fact sheet five

Sustainable Transport

This is the fifth in a series of fact sheets produced by the District Council of Mount Barker on Sustainable Residential Subdivision Design. Council's Development Plan identifies a number of areas within and adjacent to existing townships that are intended for residential development. A number of policies within the Development Plan require that residential development, including residential subdivisions, satisfy a range of sustainability objectives and principles.

This is one of five fact sheets, which cover the following topics:

- Site Analysis
- Energy Efficiency
- Water Sensitive Urban Design (WSUD)
- Biodiversity, Buffers and Open Space
- ❑ **Sustainable Transport**

What do we mean by sustainable transport?

Generally when we refer to sustainable transport we mean modes of transport that have lower associated energy costs and greenhouse gas emissions. This means, in order of priority, walking, cycling, using public transport and, least favourably, the use of motor vehicles.

The transport sector contributed 13.5% of Australia's net greenhouse gas emissions in 2004 and transport emissions are one of the strongest sources of emissions growth. Passenger cars were the largest transport source of emissions contributing around 55% of the transport sector emissions[1]. Given the concerns about climate change it is imperative that we encourage more sustainable means of moving around our townships.

A shift to more sustainable modes of transport will also result in other benefits including:

- reductions in traffic congestion, noise and air pollution, road related deaths and accidents
- improved accessibility to services and facilities for those without access to a car
- improved health as a consequence of being more physically active
- the creation of more children friendly environments
- reduced costs associated with providing and maintaining urban transport infrastructure.

What has this got to do with subdivision design?

The way our suburbs are designed - the location and design of roads and paths and the relationships with other facilities such as centres, schools, open space and public transport routes - influences how easy or difficult it is to walk, cycle or use public transport. Once roads and land use are in place and transport patterns are set, it is difficult to either 'retrofit' suburbs to make them more user friendly or to change entrenched travel behaviour patterns. It also makes sense to increase residential densities near services and facilities, thereby increasing the likelihood of people walking or cycling to satisfy their day-to-day needs. Higher residential densities adjacent to public transport routes also influence the provision of improved public transport services.

Pedestrians

The location and design of road reserves need to consider all road users, not just those that drive cars. All residential developments should be designed to provide for the safe and convenient movement of pedestrians, with particular attention to the needs of the aged, young children, people using prams, and people with disabilities.

Council requires that footpaths be provided on one side of local streets and private access ways and both sides of arterial and collector roads. However, opportunities for off-road shared use paths, utilising linear parks and other areas of open space should also be considered.

[1] *Australia's National Greenhouse Accounts - National Greenhouse Gas Inventory 2004* (2006) Department of the Environment and Heritage

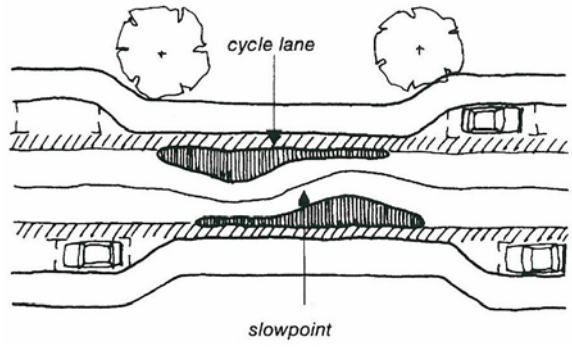
Generally it is preferable for the footpath to be located adjacent to the property boundary rather than adjacent to the kerb. This method provides for separation between pedestrians and cars and enables the planting of trees between the footpath and the kerb, further improving the pedestrian environment.

Designers will need to consider the specific context of a development site and, where provided, the requirements of Concept Plans contained within the Development Plan. Often the Concept Plans for particular development sites will identify the need for pedestrian and bicycle linkages with adjoining areas.

All footpaths should be constructed of suitable materials and generally be 1.2m in width and widened to 1.5m in the vicinity of schools, shops and other places where people congregate on a regular basis. Where a bus shelter is to be provided, its siting needs to be carefully considered to allow uninterrupted and safe pedestrian movement along the street.

Cyclists

Cyclists should be considered in the design of all residential streets. Dedicated and marked cycle lanes should generally be provided within the carriageway of higher order streets (i.e. collector roads and arterial and sub-arterial roads). Where traffic calming devices are proposed (e.g. protuberances or slow points) consideration needs to be given to how cyclists will safely navigate the route.



Consider cycle movements and safety when designing vehicle slow points and avoid forcing cyclists into traffic lanes

There may be opportunities to provide off-road paths, particularly where linear reserves are proposed along, for example, an existing creek line. The off-road path needs to be integrated with other bicycle path networks beyond the development site (both existing and proposed and on and off-road) and provide for connections with facilities such as schools and centres. Reference should be made to the *Mount Barker, Littlehampton and Nairne Bicycle Master Plan* for the location of existing and proposed routes.

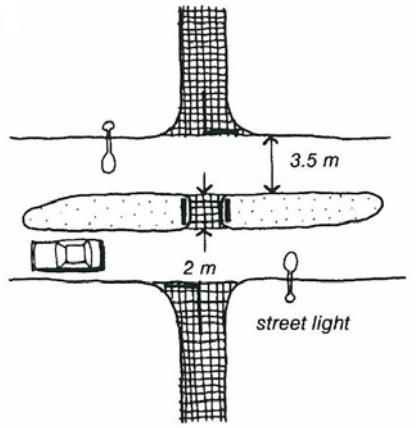
In designing off-road paths a number of factors should be considered including:

- whether the path will be a shared use path
- the appropriate dimensions, gradients (max. longitudinal gradient of 5%) and alignment (see Austroads Part 14)
- opportunities for casual surveillance
- landscaping treatment
- flooding issues
- associated signage and facilities (e.g. lighting, benches, shelter, bicycle parking).

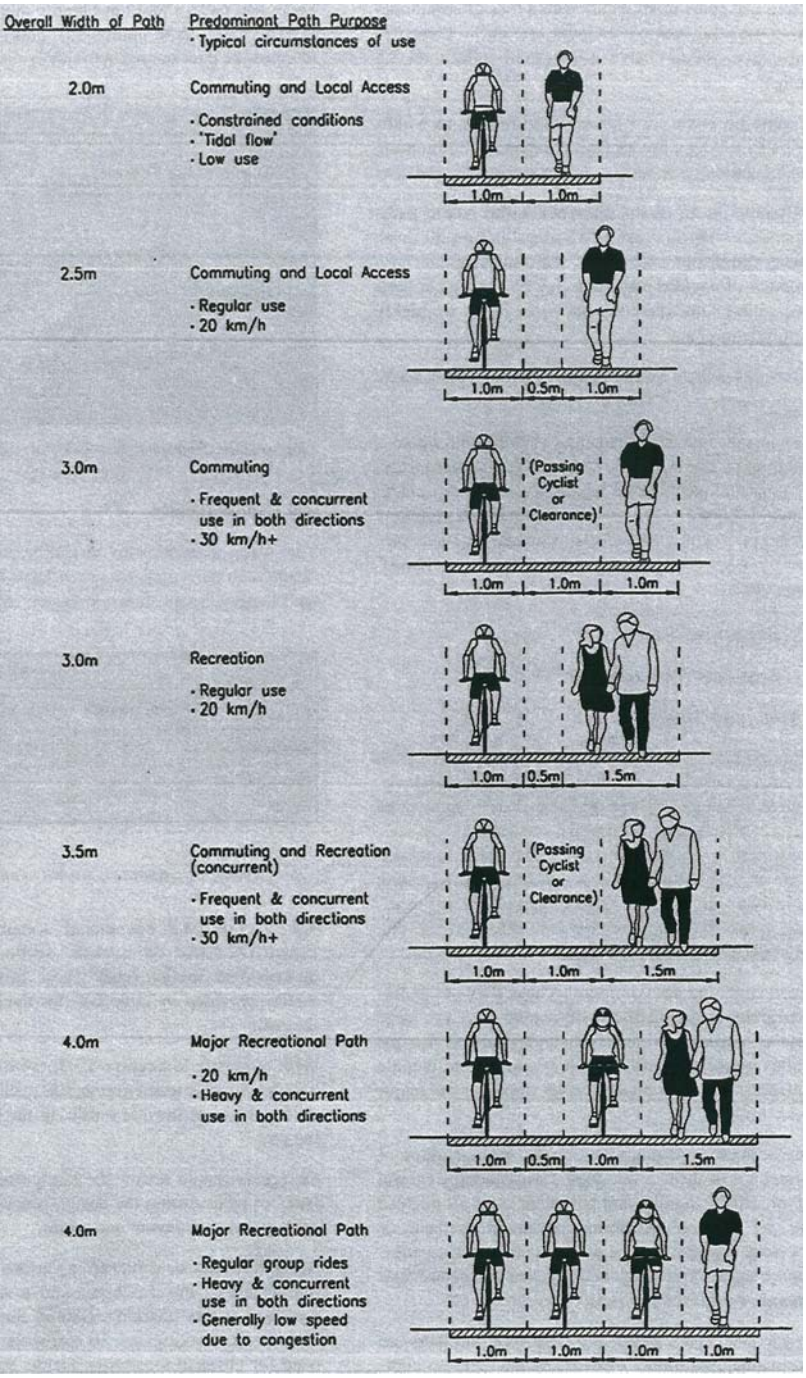
Road Crossings

Particular attention needs to be given to the safe crossing of streets for both pedestrians and cyclists where traffic volumes exceed 3,000 vehicles per day or traffic speeds exceed 50km/hour. Controlled access points should be created with the use of pedestrian refuges, slow points, thresholds or other appropriate techniques.

Path ramps connecting footpaths and cycle paths to streets need to be designed to provide for the needs of people with disabilities, the elderly, children and those with prams. Where major pedestrian and/or cycle paths intersect arterial roads, pedestrian activated signals should be provided.



An example of a safe pedestrian and/or cyclist crossing point on higher traffic volume streets



Different shared use path options and characteristics
(Source: Guide to Traffic Engineering Practice Part 14 - Bicycles, Austroads, 1999)

Interconnected street patterns

Council's Development Plan requires an interconnected residential street pattern to improve permeability and minimise trip lengths. The diagrams on the next page illustrate in conceptual terms what is meant by an interconnected street pattern.

The advantages of more interconnected street patterns include:

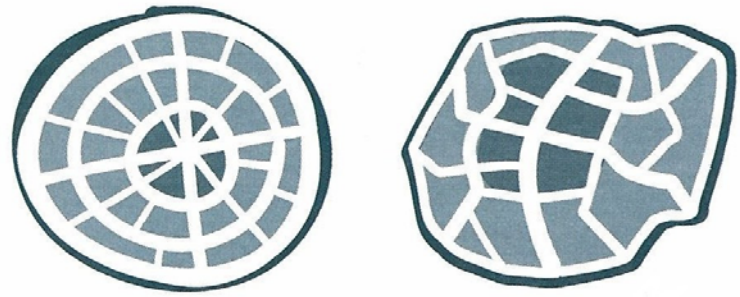
- A greater number of route options are provided and this tends to disperse rather than concentrate vehicular traffic, making roads safer for pedestrians and cyclists
- They generally decrease trip lengths for all road users and therefore improve accessibility within and beyond the local area and encourage people to satisfy at least some of their trips by foot or bicycle
- They improve opportunities for 'eyes on the street' and therefore the safety of streets.

The Development Plan also requires connections with adjoining streets, paths, public open space, residential areas, schools, community facilities, public transport stops and activity centres. In other words, the development needs to be integrated with its surrounding context (or allow for future integration where adjacent areas are earmarked for urban development).

In the first instance this will require reference to any Concept Plans that exist for particular development areas within the Development Plan. Where it is proposed to achieve a vehicular connection with an existing residential street it may be necessary to undertake an assessment to determine whether the anticipated traffic volumes will exceed the carrying capacity of that existing road. This assessment should be undertaken by a suitably qualified transport planner or engineer.

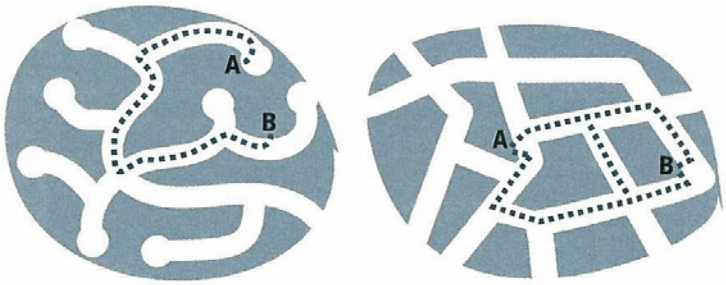
The 'perfect' street pattern for direct access to centres and public transport stops

A more organic street pattern for direct access to centres and public transport stops

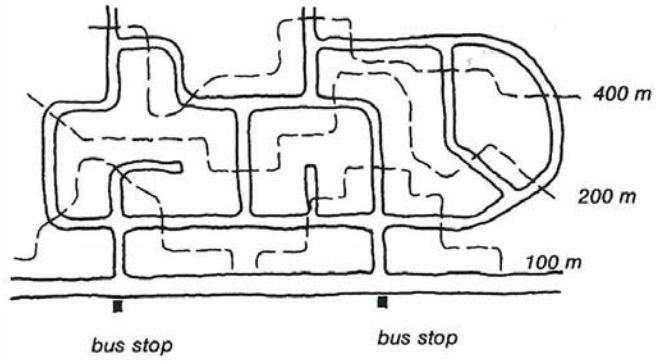


Disconnected culs-de-sac design showing long walk from A to B and only one route available

Modified grid design showing shorter walk from A to B and several routes available



Street patterns and implications for accessibility
(Source: Planning Guidelines for Walking and Cycling, New South Wales Government, 2004)



Try to achieve 90% of allotments within 500m of a bus route

Public transport

Depending on the size and location of the residential development project, it may be appropriate to consider either accessibility to existing public transport stops or the routeing of new services through the development site. A general rule of thumb is that not less than 90% of allotments be within 500 metres of an existing or proposed bus route.

If designing new residential subdivisions within close proximity to existing bus routes, ensure that the proposed road layout and any off-road pedestrian / cycle paths provide as direct a route as possible to the bus stop. Depending on the Development Plan provisions, it is also advisable to locate higher residential densities immediately adjacent to bus stops.

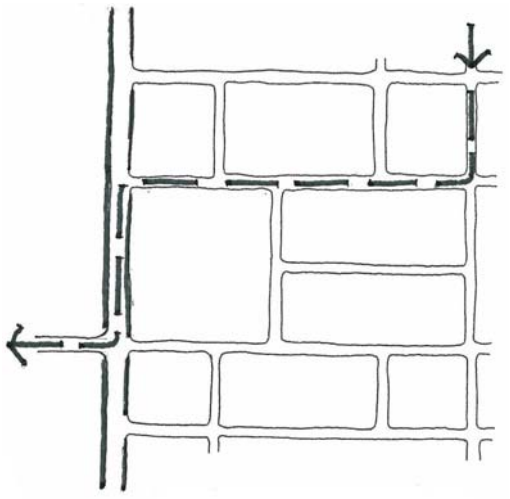
In larger residential development projects it may be necessary to accommodate future bus services through the development site (also anticipating the potential for residential development beyond the site). If this is the case, careful consideration will need to be given to the preferred route location (taking into account the 90% / 500m rule referred to above) and a preference for relatively direct routes without excessive turning movements. It is also desirable to ensure that bus route connections with adjacent major roads:

- utilise an existing traffic controlled intersection (e.g. roundabout, lights)
- result in a left turn into the major road followed by a right turn into an adjoining residential area.

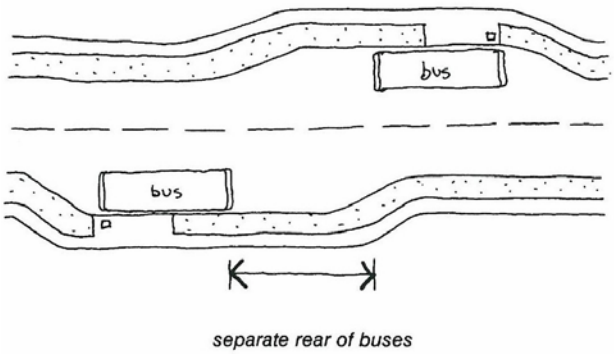
It may also be advisable to consider the design of indented bus stop bays to improve pedestrian safety and allow other vehicles to pass, particularly on busy roads.

It is advisable to consult with Council early in the design process to determine the need to plan for public transport within a development site.

Street alignment and geometry requirements for bus routes	
Street Carriageway Width	One-way bus route 6.75m Two-way bus route 7.5m
Minimum Geometric Layout	R 12.5m for single bus unit R 14m for articulated bus
Roundabouts	Max. desirable pavement crossfall: 3% Max. desirable gradient: 6% Absolute max. gradient: 12%
Slowpoints	Slowpoints designed so as not to result in any vertical movement of buses
Street Gradient	Avoid routes with gradients over 8%
Bus Stop Frequency	Stops not greater than 350m apart



Bus routes should enable left turns onto major roads and right turns into adjoining areas



An example of indented bus stop design

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