

**Making space for cyclists by sharing the road ...
... Brisbane City Council's "Bicycle Friendly Zone"**

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Abstract

Government policy seeks improved road safety and more cycling and walking yet provision of cycling facilities on roads appears constrained by safety concerns. This paper outlines development of Brisbane City Council's "Bicycle Friendly Zone" - the BFZ, which drawing from international, Australian and local experience, aimed to overcome perceived constraints and provide trials to demonstrate the improved outcomes for both users and facility designers and managers in Australia's largest local authority. To encourage wider use of the concept and strategy, the paper aims to provide a brief history, clarify the concepts and outline the applications of the BFZ.

The paper and ongoing promotion and development of the BFZ concept is dedicated to the memory of Kerry Fien who, as Bikeways Planning Officer and later, Program Manager Bicycles at Brisbane City Council, undertook most of the research and negotiation for the early trials and facilitated later development and implementation of the concept. Kerry was tragically killed on September 10, 1999.

Introduction

The Cyclist's Urban Speedlimit Taskforce (CUST) was initiated by the Bicycle Federation of Australia (BFA) in

1995 to develop support for reducing the national General Urban Speed Limit (GUSL) due to recognition that the GUSL of 60km/h although apparently generally accepted by road authorities as safe, was and remains much too fast for the safety of people with access and mobility disabilities in urban areas ie the young, elderly, those with specific, degenerative, temporary or permanent disability irrespective of whether their mode is walking, cycling or use of a mobility aid.

To establish the case for lower traffic speed and the traffic and urban planning and environmental benefits that flow from reducing speed and dominance of traffic, CUST researched and produced a report *Towards a safe urban speed limit* (BFA,1996) which was officially launched at the VeloAustralis Conference in Fremantle in 1996. At that conference, Staysafe Committee Deputy Chairman, Mr Jeff Hunter MP, presented Staysafe report No 34 supporting reducing the GUSL in NSW from 60 to 50km/h. However, international cycling engineering, mainly based on extensive research in the Netherlands, accepts that 50km/h is too fast for cyclists and that speeds of 30km/h are regarded as "safe" as Staysafe Chairman, Mr Paul Gibson MP, confirmed during his visit to Europe. *Towards a safe urban speed limit* provides an extensive examination of the issues together with a considerable reference list and examples of how lower speed can, and has been shown to, produce a "safe" urban traffic environment.

CUST has both an advocacy and a monitoring role. CUST has been represented at local, regional and national levels in Australia and internationally, including attending the international VeloAustralis Conference in Fremantle in 1996, international Velo-City Conferences in 1995, 1997 and 1999 (in Graz, Austria, the first city in the world with a 30km/h GUSL) and in June 2000, as a panellist, at VeloMondial 2000 in Amsterdam.

Despite technical knowledge being available in Australia, it appears that the interests of cyclists continue to be excluded by many "experts" whose concerns for road safety appear to reduce, rather than endorse, opportunities for cycling.

CUST seeks a safer urban road environment for all road users thus improving road safety for cyclists. By so doing, current traffic and transport engineering views of road use and road safety are challenged to encourage new ways of traffic management which can achieve more walking and cycling by integration of the many seemingly conflicting goals in support of the many and various policy goals.

The "Bicycle Friendly Zone" concept which is the focus of this report offers many and varied opportunities for integrating cycling into "mainstream" traffic management and urban design practice both safely and at low cost. The paper assumes that the policy setting and reasons for ensuring cycling is included rather than excluded, ie the "problems", are recognised and accepted. These issues and their relationship to the BFZ concept are addressed in a related report, *Making space for cyclists ... a matter of speed?* (Yeates,2000).

Suffice to note that, despite cycling being a major mode of transport previously, and unlike for example the Netherlands where efforts have been made to maintain cycling, the Australian urban setting failed to include cycling which, as it increasingly became both less valued and more dangerous, soon reduced. Trips such as those to local work, school, shopping or public transport all but disappeared. It is the "easy" trips to these destinations that must be made sufficiently "safe" people can again choose to undertake them by walking or cycling.

Cities such as Brisbane and Sydney, with their narrow roads, therefore face an almost impossible task in providing for cyclists unless a consistent means for sharing the existing road space can be employed. The other options are simple ... lower speed (see *Towards a safe urban speed limit*) or reduce or reallocate existing road space for walking or for other traffic as in Melbourne and Adelaide (Bicycle Victoria,1996). Thus, rather than continue allowing motor traffic to dominate urban areas, non-motorised accessibility, mobility and permeability should be more dominant thus reflecting, according to Brindle (1984), the ubiquity of walking and cycling. Despite a second national cycling strategy *Australia Cycling - The National Strategy 1999-2004*, Australian design standards-guidelines (AUSTROADS Part 14), concerns about urban road injury and fatality costs (*National Road Safety Strategy*), and obligations to reduce greenhouse emissions and to improve health, wellbeing and equity, it is the road authorities, local authorities and road safety authorities which remain challenged to include cycling even when apparently ideal opportunities occur.

Where to "start" first?

As much urban congestion results from local trips and these are induced by the relative perceived safety and convenience of using a car, the trips to local common destinations must be made sufficiently "safe" that people again choose to undertake them by walking or cycling eg to local work, school, shopping or public transport and

various combinations thereof which, in the Netherlands, are described as links in various individual "trip chains". All provide opportunities for "starting" cycling. Many specific opportunities and constraints exist and these are addressed elsewhere (Yeates,2000). The BFZ concept aims to overcome the constraints and to take advantage of the opportunities by increasing the "safety+convenience" for all modes. Arguably, either explicitly through regulation (eg cycling prohibited) or implicitly (eg road conditions obviously very threatening), "safety+convenience" is rarely assessed for all modes. Including cycling is therefore a challenge, even in the typical main street or school precinct where cycling might most likely be encouraged.

The problem in Brisbane and Sydney is relatively simple. At 60km/h, there is adequate space on the roads for either one lane each way for traffic with kerbside parking or for two lanes each way for traffic but with no parking. However, there is then no space for cyclists if roads are marked according to conventional road markings and designed to AUSTRROADS Part 14. Footpath cycling is therefore common, whether legal (eg in Queensland) or illegal. Thus rather than the traffic safety issue arising from conflict between pedestrians and cyclists as occurs on footpaths and bikepaths, the conflict is between potentially high speed traffic (allowed to travel at speeds of 60km/h or more on urban roads and streets) and cyclists (whose normal speed varies between 15 and 30km/h). Arguably provision of facilities or conditions which are sufficiently "safe+convenient" for cyclists on roads would encourage most cyclists to use roads. Where footpath use is banned, failing to provide such facilities or conditions effectively bans cycling, and therefore appears to be completely contrary to both National Cycling Strategy and road safety goals. Hence, to suit optimum desire lines for cycling, where cyclists are banned from footpaths, "safe+convenient" facilities and/or conditions on roads should be mandatory.

A concept from Denver, Colorado USA

During the VeloCity conference at Basel, Switzerland in 1995 (and again at VeloAustralis in 1996 at Fremantle), James Mackay, Bicycle and Pedestrian Planner for the City of Denver, Colorado, in a paper on "Bicycle-friendly infrastructure", identified the success of pavement markings in Denver which indicate *"the likely travel corridor for bicyclists"* using symbols and *"arrows in 'shared use' lanes where there is not sufficient width to provide bicycle lanes or sufficient bicycle usage to justify adding bike lanes"*. While recognising *"many traffic engineers and beginner cyclists want all cycling to take place off-street"*, Mackay notes that *"(s)eparate bikeways within street right-of-ways pose special problems at intersecting streets and driveways (and doors and gateways). The physical separation creates the **illusion** that motorists and bicyclists don't need to keep track of each other. Motorists frequently forget that there is two-way bicycle traffic when turning, and bicyclists focus on continuing straight ahead when they should be scanning for turning automobiles."* Thus identifying *"the likely travel corridor for bicyclists"* is a major road safety benefit. The symbol has become known as the "bike in the house". Its use, having proved successful, is now in the early stages of a national trial and research program.

Bicycle friendly streets in Brisbane

After many years of inability to introduce bike lanes in Brisbane due to road width and parking constraints and following the implementation of a major permanent trial project using bike lanes which resulted in severely reduced parking and access for residents and businesses, a series of "trial" projects of other alternatives commenced. These initially included several variations of wide shared parking lanes. However, as with other bike lane combinations, typical restricted road space resulted in the bike space being too narrow. This potentially requires cyclists to suddenly leave the bike lane and enter the adjoining traffic lane to avoid sudden or unforeseen events (eg a car door being suddenly opened or broken glass on the "unswept" area) and thus, as the edge line dividing the cyclists from the traffic creates false expectations, increases the likelihood of crashes in circumstances unable to be expected by drivers or cyclists. The currently used minimum width of traffic lanes also creates a speed environment which encourages higher rather than lower speed. To overcome these problems, Brisbane City Council agreed Mackay's Denver concept might be useful to endorse cycling without bike lanes by use of symbols to identify *"the likely travel corridor for bicyclists"* and, following development of an initial protocol, agreed to trial the concept.

The construction of a \$4m major "green" (cycling and walking only) bridge at Indooroopilly created the need for quality infrastructure support on both approaches. The southern approach has little regular parking and hence combinations of bike lanes with and without parking restrictions were implemented. The northern approach is quite different however. It connects into a congested area with shops, a major suburban railway station and multiple land uses and road users; a classic and complex "main street" problem area. By retaining kerbside car parking and providing "endorsement" for cyclists by a system of "symbols", it was agreed the concept developed by Mackay could potentially assist in providing "interim" space for cyclists by marginally slowing the traffic and avoiding the problems associated with narrow bike lanes.

Crucial to the implementation of the trial, research by Council's Bikeways Planning Officer showed support for the concept, in particular that encouraging traffic to travel closer to the centreline would encourage lower traffic speed and decrease, not increase, crash risk. For the drivers of larger vehicles such as buses and trucks, the presence of cyclists and the indication of the space required for them provides a guide to the actual space even allowing for over-runs at corners, bends and intersections. In effect, the concept of the symbols acting as a system is similar to but much more adaptable than the advisory bike lanes commonly in use in Europe.

The BFZ symbols show "*the likely travel corridor for bicyclists*". Where desirable to reduce traffic speed and maintain a narrow lane, legitimating cyclists' presence is important to motorists, warning them to expect cyclists and confirming that cyclists are legitimate users of road space. In Brisbane, the initial "trial" involved use of symbols in support of bike route signs (AUSTROADS Part 14). The benefit of identifying space for cyclists has increasingly broadened use of the symbols in other ways including in particular to support 50km/h on "roads" and through shopping centres and at squeeze points. Other applications could also include in or along bus lanes.

Although the idea of the concept of "bicycle friendly zones" was developed in Brisbane by Brisbane City Council and CUST from experience in Denver, in fact, symbols may have been similarly used on streets by local authorities for many years (see AUSTROADS Part 14). The fundamental issue is simple in principle. As cyclists are entitled to use the road system, road authorities should include, not exclude, cyclists safety and legitimacy in road and traffic design on all road corridors by maximising "safety+convenience" for all road users including cyclists ie by sharing the road space.

Sharing a main street in practice

"Advisory" bike lanes [ie where other traffic is also permitted to travel] are not included in Australia's guidelines (AUSTROADS Part 14) although various forms of advisory bike lanes are frequently used in Europe to confirm the location and space for cyclists where bike lanes would be unsuitable or inappropriate. They also act to endorse the presence of cyclists and increase motorists awareness. Using Mackay's "concept", it was agreed the standard AUSTROADS "bicycle" symbol was the most effective means to endorse the cyclist's "travel corridor". Hence the BFZ uses standard road marking stencils, nominally 1200 and 1500 wide in yellow, the advisory colour, to differentiate them from the white mandatory bike lane symbols.

The next issue to resolve was location. The principle concept aims to maximise the space for cyclists by encouraging kerb side parking close to the kerb and through traffic to drive as close as possible to the centreline. Thus, where parking is allowed or likely, symbols should be 1800-2000 from the kerb. Where "no parking", symbols are closer to the kerb. Contrary to initial concerns that head-on crashes might increase if traffic was closer to the centreline, the literature search referred to above suggested travel speeds would tend to reduce and thus crashes could reduce. This replicates Dutch strategies where centrelines have been removed. Where the speed limit is 60-70km/h, it was decided symbols should be 3000 from the centreline despite wider vehicles than cars tending to over-run the symbols. In areas where the speed limit is 60km/h but lower speeds would be appropriate and in 50km/h or lower speed zones, 2700 or less was chosen. In all cases, the symbols indicate the BFZ with an adjoining through traffic area which is as narrow as practical to encourage lower traffic speed.

Typical Brisbane roads are approx 12-12.5m. Each direction has a parking zone 1800-2000 and a through traffic zone 2700-3000 with the space between, the BFZ, maximised and occupied by the symbols, 1200-1500 wide. The symbols, repeated at regular intervals, thus provide Mackay's "*likely travel corridor for bicyclists*", in a space 3900-4200 wide which allows sharing the road including at traditional "squeeze points".

BCC has increasingly installed left edge or continuity lines along its more major single lane each way roads in an effort to delineate the traffic space and the parking space where travel by vehicles other than bicycles is illegal. However, this line is most confusing in regard to making clear to motorists where cyclists are entitled to travel. As with bike lanes, this line creates an expectation of separation or segregation which is neither legally correct nor appropriate from a safety perspective. In fact, cyclists can travel either side of edge lines. Placing regular breaks in these lines in which to locate yellow "symbols" certainly clarifies these issues while, as above, also making space for the cyclist. Many such roads now incorporate edge lines with yellow symbols. This has also proved to be a useful and in some cases exemplary means of supporting the 50km/h speed limit on roads which are sub-arterial in function but where 50km/h or less is appropriate eg in school zones and through strip shopping centres.

Thus, since 1996, the BFZ concept has been developed and extended in many areas in Brisbane due to the very low cost and high benefit. It has been used in conjunction with edge lines and in entry and exit areas to

roundabouts to identify what appear to be bike lanes but are simply markings encouraging vehicles not to over-run them. Using the BFZ system of symbols in 50-60km/h speed limit areas avoids the duplication of clearances and therefore wider road space necessary for exclusive segregation as in bike lanes. Using the symbols rather than bike lanes assists in achieving both speed reduction and "extra" space, both of which improve and endorse cycling by identifying the "corridor" and endorsing current cyclists.

In practice, the concept was initially applied along identified bike routes (AUSTROADS Part 14). However, with increasing recognition of both the practicality and the adaptability of the concept, the use of systems of the "symbols" has spread resulting in many examples of their use throughout Brisbane and also on the Gold Coast. Although by no means final and always subject to specific site conditions, the protocol developed has the following characteristics where traffic speeds are up to 70km/h. To reduce through traffic speed and to encourage traffic to travel close to the right of the kerbside lane or close to the centreline, the through lane width should not exceed 3000 (preferred 2700 in 50 and 40km/h areas). The symbols should always be 1200 wide (preferred 1500) and parking space should not exceed 1800-2000. Thus a typical urban 12m wide road in a 40-50-60km/h "mixed" traffic environment would have 2700 (traffic) 1500 (symbols) and 1800-2000 (for parking, buildouts etc) while a through road would have 3000 (traffic) 1200-1500 (symbol) and 1800 (parking and buildouts).

Clearance at buildouts and intersections (eg in all kerbside lanes) is crucial to avoid constructing "squeeze points" which require cyclists to take up a position in front of faster flowing traffic on the approach to the squeeze point, eg at refuges, buildouts, intersections and notoriously, roundabouts. In practice, roads can easily be assessed for suitability using basic tools (eg a length of light rope with appropriately located knots) and designs for roads and intersections subject to audit by ensuring that the minimum width (3900-4200) is always maintained and that the cycle space is marked by symbols at road narrowings, squeeze points etc.

Thus, while closely related to issues regarding speed limits, the issue of "endorsing" both the presence of, and space for, cyclists requires clearly marking space for cyclists on the road surface using a consistent but flexible system. Clearly, the BFZ is not an engineering facility but rather it acts as a warning, promotion and/or advisory device. Equally clearly, the cycling space, the BFZ, must be located on the road and integrated into the road management system with sound cycling knowledge and experienced engineering judgement. Like its "advisory" bike lane counterparts elsewhere, the BIZ and "the bike in the house" provide a useful facility which requires and encourages sharing the road. This is especially true where narrower road environments are deliberately sought to support lower speed of traffic.

The BFZ concept is being widely promoted as an option which, being both advisory and very supportive of cycling with more safety, can be readily implemented in a variety of situations. However, for consistency and ongoing development, the BFZ should only be installed in accordance with the basic concepts. Hence, as the major concept is sharing the road, the BFZ should never be used in association with or confused with facilities that look like bike lanes. The minimum size of the BFZ symbol (1200) can help ensure the BFZ protocol is followed. Similarly, BFZ should always use yellow symbols in recognition of its non-regulatory, advisory function.

The flexibility inherent in the BFZ or "bike in the house" concept is that, unlike bike lanes which have edges that encourage territoriality and prove difficult to design for continuity as at intersections, the BFZ encourages sharing of the road space and hence, as experience increases, all modes can better share the road.

The adaptability is shown by the following brief list of BFZ applications to date which includes:

- bike route identification in addition to AUSTROADS Part 14
- quality assurance to avoid creating "squeeze points" and "black spots"
- audit tool to detect proposed or existing "squeeze points" and "black spots"
- roads ranging from local streets to 70km/h multi-laned arterials
- bridges where width is limited
- shopping centres where pedestrian crossing and through traffic speed conflict
- standard designs for pedestrian crossings, refuges, "squeeze points" and buildouts
- standard designs for intersections, traffic lights and roundabouts
- support for 50km/h and lower speed limits on arterial type roads (eg school zones)
- "bicycle friendly" traffic calming and speed management devices
- parking management, parking discouragement and bus stop marking

Conclusion

Brisbane's "Bicycle Friendly Zones" developed the concept of the "bike in the house" from Denver to indicate "the likely travel corridor for bicyclists" using symbols on the road pavement "where there is not sufficient width to provide bicycle lanes or sufficient bicycle usage to justify adding bike lanes" while recognising "many traffic engineers and beginner cyclists want all cycling to take place off-street". Despite frequent use in Europe to confirm the location and space for cyclists, Australia does not have authorised "advisory" bike lanes which, like regulatory bike lanes, provide boundaries and thus do not encourage sharing the road. Hence, given Brisbane's typical narrow roads, it was agreed to develop the Denver concept to endorse the presence of cyclists and increase motorists awareness. It was agreed the standard "cycle" symbol was the most effective means of endorsing the cyclist's "travel corridor" using standard road marking stencils 1200 and 1500 wide in yellow, the advisory colour, to reduce any confusion with the white mandatory bike lane symbols.

The next issue to resolve was location. The obvious protocol seemed to be to encourage kerb side parking close to the kerb and through traffic to drive as close as possible to the centreline. Thus, the BFZ indicates the 1200-1500 wide space between the kerb or where parking is allowed and the area for through traffic which is as narrow as practical to reduce traffic speed despite wider vehicles than cars tending to over-run the symbols. In all cases, the symbols are intended to indicate a narrow through traffic area to encourage lower speed.

Since 1996, the approach has been developed and extended in many areas in Brisbane due to the very low cost and high benefit. It has been used in conjunction with edge lines and in entry and exit areas to roundabouts to identify what appear to be bike lanes but are simply markings encouraging vehicles not to over-run them - thus creating space for cyclists. Using the system of symbols in 50-60km/h speed limit areas avoids the duplication of clearances necessary for exclusive segregation as in bike lanes. Using the BFZ symbols rather than bike lanes assists in achieving both speed reduction and "extra space", both of which improve and endorse cycling by identifying the "corridor" thus improving "safety+convenience" and endorsing current cyclists on high profile main road routes at relatively very low cost. By sharing the road space and reducing traffic speed, the BFZ concept provides a successful application of the principle "if there is no space for cyclists, slow the traffic".

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