to, or greater consideration than, private car access.

Land use planning is only one important component of measures required to achieve transport objectives. Improvements to public transport services, and travel demand policies such as parking supply, are equally important. These measures need to be carefully considered when undertaking decision-making processes.

## Growth between 1981 and 1997, Sydney



*Guide to Traffic Generating Developments*, 1993, issued by the Roads and Traffic Authority (RTA), is another important technical tool. It is critical to heed the Guide's qualifications on its data before adapting numerical standards to the development situation. For example, the Guide advises users to reduce parking requirements based on unconstrained demand, when public transport is available. The Roads and Traffic Authority is currently reviewing this document.

## Key transport planning concepts

Some key concepts need to be understood when planning for transport choice. These concepts identify people's basic travel needs.

**Convenience** — the transport mode needs to be easy to find and use, and to transfer from one mode to another.

**Information** — reliable information at accessible locations is essential to encourage use of various travel alternatives.

**Proximity** — transport facilities and services, such as cycle paths and bus services, need to be in close, convenient and obvious locations to people's trip origins and destinations.

**Destination choice** — the more destinations that can be linked on a public transport route, the more attractive it will be.

**Directness** — routes should take the shortest and least deviating course, with priority to achieve fast travel times for walking, cycling and public transport (e.g. pedestrian links, dedicated bus lanes, and bikeways).

**Security** — the environment for walking and waiting needs to be comfortable and safe from personal attack or conflicts with traffic (e.g. waiting areas sheltered from the elements, natural surveillance, good lighting, bike lanes on major roads).

These concepts should be considered simultaneously in planning decisions. There may need to be trade-offs between, for example, directness and linking destinations. The preferred outcome will be the one that best contributes to reducing car dependency.

## Key resources

These guidelines have drawn on Australian and international best practice literature.

More detailed discussion, guidance and technical information are provided by:

- Commonwealth Department of Housing and Regional Development, 1995, *AMCORD* — A national resource document for residential development
- Austroads, 1998, *Cities for Tomorrow* — A Guide to Better Practice, Integrating Land Use, Transport and the Environment.

The Austroads publication provides a comprehensive suite of technical and policy tools to implement the principles outlined in Part 1. Therefore, specific page references are provided in Part 1 for each principle, under 'References'.



In some corridors and centres, there may be limited opportunities to improve public transport services to support higher densities of activity.

Councils, developers and consultants must liaise with public transport operators early in the planning process to identify land use, service and infrastructure improvement opportunities.

## **PART 1. ACCESSIBLE DEVELOPMENT PRINCIPLES**

**The planning principles explained in this part will encourage and support development that is highly accessible by walking, cycling and public transport<sup>2</sup>. They will also help moderate the demand for travel.**

- Principle 1. Concentrate in centres
- Principle 2. Mix uses in centres
- Principle 3. Align centres within corridors
- Principle 4. Link public transport with land use strategies
- Principle 5. Connect streets
- Principle 6. Improve pedestrian access
- Principle 7. Improve cycle access
- Principle 8. Manage parking supply
- Principle 9. Improve road management
- Principle 10. Implement good urban design

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<sup>2</sup> These principles are drawn from local experience, Australian and international policies, and examples of best practice found in references listed in the bibliography.

# PRINCIPLE 1. CONCENTRATE IN CENTRES

**Develop concentrated centres containing the highest appropriate densities of housing, employment, services and public facilities within an acceptable walking distance — 400 to 1000 metres — of major public transport nodes, such as railway stations and high frequency bus routes with at least a 15 minute frequency at peak times.**

## Background

When employment, housing, retail and leisure activities and services are concentrated in accessible centres, there is much more use of public transport than in areas where these facilities and activities are dispersed.

Within and close to these centres, people are more likely to walk or cycle for short trips and to use public transport for longer journeys. Concentrating activities lets people make a single trip for a range of purposes. Walking or public transport become more attractive options and reduce distances travelled by car.

## Best practice is achieved when:

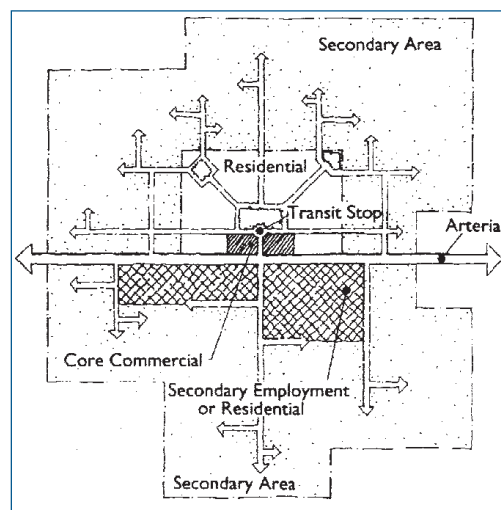
- highest appropriate densities of housing and employment are within walking distance of major public transport nodes
- the size of activity centres is consistent with existing or planned levels of public transport
- a mix of compatible uses is permitted, such as shops and restaurants, on the ground floor of residential or commercial buildings
- public transport can directly penetrate the core of centres and is highly visible to potential users
- shopping centres, and entertainment and recreational facilities, are encouraged to locate in activity centres that are within an acceptable walking distance of public transport nodes
- the travel needs of all age and social groups are considered.

## References

For more detail refer to *Cities for Tomorrow* (Austrroads, 1998):

- pp. 93–98 — Urban density
- pp. 99–104 — The right activity in the right location
- pp. 105–110 — A hierarchy of centres
- pp. 111–116 — Key regional and transit centres
- pp. 173–176 — Accessibility/activity zoning
- pp. 217–222 — Centres as precincts

See also: Queensland Department of Tourism, Small Business and Industry, 1996



Centres provide good access to activities, make public transport more viable, and maximise single multi-purpose trips.

Source: Center for Livable Communities — United States Local Government Commission, 1996

## PRINCIPLE 2. MIX USES IN CENTRES

**Encourage a mix of housing, employment, services, public facilities and other compatible land uses, in accessible centres.**

### Background

Activities need to be located to meet the needs of the economy and people's lifestyle choices. Compatible uses should be mixed vertically within the same building or horizontally on adjacent sites, and be within walking distance of each other. If a mix of uses is not appropriate, buildings can be designed for easy conversion to alternative uses in the future (e.g. warehouse to residential use or vice versa).

The co-location of many compatible uses will reduce car travel and increase walking, cycling and public transport use. Locally, traffic congestion will be reduced, air quality improved and accessibility maximised.

Vibrant centres will attract more business and employment, along with leisure, recreational and entertainment facilities. A wide range of uses will support the better provision of services, such as 24-hour public transport. Duplication can be avoided if, for example, one public transport service can cater to two markets, such as daytime commuters and people undertaking evening leisure pursuits.

### Best practice is achieved when:

- key land uses are located within walking distance of each other (e.g. shops, library, childcare centres, cinemas, bus/rail interchange)
- the highest densities of housing and employment appropriate to an area are located within walking distance of public transport nodes
- uses are mixed either vertically within the same building or horizontally on adjacent sites
- functional requirements, such as servicing, and impacts such as sound, odours and identity in the layout and design of horizontally and vertically mixed uses, are considered
- pedestrian and bicycle access is safe, direct and comfortable between uses
- plans and codes encourage home businesses and home workplaces.

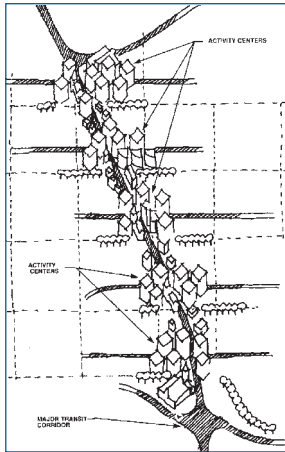
### References

For more detail refer to *Cities for Tomorrow* (Austroads, 1998):

- pp. 105–110 — A hierarchy of centres
- pp. 173–176 — Accessibility/activity zoning
- pp. 177–184 — Transit-friendly land use
- pp. 191–194 — Increasing choice in land use
- Urban Design Advisory Service 2000 *Mixed Use in Urban Centres Guidelines for Mixed Use Development*.

See also:  
Commonwealth Department of Transport and Regional Development, 1995

Queensland Department of Tourism, Small Business and Industry, 1996



A regional corridor containing mixed-use centres of activity is a highly efficient urban form.

Source: New Jersey Transit, 1994

## PRINCIPLE 3. ALIGN CENTRES WITHIN CORRIDORS

**Concentrate high density, mixed use, accessible centres along major public transport corridors within urban areas.**

### Background

Centres should include major and neighbourhood centres around railway and transitway stations and key bus stops. Major public transport corridors should include heavy and light rail links, transitways and trunk bus routes.

Ensuring that centres and other concentrations of activities locate along major public transport corridors will:

- support high frequency public transport services and further boost the effectiveness of centres and corridors
- encourage more origins and destinations within the corridors
- make transport services more attractive to operators and users.

### Best practice is achieved when:

- new centres are located along key transport corridors and existing centres in corridors are reinforced
- centre-type activities are prevented from dispersing to non-centre locations, away from transport nodes and corridors
- major investments in public transport infrastructure are supported by planning and implementing new urban development or redevelopment — this maximises the effectiveness and productivity of the infrastructure
- major public transport service initiatives, such as bus priority measures, are similarly supported
- the design of development above or adjacent to rail lines should address noise and vibration issues.

### References

For more detail refer to *Cities for Tomorrow* (Austroads, 1998):

- pp. 93–98 — Urban design
- pp. 105–110 — A hierarchy of centres
- pp. 111–116 — Key regional and transit centres
- pp. 117–124 — Public transport systems and land use
- pp. 177–184 — Transit-friendly land use

See also:  
Queensland Department of Tourism,  
Small Business and Industry, 1996

NSW Roads and Traffic Authority and  
Federal Office of Road Safety, 1999

‘Plans should aim to focus development around nodes and in corridors so as to maximise the use of rail. Research at Oxford Brookes University, and the Transport Corridor Study by Shropshire County Council in 1995, confirmed that three of the factors that will increase the proportion of journeys by rail are increased residential densities, proximity of homes to stations and frequency of rail services.’

Source: UK Department of Environment and Department of Transport, 1995



### **Parramatta sets the pace for land use and transport integration**

The Sydney regional environmental plan No. 28 for Parramatta — City at the Centre of Sydney, provides a comprehensive vision for the future of the Parramatta Primary Centre.

The Plan paves the way to eventually accommodate 90 000 jobs. Substantial improvements to the public transport network will help achieve a 60 percent modal split favouring public transport for the journey to work.

## **PRINCIPLE 4. LINK PUBLIC TRANSPORT WITH LAND USE STRATEGIES**

**Plan and implement public transport infrastructure and services in conjunction with land use strategies to maximise access along corridors, and to and from centres.**

### **Background**

Correct location and design of new transport infrastructure — road, rail, transitways, bus and other forms of transit, walkways and cycleways — should help achieve the goals of maximising transport choice and managing travel demand by minimising the need for, and distance of, travel. Planning for new infrastructure should be integrated into corridor and regional land use strategies. These will influence housing and employment location, densities and other factors that maximise the infrastructure catchment.

Similarly, planning for new public transport services, on new and existing infrastructure, should be closely aligned with land use planning, corridor development and new development projects. In particular, services should facilitate access to transport nodes and centres in major corridors.

### **Best practice is achieved when:**

- new and upgraded arterial and orbital roads are designed to provide for trunk public transport services between centres — this includes providing for stops and interchange with feeder services
- new public transport routes link two or more primary attractors — such as railway stations and town centres — with secondary attractors — such as schools, hospitals, post offices and leisure/entertainment centres — located along the route
- a mix of trip purposes at nodes or stops — such as shops, childcare centres, post offices and homes — provides two-way passenger loads on public transport services, maximising asset utilisation and reducing empty return trips
- priority is given to improving services to major centres containing employment opportunities and community facilities
- a balance is achieved between fast, direct services to major centres and frequent stopping services that provide local access
- bus stops are located to maximise the patronage catchment and to consider personal safety, lighting and traffic management
- innovative servicing strategies are provided, such as hail and ride/demand responsive bus services, which best meet local needs.

### **References**

For more detail refer to Cities for Tomorrow (Austroads, 1998):

- pp. 87–92 — Urban structure and form
- pp. 117–124 — Public transport systems and land use
- pp. 153–158 — Travel demand management
- pp. 177–184 — Transit-friendly land use

See also:  
UK Department of the Environment,  
Transport and the Regions, 1998

# PRINCIPLE 5. CONNECT STREETS

**Provide street networks with multiple and direct connections to public transport services and efficient access for buses.**

## Background

An interconnected street system provides pedestrians and cyclists with more direct and safer links to public transport stops and nodes. It is also more legible (i.e. more easily understood) permeable (i.e. allows for a choice of routes) and flexible, allowing for maximum choice of land use and future movement options. An interconnected street network is easier to provide with frequent bus services.

Conventional suburban development is often characterised by circuitous roads, many culs-de-sac and few footpaths. These require more 'dead running' for buses, are often too narrow, add to trip times, and increase walking distances.

More interconnected streets can be opened or closed over time to manage traffic, unlike a cul-de-sac that cannot be reconnected to the surrounding street network without considerable cost. A closed street in a connected street network provides the same level of safety for children and property as cul-de-sac. Bus-only links can be provided between neighbourhoods where through traffic is discouraged.

Care should be exercised in planning the number of access points to major arterial roads. Every access point reduces the efficiency of the arterial road and may adversely affect public transport operations on that road.

## Best practice is achieved when:

- the street, footpath and open space network provides multiple pedestrian and cycle routes, with connections to adjoining streets, open spaces, public transport stops and local activity centres
- the arterial and major collector road network is designed and engineered to accommodate public transport vehicles, as well as access to public transport stops for pedestrians and cyclists
- there is provision for efficient bus routes through neighbourhoods, which are direct and safely accessible by foot from dwellings and activity centres — 400 metres maximum walking distance for primary routes
- street design features ensure that driver behaviour is appropriate to the street's primary function and drivers recognise the needs of non-car modes
- street design features enhance their multiple functions as public places.

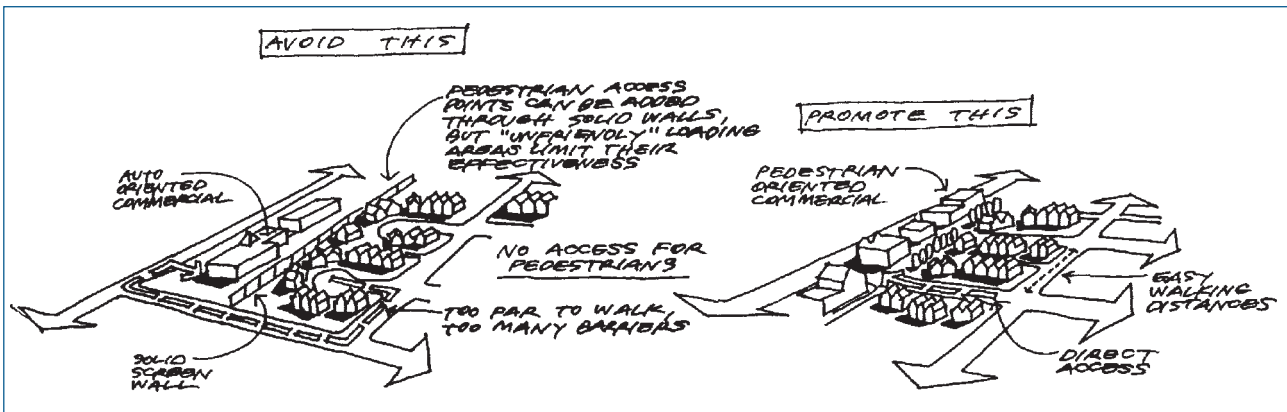
## References

For more detail refer to  
Cities for Tomorrow  
(Austroads, 1998):

- pp. 223–228 —  
Residential precincts
- pp. 315–318 —  
Maintaining community  
cohesion

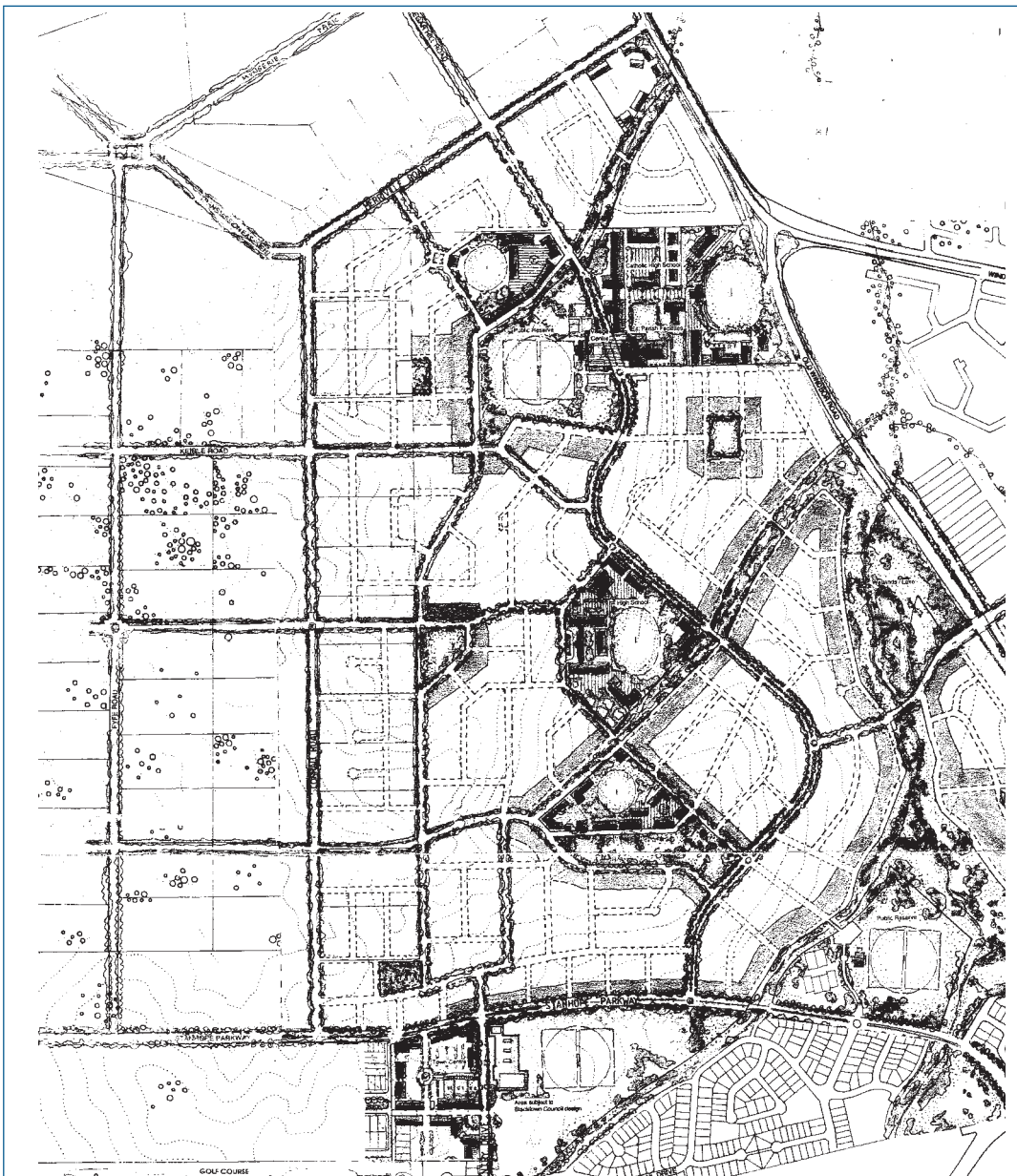
See also:  
Commonwealth Department of  
Transport and Regional Development  
et al., 1995

Western Australian Planning  
Commission, 1997a and b



Encouraging walking as a practical transport choice.

Source: The Planning Centre, 1993



This new residential estate in Western Sydney embodies many design features that will help improve street connections and provide greater transport choice for its residents.

Source: Landcom

### The 5 'C's for evaluating a pedestrian network

Is it:

- connected
- convenient
- comfortable
- convivial
- conspicuous?

Source: London Planning Advisory Committee, 1997

## PRINCIPLE 6. IMPROVE PEDESTRIAN ACCESS

**Provide walkable environments and give greater priority to access for pedestrians, including access for people with disabilities.**

### Background

Many trips people make are short and can be walked. Walking has the obvious advantage of being a cheap, efficient, clean and healthy mode of transport.

A walkable environment is very important in generating public transport, because all public transport users are pedestrians for some part of their journey. Walkable urban areas increase the potential catchment area for public transport services.

This principle requires attention to urban and traffic design details, such as street orientation of active uses to provide natural surveillance, footpaths, kerb ramps, signal timing, lighting, gradients, weather protection and shade, as well as other design features that improve safety, security, amenity and convenience.

### Best practice is achieved when:

- pedestrian audits of centres and public transport nodes are undertaken as part of a pedestrian plan, and provide the basis for a capital improvement program
- local street and footpath networks provide a choice of routes and are easily understood
- routes from houses to local facilities, such as shops, schools and bus stops, are direct and pleasant, avoiding steep slopes, and enjoying good lighting and natural surveillance from adjacent uses
- every development has convenient and prominent pedestrian entrances, in terms of design, signage, lighting and gradient
- expanses of ground level blank walls along street frontages, and large driveways and entrances to car parks, are avoided
- a feeling of security is assisted by buildings and active uses, such as cafes and front verandahs, being oriented to the street
- safety from traffic is provided by traffic calming and appropriate road crossing facilities — these should cater for all pedestrians, including older people, children and the mobility and vision impaired
- intersections on public transport routes are designed to facilitate vehicle movements and good pedestrian access
- pedestrian-only links are short, well lit and offer surveillance from adjacent uses
- pedestrian crossing distances in town centres and local streets are reduced through kerb extensions and tight turning radii, to slow traffic, while still allowing buses to turn slowly and easily
- footpaths are provided and maintained as a connected network
- footpaths have ramps at all kerb corners for wheelchairs and pram access, and tactile ground indicator tiles for vision impaired pedestrians
- street furniture is attractive but does not obstruct footpaths, and footpaths do not have blind spots and are of adequate width.

### References

For more detail refer to *Cities for Tomorrow* (Austroads, 1998):

- pp. 201–206 — Pedestrians and land use
- p. 219 Figure C-L9-4 — Categorisation of roads and streets according to user priority
- pp. 229–234 — Traffic calming
- pp. 235–237 — Safety
- pp. 241–244 — Visibility

See also:  
Commonwealth Department of Transport and Regional Development et al., 1995

Western Australian Planning Commission, 1997 a and b

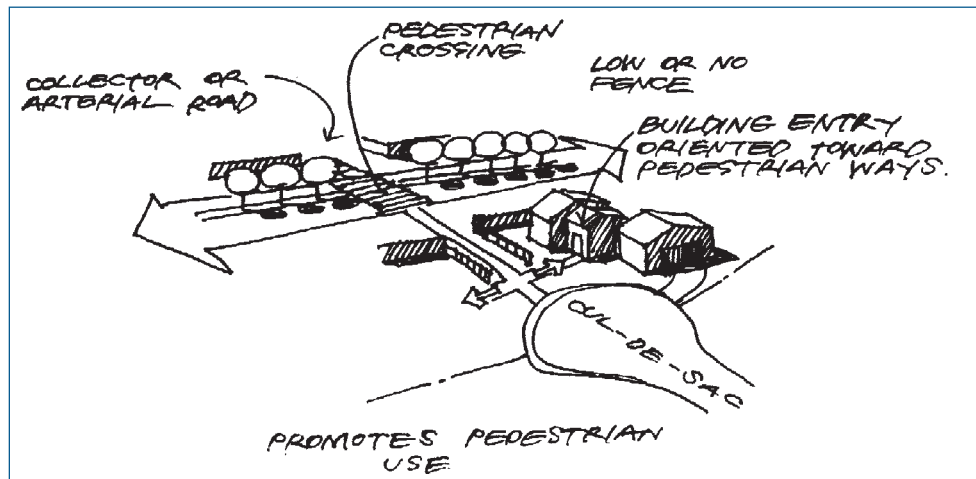
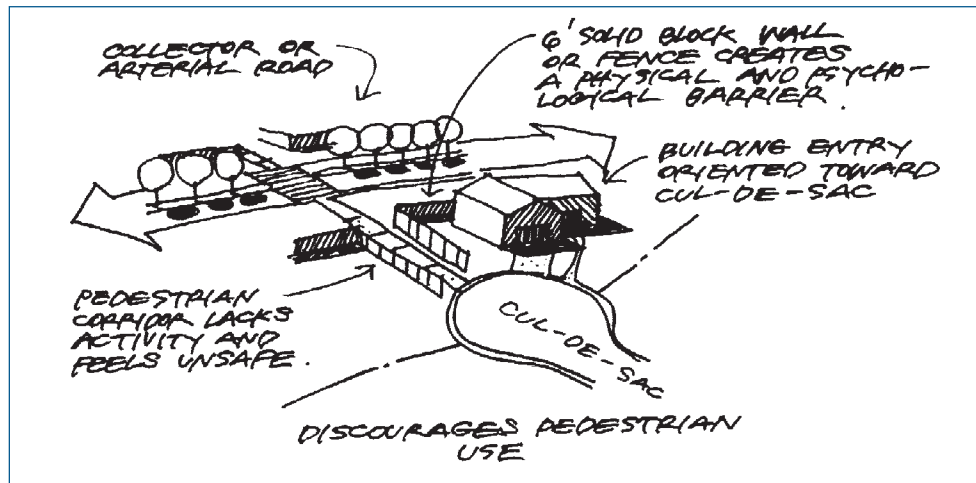
Australian Standard AS 1428.1, 1998, Parts 1–4

Australian Standard AS 1428.4, 1992

Austroads, 1995, Part 13 — Pedestrians

NSW Roads and Traffic Authority and Federal Office of Road Safety, 1993

Western Sydney Regional Organisation of Councils, 1999



Connecting streets means removing physical and psychological barriers to direct routes.

Source: The Planning Centre, 1993



An example of a walkway which discourages pedestrian use.



A more inviting and safer pedestrian connection.



# PRINCIPLE 7. IMPROVE CYCLE ACCESS

**Maximise cyclists' accessibility to centres, services, facilities and employment locations.**

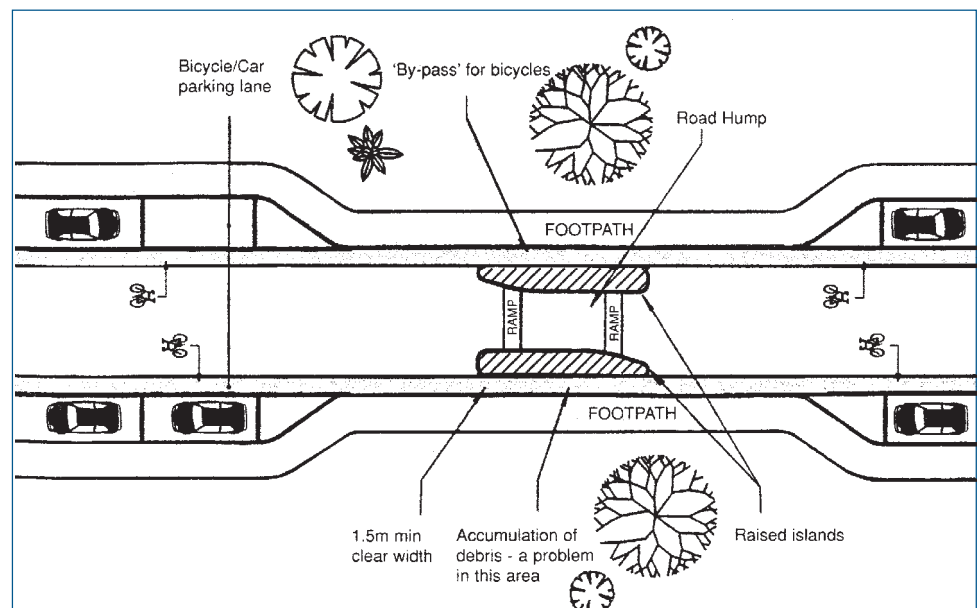
## Background

Cycling is a cheap, efficient, clean and healthy mode of transport. It is well-suited to trips of less than ten kilometres. If people are to be encouraged to use bicycles instead of cars, they need to be convinced that cycling is a reasonably safe, convenient and comfortable way to travel. This means providing an easy to follow and a direct network of roads/paths, spaces, lighting (where feasible), direction signs, and storage and other facilities at destinations.

Cycle networks may comprise recreational or commuter routes, with elements located on- and off-road, within a permeable street and road network. Safety is paramount, but different design treatments can apply to reflect the different functions of cycleways. The key concern is that on- and off-road components link into an easily understood network. Recreational cycle networks may not necessarily take direct routes, but certain sections may be incorporated into an overall system linking land uses.



Examples of components that make up a legible cycling network.



An example of a traffic calming measure that accommodates cyclists.

Source: Austroads, 1999

### Best practice is achieved when:

- bicycle plans are prepared, providing the basis for a capital improvement program
- bicycle plans are continually updated and considered in all planning and management processes and work programs
- bicycle plans are part of wider bicycle strategies comprising education and encouragement programs, targets and monitoring
- an established Austroads standard is upheld in the planning, design, location and construction of bicycle facilities, i.e. the cycle network, cycle parking in public spaces and end-of-trip facilities in private developments
- bicycle facilities are supported by car restraint measures, such as lower speed limits or traffic calming measures, and investigations for traffic management measures consider the requirements of cyclists
- suitable facilities including storage, shower and changing facilities are provided at work and other end-of-trip locations
- bicycle storage is conveniently located close to building entries and at ground level in multi-storey buildings
- separate bicycle lanes and paths are provided where it is considered unsafe for cyclists to share the road with motorised traffic
- regular consultation occurs with local bicycle groups and users
- the cycle network is continuous, is easily understood and allows for unimpeded travel from residences to common destinations, e.g. shopping centres, railway stations and major public transport stops, community facilities and parks
- cycle connections to the network are provided at frequent intervals, thus maximising directness of travel for long distance commuter trips and short local trips
- a cyclist is allocated an adequate operating space and any ambiguity about where the cyclist and other road/path users are situated on the road/path is reduced
- cycle crossings are an integral part of cycle routes, and intersection and crossing design favour cyclists' convenience and safety
- the cycle routes are overlooked from adjoining buildings, have clear lines of sight, are smooth and free of obstacles, make use of views and attractive sights, are well-lit at night time and signposted.

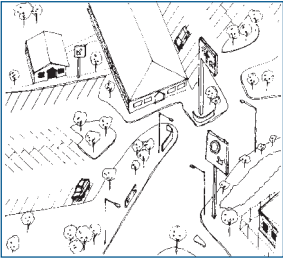
### References

For more detail refer to  
Cities for Tomorrow  
(Austroads, 1998):

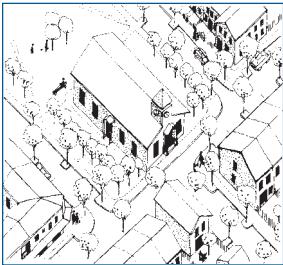
- pp. 195–200 —  
Cycling networks and  
land use
- p. 219 Figure C-L9-4 —  
Categorisation of roads  
and streets according  
to user priority
- pp. 229–234 —  
Traffic calming
- pp. 235–240 —  
Safety
- pp. 241–244 —  
Visibility

See also:  
Austroads, 1999, Part 14 — Guide to  
Traffic Engineering Practice —  
Bicycles

Australian Standards AS 2890.3.,  
1993, Bicycle Parking Facilities



Excessive parking creates car dependent environments.



Managed parking creates environments more conducive to transport choice.

Source: Allen Jack Cottier Architects for the Urban Design Advisory Service

## PRINCIPLE 8. MANAGE PARKING SUPPLY

**Use the location, supply and availability of parking to discourage car use.**

### Background

Prominent, plentiful, cheap and unrestricted parking encourages people to drive; public transport becomes a less attractive alternative.

Large parking areas are often unsightly and reduce amenity. They can be difficult or dangerous to cross on foot, and may impede access from public transport stops to destinations.

Control of parking is an effective tool in managing the demand for travel. Consideration needs to be given to:

- reducing parking requirements for development in areas with good public transport
- the location and design of parking areas.

### Best practice is achieved when:

- parking policies and codes are part of, and consistent with, broader transport and land use strategies and plans
- variable parking requirements and charges are applied, depending on public transport accessibility
- the type and number of parking spaces are appropriate to the land use, such as short stay parking for retail purposes; there should be no more than the minimum justified in the circumstances, especially for long stays and commuting
- parking requirements are reduced in concentrated activity centres with good public transport access
- shared parking is encouraged for land uses with staggered peak periods of demand (e.g. offices and restaurants)
- in activity centres, parking is placed at the rear of buildings or internal to the block
- parking for people with disabilities is provided adjacent to key facilities — it must be enforced
- vehicular access across footpaths to parking areas and entries to underground car parks do not reduce pedestrian accessibility or amenity, or reduce bus accessibility
- parking incentives, such as cheaper rates or reserved spaces, are provided for high occupancy vehicles, including car pools and community buses.

### References

For more detail refer to *Cities for Tomorrow* (Austroads, 1998):

- pp. 149–152 — Regional planning policies
- pp. 153–158 — Travel demand management
- pp. 159–164 — Commuter planning
- pp. 207–212 — Parking standards and management



# PRINCIPLE 9. IMPROVE ROAD MANAGEMENT

**Improve transport choice and promote an integrated transport approach by managing road traffic flow and priority of transport modes.**

## Background

Traffic management measures should help to establish clear priorities for access by different modes of transport. These priorities, and the requirements of pedestrians, cyclists and public transport users, should be part of an integrated approach to transport.

It may be appropriate to allocate road space for public transport modes at the expense of private cars. Priority measures, such as transit lanes, can improve the reliability and attractiveness of bus and taxi travel relative to private cars.

## Best practice is achieved when:

- integrated transport management plans are prepared for areas and centres
- transit lanes and bus priority measures such as bus lanes, bus-only links and 'B' signals, are provided to improve the reliability and attractiveness of bus and taxi travel
- traffic calming measures are used to slow traffic in residential and pedestrian environments
- traffic speed and volume reduction measures are compatible with the needs of other street users and adjoining dwellings, by avoiding:
  - devices that reduce directness, convenience, comfort and safety levels for cyclists, buses and pedestrians
  - stop/start conditions
  - increased vehicle emissions
  - unacceptable traffic noise
- through traffic is discouraged from the local road network without disadvantaging bus services or directness for pedestrians; bus-only links and priority measures, such as 'B' signals, can be used for this purpose.

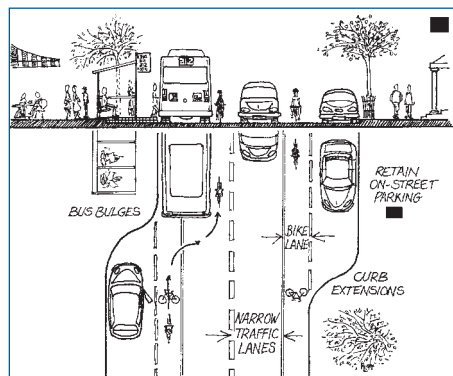
## References

For more detail refer to *Cities for Tomorrow* (Austroads, 1998):

- pp. 153–158 — Travel demand management
- pp. 229–234 — Traffic calming
- pp. 235–240 — Safety
- pp. 241–244 — Visibility

See also:  
NSW Department of Transport, 1992

NSW Roads and Traffic Authority and  
Federal Office of Road Safety, 1999



An example of actively managing the road in a commercial setting.

Source: Roseland M., 1998

# PRINCIPLE 10. IMPLEMENT GOOD URBAN DESIGN

**Design with an emphasis on the needs of pedestrians, cyclists and public transport users.**

## Background

The details of urban design matter when encouraging travel by foot, bicycle and public transport. These details — on the site, building and streetscape — can have a significant impact on actual and perceived personal safety. For example, buildings that are human scaled and oriented to the street with clear pedestrian entries provide natural surveillance, a sense of security for pedestrians, and visual interest.

## Best practice is achieved when:

- buildings and their pedestrian entrances are oriented to the street
- building setbacks are minimised to provide natural surveillance of footpaths, bus stops and taxi ranks, while still allowing sunlight access and minimising wind tunnel effects
- attractive streetscapes reinforce the functions of the street and enhance the amenity of adjacent development
- bus stops are located and designed to provide shelter, seats, adequate lighting, and timetable information; they provide access for people with disabilities, and are overlooked from nearby buildings
- footpaths, cycleways and taxi ranks are well-lit and located where there is natural surveillance from adjacent uses
- pedestrian amenity is enhanced by attractive, coordinated street furniture, lighting and signage
- the design of development in accessible centres, especially involving railway stations, addresses issues of potential conflicts, such as transport noise and vibration.

## References

For more detail refer to  
Cities for Tomorrow  
(Austroads, 1998):

- pp. 87–92 —  
Urban structure and form
- pp. 169–172 —  
Keeping options open
- pp. 177–184 —  
Transit friendly land use
- pp. 217–222 —  
Centres as precincts

See also:  
NSW Department of Housing, 1994

Urban Design Advisory Service et al.,  
1998

NSW State Transit Authority, 1999



## **PART 2. THE LAND USE PLANNING PROCESS**

**This part outlines how the ten development principles set out in Part 1 can be applied to the various aspects and levels of land use planning to help provide transport choice.**

Regional and urban policies and strategies, and major transport investment and service initiatives can be ineffective without supportive land use and design decisions at the local level. At the same time, good local and regional planning initiatives require long-term commitment at the broader level. An integrated approach generally provides the best outcome.

To improve transport choice and help achieve the government's objectives for the environment, equity and the economy, change is required at all levels and stages in the land use planning and development process.

Planning is undertaken within state, regional and local spheres, from broad to detailed stages, as follows:

- strategic policy and planning
- land use planning
- development codes and guides
- project design and assessment.

The guidelines are relevant to each of these stages. They should be used with existing planning documents and when preparing new documents.

## Strategic policy and planning

Strategic levels of planning use broad policies to achieve metropolitan or regional objectives. They provide frameworks to enable consistent decisions to be made at all levels of planning.

This level of planning may have a spatial focus, for example through area strategies, urban settlement strategies, transport corridor planning and urban redevelopment schemes. It may also comprise non-spatial documents, such as infrastructure and corporate plans.

Strategic approaches may be implemented through statutory instruments such as state environmental planning policies (SEPPs), regional environmental plans (REPs) and local environmental plans (LEPs)<sup>3</sup>.

State government policy and strategic planning incorporate the goals of managing travel demand and improving transport choice, and use the accessible development principles. *Shaping Our Cities, Action for Air* and *Action for Transport 2010* set the context for more detailed planning in the Greater Metropolitan Region.

## Structure and land use planning

Structure and land use plans generally identify preferred locations and criteria for the use and development of land, as well as the relationships between land uses and transport systems.

LEPs are the principal land use plans, although REPs and sometimes SEPPs can also serve this role. Land use zones and other development requirements can significantly influence travel behaviour. It is important that these are consistent with the broader context.

The planning and design of movement networks, including pedestrian, cycling and public transport, should be an integral part of this level of planning. Movement networks are particularly relevant in the assessment of an area's capability to accommodate new urban release areas and areas of urban redevelopment.

Studies of land capability and opportunity should consider accessibility as a major criterion for assessment, especially access by public transport. Consultation with public transport operators and cyclist, pedestrian and disability groups should commence in the early stages of plan preparation. An integrated transport management plan should be considered when preparing land use plans for larger areas or when transport issues are significant.

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<sup>3</sup> Made under the *Environmental Planning and Assessment Act 1979*.

## Linking design codes to zoning provisions

Councils have prepared area- or municipality-wide LEPs concurrently with DCPs which incorporate urban design codes. Place-based plans and codes are other mechanisms that deliver specific outcomes for a precinct or area across a range of council and other government functions.

Special zones or zoning overlays have been used in the USA and Canada to achieve public transport supportive development around key public transport nodes, centres and corridors — for example, Pedestrian Priority Zones (Edmonton, Alberta) and Station Area Zones (New Jersey).

## Development codes and guides

It is essential that development is well-located and designed appropriately.

Development control plans (DCPs)<sup>4</sup> and other codes or guides, describe the desired relationships between land use and transport to guide specific development proposals. DCPs are usually prepared by councils and are the preferred means to set detailed objectives, performance criteria and standards in a local context.

A good DCP can guide development at an early stage and ensure that transport considerations are well-integrated into project design. This may be achieved by area or site specific plans. In other cases, DCPs may be issues-based and apply important transport matters, such as parking requirements, to a range of development.

## Project design and assessment

Good development is well-designed from the outset and is based on clear and consistent policies, plans and guidelines.

Project design and the specific development proposal are the ultimate means of defining how the proposed land uses and transport will actually work on the ground. These are sometimes part of a larger development process, such as master plans, capital works programs, and local area traffic management schemes.

Specific proposals are usually defined in development applications (DAs), whether for state significant, local or integrated development, or as exempt or complying development identified in LEPs and other planning instruments.

In assessing proposals, significant issues for consent and referral authorities should include the likely trips and modes of travel generated by a proposal, and measures to increase access by public transport, walking and cycling in favour of car use. Accordingly, DAs and proposals need to be accompanied by sufficient information for councils or other consent authorities to make informed decisions on the likely transport outcomes.

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<sup>4</sup> Made under the *Environmental Planning and Assessment Act 1979*.



## **PART 3. LOCATION AND DESIGN GUIDELINES**

**This part applies the ten development principles set out in Part 1 to specific land use types or urban areas and precincts. Each section contains best practice location and design principles that can be used as checklists.**

### **The right location**

Major benefits can arise from choosing the most appropriate location for new development that will reduce car dependence and increase transport choice. The right location is relevant to:

- planning the spatial distribution of land uses
- assessing the appropriateness of the location of a specific development proposal
- setting priorities for the development or redevelopment of land.

Compatible land uses should be located together to reduce trip lengths, provide viable transport choice, and encourage walking and cycling between activities. In particular, the location, mix and density of higher trip-generating developments should match the accessibility of the area and the ability to manage travel demand (see Part 4).

As a general principle, decisions concerning the location of land uses, for example, in an LEP, should:

- represent a practical fit between the needs of a land use and the need to improve transport choice
- support a strong pattern of centres and transport corridors
- minimise the need for and distance of travel.

## Good design

Good urban design can improve the attractiveness of more sustainable alternatives to the car by providing a safe, comfortable and pleasant physical environment.

Good design should complement good location to improve accessibility, particularly by public transport, walking and cycling. For example, high density office employment may be located within a short walking distance of a railway station. However, if the pedestrian environment between the two is not human-scaled, lacks 'eyes on the street' from adjacent activities and has narrow, poorly lit footpaths, walking between work and the station is discouraged.

## Location and design guidelines

The following location and design guidelines are outlined for a range of land use types or urban areas/precincts, including:

- centres
- commercial
- retail
- entertainment and leisure
- health and education
- housing
- industrial
- public transport nodes.

The advice is not exhaustive and planners and designers should consider the specific characteristics of any site, area or proposal in light of the accessible development principles and best practice examples set out in Part 1.







Mixed use centres accommodate a range of land uses with higher densities that provide a natural focus for community facilities, including parks and health and educational establishments, and public transport infrastructure.

Source: Western Australian Planning Commission, 1997b

## CENTRES

### Location

Centres with a mix of land uses are well established in existing urban areas but their success relies on continued investment. Investment confidence must be cultivated through consistent decision-making that supports centres. This approach enjoys widespread appreciation by the community and business sectors.

Retail, intensive entertainment and other commercial development should be located in town centres, preferably with high frequency rail or bus services. The scale and density of development should match centre public transport service levels. Similarly, the trade area of services, including retail, should match the reach of the public transport network.

Where a new centre is planned, the catchment of its likely functions should be considered, and there should be a focus on locations with high frequency rail or bus services. When an existing or planned railway line or transitway is not available, good locations include areas that satisfy a majority of the following criteria:

- where two or more frequent existing or potential bus routes converge
- good access to the arterial and collector road network
- adjacent to existing or planned large employment or retail facilities
- adjacent to high density residential development
- the potential to be intensified with more higher density mixed use development over time.

### Design

Good design plays an important role in maintaining and improving the quality and attractiveness of centres, particularly for creating safer environments. Development design in centres should ensure optimum pedestrian conditions and flow between different functions and retail outlets.

For detailed urban design guidance on mixing uses in urban centres, refer to guidelines produced by the Urban Design Advisory Service of DUAP.



# COMMERCIAL

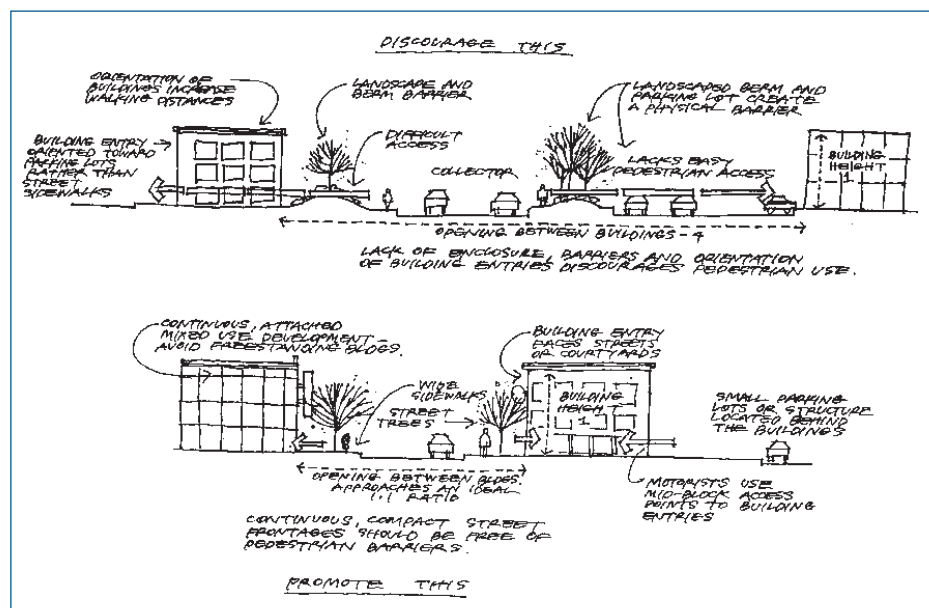
## Location

Commercial activity generates a lot of transport demand through the travel of clients, customers, service providers and employees. The collocation of these in accessible centres, or higher density corridors, provides transport advantages. Trips are focused to areas with public transport infrastructure, making public transport services more viable and maximising the potential for multi-purpose trips.

- Land uses with a high density of employment, such as offices, should be concentrated in centres that are accessible by high frequency rail or trunk bus services. Low density office parks are typically car dependent and difficult to service with viable and frequent public transport services. They should be discouraged unless measures are committed to significantly improve transport choice
- The scale and density of development should match accessibility levels. For example, high rise offices should be located in larger centres with good links to the regional public transport network
- Smaller businesses with more localised markets should be clustered in or adjoining lower order centres with relatively frequent bus services, retailing and higher density housing.

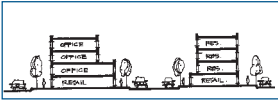
## Design

- Commercial buildings should be orientated to the street, rather than to car parks
- A vehicle and pedestrian address or front door to developments should be provided, preferably at or near the street boundary
- Car access and movement between buildings and the street should not create pedestrian barriers or be given priority
- Many of the design principles that apply to retail uses are also appropriate to the design of commercial developments and precincts.



Direct pedestrian access to and between commercial buildings is the key to providing environments more supportive of alternatives to the car for travel.

Source: The Planning Centre, 1993



Retailing provides a good opportunity to vertically mix uses in appropriate locations.

Source: American Planning Association, 1996

# RETAIL

## Location

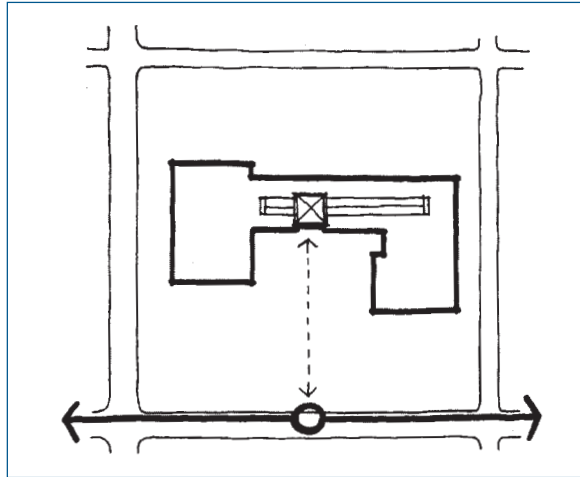
Retailing forms the foundation of most centres and ensures their continued viability and vitality. It is also one of the main generators of travel. It is crucial to have well-located retail areas.

- Retail functions should be ideally located in a network of attractive and vibrant, mixed use centres of all sizes and functions, and closely aligned with the public transport system. A vibrant centre protects and maximises the use of community investment, encourages continued private and public investment in the centre, and fosters growth, competition, innovation and further investment confidence
- Dispersed, isolated retail locations should be avoided because they are car dependent and incur significant community and environmental costs
- Retail format alone (e.g. bulky goods, big box) should not be a justification for an isolated location
- Integration of retail functions encourages single multi-purpose trips, particularly when pedestrians can move freely within a centre
- Any retail location on main roads, which would afford high exposure, should not compromise the best use of the road and public transport infrastructure.

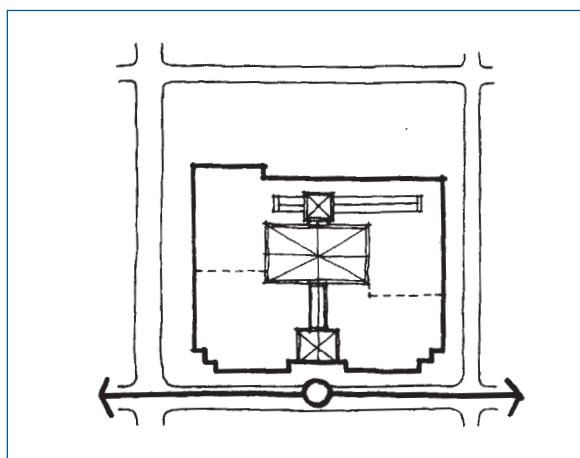
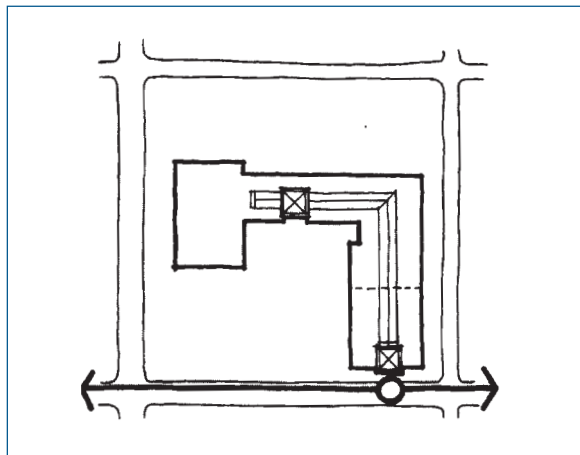
## Design

- Access by all transport modes should be encouraged. The configuration of shops and other services must seek a balance between pedestrian, cyclist and driver comfort, visibility and accessibility. Shopping centres and malls, entertainment complexes and personal services offices should be designed to allow direct and convenient access by walking, cycling and public transport and provide access for people with disabilities
- Public transport and taxis should have direct access to retail areas. When retail or entertainment facilities are set back from the street, buses and taxis should be easily and directly rerouted through the facility with a sheltered stop at their front entrance. Bus stops and taxi ranks on the far side of large car parks should be avoided
- As redevelopment occurs over time, retail complexes should be joined more directly with street frontages and bus stops
- Clear signage should direct patrons to public transport stops, taxi ranks and pedestrian links to adjacent uses. Public transport operators should provide timetable information, ranging from display cases to visual displays with touch/voice access
- To encourage access by public transport, retail and other commercial and community facilities located in centres with high frequency rail services should be developed with reduced or shared parking
- These location and design guidelines can be equally applied to bulky goods outlets. The need for extensive same-level parking areas for loading bulky goods is often exaggerated and little different from other retail outlets.

## Modifying existing car-orientated development



The traditional layout for shopping centres and other facilities that emerged with growing car ownership simply reinforced car use over other modes.



These old designs can be modified over time to first gain an entrance fronting the street and then undertake greater intensification, especially adjoining a public transport route.

Source: Ontario Ministry of Transportation and Ministry of Municipal Affairs, 1992

# ENTERTAINMENT AND LEISURE

## Location

Entertainment and leisure facilities share social and commercial characteristics with retailing and other centre-based activities. Cinema facilities, in particular, generate significant transport demand. The trend to locate these facilities in or near retail centres encourages multipurpose trips, reducing overall travel demand.

- Wherever possible, entertainment and leisure facilities should collocate with other uses in accessible centres. Locating cinemas within shopping centres shares parking. However, other locations within mixed use centres are also suitable and allow for competition
- Unless exceptional circumstances prevail, cinema-based entertainment facilities should not be located on freestanding sites
- Where centre locations are not feasible for lower density leisure activities, such as sports facilities, access by public transport, walking and cycling should still be provided because of their high use by younger people without cars
- The co-location of lower intensity leisure facilities with complementary land uses such as schools and other educational institutions, can justify increased frequencies for public transport services.

## Design

See principles under Centres, Commercial and Retail.



# HEALTH AND EDUCATION

## Location

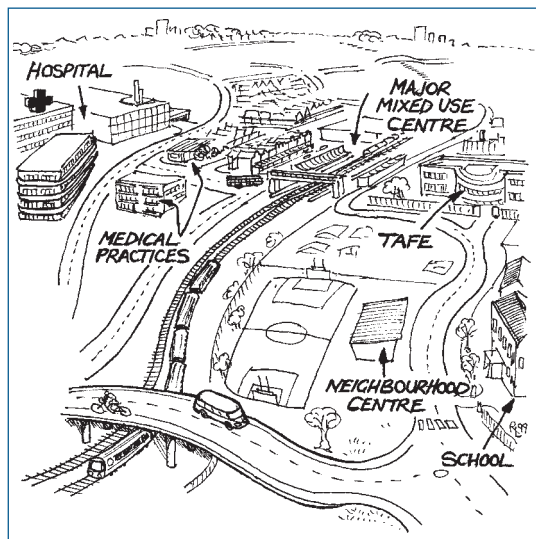
Equitable access to health and educational facilities depends on their location. The increasing predominance of part-time work and study means that careful location of these services can improve their accessibility and mean lower transport costs for users. Collocation of facilities in or adjoining centres appropriate to their catchment, is advisable.

The large land requirements of regional hospitals do not often permit central locations.

- Major hospitals should locate as close as possible to regional centres with a railway station or similar mass transit node, on public transport corridors servicing those centres from more than one direction
- Public transport services can be created or made more viable by the location of medical specialist facilities, which often adjoin major hospitals
- Smaller medical facilities should be clustered along streets containing public transport routes rather than in locations that are only accessible by car
- Where major hospitals are accessible to the public transport network and capable of achieving a reasonable mode share to public transport, opportunities for associated retail and personal services development may be appropriate. Where major hospitals are less accessible, the proposed development should show a net community benefit.

Large university campuses have similar land needs to major hospitals, and their location should follow similar criteria.

- Large educational institutions such as TAFEs or smaller university campuses should co-locate with other uses in or adjoining centres with a railway station or similar mass transit node, accessible by bus services from the catchment which are served by the institution
- Schools should locate as near as possible to neighbourhood and community centres connected to pedestrian, bicycle and public transport networks.



Practical arrangements for health and educational facilities can support greater transport choice.



## Design

Special uses, such as housing for older people, schools, colleges, hospitals and community centres, are used by a high proportion of public transport dependent people, some of whom have restricted mobility or disabilities.

- Safe, level and direct pedestrian paths to nearby bus stops, shops and other facilities should link these services
- In the siting and design of schools and hospitals, it is important to balance the need for close proximity to public transport routes with the need to avoid disturbance from noise or vibration and to optimise road safety. This requires careful consideration of the street and road network
- Sufficient off-street space should be provided for the movement of all transport modes — cars, taxis, bicycles, pedestrians, service and emergency vehicles and buses. Safe pick up/set down areas away from major roads should be provided for new facilities
- Where good public transport services are available, consideration should be given to constraining parking provision for staff. However, the parking needs of night workers should be taken into account
- School buses should have an exclusive loading/unloading zone, separate from all other vehicles. There should be adequate manoeuvring space, and pick up and drop off should be on the same side of the road as the school
- Safe 'kiss and ride' space should be provided at schools, so that bus stops, pedestrian crossings and unsafe driveways are not used
- Footpaths should be provided and maintained along nearby streets and within the educational or health facility site
- Good bicycle storage facilities should be provided, or shared with other uses.



The proximity of Westmead Hospital to the railway station makes the station one of the busiest nodes on the Sydney rail network.

# HOUSING

## Location

The proximity of housing to transport services is an important determinant in improving transport choice and managing travel demand in urban areas. In general:

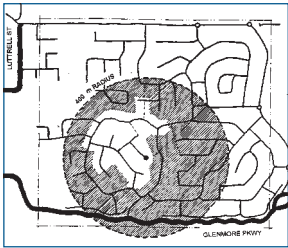
- households should be within an 800–1000 metres walk of an existing or programmed metropolitan railway station or equivalent mass transit node, served at least every 15 minutes, or within a 400 metre walk of a bus route, accessing a metropolitan railway station, or equivalent mass transit node, served at least every 20–30 minutes — in denser urban areas with higher frequency services, the walking catchment may be 600–800 metres
- the highest appropriate housing densities should be located close to major public transport stops and corridors, such as railway stations and high frequency bus routes
- higher density housing should be encouraged to mix in centres with offices, services and retail developments.

New residential areas should:

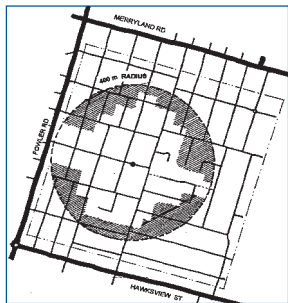
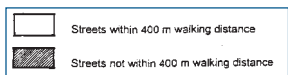
- adjoin or be within the existing urban footprint or located on new public transport corridors — pockets of development should not be isolated, except in the short-term — this includes staged release areas
- be substantially within five kilometres of an existing or programmed railway station or equivalent mass transit node, such as a transitway stop, served at least every 15 minutes in the peak hour, and conform to the accessibility criteria outlined above.

## Design

- In residential areas a mix of housing types is desirable with higher densities focused on centres and along public transport routes
- A minimum gross neighbourhood residential density of 15 dwellings per hectare needs to be achieved to support reasonable bus services, that is, 15-minute frequencies. Much higher densities — in conjunction with other transport policies — are desirable to support transitway, light rail and heavy rail services and achieve significant shifts to non-car modes
- Development should be staged in a contiguous manner and with adequate roads and footpaths to make the early provision of bus services feasible. Councils should work closely with local bus operators at the planning stage for new development, to provide services as soon as possible after the first residents move in
- In new residential subdivisions, at least two entrances to the major road network should ideally be provided to avoid circuitous bus routing. They should also aim to have over 95 percent of dwellings within a 400-metre safe walk from an existing or potential bus route, and not more than 500 metres from the nearest or nearest potential bus stop
- Neighbourhood employment opportunities, such as home offices and teleworking, should be encouraged by zoning, for example, and by the provision of additional phone lines to all new dwellings.



The limited walking catchment of a site in Glenmore Park, near Penrith — a residential subdivision design of the 1980s.



A more traditional road layout provides a much larger walking catchment in the residential area created in Merrylands in the 1940s.

Source: Stapleton, 1998



- Direct and safe pedestrian and cycle connections should be provided to schools, shops and public transport destinations, such as bus stops, through interconnected street networks or pedestrian and cycle links. Footpaths should be adequately lit on at least one side of the street. Provision of shared pedestrian/cycle paths should be encouraged on major travel desire lines, particularly to schools and shops
- Building setbacks should be minimised to provide 'eyes on the street', especially on footpaths and at bus stops, while still providing privacy for occupants
- In multi-unit buildings, entrances should be oriented to the street. Front porches, bays and balconies should be encouraged.



# INDUSTRIAL

## Location

Low density employment areas, such as industrial areas, are difficult to service with viable public transport primarily because of their fringe locations and because of the changing nature of work practices. Urban fringe locations increase trip lengths for couriers, deliveries and work-based travel.

Low density employment areas should be used only for industries that have legitimate needs for land, freight movement and separation from other land uses. Otherwise, these areas should be avoided for other forms of employment.

- Industrial zones in urban fringe locations are suitable for businesses with significant freight movements and low employment density
- Some smaller, modern, light industrial uses are compatible with a mix of uses in lower order centres
- Employment locations should be provided with improved transport choice for employees and customers through, for example, improved footpath links and the provision of company operated shuttle buses between workplaces, centres and public transport nodes
- NSW government policy allows for land use flexibility in industrial zones to reflect the changing nature of employment, but emphasises the need to manage travel demand, particularly to aid economic productivity.

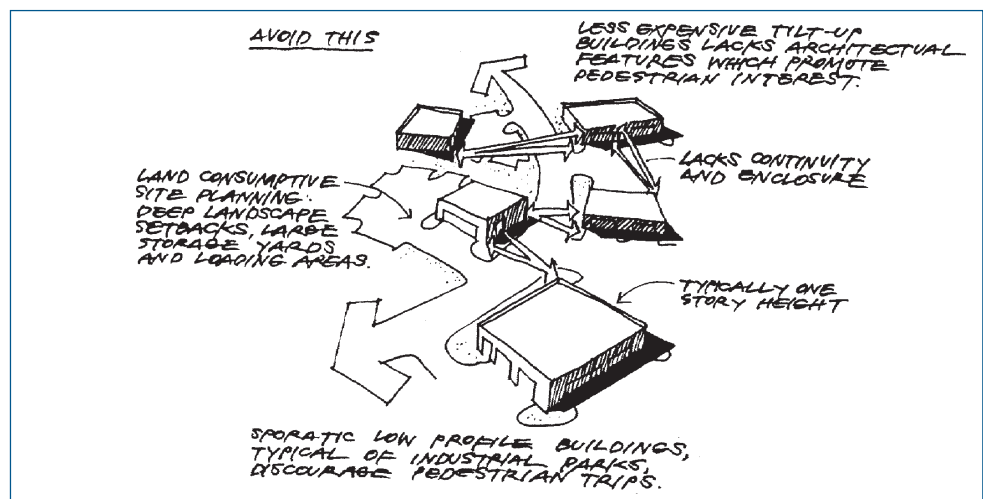
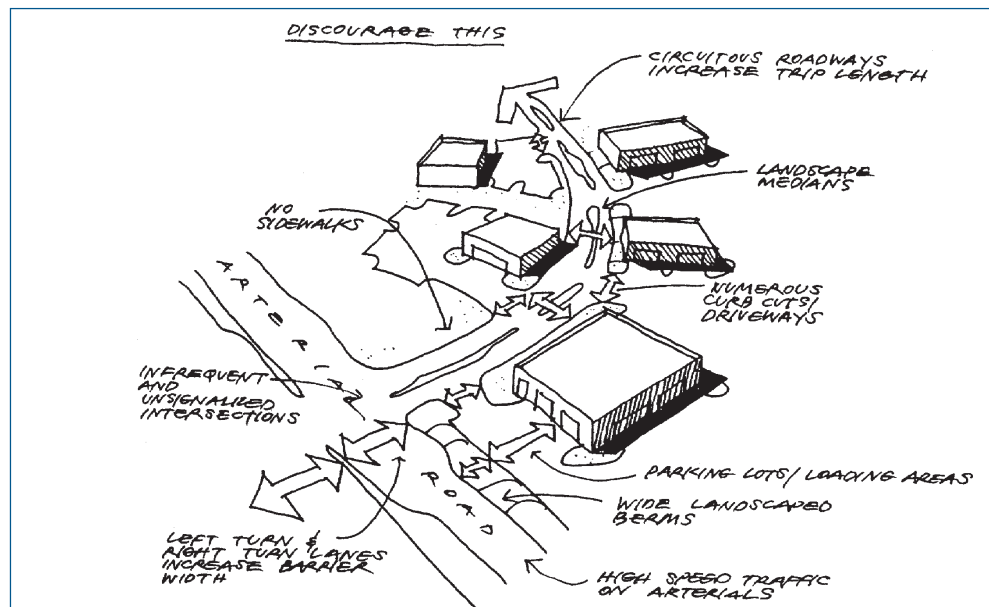
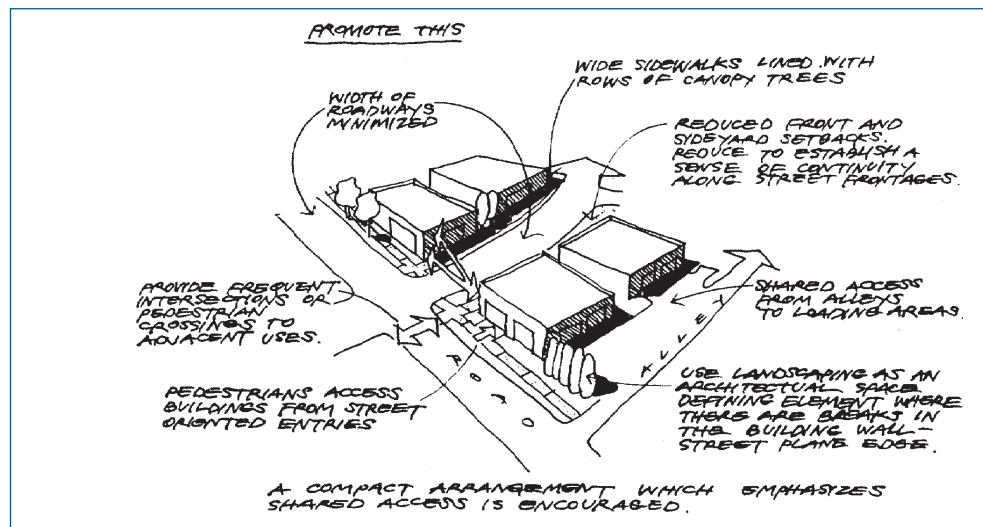
## Design

Large industrial districts and business parks, especially on the urban fringe, are very car dependent. Development densities are low, blocks are large, buildings are set far back from the street and walking distances from public transport routes to the interior of the area can discourage public transport use. The following principles will help improve transport choice for workers and visitors.

- Street networks should allow permeability for buses and pedestrians
- Pedestrian amenity, such as footpaths to bus stops and sandwich shops, should be given a higher priority in employment/industrial areas
- Direct and safe pedestrian links should be provided to surrounding areas and to bus stops with all weather shelters
- Central places with shops, bus stops, banks and other service facilities should be encouraged or reinforced in employment/industrial areas, to enable workers to link trips and walk to local facilities. Such central places could also become central taxi or car pool collection areas
- Intensification and a greater mix of uses, including residential development, should be encouraged along the public transport routes and corridors that serve these areas to support more frequent bus services
- Minimum setbacks from the street and between adjoining buildings should be employed. Room to expand, and staff and visitor parking, can be accommodated at the rear of properties.

The principles employed to help provide transport choice still work well in low density employment areas.

Source: The Planning Centre, 1993



Approaches such as these to the layout of low density employment areas will make effective transport choice almost impossible.

Source: The Planning Centre, 1993



Under the requirements of the Commonwealth's Disability Discrimination Act, all new construction of public transport facilities must provide access for people with disabilities. Draft Accessible Public Transport Disability Standards have been formulated and are awaiting ratification by the federal government. Other standards, particularly AS 1428.1 Design for Access and Mobility, have been incorporated into the Building Code of Australia.

## PUBLIC TRANSPORT NODES

### Location

Public transport nodes include bus and light rail stops, ferry wharves, bus/rail interchanges, railway and transitway stations and taxi ranks.

These nodes should be located to maximise their walking catchment and access by other modes, such as bus, car and bicycle. Major nodes, such as railway stations, will usually be located in centres and can be the focus for the intensification of land uses to take advantage of their high accessibility. Others should seek locations with complementary land uses (e.g. bus stop and corner shop).

In all cases, the location of public transport nodes should be planned in consultation with the relevant service providers and in sympathy with existing and potential land uses.

### Design

In general, public transport nodes/stops should be designed and managed to provide the following:

- good pedestrian access from surrounding areas, including direct, safe and well-lit street connections or pedestrian links, safe pedestrian crossings and clear lines of sight to the stop
- safe, well-lit and comfortable waiting areas with shelter and information on available services
- direct and convenient connections from the footpath to the shelter/waiting area and from the shelter/waiting area to the doors of the public transport vehicle, and vice versa
- clear identification of the public transport nodes and access points by attractive design and signage
- access for all users, including appropriate provision for people with disabilities — for example, ramps, kerb heights, and lifts at stations, tactile tiling and illuminated signage — and other users, such as bicycle storage for cyclists and pram and kerb ramps for people with strollers
- bus stops with adequate lighting and shelter as well as public telephones and passive security, such as that provided by proximity to shops and mixed businesses
- proximity to commercial and community facilities at major nodes, such as cafes and cinemas, to improve after hours activity and visibility and safety for public transport users
- well-managed precincts around such nodes to optimise amenity and safety
- integration of major nodes with retail and commercial development to form a mixed use precinct.

## Interchanges

Interchange between modes (e.g. bus/rail) requires careful design. Multi-modal interchanges should be provided at key railway stations and ferry wharves and at certain district or subregional centres for bus to bus transfers. Interchanges should provide:

- safe, direct and convenient transfers between modes
- priority for pedestrians followed by cyclists, public transport users, taxis and cars — pedestrians are separated from vehicular movements as much as possible without compromising pedestrian access to facilities
- clearly marked entrances and exits
- signposted walkways to public transport and surrounding development
- waiting space and shelter, cafes, shops and telephones, access to toilets and baby change facilities
- well-maintained information on services and timetables
- secure bicycle lockers, where appropriate.



## Commuter car parks

Commuter car parks should be located at major public transport nodes or centres in locations where they do not contribute to traffic congestion and loss of pedestrian amenity. They should be located at key railway stations and at major bus/light rail stops on trunk routes, which have high frequencies and express services. The following design principles apply to commuter car parks.

- The commuter car park should be easily visible, well-signed from the main approach roads and designed to minimise its visual impact, especially if it is multistorey
- Good security for parked vehicles should be provided through appropriate lighting and video camera surveillance, where appropriate
- Safe, well-lit and direct pedestrian links should be provided. There should be no more than 400 metres between the car park and railway station
- Secure bicycle lockers should also be provided in conjunction with commuter car parks.



## Railway and transitway station precincts

Railway and transitway station precincts are important gateways to the public transport system and to local communities. They offer significant opportunities for pedestrian- and public transport-friendly development, which can help local economic vitality and reduce car trips.

Consultation with public transport operators and local businesses is essential to improve these precincts for the travelling public. The design principles provided below can also be applied, to a lesser extent, to major bus stops, ferry wharves and interchanges<sup>5</sup>.

### Provide a sense of arrival, order and orientation within the precinct

- Reinforce sight lines to and from the station to orient the traveller. Where appropriate, buildings, trees, signs or fences should not block the view to key buildings and facilities. Redevelopment plans should consider the opportunity to create new building patterns that open up view corridors
- Clear signage and information maps, informing the traveller where they are in the public transport network and orienting them to activities in the surrounding precinct, should also be provided. Consider the information requirements of people from non-English speaking backgrounds
- Create safe and direct pedestrian links to and from the station
- Street names should be clearly marked.

### Provide a safe and secure environment within the precinct

Personal safety is a major concern for the travelling public, especially women.

- Under the requirements of the Commonwealth's Disability Discrimination Act, all new construction of public transport facilities must provide access for people with disabilities. Draft Accessible Public Transport Disability Standards have been formulated and are awaiting ratification by the federal government. Other standards, particularly AS 1428.1 Design for Access and Mobility, have been incorporated into the Building Code of Australia
- Provide natural surveillance through active frontages of buildings to provide a sense of personal safety. Encourage adjacent uses to orient to the street, with large windows or street displays and seating. Encourage uses that operate after hours, such as cafes and cinemas
- Provide direct and unobstructed views to major destination points through the precinct, if possible
- Provide appropriate lighting, which does not create deep shadows
- Provide clear and direct links from the station to the surrounding street network
- Choose plantings and street furniture that do not create secluded and visually separated areas
- Encourage a police presence, especially during off-peak hours
- Obtain police safety audits of new and existing development in the precinct.

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<sup>5</sup> These principles are largely drawn from New Jersey Transit, 1994

### Provide an attractive and well-maintained precinct

- Clarify responsibilities for the maintenance of various parts of the station precinct.
- Maintain all public areas within the vicinity of the station, using a scheduled maintenance program. Involve all relevant agencies.
- Encourage station precinct upgrading and maintenance through cooperation of public transport operators and local businesses. Chambers of commerce and main street groups can be important sources of support.
- Actively manage commercial areas in the precinct to maximise profitability and provide an attractive and safe environment for pedestrians.

### Provide information about public transport services

Transport information should be located and designed for the first time user.

Include:

- system maps of railway lines, transitways and services
- guidance through the elements of the station/interchange, such as the location of station entrances, bus stands, directional information
- network information (where buses go, at what times) relevant to destinations — how close can passengers get to their ultimate destination, mode changes or transfers required
- route identification and timetables — departure times, bus route numbers, platform numbers — and fare information
- performance information, such as real time information on the next train
- advice on access to infrastructure and conveyances for people with disabilities
- appropriate information for people from non-English speaking backgrounds.

Regular maintenance and updating of information is critical to its useability and hence access to the public transport system.







## **PART 4. PRACTICE ISSUES AND INITIATIVES**

**Effective planning for transport choice requires a comprehensive approach and involves all stages of the planning and infrastructure design process. The optimum outcome is urban development that moderates the demand for travel and improves access by more sustainable modes than the car.**

This part outlines some of the contemporary issues, actions and methods being used to implement the principles, and achieve the outcomes discussed in the earlier parts. These include:

Coordination and consultation

Planning by accessibility

Parking policies and codes

Pedestrian and bicycle plans

Street and road design standards

Section 94 contribution plans



## COORDINATION AND CONSULTATION

Planning for better transport choice requires a coordinated approach, so clear objectives are set and actions are identified at state and local levels of government or jointly, where appropriate, through consultation and liaison with key stakeholders. A comprehensive program of effective consultation should be worked out early in this process.

Consultation with public transport operators, such as bus companies, CityRail, State Transit and community transport organisations, is essential at all stages of the planning process. This includes the preparation of LEPs and the assessment of major subdivision and site specific proposals. In addition, expert advice should be sought from local cyclist, pedestrian and disability groups, where relevant. This consultation can be done without unnecessary delay and cost.

The other significant form of consultation is with the broader community. For example, increasing the density of development around railway and transitway stations is likely to generate community debate. This should be focused on livability and density so that the benefits of improved accessibility at the local and regional levels can be addressed.

A comprehensive program of effective consultation should be worked out early. The Roads and Traffic Authority, for example, requires community involvement plans as a first step of consultation programs for projects they fund.

### Car to public transport ratio

London suburban centre 1.2:1

Town centre core 2.5:1

Edge of town centre 3:1

Edge of town 4:1

Out of town 6:1

The findings show that the relative attraction of public transport is higher within centres or closer to town. It also demonstrates that concentrating development within centres well-served by public transport will encourage use of these more sustainable modes.

## PLANNING BY ACCESSIBILITY

Accessibility is the ability to carry out a range of daily activities with a minimum of travel — work, shopping, education, worship and recreation, for example, Accessibility planning emphasises demand management. It seeks to manage physical space and resources to avoid or minimise motorised travel and encourage travel on environmentally sustainable modes, such as public transport, walking and cycling.

A good understanding of the subregional and local transport network and capacity and patterns of movement by all travel modes is an essential first step in planning for transport choice and implementing demand management. In particular, the subregional network of designated public transport corridors with high service frequencies, 10–20 minutes apart, needs to be identified. In the Greater Sydney Metropolitan Region, this will mainly be the rail, trunk bus and ferry network. In regional cities, local and intercentre services need to be considered.

Councils should create and promote opportunities for higher density land uses that can maximise their proximity to public transport and correspond to the level of service provided along these corridors.

An assessment of accessibility levels in an area, and how these might change over time, is a valuable tool in planning for new development and encouraging transport choice. An emphasis on accessibility will ensure that:

- better use is made of existing transport infrastructure
- consideration is given to the best locations for development to ensure access by all modes of travel.

### Relative accessibility

Relative accessibility is the ratio of the population or the number of jobs that could be reached in a given time by car, to the ratio of the population that could be reached by public transport in the same time. Studies conducted in the southern English cities of Poole and Bournemouth looked at the ratio of the population that could be reached in 45 minutes from particular office locations<sup>6</sup>. Catchment areas were drawn up for public transport and for the private vehicle. The ratio of the population within each boundary provided a public transport accessibility index, shown on the left, with a comparison to a typical London centre.

<sup>6</sup> UK Department of the Environment and Department of Transport, 1995

## London Borough of Hammersmith and Fulham

The London Borough of Hammersmith and Fulham has established six bands of accessibility based on the walking time to public transport and the level of service that is provided. The calculation makes allowance for walking time, waiting time and the number of public transport routes/lines and frequency of service.

The Public Transport Accessibility Levels (PTALs) have been mapped and used to define parking standards and development floor space ratios; so the better the PTAL, the higher the plot ratio and the poorer the accessibility, the lower the density of development allowed.

These bands are not static and may change if new public transport infrastructure is provided or an increased service frequency introduced. Public transport improvements may be offered as part of a development to justify increased development density.

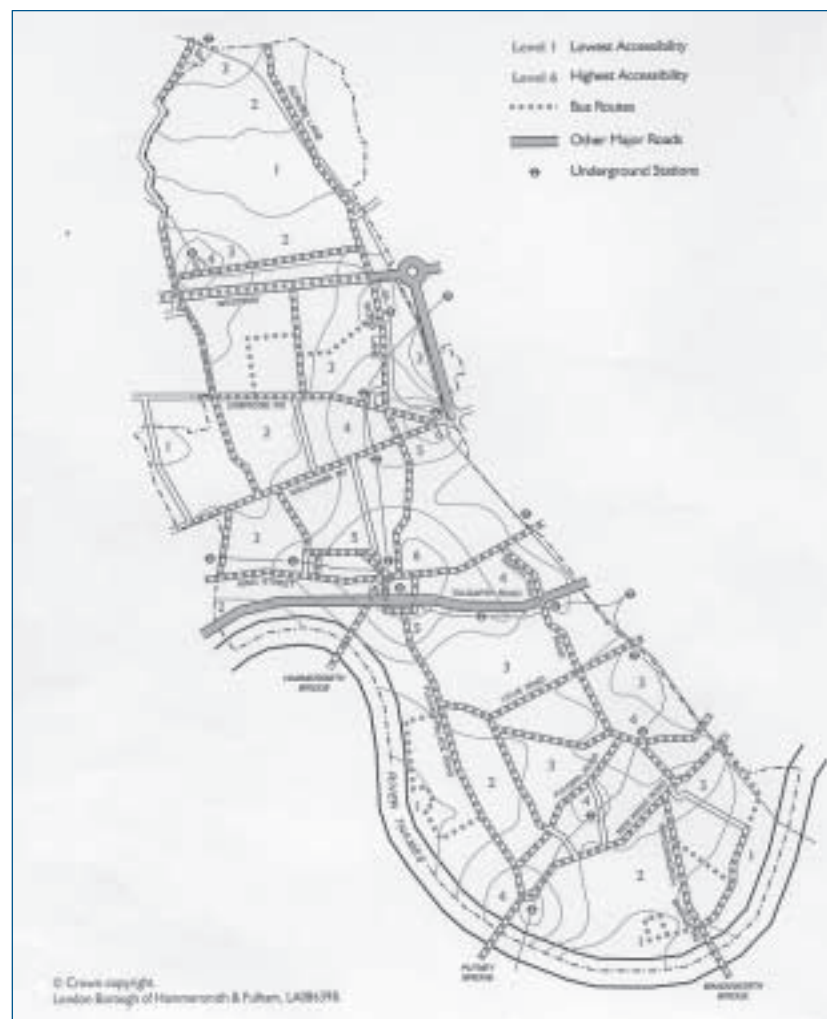
Source: UK Department of the Environment and Department of Transport, 1995, and London Borough of Hammersmith and Fulham, 1999

## Accessibility mapping

Some local authorities in Australia, the USA and UK, have undertaken various forms of accessibility mapping. Access to areas by walking, cycling and public transport is mapped to ascertain strengths, weaknesses and opportunities. For example, comparing a 400-metre radius around a railway station with actual walking distances can identify where pedestrian links must be improved to maximise the potential catchment.

This technique is referred to as the walkable catchment technique or ped-sheds<sup>7</sup>. Its use will assist in the identification of areas where trip generating development and areas requiring new links to improve accessibility should be focused.

The accessibility map should form a key input to an integrated land use/transport strategy for the area that is implemented via, among other things, an LEP. Site specific land uses should meet the objectives of the overall strategy. The cumulative impacts of single locational decisions also need to be considered.



Accessibility map — London Borough of Hammersmith and Fulham

<sup>7</sup> See Western Australian Planning Commission, 1997b

## Matching accessibility and mobility

A useful model for NSW may be provided by the Dutch Government's policy of concentrating employment intensive development around public transport routes and nodes<sup>8</sup>. The policy, *The Right Business in the Right Place* (also known as the *ABC Location Policy*), aims to match the mobility needs of businesses and services with the accessibility of different locations.

An *accessibility profile* indicates the quality of the accessibility of a location by public transport and by car, its proximity to railway stations and other public transport stops, its location in relation to major arterial roads and its parking facilities and limitations.

*Mobility profiles* provide an account of the transport and traffic characteristics of businesses and services, both of people and goods. For example, the profile indicates the employment density — employees per square metre — dependency on motorised transport in conducting business, the number of visitors, and reliance on road haulage.

The two profiles must match by using the three types of locations defined below:

**A locations** are main public transport interchanges in town centres with easy access by cycling and walking and rapid connection to regional public transport services. These locations are suitable for people-intensive businesses or businesses with a large number of visitors, minimal business related car use, and minimal goods transport.

**B locations** are accessible by car and public transport, for example, a bus interchange in a district centre near a main arterial road. These locations are suitable for businesses with moderate employee densities, business car use and dependency on road haulage for goods (e.g. retail and clothing industry).

**C locations** are easily accessible by car but not by public transport and are within the immediate vicinity of arterial road/motorway junctions at the edge of urban areas. These locations are suitable for businesses with a low density of employees, few visitors and a strong reliance on motorised transport for people or goods.

## A possible process for NSW

The process of preparing an accessibility zoning map could consist of the following steps<sup>9</sup>:

1. determine accessibility criteria
2. categorise existing locations according to accessibility (e.g. the Dutch ABC model)
3. classify activities according to their anticipated mobility characteristics and need for accessibility
4. analyse and assess existing activities and future needs

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<sup>8</sup> Netherlands Ministry of Housing, Physical Planning and Environment, 1995

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<sup>9</sup> Austroads, 1998, p. 175.

5. assess adequacy of existing locations to determine scope for accommodating future land uses with the required mobility characteristics for the location
6. prepare an accessibility zoning map that identifies locations with different accessibility characteristics, defines the objectives of such zones, and identifies the type of land uses appropriate to these locations and the performance standards that apply to them
7. prepare REPs, LEPs, DCPs and development contribution plans, including parking standards and contributions and contributions towards public transport, bicycle and pedestrian facilities and services
8. monitor and review the operation of the zoning system.

### **Assessing accessibility**

To ensure that development proposals will not further increase car dependence but rather maximise transport choice, we must reconsider the way in which traffic and transport studies are currently conducted. Too often these studies focus almost exclusively on accommodating private car and commercial traffic likely to be generated by a development. The suitability of the site for the use proposed in terms of reducing car dependence and the consideration of access for pedestrians, cyclists and public transport, is often overlooked or given superficial attention.

Traffic studies have usually been conducted to satisfy the requirements of consent authorities and referral agencies. They are usually carried out for rezoning proposals or development applications. The standard format of a traffic impact study is set out in ss. 2–3 of the Roads and Traffic Authority's (RTA) *Guide to Traffic Generating Developments* (1993). In practice, however, most traffic studies are much less comprehensive.

It is now policy to place greater emphasis on *reducing the number of trips generated by development, especially those by the private car* through accessibility assessments. These assessments may replace or be incorporated into traffic studies for specific proposals.

The traffic impacts and the safety of all modes should still be considered as part of these assessments. Trip generation and distribution will still need to be considered, but expanded to include all trips and modes.

Satisfying the demand for travel or parking should be balanced against reducing the amount of travel generated by the development, where possible, and maximising the amount of travel by public transport, walking and cycling.

The RTA's *Guide to Traffic Generating Developments* (1993) is being reviewed to reflect this new emphasis.

Best practice assessments of accessibility should address the following issues:

1. Is the proposed development well-located to reduce the need to travel, and does it encourage access by walking, cycling and public transport?

(This question is more relevant to rezoning proposals than development applications, which meet LEP requirements.)

- What is the likely catchment area for employees and visitors/customers?
  - What are the likely destinations of residents?
  - What proportion of employees/visitors/customers are likely to live within walking/cycling distance and a single public transport journey?
2. Is the proposed development designed to encourage access by walking, cycling and public transport?
    - How will the development be connected to existing pedestrian, cycle and public transport routes?
    - How does the design of the development cater for pedestrians?
    - How does the development relate to adjacent land uses to encourage multipurpose trips?
    - Has adequate consideration been given to the safety of vehicle passengers and pedestrians, including people with disabilities, and cyclists? For example, roundabouts need to be well-designed to cater for pedestrians and can be dangerous for cyclists.
  3. Is the existing public transport network appropriate to serve the site, and how can its use be encouraged?
  4. How will the demand for parking be managed on or off the site?
    - Has parking provision been matched to the accessibility profile of the area?
    - Are parking requirements reduced or shared for uses near high frequency public transport?
    - Are maximum rather than minimum rates used?
    - Is parking located to enhance the streetscape?
    - Is bicycle storage provided?

## South Sydney transport guidelines for development

South Sydney City Council uses Development Control Plan (DCP) No. 11 — Transport Guidelines for Development (1996) to provide transport requirements and related design criteria for the preparation of plans and development applications. One of the main objectives of these guidelines is to encourage a reduction in the level of vehicular travel in South Sydney by reducing parking requirements and improving facilities for pedestrians, cyclists and public transport users.

The DCP establishes a hierarchy of transport information to accompany development applications. These include information on:

- the estimated travel demand for each major mode
- an assessment of the appropriateness of the existing public transport network to service the site
- public transport, road or pedestrian improvements that may be necessary to service the development.

For each land use, guideline rates are provided for car parking, bus and coach facilities, servicing vehicles and bicycle storage.

# PARKING POLICIES AND CODES

The cost and availability of parking influences the choice of transport mode<sup>10</sup>. Even with very good access by public transport, centres with abundant free or very inexpensive car parking will attract private car travel. Car parking can occupy a large amount of space in developments, be unsightly and reduce amenity. Multilevel structures are expensive.

Local parking policies and codes are important tools to influence the demand for travel and the mode by which it is undertaken. They should therefore support location and urban design policies that seek to improve access by walking, cycling and public transport.

While it has been traditional for councils to have parking policies, parking spaces are only one form of transport facility that may be required to meet the needs of users of a particular development. Facilities for non-car transport may also be required, such as bicycle storage, bus shelters and pedestrian links.

It is recommended that councils review their parking policies and codes to ensure that these:

- are part of a broader transport/access strategy to manage travel in the local area, municipality or region
- incorporate policies that manage the demand for parking rather than seeking to accommodate all of that demand
- promote access by public transport, walking and cycling.

Parking requirement guidelines from state and commonwealth agencies should not be adopted inappropriately, that is, without local review and adaptation.

Parking codes, or the parking elements of broader transport policies, should:

- be explicit in their desire to moderate the growth in car use
- be flexible, taking into account local circumstances, and be able to provide for a range of parking requirements, depending on the provision of public transport in an area
- assess the likely travel characteristics of the users of a proposed development
- consider regional impacts of parking provision, if any
- provide guidelines for developers on requirements to meet the needs of non-car users, for example, bus shelters, bicycle storage, showers and changing rooms, pedestrian access and other public domain improvements
- contain a package of requirements covering, for example:
  - parking requirements for various land uses
  - a s. 94 contributions plan under section 94 of the Environmental Planning and Assessment Act for parking, public transport, bicycle and walking facilities
  - parking enforcement practices
  - council provision of parking
  - resident parking scheme policies
  - design of parking spaces and areas, including bicycle storage
  - preferential parking for car pooling and community transport vehicles

<sup>10</sup> Cervero, 1993



### **Parking policies can influence transport choice — some local examples:**

Ryde City Council has lower parking requirements for residential flat buildings located within 400 metres of Victoria or Epping roads — where there is good access to buses — or any railway station.

Similarly, Willoughby Council requirements are lower close to Chatswood station; Hurstville Council requires lower parking provision for commercial development within its main centre; and Newcastle Council has reduced parking rates for land within its CBD.

### **Parking provisions and multiple occupancy vehicles**

There was little change in vehicle occupancy between 1991 and 1997. In 1997, the average vehicle occupancy per trip was 1.5 persons and only 1.2 persons for commuting trips (Transport Data Centre, 1999).

Parking provisions can be used to encourage sharing, and possibly reduce the overall number and length of car trips. In the downtown area of Seattle, USA, for example, a minimum of 20 percent of the spaces provided to meet long-term parking demand must be reserved for car pooling from 7.00 a.m. to 9.30 a.m. Elsewhere in Seattle, for every space provided for car pooling, the total requirements for a commercial use are reduced by 1.9 spaces or up to 40 percent of the total parking requirement.

- where appropriate, incentives should be offered for the development of public or shared parking rather than private parking exclusive to a particular property.

Parking requirements should seek a balance between satisfying a proportion of parking demand on-site, addressing car reduction objectives and minimising the spread of parking into surrounding areas. This approach should be applied consistently.

Maximum rates of provision are preferred, especially in centres with good public transport access, to manage parking supply and moderate car use. Reduced parking requirements may also help attract good quality and affordable higher density development at these nodes.

The level of car parking charges may be used as a tool to encourage the use of more sustainable modes of transport and discourage particular forms of travel, such as car commuting journeys.

Based on parking provisions that are excessive by today's standards or work against other travel demand management initiatives, s. 94 funds may be accumulated over a long period of time. In these circumstances, councils should review the contribution requirements, or even return unspent funds, rather than oversupply parking provision.

## BikePlan 2010

The NSW BikePlan 2010 — Action for Bikes notes that almost half the households in NSW have at least one bike. About 100 000 people use bikes to get to work and about 160 000 students cycle to school, college or university.

The Roads and Traffic Authority's plan identifies proposed improvements to the NSW and Sydney bike networks, and also identifies ways to improve cycle safety, and encourage cycling as a mode of transport as well as a sport and recreational pursuit.

## Marrickville pedestrian access and mobility plan (PAMP)

As a joint project, Marrickville Council and the Roads and Traffic Authority have recently prepared a PAMP for the Marrickville local government area.

It is a 5–10 year plan detailing the nature, location, cost and scheduling of pedestrian facilities. The aim of the PAMP is to improve planning for pedestrian safety, access and mobility.

# PEDESTRIAN AND BICYCLE PLANS

Some councils have or are preparing pedestrian plans (typically for town centre precincts), pedestrian access and mobility plans (PAMPs) and bicycle plans. Additional benefits can arise where an area-wide approach is taken for all plans, and where links to adjacent and faraway areas are recognised. To be effective, these plans must be reflected in land use plans and design codes, capital works programs and public transport improvement plans.

The London Planning Advisory Committee has published a consultation draft of its Walking Advice document. It recommends a multi-layered approach, involving the following key elements:

- setting **design standards** for all streets, for example, pavement widths and materials
- identifying **key walking routes** between places and longer distance recreational routes and prioritising these for improvement
- identifying locations on these routes where facilities need **improvement** to ensure network continuity
- **auditing the accessibility** by foot of key destinations — for example, 400 metres around railway and transitway stations and main bus stops or recreation centres and employment sites
- identifying local areas where pedestrians should be given high **priority**
- improving the pedestrian environment by encouraging **good quality urban design**
- selecting and developing appropriate locations for **demonstration projects**<sup>11</sup>.

Walking inventories or audits are recommended as a tool to determine the existing amount and quality of, and future potential for, walking in particular areas. They also help to identify how and where improvements to the pedestrian environment could be made.

## Walkable catchments

A useful technique to evaluate the accessibility of walking to and from centres or facilities, is to prepare a map measuring walkable catchments, or ped-sheds.

These show the actual area within a five minute walking distance of any centre or 10 minutes from any major transport node. These are measured as a percentage of the theoretical five minute distance (estimated as a 400 metre radius, with a total area of 50 hectares), or the 10 minute distance (an 800 metre radius and area of 200 hectares). (See example in Part 3 — Location and Design Guidelines — Housing).

The higher the percentage, the better the walkability of the surrounding catchment. A good target for a walkable catchment is to have 60 percent of the area within a five minute walking distance, or within a 10-minute walk to public transport.

<sup>11</sup> London Planning Advisory Committee, 1997

### **We could walk more trips**

Between 1991 and 1997, Sydney residents reduced walking trips by three percent, i.e. from 20 to 17 percent of all trips. The reduction was directly offset by greater car use, particularly by children and teenagers whose passenger trips increased at the expense of walking.

These trends are not limited to Sydney. Throughout the industrialised world, greater car use has paralleled the decline in walking. Lengthening trips, a shortage of time and an increase in car availability are key factors in the declining distances walked by the British, where about one third of journeys are made on foot. Fears about the physical and social environment are also important (Lumsdon and Tolley, 1999). As in the UK, walking in Sydney is now being actively encouraged as a good transport choice. Policies and plans increasingly reflect this.

## STREET AND ROAD DESIGN STANDARDS

Street or road design practice can support or seriously undermine land use planning efforts to encourage public transport use, walking and cycling. For example, conventional suburban subdivision design — curvilinear with culs-de-sac — can discourage walking and viable bus operations<sup>12</sup>.

In line with AMCORD (Commonwealth Department of Housing and Regional Development, 1995), street and road network standards should be reviewed to ensure their compatibility with the objectives of reducing the need to travel and promoting public transport, pedestrian and bicycle travel. Consideration needs to be given to a more connected movement network, narrower streets, traffic calming and block size.



Street design should incorporate traffic, walking, bicycle use, environmental and streetscape issues.

Source: Commonwealth Department of Housing and Regional Development, 1995

<sup>12</sup>Fleming and Pund, 1993

### Some s. 94 initiatives so far:

A number of councils have taken the lead in applying s. 94 to the range of transport modes.

- Waverley Council levies most developments for the provision of bus-related infrastructure.
- Baulkham Hills, in its s. 94 plan for Kellyville and Rouse Hill release areas, levies for a comprehensive range of transport facilities. Levies include the cost of constructing an enhanced collector road that will be used as a key bus route, and for public transport nodes and accompanying facilities for walking and cycling.
- Willoughby Council is proposing to spend part of its s. 94 contributions on studies on how to better provide for pedestrians, cyclists and users of public transport.
- Newcastle Council levies all development for cyclist facilities, as part of its city-wide bike plan.

## SECTION 94 CONTRIBUTION PLANS

Local councils can use s. 94 of the *Environmental Planning and Assessment Act 1979* to levy developers for the provision of a range of physical and social infrastructure. Councils must demonstrate that a development creates an additional demand for these facilities or services before they can impose the levy. Councils are required to prepare s. 94 contributions plans setting out what they consider to be necessary community facilities in their area. Developers can provide the facilities in kind or make contributions to councils' s. 94 funds.

The traditional response to travel demand generated by new development has focused on providing or augmenting public facilities for use by cars, such as roads, traffic management facilities and car parks. This travel demand, however, should be allocated between several modes, including the car, public transport, cycling and walking.

Each mode requires particular infrastructure to function safely and effectively and there is no reason why s. 94 cannot be levied to provide the infrastructure needs of each mode.

The apportionment principle is an important aspect of s. 94, particularly where public transport, cycling and walking facilities in a local area form part of a broader network. Developers can be levied for part of the cost of providing a facility that serves a broader or existing population not specifically generated by their development. There is potential to apply this principle to the provision of public transport, cycling and walking facilities that form part of a broader network in that local government area.

In general, s. 94 contributions can only be levied for capital costs. Operating and maintenance costs — recurrent rather than capital — must be funded from other sources. This would appear to restrict councils' ability to levy through s. 94 for localised public transport services, but need not hamper councils' ability to provide supporting infrastructure, such as shelters, information, bus bays and lanes, and B signals.



## GLOSSARY OF TERMS

*Accessibility* — the ability to undertake a range of daily activities with a minimum of travel.

*Bus priority* — traffic management measures where buses have priority over other vehicles in the traffic stream. These include bus-activated traffic signals and bus only lanes.

*Commuter car parks* — provided for the use of public transport passengers at public transport nodes, for example, at railway stations.

*Frontage* — the interface between a land use and the street.

*Interchange* — a facility that provides for the safe and convenient transfer of passengers from one mode of transport to another.

*Livability* — the quality of life of an area, including such factors as the quality of public areas, accessibility and economic vitality.

*Mixed use development* — development that involves more than one activity, either vertically or horizontally, for example, housing located above shops.

*Mode* — the means of travel, for example, car, ferry and bicycle.

*Pedestrian and walking* — includes people using non-motorised mobility aids and motorised wheel chairs.

*Public transport node* — the point at which one gains access to the public transport network, for example, bus stop, railway or transitway station.

*Rail or transitway station precinct* — the area immediately surrounding a railway or transitway station.

*Street network* — the pattern of street connections.

*Travel demand management* — measures designed to minimise the need for travel as well as the length of trips, particularly by cars.

*Vehicle kilometres travelled (VKT)* — a measure of the total distances of travel by cars, that is, the number of kilometres travelled by private car.



## BIBLIOGRAPHY

- American Planning Association, 1993, *Neighbourhood-Based Planning — Five Case Studies*, APA, Chicago, USA
- American Planning Association, 1994, *The Transportation/Land Use Connection — A Framework for Practical Policy*, APA, Chicago, USA
- American Planning Association, 1996, *Creating Transit-Supportive Land-Use Regulations*, APA, Chicago, USA
- Australia Standard AS 1428.1, 1993, *Design for Access and Mobility*, Standards Australia, Homebush, Sydney
- Australian Standard AS 1428.4, 1992, *Tactile Ground Surface Indicators for the Orientation of People with Visual Impairment*, Standards Australia, Homebush, Sydney
- Australian Standard AS 2890.3, 1993, *Bicycle Parking Facilities*, Standards Australia, Homebush, Sydney
- Austrroads, 1999, *Guide to Traffic Engineering Practice*, Austrroads, Haymarket, Sydney
- Austrroads, 1998, *Cities for Tomorrow — A Guide to Better Practice, Integrating Land Use, Transport and the Environment*, Austrroads, Haymarket, Sydney
- Austrroads, 1998, *Cities for Tomorrow — Resource Document, Integrating Land Use, Transport and the Environment*, Austrroads, Haymarket, Sydney
- Bicycle Victoria, 1996, *'It can be done', A Bicycle Network on Arterial Roads — Completing Melbourne's Principal Bicycle Network*, Bicycle Victoria, Melbourne
- Center for Livable Communities, United States Local Government Commission, EPA Transport Partner, 1996, *Building Livable Communities — A Policymaker's Guide to Transit-Oriented Development*, Local Government Commission, Sacramento, USA
- Cervero, R., 1993, *Ridership Impacts of Transit-Focused Development in California*, University of California at Berkeley, Institute of Urban and Regional Development, Berkeley, USA
- Commonwealth Department of Housing and Regional Development, 1995, *AMCORD — A national resource document for residential development*, AGPS, Canberra
- Commonwealth Department of Transport and Regional Development, Better Cities Programme (Australia) & National Capital Planning Authority, 1995, *Facilitating Mixed Use Development, Better Cities Program*, NCPA, Canberra
- Department of Urban Affairs and Planning (1998) *Shaping Our Cities, The Planning Strategy for the Greater Metropolitan Region of Sydney, Newcastle, Wollongong and the Central Coast*
- Ecotech Research and Consulting Ltd & Transport Planning Associates, 1993, *Reducing Transport Emissions Through Planning*, Department of the Environment, London, UK
- Ewing, R., 1997, *Transportation and Land Use — When You Can't Pave Your Way Out Of Congestion*, American Planning Association, Chicago, USA



Fleming, R. & Pund, G., 1993, *The Impact of the Planning of Urban Areas on the Use and Attractiveness of Local Bus Services*, 17<sup>th</sup> Australian Road Research Board Conference, Melbourne

Geoplan Urban and Traffic Planning & ARUP Transport Planning, 1993, *Towards Traffic Calming — A Practitioners' Manual of Implemented Local Area Traffic Management and Blackspot Devices*, Federal Office of Road Safety, Canberra

JHK Associates Inc., 1995, *Transportation-Related Land Use Strategies to Minimise Motor Vehicle Emissions: An Indirect Source Research Study*, Final Report for the Californian Air Resources Board and the Californian Environmental Protection Agency, USA

London Borough of Hammersmith and Fulham, 1999, *The Unitary Development Plan Review*, LBHF, London, UK

London Planning Advisory Committee, 1997, *Putting London Back On Its Feet: A Strategy for Walking in London*, LPAC, London, UK

Lumsdon, L. & Tolley, R., 'Techniques for Planning Local Networks: Developing a Walking Strategy', *World Transport Policy and Practice*, Spring 1999

National Association of State Road Authorities Working Group, 1988, *Planning and Design for Bicycles*, NASRAWG, Canberra

Netherlands Ministry of Housing, Physical Planning and Environment, 1995, *The Right Business in the Right Place*, Netherlands Ministry of Housing, Physical Planning and Environment, The Hague, Netherlands

New Jersey Transit, 1994, *Planning For Transit-Friendly Land Use — A Handbook for New Jersey Communities*, NJT, New Jersey, USA

NSW Department of Housing, 1994, *Urban Housing Guidelines*, NSW Department of Housing, Sydney

NSW Department of Transport, 1992, *Guidelines for the Use of Speed Control Devices on Bus Routes*, NSW Department of Transport, Sydney

NSW Government (2000) *Action for Air, The NSW Governments 25-year Air Quality Management Plan*

NSW Roads and Traffic Authority, 1991, *Road Transport Future Directions*, Roads and Traffic Authority, Sydney

NSW Roads and Traffic Authority & Federal Office of Road Safety, 1999, *Sharing the Main Street: A Practitioner's Guide to Managing the Road Environment of Traffic Routes through Commercial Centres*, (Second edition), Federal Office of Road Safety, Braddon, ACT

NSW State Transit Authority, 1999, *Bus Stop Style Guide*, STA, Sydney

Ontario Ministry of Transportation & Ministry of Municipal Affairs, 1992, *Transit-Supportive Land Use Planning Guidelines*, Ontario Ministry of Transportation, Ontario, Canada

Queensland Department of Tourism, Small Business and Industry, 1996, *Mixed Use Developments — New Designs for New Livelihoods, An Information Paper*, Department of Tourism, Small Business and Industry, Brisbane



Queensland Government, 1998, *Shaping Up — A Guide To The Better Practice And Integration Of Transport, Land Use And Urban Design Techniques*, Queensland Government, Brisbane

Roseland, M., 1998, *Toward Sustainable Communities — Resources for Citizens and their Governments*, New Society Publishers, Canada

South Sydney City Council, 1996, DCP No. 11 — Transport Guidelines for Development, unpublished

Stapleton, C., 1998, A Comparison of Connective and Tree Road Systems, consultant report for NSW Department of Transport and Queensland Transport, unpublished

The Planning Centre, 1993, *Land Use, Transportation and Air Quality — A Manual for Planning Practitioners*, San Bernardino Air Quality Plan, San Bernardino, USA

Transit Cooperative Research Program, 1997, *TCRP Report 22 — The Role of Transit in Creating Livable Metropolitan Communities*, National Academy Press, New York, USA

Transport Data Centre, 1997, *Household Travel Survey*, NSW Department of Transport

Transport Data Centre, 1999, *Sydney Travels 1997 — Travel Characteristics of Sydney Residents*, NSW Department of Transport, Sydney

Tri-County Metropolitan Transportation District of Oregon, 1993, *Planning and Design for Transit*, Tri-County Metropolitan Transportation District of Oregon, Oregon, USA

UK Department of the Environment & Department of Transport, 1995, *PPG13 — A Guide To Better Practice: Reducing the Need to Travel Through Land Use and Transport Planning*, HMSO, London, UK

UK Department of the Environment, Transport and the Regions, 1998, *PPG13 — Planning for Sustainable Development: Towards Better Practice*, UK Department of the Environment, Transport and the Regions, London, UK

United States Department of Transportation, 1991, *Guidelines for Transit-Sensitive Suburban Land Use Design*, United States Department of Transport, Washington DC, USA

Urban Design Advisory Service, Department of Urban Affairs and Planning, 2000, *Mixed Use in Urban Centres — Guidelines for Mixed Use Development and Residential Subdivision — A Handbook for the Design and Planning of New Neighbourhoods*

Urban Design Advisory Service, Department of Urban Affairs and Planning & Department of Public Works and Services, 1998, *Better Urban Living — Guidelines for Urban Housing*, NSW Government, Sydney

Western Australian Planning Commission, 1997a, *Integrated Land Use and Transport Planning Policies — A Discussion Paper*, Western Australian Planning Commission, Perth

Western Australian Planning Commission, 1997b, *Livable Neighbourhoods — Community Design Code*, Edition 1, Western Australian Planning Commission, Perth

Western Sydney Regional Organisation of Councils, 1999, *Access for People with Mobility Impairment — Manual of Best Practice*, Western Sydney Regional Organisation of Councils, Blacktown

