



Design Innovations Working Group



Practice Note: Contraflow Cycling in Quiet Streets

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August 2022



Photo credit: Department of Transport Western Australia

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01 INTRODUCTION

Under the Australian Road Rules, cyclists can be exempted from one-way travel restrictions through the provision of a “Bicycles Excepted” sub-plate [R9-3]. This can accompany provision of a contraflow bicycle lane, but the Australian Road Rules do not specify that a bicycle lane must be provided.

Overseas evidence indicates that allowing two-way cycling in one-way streets without a contraflow bicycle lane can improve cyclist safety. This applies in streets where the traffic environment [low speed, low volume] presents a low risk. In such streets, contraflow provides cyclists with alternatives to busy roads, and by encouraging them to use the road pavement also reduces footpath conflicts with pedestrians.

To date, this form of signage-only contraflow provision has not been implemented on a widespread basis in Australia, however it is desirable that this occurs for both safety reasons and as an inexpensive way of increasing the connectivity and convenience of the street network for cyclists.



Photo credit: Department of Transport Western Australia

Most Australian technical guidance [such as Austroads’ Guides to Traffic Management and Guide to Road Design] only applies to contraflow cycling facilitated by bicycle lanes, although the NSW RMS Technical Direction “Signposting for contra-flow bicycle facilities” [TTD2014/002] notes that bicycle lanes do not have to be provided. This Practice Note is intended to highlight the potential use of cyclist contraflow in quiet streets without provision of a contraflow bicycle lane, by presenting best-practice technical advice not documented in other Australian literature.



Photo credit: Department of Transport Western Australia



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02 BACKGROUND

One-way traffic restrictions generally exist on:

- **Major roads:** to maximise and regulate traffic flow. Traffic volumes and speeds are high and formal contraflow bicycle lanes should be provided if safe, alternative routes are not available. These roads are not the subject of this Practice Note; other technical advice regarding contraflow bicycle lanes applies.
- **Quiet streets:** typically residential, in the interests of road safety and to prevent rat-running. This creates inconvenience for and deters local cyclists, however traffic volumes and speeds are low. These streets are the subject of this Practice Note.

The type of contraflow covered by this Practice Note involves permitting contraflow in quiet streets through signage and without a formal contraflow lane.

Permitting
contraflow in
quiet streets
through signage
and without a
formal contraflow
lane

03 THE EVIDENCE

As a practice, contraflow cycling in quiet streets without contraflow bike lanes is widespread in Europe and Japan, and has been implemented in various locations in Australia [some examples are provided in the Appendix]. Where it has been allowed, studies have shown no negative and some positive impacts in cyclist safety. In Australia, no safety studies are known to have been undertaken regarding this form of contraflow treatment, but no safety issues have been reported by road authorities where the treatment has been used.

Two major pieces of overseas research support this contraflow approach.

1. The German Federal Road Research Institute examined traffic safety in 30km/h one-way streets, where contraflow bicycle traffic permitted by signage only was being trialled [Alrutz et al., 2002].

- There were very few crashes. 80% of streets had no crashes over a 3 to 4 year study period.

- 60% of contra-flow cyclists used footpaths before being exempted from one-way provisions. This decreased to 20% afterwards, reducing footpath crashes [mainly with pedestrians].
- The crash density in the 669 one-way streets studied decreased slightly once contraflow cycling was allowed, and was lower than in nearby two-way streets. Crash severity also decreased.



Photo credit: Department of Transport Western Australia

- A detailed before and after study of three test areas in Frankfurt am Main identified network-wide safety improvements as bicycle traffic transferred from busy main streets and arterials to quieter one-way streets having bicycle exemption.

Research by the German Insurance Association [2016] has since found that only one in three collisions on streets with contraflow cycling involved a cyclist riding against traffic.

1. The Belgian Highway Code first allowed road managers to authorise contraflow cycling in one-way streets without contraflow bike lanes in 1991. When the measure was not widely embraced, despite research indicating its safety, the Minister of Transport and Mobility mandated contraflow cycling in one-way streets, applying from 1 July 2004. Dupriez [2009] examined crash data for six municipalities of the Brussels Region from 2005 to 2007.

Within this region, the urban speed limit is 30km/h; the measure is also used in other regions, where the speed limit is 50km/h.

- 165 crashes were recorded, of which sixteen were in/at an intersection with a contraflow one-way street. The cyclist was not riding in the contraflow direction in eight of these cases; the direction of travel of the cyclist was unclear in five cases; and the cyclist was riding in the contraflow direction in three cases.
- The crash causes for the three cases of contraflow cycling were similar: the driver failing to yield to a cyclist. In two of these cases, infrastructure could have given the driver the perception that the cyclist should yield.
- Compared to the rest of the road network, the crash rate for contraflow one-way streets was lower in terms of both crashes per km [0.18 compared to 0.28] and crashes per section [0.022 compared to 0.049]. The crash risk for cyclists travelling in the contraflow direction was even lower, but not statistically reliable due to the low numbers.

Dupriez concluded that contraflow cycling without contraflow bike lanes was a road safety solution.

In addition, France and the UK have undertaken safety reviews of trials of the practice, with both finding [very] low safety risks.

- France mandated contraflow cycling in quiet streets in 2008 after trialling the measure near and then in Strasbourg. Of 4,004 road collisions in Strasbourg from 1997 to 1999, 452 involved a cyclist, of which five involved a cyclist travelling contraflow. All occurred at intersections. Considering the large number of contraflow schemes implemented, the crash risk from contraflow cycling without contraflow bike lanes was assessed to be [very] low.



MVA Consulting [2010] reviewed trials in two UK boroughs involving streets zoned 30 mph [48 km/h] with cycle markings at the entry but no contraflow bike lanes. A review of European evidence disputed the assumption that crashes were higher at intersections, while the primary research found: low crash risk; no injuries from conflicts between cyclists turning into the street and vehicles on the street, nor between vehicles illegally turning into the street and other vehicles; where collisions did occur, these largely did not involve cyclists and were not due to the street layout or signing regime.

04 TECHNICAL ADVICE

As noted, technical advice regarding contraflow cycling without contraflow bike lanes is not included in Austroads Guide to Traffic Management Part 8 [7.5.3] or the Guide to Road Design Part 3 [4.8]. NSW RMS Technical Guidance TTD2014/002 states that “If the road space is too narrow to permit a marked bicycle lane and there is good sight distance, motor traffic volumes and speeds are low and the road geometry does not present an unacceptable safety risk, the contraflow movement can be provided by signage alone.”

The technical advice provided in this section is derived from overseas guidance. Examples of Australian installations are provided in the Appendix for further reference.





Photo credit: Department of Transport Western Australia



Photo credit: Department of Transport Western Australia

05 INDICATIONS

The treatment is recommended for streets where[1],[2],[3]:

- Vehicle volumes are under 1,000 vehicles per day.
- 85th percentile speeds are up to 40km/h and/or the posted speed limit does not exceed 30km/h
- Heavy vehicle volumes are low, with no bus traffic.

In these situations, the evidence for safety improvement is such that if the treatment is not used, traffic managers are advised to prepare a Traffic Impact Statement in support of the decision.

No minimum street width has been identified for contraflow cycling without a contraflow bike lane. Research indicates that the narrower street, the slower traffic flows and hence the safer conditions are for cyclists. Very narrow streets [less than 3.0m wide] may not meet cyclist needs regarding comfort and speed, and routes involving such streets may have a diminished level of service.

Nonetheless, contraflow cycling in narrow streets with low volume and slow traffic is still advised where this avoids detours.[4]

Wider streets [5m and over] should be able to accommodate contraflow bike lanes. This is advised for reasons of traffic calming/speed control; or other traffic management devices should be considered to ensure traffic speeds are kept to indicated levels.

The narrower street, the slower traffic flows and the safer conditions are for cyclists.

1) TRL [1998].

[2] FGSV [2010].

[3] PRESTO [n.d.]

[4] PedBikePlanner [2019].

[5] Certu [2009].

The treatment can be considered for streets where^[1]:

A

- Vehicle volumes are under 1,000 vehicles per day.
- Heavy vehicle volumes are low, with no bus traffic.
- 85th percentile speeds are over 35km/h and/or the posted speed limit exceeds 30km/h - in conjunction with traffic management that aims to produce an 85th speed limit below 35km/h; and/or a reduction in the posted speed limit to 30km/h.

B

- Vehicle volumes are between 1,000 and 5,000 vehicles per day.
- 85th percentile speeds are under 35km/h and the posted speed limit does not exceed 50km/h
- Heavy vehicle volumes are low, with no bus traffic.
- Street width is below 3.5m.

The treatment is also appropriate for “false” one-way streets [where a street can be used by cars in both directions but entering the street is forbidden from one side], subject to the same preceding indications.

Whether recommended or considered:

- Intersections should be reviewed to ensure no safety issues exist and sufficient ranges of vision exist to ensure safe and smooth traffic for all transport users, with remedial treatment applied as required.
- Maximum benefit occurs with widespread, across-the-board implementation of the practice in suburbs and/or municipalities as this provides drivers with a consistent treatment throughout the street network. This also maximises the network benefits to cyclists.⁰⁵

¹ Certu [2009].

06 IMPLEMENTATION AND DESIGN

Under the Australian Road Rules, the only infrastructure required to exempt cyclists from one-way restrictions is the “bicycles excepted” subplate [R9-3], which must be affixed beneath “one-way” [R2-2] and “no entry” [R2-4] signage, including at mid-block locations where a side street joins a quiet one-way street. While not required by legislation, bicycle logos with an arrow in the contraflow direction should also be provided at these locations, to advise/ remind drivers to expect two-way bicycle traffic and to locate appropriately. See Figures 1, 2 and 3 for examples of contraflow streets.



Figure 1. Contraflow cycle provision in a quiet one-way urban street, Belgium. Source: PRESTO [n.d.]



Figure 2. Contraflow cycle provision in a quiet one-way street, Sydney. Source: NSW RMS Technical Guidance TTD2014/002.



Figure 3. Contraflow cycle provision in a quiet one-way residential street, Germany. Source: Fay Patterson.

Other measures can/should be considered on a case-by-case basis:

- Belgian practice [Figure 4] suggests a white-on-green logo is desirable where a quiet contraflow treatment exits onto a two-way street, to further highlight the treatment.

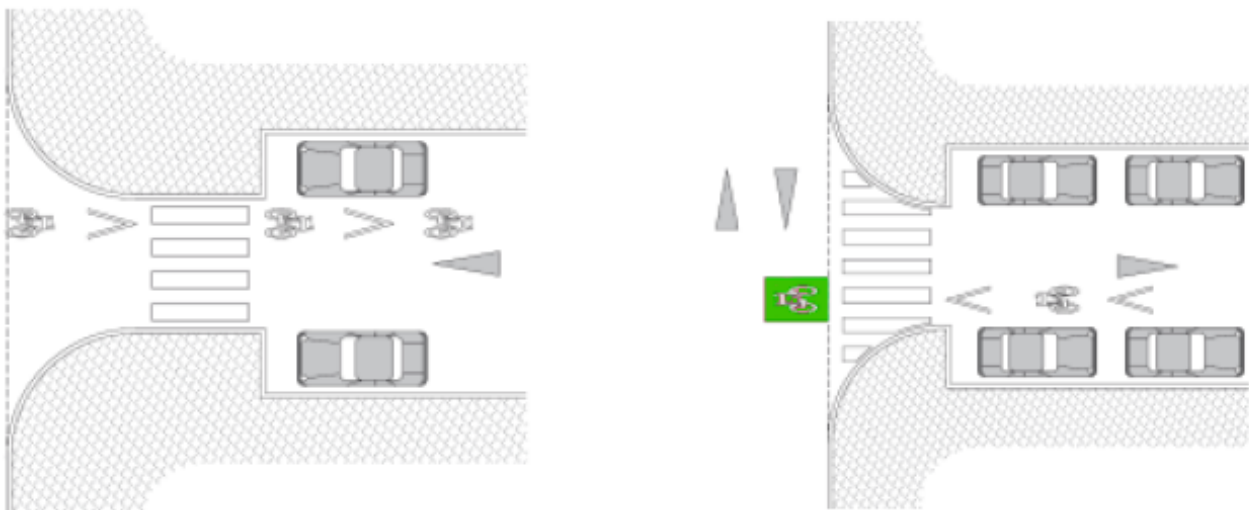


Figure 4. Example of contraflow bike lane in Belgium. Solid triangle marking shows direction of traffic flow

- Removal of a car park and installation of kerb extensions in the contraflow one-way streets at intersections, to improve visibility [as shown in the Belgian practice above]
- Lane separation [e.g. a short section of advisory contraflow bicycle lane] at intersections
- Placing on-street parking on the contraflow side of the one-way street – unused on-street parking and entrances to adjacent properties provide opportunities for cyclists to get out of the way if they encounter oncoming traffic
- Contraflow space at road bends [Figure 5]: in these locations, drivers may feel safe because there are no oncoming cars, and therefore cut the corner. Advisory road markings, including audio-tactile line marking where this does not cause a hazard, should be used to alert motorists to the traffic path of contraflow cyclists and warn contraflow cyclists to exercise care.



Figure 5. Contraflow space at road bends. Source: PRESTO [n.d.]

- Where a tight radius turn is required to enter the facility and a physical divider is placed near the entry point, additional width should be given to allow for turning error – if a cyclist miscalculates the appropriate line around the curve, a divider where the cyclist is still on a lean can cause evasive action, in turn resulting in the cyclist overshooting the required entry line.
- Where kerb separation or a physical divider is used, intersection areas should be adequately lit and/or have visibility aids installed on the approach, as infrastructure can pose a safety risk to cyclists.
- Advisory contraflow lane marking at larger and/or two-way side streets – to encourage drivers entering/exiting the one-way street to look for and yield to cyclists travelling in the contraflow direction.

07 REFERENCES

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APPENDIX 1: EXAMPLE CONTRAFLOW INSTALLATIONS IN AUSTRALIA AND NEW ZEALAND

This section presents different approaches taken to contraflow cycling without bicycle lanes in quiet streets. Distinctive features are noted in the title. The examples are roughly arranged in the order of greatest infrastructure intervention to least, with “false” one-way contraflow examples provided after full one-way street treatments. This is not an endorsement of more infrastructure over less; each case should be considered on its merits and infrastructure can itself form a hazard.

In the title comments, “entry” means the entry direction for contraflow cyclists, which is the end of the one-way treatment signed with “No Entry” signage. “Exit” refers to the side signed with “One-way” signage, where this exists [one-way signage is not provided as part of “false” one-way streets].

Charlotte Street, Adelaide, South Australia – physical separation at both entry and exit; contraflow warning sign at exit. Note: physical separator at entry can make it hard to enter if turning left into the treatment. Photo credit: Fay Patterson



Nash Street, Brunswick, Victoria - advisory bicycle lane at entry, physical separation at exit.
Photo credit: Phil Gray



Edmends Street, Brunswick, Victoria – advisory bicycle lanes with enhanced separation at both entry and exit. Photo credit: Phil Gray



Burchett Street, Brunswick, Victoria – advisory bicycle lanes with enhanced separation at both entry and exit, with parking on both sides of the street. Photo credit: Phil Gray



Lowe Street, Adelaide, South Australia – advisory bicycle lane with separation at entry only, no separation at exit with existing road calming, contraflow warning sign at exit. Photo credit: Fay Patterson



Nairne Terrace, Unley, South Australia – no separation at either entry or exit, additional signage at entry due to local sight distance issues, on-street parking faces contraflow cyclists[1]. Photo credit: Fay Patterson



[1] On-street parking to the left of the contraflow direction reduces dooring issues as cars must park facing the one-way direction. Hence a collision would be between a contraflow cyclist and the flat front side of the car door, which yields as the door closes, rather than the sharp, unyielding back edge of the door. Meanwhile, the with-flow cyclists do not face any doors. Despite this case having the opposite parking arrangement, there is no with-flow bicycle lane encouraging cyclists to use the door zone and no dooring injuries are known to have occurred.

Richards Terrace, Unley, South Australia – no separation at either entry or exit, no on-street parking [intermediate road calming recently installed to control motor vehicle speed rather than bicycles]. Photo credit: Fay Patterson



Richards Terrace, Unley, South Australia – no separation at either entry or exit, no on-street parking [intermediate road calming recently installed to control motor vehicle speed rather than bicycles]. Photo credit: Fay Patterson



Almond Street, Unley, South Australia – “false” one way with no infrastructure or logos, narrow street; on-street parking in the two-way street section faces contraflow cyclists. Photo credit: Fay Patterson



Lyons Parade, Unley, South Australia – “false” one-way with no infrastructure or logos, wider street [the “bicycles excepted” subplate is missing from the closest “No Entry” sign].
Photo credit: Fay Patterson



Fish Lane, South Brisbane, Queensland – shared zone with “false” one way and no contraflow infrastructure. Photo credit: Eleanor Nightingale.



Wells Street, Redfern, NSW – shared zone with “false” one way and no contraflow infrastructure. Photo credit: Abril Felman, City of Sydney





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ACKNOWLEDGEMENT OF COUNTRY

CWANZ acknowledges the Traditional Owners of the land on which we meet and work, and all Traditional Owners of country throughout Australia and New Zealand. We recognise Aboriginal and Torres Strait Islander peoples' continuing connection to land, place, waters and community. We pay our respects to their cultures, country and elders past and present. We also recognise the Māori as tangata whenua and Treaty of Waitangi partners in Aotearoa New Zealand.



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