Bicycle riding and new subdivision design

Purpose

This note aims to raise awareness of approaches available to improve conditions for bicycle riders in design and planning of new subdivisions. The note summarises the main planning and design principles of the Queensland Transport *Shaping Up guide*.

Why consider bicycle riding in urban design?

Bicycle riding is an important means of transport as well as a popular recreational activity. Urban planning should recognise the significance of the bicycle for successful neighbourhood and community development. Good urban development will include comprehensive cycling and walking routes to maximise convenience for all members of the community. Best practice design of neighbourhoods in urban environments:

- focuses on accessibility and not mobility
- makes cycling and walking safer and more enjoyable, convenient and comfortable
- encourages walking and bicycle riding, and
- discourages unnecessary or unsafe motor vehicle use.

Planning should also consider the Local Cycle Network Plan (LCNP) and Integrated Regional Cycle Network Plan (IRCNP). For example, providing a link that forms part of a coherent cycle network in the long term. (Refer to Cycle Note A4 - *Developing a local cycle strategy and local cycle network plan)*.

Shaping Up

Shaping Up is designed to inform and influence planning decisions for all levels of government (state, regional and local) and types of land use. The guidelines address a number of different themes associated with the integration of transport and land use planning that can inform across planning stages.

The guidelines suggest ways to develop urban areas to reduce reliance on the private car (and its detrimental effects on the environment) to produce more liveable communities. It outlines ways in which land use transport planning and urban design can reduce both the number and length of trips. It also shows how these approaches can support other more healthy and environmentally friendly modes of travel such as walking, cycling and public transport. Past approaches to land use and transport planning have tended to focus on facilitating the use of cars and trucks (e.g. freight) with little consideration for sustainable travel.

Aim

This series of notes aims to assist planners and engineers to provide for cycling in their local area.
The Cycle Notes should be read in conjunction with:

- Guide to Traffic Engineering Practice, Part 14 – Bicycles (Austroads, 1999)
- Queensland Manual of Uniform Traffic Control Devices, Part 9 Bicycle Facilities
- Road Planning and Design Manual (Queensland Department of Main Roads).

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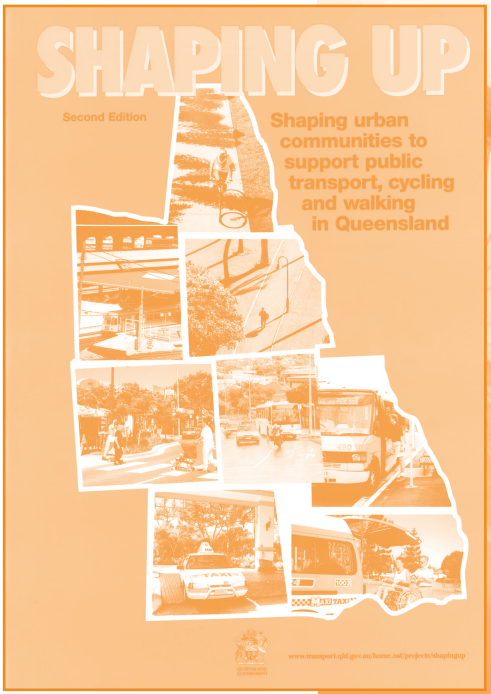

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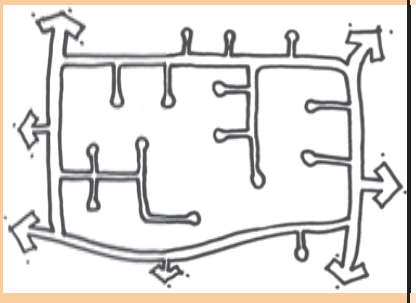
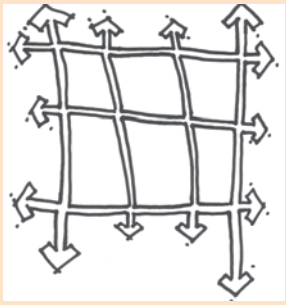
Key themes

Good subdivisional planning can encourage sustainable travel behaviour, for example by:

- mixing land uses – providing lots in locations and mixing compatible land uses to bring origins and destinations closer together and reduce trip distances
- increasing and grading the density of developments around key locations such as business centres, transport nodes and neighbourhood or town centres
- locating and designing developments with walking, bicycle and public transport connections and links between bicycle facilities and public transport (connectivity and permeability)
- providing secure cycle parking at key locations (e.g. workplaces, schools, universities)
- developing strategic regional and local cycle networks with implementation priorities established
- reducing motor vehicle speeds in specific areas
- providing for both the transport and recreation functions of cycling in the design, location and routes of networks.

Table 1: Summary of conventional and more innovative residential area design and layout

Issue	Conventional Practice	Better Practice
Mixed land use development	Suburbs feature one dominant residential land use zone that excludes small businesses.	Planning allows for jobs to be created in small service sector businesses, many of which are located within residential areas without adversely affecting residential amenity.
	Inflexible planning controls and housing forms make it difficult for the subdivision to respond to changes in society (e.g. reducing household sizes).	Planning has sufficient flexibility to meet the residential needs of various demographic groups and their travel needs. Flexible routes mean that a person can choose to take an easier route as they gain riding confidence.
Density	Residential subdivisions comprise low to very low density housing on individual, large allotments.	Subdivisions are designed so that there are at least 15 dwellings per hectare within 400m of major business centres. The viability of public transport, walking and cycling is increased. Wide green corridors should also be promoted.
	Limited number of medium-density developments are scattered through the suburb.	Medium density housing is developed close to major public transport stops stimulating demand for local businesses and public transport. The close proximity to destinations for more people increases the attractiveness of cycling and walking.
Road network design	Disconnected street network 	Pedestrian and bicycle-oriented street network 

Issue	Conventional Practice	Better Practice
Road network design	Emphasis is placed on travel by motor vehicle with little consideration given to sustainable forms of transport.	The local street network improves access within and through the subdivision for motor vehicles, public transport, pedestrians and bycicle riders in a way that minimises the impact of traffic in the community
	Cul-de-sacs are favoured in the design of residential subdivisions. Traffic increases on the few through streets, trip distances to local destinations increase and walking and cycling activity is low.	Highly connected local street systems allow movement within the subdivision without road users being forced to use the surrounding arterial road system. As trip distances to local destinations decrease, walking and cycling activity is high.
	Pedestrian and cycle movement between the subdivision and adjacent areas is only possible on arterial roads designed primarily for motor vehicles.	Multiple opportunities are created for pleasant, safe and relatively direct pedestrian and bicycle movement to nearby trip attractors.
	Development of facilities for cyclists and pedestrians is unplanned and ad hoc. Establishing unplanned infrastructure requires expensive retrofitting to existing facilities.	Local/regional cycle and pedestrian links are planned and prioritised from the earliest planning stages. Integrated bicycle networks are included within large master planned communities.
Transport integration	Lack of public transport, bicycle and pedestrian opportunities leaves those without private cars socially isolated.	Planning controls encourage a higher intensity of residential land uses within a convenient walking distance of public transport nodes. Bicycle and pedestrian links connect important trip attractors.
	Options of using a variety of transport modes as part of the same journey are severely limited (e.g. riding a bike to the bus station and riding the bus to work).	Public and other transport modes are integrated. Bicycle parking and other facilities are provided at major transport nodes and/or bicycles allowed onto public transport.
Development location	Out of sequence residential developments form 'dormitory suburbs'. Residents are forced to travel long distances to access facilities; public transport patronage and walking/cycling activity are low.	Strict development sequencing prevents the formation of isolated fringe residential estates. New developments are integrated with existing and planned transport infrastructure and services.

Local government cycle planning

Local Network Plans are tools that may assist developers to contribute to the local bicycle network. A comprehensive Local Cycle Network Plan can be used to develop assessment and infrastructure changes. Cycle Note A3 - *Funding mechanisms for cycling infrastructure* has detailed information on Infrastructure Charging Schedules and Priority Infrastructure Plans and their relationship with local cycle network planning. Cycle Note A4 - *Developing a local cycle strategy and local cycle network plan* is a guide for developing a local cycle network plan. It is also important that cycle routes and network plans for new developments are included within local and regional cycle network plans to ensure connectivity with the surrounding area.

Research case study

In 1996, Cervero and Radisch undertook research comparing two neighbourhoods in the San Francisco/Oakland region. The first, Rockridge, was an older, compact and mixed-use neighbourhood built with many traditional transit-oriented design principles (Figure 1). The second, Lafayette, was a post-WWII suburban community with car-oriented retail strips and plazas (Figure 2). The two were similar geographically and demographically and both lay on the same railway line.

Figure 1: Rockridge.
(Source: Cervero, 1997)

Figure 2: Lafayette.
(Source: Cervero, 1997)

Rockridge is considered to be a pedestrian-friendly environment. The neighbourhood is linked by an integrated network of roadside and off-road footpaths generally lined with shade trees that connect residents to key destinations (e.g. the railway station and local shops). Land uses are frequently mixed and shopfronts are designed at the pedestrian scale. Almost all parking is accommodated on the street or behind the buildings. In contrast, Lafayette's network of footpaths and off-road paths are not as well integrated or efficient at connecting residents to key sites. There is little mixing of land uses to create an interesting pedestrian environment. The built environment accommodates the car better than it does walking or cycling.

These contrasting built environments influence the instances of walking and cycling in their respective communities (TALC, 2002). By surveying residents in each neighbourhood, researchers found that the proportion of pedestrian and cycling trips made in Rockridge, the traditional neighbourhood, was 16%. This compared with only 4% in Lafayette. For non-work trips under one mile in length, 28% were conducted on foot in Rockridge, while this figure was only 6% in Lafayette (Cervero, 1997).

Yencken and Mees (1994) used this approach to compare the traditional mixed use environment of Melbourne's Albert Park with the suburb of Blackburn. Again, despite similarities in income and demography, more non-motorised trips were made in traditional transit-oriented Albert Park.

These studies demonstrate that subdivision design serves to integrate pedestrian and bicycle networks with public transport and community facilities. This encourages connectivity between residential and mixed land use areas, delivering a higher proportion of non-motorised trips.

Other aspects of new developments

Planning new developments should take account of the following:

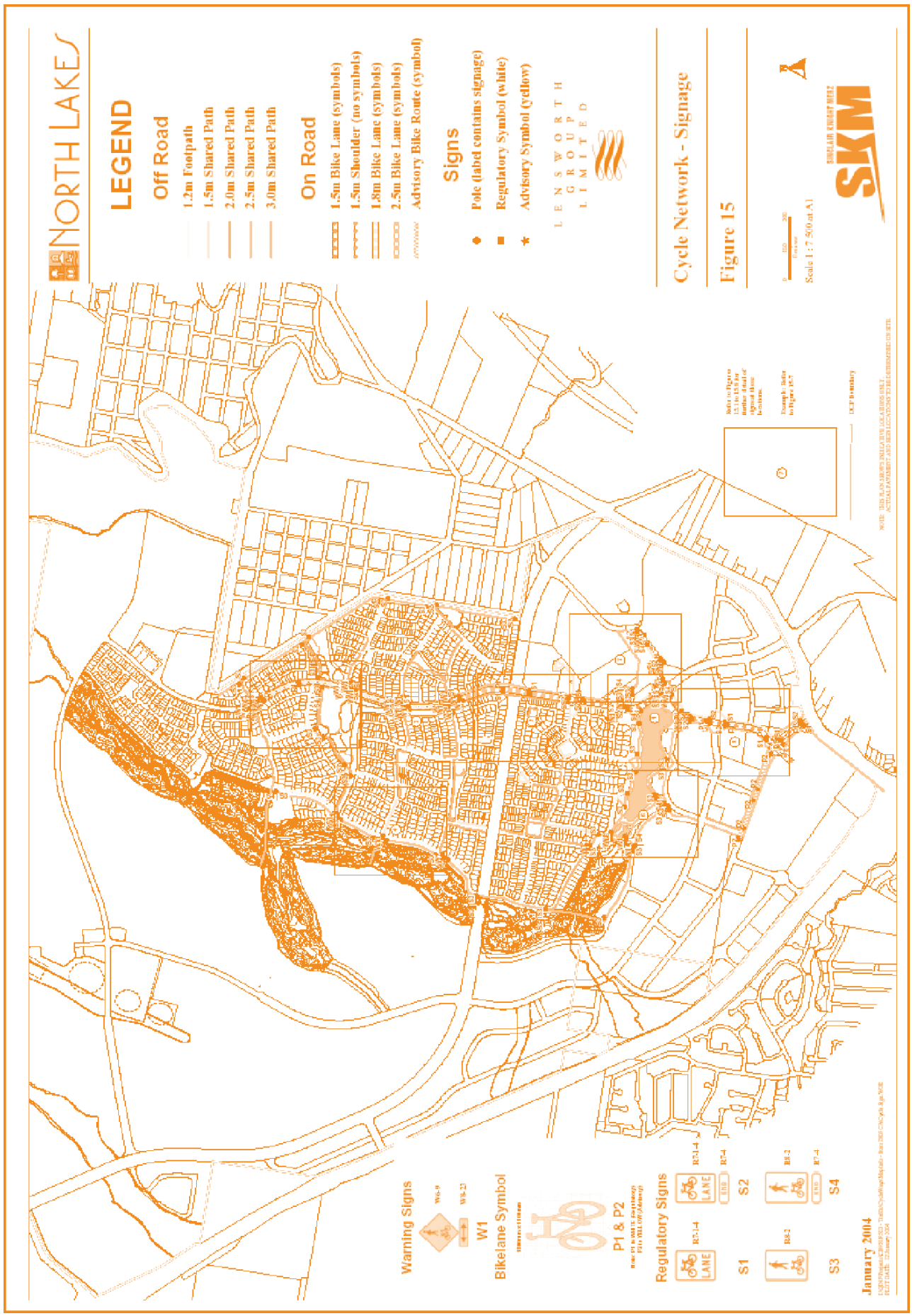
- in-fill developments increase pedestrian and cycle route options by providing new routes and facilities
- gated communities prevent through-movement on foot or by bicycle
- bicycle and pedestrian infrastructure planning should consider personal security. This means paying attention to lighting and surveillance of paths and bicycle parking facilities, and following *Crime Prevention Through Environmental Design* (CPTED) principles
- bicycle and pedestrian crossings at major roads should coincide with desire lines and be designed in accordance with *Austroads Parts 13 and 14*
- buildings and their entrances are oriented towards footpaths and are scaled to the pedestrian
- car parking at the front of buildings should be limited to improve the aesthetics of the streetscape and giving prominence to cyclists and pedestrians
- on-road and off-road bicycle facilities are considered essential infrastructure and are put in place in the early stages of development, rather than being retro-fitted.

Queensland examples

There are a number of excellent examples of Queensland subdivision designs that integrate cycling needs into land use planning:

- *North Lakes Cycle Network Planning*, Sinclair Knight Merz and Lensworth North Lakes Pty Ltd. This master-planned community incorporated a bicycle network early in subdivision design leading to the establishment of over 40 kilometres of bicycle and pedestrian paths. On-road routes are also incorporated (see Figure 3).

Figure 3: North Lakes Cycle Network Plan



- *Cutters Landing*, Mirvac Group (see Figure 4). This in-fill urban renewal development in Brisbane City has assisted in both extending an important riverfront shared path and increasing opportunities for cyclist through movement on a constrained site. By way of development, negotiations and conditions, the developers have contributed a key section of riverside pathway that forms part of Brisbane City Council's *RiverWalk* project. The shared path is 5.5 metres wide, well-lit and has seating at vantage points along the boardwalk. The project demonstrates the importance of establishing a Local Cycle Network Plan to promote future route development opportunities.

Figure 4: Cutters Landing, Brisbane City – an example of in-fill development providing for new bicycle links and route options.

Other references

1. *Shaping Up – Shaping urban communities to suport public transport, cycling and walking in Queensland*, Queensland Transport and the Department of Main Roads, Brisbane, 1999.
2. Cervero, R. (1997). *Paradigm Shift: from automobility to accessibility planning*. Urban Futures 22 (June): 9-19.
3. Yencken, D. and Mees, P. (1994). *Comparative Residential and Travel Survey – Albert Park and Blackburn*, School of Environmental Planning, University of Melbourne, Melbourne.
4. Ewing, R.and Cervero, R. (2002). *Travel and the Built Environment: a synthesis*, Transportation Research Record 1780:87-114.
5. TALC - Transport and Land Use Coalition (2002). *World Class Transit for the Bay Area*. http://www.transcoalition.org/reports/wct/6choices.html
6. *Crime Prevention Through Environmental Design*. http://www.cpted.net/home.html

Source material and images of North Lakes were kindly provided by Sinclair Knight Merz. Source material and images of Cutters Landing were kindly provided by Brisbane City Council.

A copy of ***SHAPING UP*** in .pdf format can be obtained from the Queensland Transport website: www.transport.qld.gov.au/QT/irtpsign.nsf/index/library.

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Phone: (07) 3253 4437
Fax: (07) 3253 5858
Email: cycles@transport.qld.gov.au
Website: www.transport.qld.gov.au/cycling

Postal Address
PO Box 673
Fortitude Valley Q 4006

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