Cycling and traffic calming

Purpose

This note aims to improve understanding of the benefits and problems associated with traffic calming devices for cycling and to provide advice on treatments that consider the needs of bicycle riders.

Definitions

Local Area Traffic Management (LATM) is the re-engineering of roads in a local area to:

- redistribute traffic and perhaps reduce it in particular streets using traffic calming devices
- encourage traffic to slow down.

LATM devices are generally used on roads that have a road function corresponding to the lower-end of the road hierarchy. They are not suitable for collector-distributor roads, sub-arterials, arterials, highways and motorways.

Traffic calming encourages drivers to travel at a speed suited to local conditions. Devices used for traffic calming include:

- slow points - including central islands, pinch points and chicanes
- road humps
- road closures and one-way streets
- small diameter roundabouts
- surface treatment.

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).

Contents

Bicycle riders' attitudes towards traffic calming

- They value the improved behaviour of drivers and slower vehicle speeds resulting from traffic calming schemes
- They are concerned with treatments that result in narrower lanes that give motorists less room to overtake
- They do not like devices that require them to deviate a long way from their preferred path or slow down (especially at the bottom of steep hills) as momentum is lost for the climb.

Incorporating bicycles into LATM planning and design

Many of the concerns bicycle riders have with traffic calming are due to their needs not being considered in the early planning and design phases.

All LATM schemes should consider the needs of bicycle riders in planning and design to ensure suitable bicycle facilities are provided where necessary. This is especially important where the road forms part of a designated cycling route (i.e. is identified on the Intergrated Regional Cycle Network Plan or Local Cycle Network Plan), or will form part of one in the future. If road space for motor vehicles is to be reduced as part of an LATM scheme, then the effect on cycling should be considered. Bicycle facilities such as on-road bicycle lanes may be used in many circumstances as effective traffic calming treatments (e.g. contra-flow bicycle lanes in one-way streets). Other LATM treatments that strongly encourage cycling include bicycle boulevards and home zones (see below).

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LATM devices (and any landscaping of them), should not obstruct sightlines of cyclists, other vehicles or pedestrians.

All individual traffic calming devices should make adequate allowance for bicycles. Devices should be designed and maintained to allow cyclists to travel safely and comfortably through them at 20km/h – or at higher speeds in locations with steep downhill gradients. Where possible, treatments should be provided on an area-wide basis.

Bicycle boulevards

LATM schemes can be used to meet other transportation objectives. This includes the provision of safe and efficient commuter cyclist routes. In larger LATM schemes, bicycle boulevards may be established. The object of a bicycle boulevard is to provide a safe and direct route where bicycles have priority over cars. These facilities are of great benefit where they run parallel to busy arterial roads that are unsafe for bicycle riders.

Bicycle boulevards use traffic calming devices that restrict or prohibit vehicular traffic (but allow through bicycle traffic) to create continuous linear bicycle routes. At the same time, a bicycle boulevard continues to function as a normal local street, providing access to residences, on-street parking and unrestricted pedestrian movement. Although not necessarily part of an LATM scheme, the Brisbane City Council has used this approach to provide a safe bicycle route through local streets and parkland to the University of Queensland's St Lucia campus.

Home zones

Another LATM treatment that is especially beneficial to bicycle riders is the transformation of residential streets into shared space in line with the Dutch *woonerf* or 'living yard' approach to street design. A *woonerf* (also known as a 'home zone' in the UK), combines various traffic calming devices to create a street where there is no clear separation between space that is designated for the car and space assigned for pedestrians and other street users. The effect is to limit through traffic in neighbourhoods, reduce vehicle speeds and create street space for play and other social activity. Younger, more vulnerable bicycle riders especially benefit from this design. As yet, there are few home zones in Australia. For more details see http://www.homezonenews.org.uk/.

Treatments that assist bicycle riders at traffic calming devices

Bypasses or exclusive bike lanes that cut through a device at the same level as the carriageway are a useful means of avoiding the problems associated with traffic calming devices. The best bypasses are not textured, cobbled or slippery and do not require significant deviation from a straight line.

Where bypasses of traffic management devices are provided:

- they need to lead riders back into the flow of general traffic on the departure side of the device
- they should provide adequate clearance to obstacles (e.g. kerb and channel, trees etc)
- drainage grates should be cycle-friendly (i.e. grates with bars at right angles or diagonal to the direction of the cyclist travel to accommodate cylists), and
- drainage and cross section should prevent debris from accumulating in the bypass. Some designs may require a higher level of commitment to regular maintenance.

Avoid the following:

- single-lane devices that rely on visual obstruction for effective operation. These devices produce conditions where bicycle riders may be vulnerable. If such a device has been installed, investigate the inclusion of a bicycle bypass lane. Avoid installation of such a treatment in the first place
- devices located at the bottom of hills. These cause a loss of momentum. Install a small diameter roundabout or a bypass for bicycle riders at the same level as the carriageway
- devices that create squeeze points where the speed environment exceeds 40 km/h and particularly where motor vehicle speeds remain relatively high (60 km/h or more) as may be the case with two-lane slow points. In this case a bypass lane is recommended
- devices with rough or difficult surfaces for bicycle riders including cobbled surfaces, raised markers, steep ramps (greater than 1(v):15(h)), on-road humps and other raised devices.

Remember:

- on gentle gradients, plateau-style humps are preferred to small diameter roundabouts or slow points
- devices should use fully-mountable kerb and channel which is much more forgiving than a stone or concrete barrier kerb if the rider runs into it or needs an escape route
- all devices require adequate lighting and marking for safe night-time use
- maintain adequate sight distance for cyclists when designing for traffic management treatment.

Table 1 shows a range of traffic calming treatments and their respective issues for cyclists.

Table 1: Traffic calming treatments and their respective issues for cyclists.

Traffic calming treatment	Issues for cyclists	Alternative or solution
Slow points: - central islands - pinch points - chicanes	■ Narrow lanes may not be wide enough to allow motor vehicles to overtake safely.	■ Where high cycle use is expected, install a bicycle bypass lane. ■ Provide suitable lighting and marking. ■ Lower speed limits.
Road humps	■ Problems with profile and surface. ■ Insufficient road width in some designs.	■ Bicycle riders prefer a sinusoidal hump profile to a flat top or Watts profile. ■ Ramp gradient no steeper than 1(v):15(h). ■ Side taper gradient no steeper than 1(v):8(h) or hump not constructed within 1.0m of the kerb. ■ Surface and marking must not be slippery when dry or wet.
Road closures	■ Problems with navigation and increased trip distances. ■ May encourage cyclists to use more dangerous routes.	■ Provide a smooth, all-weather bike path through the road closure. ■ A curved path will help to slow cycle traffic for a safe approach to the through road. Do not make the radius too small to negotiate safely. A 5m radius is recommended. ■ Use signs and pavement markings to encourage bicycle riders and discourage motor vehicles. ■ Use a 2.5m wide two-way path or two 1.5m wide single lane paths depending upon site conditions.
Small diameter roundabouts	■ Require bicycles to integrate with motor traffic on approach to the roundabout. ■ It is difficult to strike a balance between narrowing the approach lane to slow vehicular traffic and providing enough space for cyclists.	■ Bypass lanes for cyclists are not safe in this application. ■ Marking a bike lane to the left of the traffic lane approaching the roundabout can cause conflict between left-turning motor traffic and through cyclists. ■ Signs and education are the best strategies: signs where cycle use is high and education campaigns targeted at specific behaviours. ■ For more information on cycling and roundabouts see Cycle Note B7 – *Cycling and roundabouts*.

Traffic calming treatment	Issues for cyclists	Alternative or solution
One-way streets	■ Problems with navigation and increased trip distances. ■ May encourage cyclists to use more dangerous routes.	■ Contra-flow cycle lane. See Cycle Note B4 – *Designing good quality on-road facilities*.

Other references

1. Traffic Advisory Leaflet 01/97: *Cyclists at Road Narrowings*, UK Department of the Environment, Transport and the Regions (1997).

2. Ciccarelli, John 1999. Bicycle Boulevardes in '*Tech Transfer Newsletter*', Institute of Transportation Studies, Technology Transfer Program, Fall 1999, http://www.its.berkeley.edu/techtransfer/resources/newsletter/fall99/bicycles.html.

3. Smith, Graham 2002. Home Zones and traffic calming: implications for cyclists, McClintock, Hugh (ed.) *Planning for Cycling: principles, practice and solutions for urban planners*, Woodhead, Boca Raton, USA.

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