DEVELOPING OPTIONS FOR CONTRA-FLOW CYCLEWAYS

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ABSTRACT

Contra-flow cycleways allow people to cycle on one-way streets in the opposing direction. This can be achieved by means of physical separation or signs and markings alone. These treatments help to provide improved network permeability and connectivity for cycling (relative to motor vehicles), either on existing one-way streets or those planned to be made one-way. While they are common overseas (particularly in Europe), contra-flow cycleways are still rather unknown in New Zealand, with little design guidance available and few practical examples.

Auckland Transport commissioned ViaStrada to investigate some options for providing contra-flow cycling on three suburban one-way streets, as well as reviewing the design for another central city contra-flow route. In the absence of current guidance and examples in New Zealand, a “first principles” approach was taken to consider all possible ways to provide for contra-flow cycling on the streets in question. These options included variations on the use of roadway, pathway, separators, signs, markings and end treatments, as well as considering the presence or otherwise of car parking and street vegetation. The investigations also took into consideration appropriate traffic volumes, traffic speeds and road widths.

This paper outlines the process undertaken to develop and assess contra-flow cycling options for Auckland. The advantages and disadvantages of the various options considered will be discussed, as well as relevant aspects of current transport legislation. Design features at side roads and accessways also need to be considered. It is likely that a “softly softly” approach will be needed to introduce contra-flow cycling to the general NZ population; for example, using more delineated treatments options first rather than completely integrated ones. These case studies can provide a template for others considering contra-flow cycle provision on their networks.

1 INTRODUCTION

Contra-flow cycleways allow people to cycle on one-way streets in the opposing direction. This can be achieved by means of physical separation (e.g. kerbs) or signs and markings alone. These treatments help to provide improved network permeability and connectivity for cycling (relative to motor vehicles), either on existing one-way streets or those planned to be reduced from two-way to one-way. While they are common overseas, contra-flow cycleways are still rather unknown in New Zealand, with little design guidance available and few practical examples.

Auckland Transport commissioned ViaStrada to investigate some options for providing contra-flow cycling on three suburban one-way streets, as well as reviewing the design for another central city contra-flow route. In the absence of current guidance and examples in New Zealand, a "first principles" approach was taken to consider all possible ways to provide for contra-flow cycling on the streets in question. This paper outlines the process undertaken to develop and assess contra-flow cycling options for Auckland. The advantages and disadvantages of the various options considered will be discussed, as well as relevant aspects of current transport legislation and practical implementation of contra-flow facilities here.

2 EXISTING PRACTICE AND DESIGN GUIDANCE

2.1 Contra-flow cycling internationally

Contra-flow cycle practice is more common in many overseas jurisdictions (particularly Europe); as well as typically higher levels of cycling, there are often low-volume, low-speed narrow one-way streets (e.g. Figure 1) that have traditionally provided two-way cycling connections (whether legally or otherwise). Therefore, it is not surprising to find a range of overseas guidelines that cover contra-flow cycling to some degree, such as Transport for London (2014), CROW (2007) and NACTO (2014). Closer to home, Austroads (2014) also discusses contra-flow bicycle lanes, albeit relatively briefly, with examples to be found in Australian cities like Adelaide, Melbourne and Newcastle.

Figure 1: Contra-flow cycling along one-way street, Strasbourg, France

The most comprehensive guidance encountered to date on the topic is the French guide by CERTU (2012), which has 64 pages completely dedicated to the issue of contra-flow cycling. Of particular interest is the guidance that discusses what type of contra-flow cycle provision is acceptable given different road and traffic criteria, as summarised in Table 1.

Table 1: Contra-flow decision-making table (CERTU 2012)

Status	*Traffic / day*	Road width *(m)*				
		< 2,70	2,70 - 3,50	3,50 - 4,50	4,50 - 5,00	> 5,00
Pedestrian zone		N	N	N	N	N
Shared space		N	N	N	N / NSM	N / NSM
30 km/h zone section (*)	< 1 000	N / NSM	N / NSM	N / NSM	NSM / SM	NSM / SM
	1 000 - 5 000		N / NSM	NSM	NSM / SM	NSM / SM
	5 000 - 8 000			NSM / SM	SM	SM / S
	> 8 000				SM	SM / S
50 km/h section	< 1 000				SM	SM / S
	1 000 - 5 000				SM	SM / S
	5 000 - 8 000				SM	S
	> 8 000				SM / S	S
70 km/h section						S

For the direction reserved for cyclists:

N on linear sections of road

NSM non-separating marking *(cycle pictogram + arrows)*

SM medial type separation marking or cycle lane

S separator *(track)*

When introducing counterflow cycling, the road in question should at the same time be made into a 30 km/h zone within the scope of a broader traffic-calming area project.

Introducing counterflow cycling requires a thorough study and more extensive treatment.

Unrealistic cases.

It can be seen that greater levels of separation are recommended as traffic volumes and speeds increase, from no markings, to painted symbols, painted lines and physical separators. The guidance also acknowledges the practical difficulty of allowing contra-flow cycling as road widths get narrower (relatively few New Zealand roads would fall into the “below” 5m categories, although they might if the car-parking zones were discounted).

2.2 Contra-flow cycling in New Zealand

Koorey & Lieswyn (2016) noted the increasing desire in New Zealand to provide road space for a range of different road users, including cycles, buses, and light rail. For many narrower road corridors, they identified contra-flow cycleways as one treatment to consider, either on existing one-way streets or by removing one direction of general traffic. Other than a local bylaw change controlling the allowed and prohibited movements, no legislative impediment was identified to introducing contra-flow cycleway sections in New Zealand.

In Auckland in 2016, two-way cycling was introduced into the otherwise one-way shared spaces along Jean Batten Place, Fort Lane and O'Connell Street in central Auckland (see Figure 2). The low-speed, low-volume central city streets were considered a low risk for trial implementation.

Figure 2: Contra-flow cycling central Auckland (c/ Lawry 2016)

A contra-flow cycleway scheme is also being implemented along Federal St in central Auckland, largely involving a separated one-way cycleway placed behind separator posts and car parking. The authors were involved in the safety audit for this scheme and this is discussed further later.

Prior to the re-ordering of the central city one-way street network, Christchurch had a short section of contra-flow cycleway near the hospital facing the oncoming one-way street section. Although further schemes are being planned around the country, to date we are not aware of any other formal sections of contra-flow cycling in New Zealand.

Currently the new *Cycling Network Guidance* for New Zealand (NZTA 2016b) is relatively limited in its coverage of contra-flow cycle facilities. The guidance notes:

> *"There may be situations where a contra-flow cycle lane could be used to provide for cycling on a route, for example on one-way streets where a bylaw allows this.*
>
> *This treatment should only be applied in low speed and low volume environments, and where a suitable transition at each end of the street can be achieved. Treatments at any side streets or driveways should also be considered carefully.*
>
> *The Transport Agency is willing to work with road controlling authorities that would like to use this type of cycle lane in an innovative way."*

No specific design details are provided. However, associated guidance on separated cycleways at priority-controlled side roads (NZTA 2016a) does discuss some aspects of dealing with them at intersections and driveways. It states:

> *"Contraflow facilities, i.e. those that are one-way in the opposite direction, or those that are two-way, especially require careful design due to the risks associated with motorists not expecting cyclists travelling in the contraflow direction. The separated cycleway options tool (SCOT) can assist with the decision whether to consider contraflow facilities along a given route."*

Following localised trials, sharrow markings (see figure to the right) have recently been allowed for general use in New Zealand as a means of indicating cycling routes on shared streets without formal cycle facilities. Best-practice guidance has been prepared for their application (Flow Transportation 2016); however, the current guidance does not consider the application of sharrows as a treatment for contra-flow routes, potentially in both the with-flow and contra-flow directions.

3 CONTRA-FLOW SCHEME ANALYSIS

In 2016, Auckland Transport commissioned ViaStrada to investigate some options for providing contra-flow cycling on three suburban one-way streets. A desktop safety audit of the design for another contra-flow route was also undertaken on an Auckland central city one-way street. The streets investigated were (see Figure 3):

- York Street, Newmarket, between Kent Street and Khyber Pass Road
- Crummer Road, Ponsonby, between Ponsonby Road and Maidstone Street / Vinegar Lane
- Selbourne Street, Grey Lynn, between Surrey Crescent and Williamson Avenue
- Federal St, central city, between Fanshawe Street and Victoria Street (safety audit only)

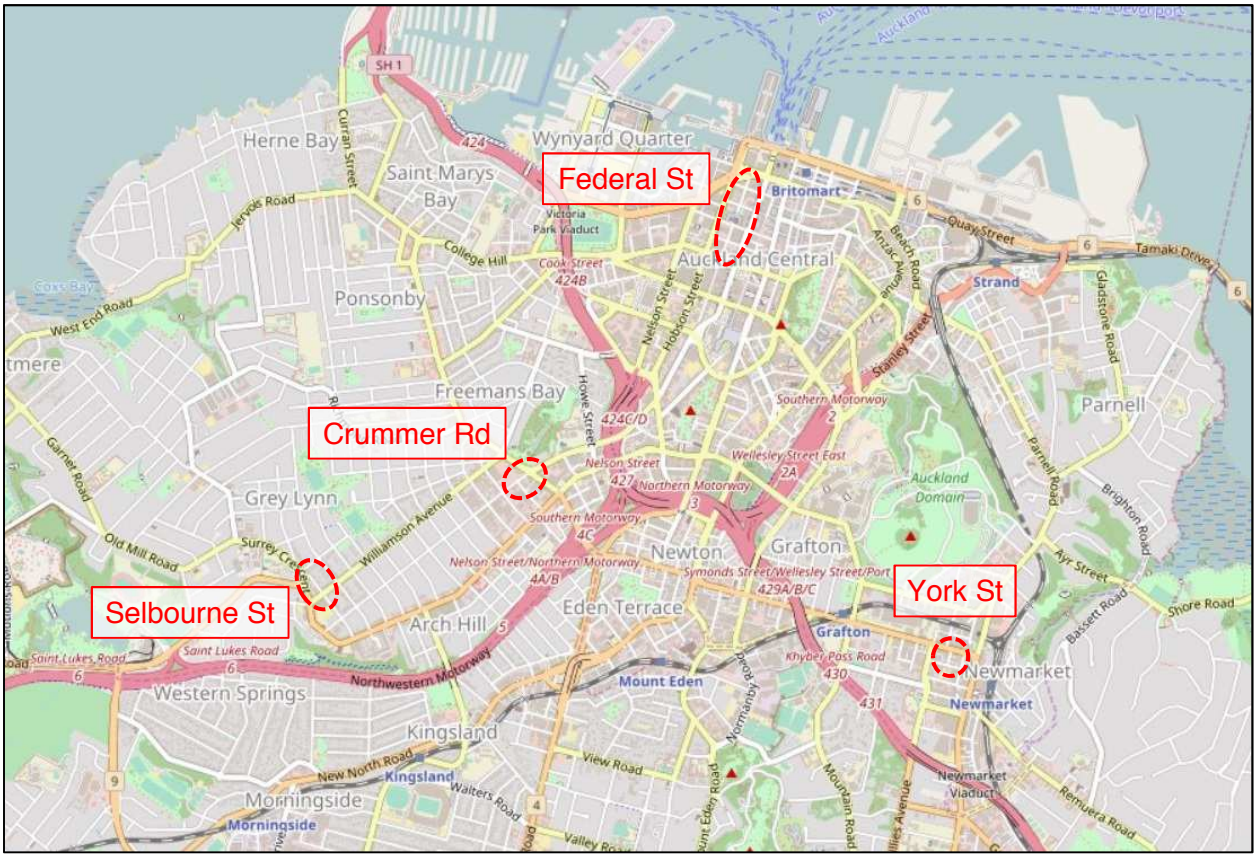


Figure 3: Location of contra-flow streets investigated

For the first three cases, the street sections studied are relatively short (60-140 m), low volume (200-2000 vehs/day) with reasonably slow speed environments (although all posted at 50 km/h). One street, York, features parallel parking on one side of a narrow cross-section, while the other two have angled parking in wider roadways.

In the absence of current guidance and examples in New Zealand, a “first principles” approach was taken to consider all possible ways to provide for contra-flow cycling on the streets in question. Potential options were “white-boarded” (see Figure 4) before assessing their respective merits. The options included variations on the use of roadway, pathway, separators, signs, markings and end treatments, as well as considering the presence or otherwise of car parking and street vegetation.

The investigations also took into consideration appropriate traffic volumes, traffic speeds and road widths, using the CERTU (2012) guidelines. Particularly for contra-flow treatments involving on-street provision, introducing a 30 km/h (or lower) speed limit was considered appropriate to mitigate the safety risk at all sites, and should be considered at all on-road contra-flow cycling locations.

The following sections outline how the process was undertaken for one of the streets investigated, Selbourne Street (a similar process was also undertaken for the other sites; interested readers can contact the authors for further details).

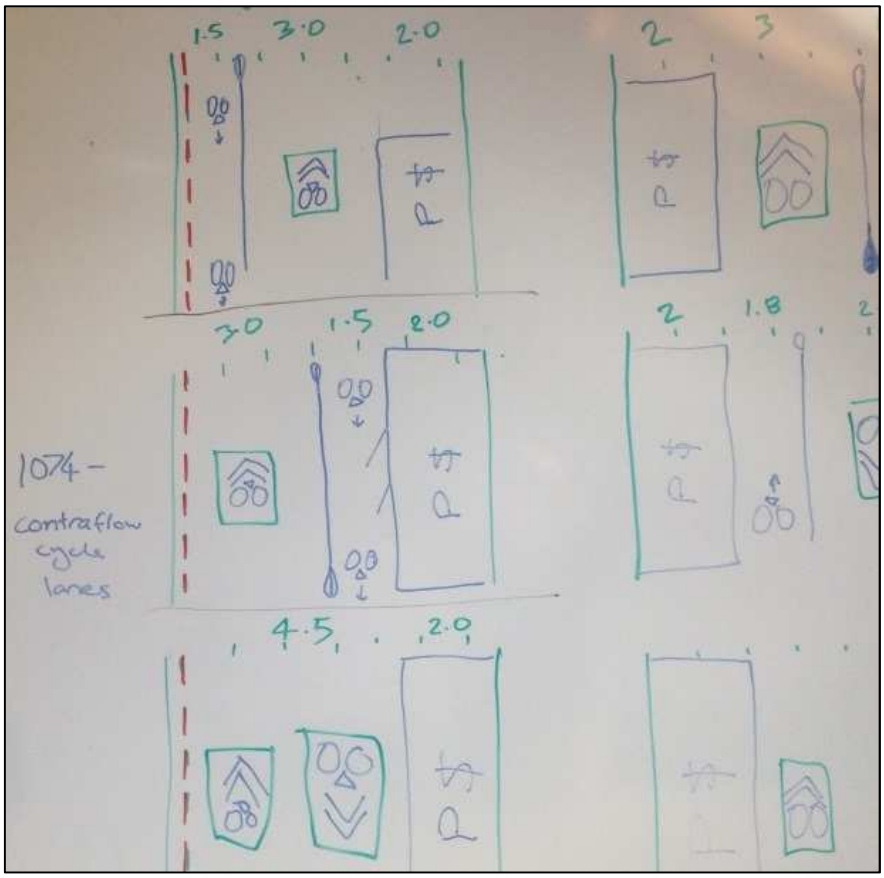


Figure 4: Examples of white-board options considered for York St

3.1 Selbourne Street - Existing layout

The section of Selbourne Street considered here is a short (140 m) street with one-way flow (south-bound) between Surrey Crescent and Williamson Ave. It has a (2004) traffic count of 200 vehicles per day, possibly higher now. The posted speed limit is currently 50 km/h, but with two traffic calming devices combining speed humps and road narrowing (via kerb extensions) along its length, the operational speed is expected to be lower. There is quite a bit of roadside friction as a consequence of the adjacent land use activity, which also keeps through-traffic speeds low.

On the western side is a group of shops, with on-street angle parking (29 spaces) and one commercial driveway accessing further carparks. The eastern side has residential properties, with some indented parallel parking (5 spaces) provided. Figure 5 shows the current street layout.

Figure 5: View of Selbourne St looking south (one-way direction)

The following schematic diagram (Figure 6) shows the existing Selbourne Street layout; the subsequent options presented can be compared with this (dimensions are approximate). Not shown are the two mid-block speed management points where the roadway narrows to less than 3.5m.

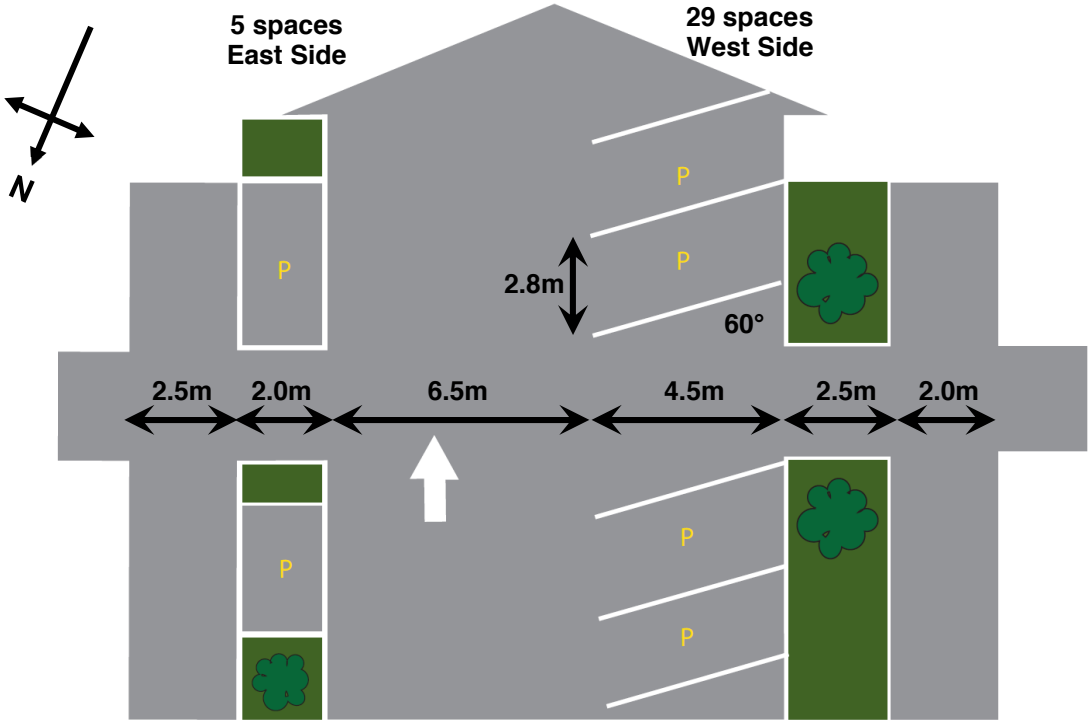


Figure 6: Existing street section (schematic) for Selbourne Street

To the north (bottom of the diagram), where traffic enters Selbourne Street from Surrey Crescent, it is desirable that the Selbourne Street contra-flow facility can connect to the existing zebra crossing across Surrey Crescent and also the path continuing up to Prime Road and possibly on to Selbourne Street north.

To the south (top of the diagram), traffic exits at a crossroad intersection with Williamson Ave and Coleridge St, neither of which has any specific cycling facilities. However, Coleridge St leads to Crummer Rd, which is a popular cycling route towards the central city via Hopetoun St.

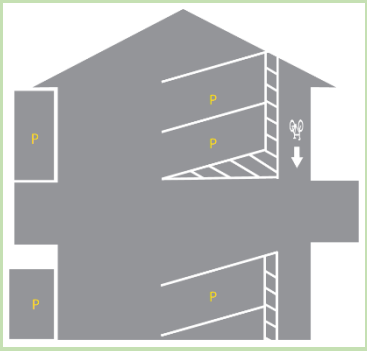
3.2 Contra-flow concepts for Selbourne Street

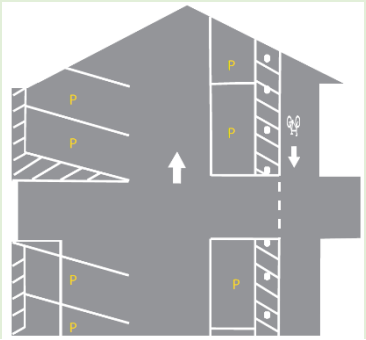
The following options were developed for Selbourne Street for further discussion; they are grouped below with respect to the degree of separation from motor vehicles. Each of the options have advantages and disadvantages but most could satisfy minimum levels of operational efficiency and safety. It appears that each could work with the current constraints at the intersections either end of Selbourne Street and the existing mid-block speed hump and narrowing points. However, in the final assessment, some were deemed not acceptable for other reasons, including public resistance, safety risk potential, and legibility/understanding in New Zealand.

Each contra-flow option is shown approximately to scale (although final dimensions used may vary, particularly in regards to traffic lane and cycleway widths) on a plan based on Figure 6. The plans show conceptual layouts and do not include details like types of markings, signs or end treatments (discussed later).

3.2.1 Physical separation from traffic and parking

Although the form of separator hasn't been specifically indicated here, we note that a flush treatment (e.g. painted hatched markings, textured surface) with gaps between any vertical elements (e.g. flexi-posts, wheel-stops) would be the simplest form of separation to continue maintaining existing drainage.

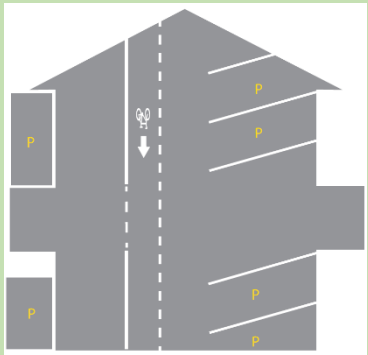
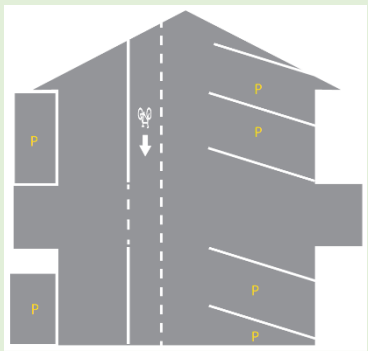
	Concept	Pros	Cons
A	Contra-flow facility kerb-side of angle parking west-side (with buffer) 	• Good separation with cyclists well away from vehicles manoeuvring into / out of parks. • No dooring issues • Retains all existing parking	• Path on west side will probably have to transition to east side at Surrey Cres to link up with zebra crossing. • Possible that contra-flow facility will be used by cyclists in with-flow direction as well, although it probably isn't wide enough to function as a 2-way facility. • Parked cars may slightly obscure inter-visibility between cyclists and drivers turning into driveways. • Occupants of parked vehicles cross contra-flow cycle lane to access commercial area
B	Contra-flow facility kerb-side of parallel parking west-side (with buffer) 	• Good separation of cyclists from moving vehicles • No dooring issues (subject to suitable buffer)	• Wide single lane for general traffic may increase speeds (although extra east side parallel parking would help and speed hump controls will be retained). • Drivers less accustomed to parallel parking on the right-hand side. • Loss of parking (could be somewhat mitigated by additional east side parking). • Parked cars may obscure inter-visibility between cyclists and drivers turning into driveways. • Occupants of parked vehicles cross contra-flow cycle lane to access commercial area
C	As for Option B above, but bi-directional cycleway (probably have to remove any additional east-side kerb parking spaces)	• Good separation of cyclists and no dooring issues	• Drivers less accustomed to parallel parking on the right-hand side. • Loss of parking. • Parked cars may obscure inter-visibility between cyclists and drivers turning into driveways. • May be more difficult to provide good end transitions. • Additional risk at driveway crossing point, due to need to check in both directions • Occupants of parked vehicles cross contra-flow cycle lane to access commercial area

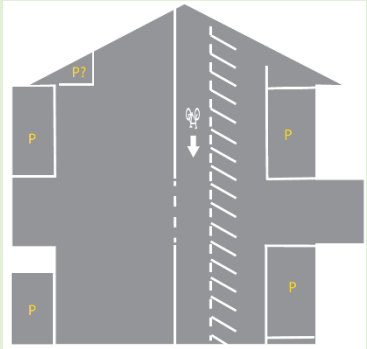
	Concept	Pros	Cons
D	Parking swapped sides with contra-flow facility kerb-side of parallel parking west-side 	• Good separation of cyclists with reduced dooring issues • Minimal parking loss	• Shifts parking away from commercial side of street to the residential side • Occupants of parked vehicles cross contra-flow cycle lane to access commercial area • Loss of trees and berm on east-side

- Concepts A & B were considered to be acceptable contra-flow cycling options for Selbourne Street
- Concepts C & D were considered to be unacceptable contra-flow cycling options for Selbourne Street, for legibility and political reasons

3.2.2 Painted delineation on-street

Typically, a conventional marked contra-flow cycle lane was envisaged for these treatments.

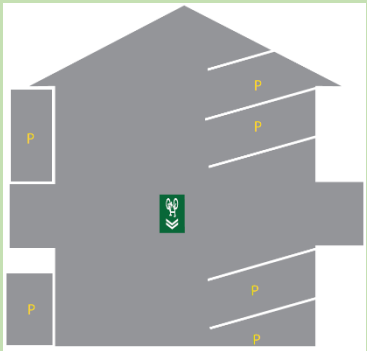
	Concept	Pros	Cons
E	Marked contra-flow lane traffic-side of angle parking west-side 	• Perhaps easier than option A for cyclists to transition to east side and access zebra crossing at Surrey Cres? • Retains all existing parking • Parked drivers don't cross contra-flow cycle lane to access commercial area	• High risk of conflict between cyclists and manoeuvring vehicles (especially if separation gap is small).
E1	Marked contra-flow lane traffic-side of reverse-in angle parking west-side 	• Perhaps easier than option A for cyclists to transition to east side and access zebra crossing at Surrey Cres? • Retains all existing parking • Parked drivers don't cross contra-flow cycle lane to access commercial area • Drivers departing the angle parking have good visibility of any oncoming contra-flow cyclists.	• Reverse-in angle parking concept is not familiar to most NZ drivers.

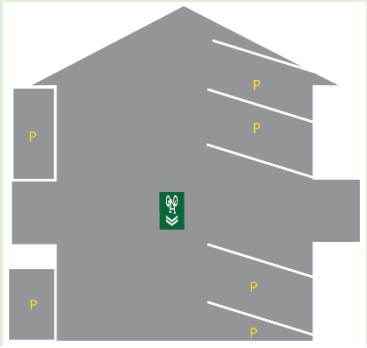
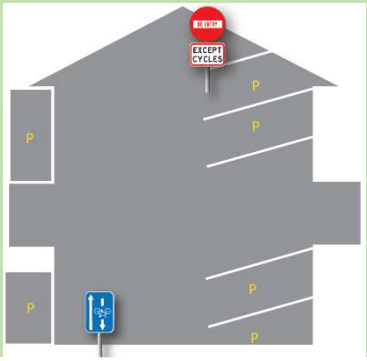
	Concept	Pros	Cons
F	As for Option E above, but with marked cycle lane in direction of traffic flow as well.	• As above, plus: • Dedicated space for cyclists travelling in the same direction as general traffic. • Parked drivers don't cross contra-flow cycle lane to access commercial area • Narrower traffic lane may help keep through speed down	• High risk of conflict between cyclists and manoeuvring vehicles • Possibly increased traffic speeds if not required to follow behind same-direction cyclists • More appropriate for a higher volume street
G	Marked contra-flow lane traffic-side of parallel parking west-side 	• Better definition of buffer zone between contra-flow cycle lane and parking compared with option E (and F) • Less risk of conflict with parallel parks than with angle parks (e.g. options E, H, I) • Parked drivers don't cross contra-flow cycle lane to access commercial area	• Still some risk of conflict between cyclists and manoeuvring vehicles. • Loss of parking • Wide single lane for general traffic may increase speeds (although extra east-side parallel parking would help and speed hump controls will be retained). • Drivers must manoeuvre in the cycle lane when parking.

- Concepts E1 & G were considered to be acceptable contra-flow cycling options for Selbourne Street
- Concepts E & F were considered to be unacceptable contra-flow cycling options for Selbourne Street, due to safety concerns

3.2.3 No defined space for contra-flow cycling

These options were tabled for completeness only. At the initial stages of implementing contra-flow cycling in one-way streets in Auckland (and New Zealand in general), they are unlikely to be effective in informing cyclists and drivers of the expected operational use and behaviour.

	Concept	Pros	Cons
H	Contra-flow Sharrow markings traffic-side of angle parking west-side 	• Simple to implement • Retains all existing parking • Parked drivers don't cross contra-flow cycle lane to access commercial area	• High risk of conflict between cyclists and manoeuvring vehicles. • Cycle route less defined than for option E – motorists accessing / leaving parking spaces less likely to think to check for cyclists. • May be too novel a treatment to be introduced at this time.

	Concept	Pros	Cons
H1	Contra-flow Sharrow markings traffic-side of reverse-in parking west-side 	• Simple to implement • Retains all existing parking • Parked drivers don't cross contra-flow cycle lane to access commercial area	• Reverse-in angle parking concept is not familiar to most NZ drivers. • Cycle route less defined than for option E – motorists accessing / leaving parking spaces less likely to think to check for cyclists. • May be too novel a treatment to be introduced at this time.
I	Provide contra-flow by means of signage in each direction only 	• Simple to implement • Low maintenance costs • Retains all existing parking • Parked drivers don't cross contra-flow cycle lane to access commercial area	• Cycle route less defined than for other options – motorists accessing / leaving parking spaces less likely to think to check for cyclists. (Could repeat signs along midblock). • Probably too novel for NZ at this time

- Concept H1 may become an acceptable option for Selbourne Street in time, when drivers and cyclists are more familiar with contra-flow sharrows on one-way streets in Auckland.
- Concept I may become an acceptable option for Selbourne Street in time, when drivers and cyclists are more familiar with contra-flow cycling on one-way streets in Auckland.
- Concept H is considered to be an unacceptable contra-flow cycling option for Selbourne Street, due to safety concerns.

3.2.4 Options that were not considered further

The following list summarises the cycle contra-flow possibilities that have been identified initially but are not considered worth pursing further:

- Modify berm on west (shops) side
  - Would require removal of 7 trees
  - Would require relocation of electrical transformer box
- Convert footpath on east (houses) side to shared path
  - 2.5 m is too narrow for a shared path
  - 6 driveway conflicts (often with adjacent high fences) – best to avoid
- Convert footpath on west (shops) side to shared path
  - 2.0 m at northern end - too narrow for a shared path
  - 1 busy commercial driveway conflict
  - Conflict with commercial pedestrian activity, etc
- Remove parking on west side
  - Business owner concerns over significant loss of parking

- Provide for contra-flow cycling on east side
  - Not intuitive for all road users
  - 6 driveway conflicts – drivers unlikely to expect cyclists in "wrong" direction.
- Modify berm on east side
  - Would require removal of 7 trees.
  - Would require removal of at least 5 parking spaces.
- Switch angle parking over to east side (except as shown in Option D)
  - Including existing indented parking bays would create "ragged" parking area; might be easier with a mix of (indented) angle and parallel parking there
- Change direction of one-way street
  - Likely to involve longer trips for most origins/destinations
  - Difficulty for traffic to access Surrey Cres and streets north
- Convert street to a cul-de-sac for general traffic (e.g. entry/exit via Surrey Cres)
  - Likely concerns from retailers
  - Unnecessary; one-way restriction already limits traffic sufficiently

A key point to note is that, with 11m kerb to kerb, there is sufficient width *within* the roadway to provide for contra-flow cycling without having to modify the existing kerbs, berms or footpaths.

3.3 Other considerations for contra-flow streets

These issues should also be considered in the development of preferred contra-flow cycle facilities.

3.3.1 Angle Parking vs Parallel Parking

There are a number of safety and operational issues with implementing either angle or parallel parking. While parallel parking uses up less road cross-section, this comes at a cost in the number of parks that can be fitted in the same length (roughly half of 90 degree parks). Consideration would also need to be given to adjusting any existing mid-block islands and traffic calming treatments.

Potential "dooring" issues with parallel parking (i.e. cyclists hit by opening car doors and being forced into the live traffic lane) can be mitigated with suitable buffer spaces; however, considerable buffer space behind angle parking is required for reversing vehicles to avoid conflicts with passing cyclists (or at least be able to see them clearly). Adjusting the angle of the parking (either more or less) would not appear to greatly resolve the problem, at least not without reducing the available parking numbers or cross-section width.

One possible option to consider is to introduce "reverse-in" angle parking, where the parking bays are angled in the opposite direction and drivers must reverse in and drive out forwards. This has the advantage that the greatest conflict with passing cyclists (in both directions) is greatly reduced due to the improved visibility of drivers when departing. However, reverse-in angle parking is still a relatively novel concept for New Zealand drivers; it may also require a change in local Traffic Bylaws to allow it (although clause 6.13 of the *Land Transport Road User Rule* expects vehicles to reverse into angle parking oriented in the opposite direction).

Reverse-in angle parking has the advantage that drivers exiting the park are facing forwards and are more able to see approaching 'contra-flow' cyclists. Before / after studies at several locations in North America have shown that reverse-in angle parking is safer than front-in angle parking.

3.3.2 Signs & Markings

CERTU (2012) guidance indicates that, as the motorised traffic speed, volumes and road width increases, so does the need for additional signs and delineation. New contra-flow cycle facility design projects are considered to be in their infancy stages in New Zealand. Drivers and cyclists are not familiar with them and will take some time to become familiar with how they operate. Road controlling authorities may need to consider increasing the amount of signs and markings applied as initial projects are implemented. Over time, it may be that some markings can be allowed to fade, rather than re-marking, as people get used to the concept.

Although not shown in the schematic plans in section 3.2, all of the options considered will require signs at each end to legally denote and warn of the nature of the street. Auckland Transport is already trialling some suitable signs on its shared space streets (Figure 7).

Figure 7: Contra-flow signs being used in Auckland shared space streets

There may also be a need to include speed restriction signs if there is a desire to reduce the posted speed limit to reduce the relative risk of contra-flow cycling.

From 1 December 2016, the road user rules now allow road controlling authorities to use sharrow markings for mixed traffic situations (i.e. where cycle lanes are not being considered). On-road contra-flow cycling would certainly benefit from sharrow markings to highlight their presence. It may also be advantageous to mark sharrows in the with-traffic direction to encourage with-traffic cyclists to take the lane with other traffic (a 30 km/h speed limit, speed management devices, and a sufficiently narrow roadway will also help encourage this).

3.3.3 End treatments

When the preferred midblock option is selected, it will be necessary to develop end treatments for the connections at each end. These treatments must convey the intended entry and exit behaviour to all road users. It is particularly important to make clear whether contra-flow cyclists are expected to use the existing roadway or a separate facility.

In the case of Selbourne Street, none of the options described above generally pose significant difficulties at either end of the street. Therefore, intersection end treatments do not prevent any of the preferred options from being considered further. Some specific consideration may be needed to determine the best way to safely convey contra-flow cyclists across the street entrance at Surrey Crescent where entering traffic may not be expecting to see “wrong way” cyclists; additional signage, markings and possibly a raised platform may be needed to mitigate this.

3.3.4 Side road treatments

Although not an issue with the three scheme design projects discussed above (other than busy driveways), many longer contra-flow routes may have side roads to address. This was the case for the Federal Street contra-flow route recently safety audited. Figure 8 shows an example of a proposed side road treatment along the route, with recommended improvements. To reinforce the priority of contra-flow cyclists over turning traffic, it may also be prudent to extend the flush median right across the side road entrance.

An important consideration where contra-flow facilities are located behind parking is to provide adequate inter-visibility at side roads. This may require setting the end of parking back from the intersection. Coloured surfacing may also help to highlight conflict area across side roads and busy driveways. Directional arrows with cycle markings at side roads may also help other road users realise where cyclists will be approaching from (and hence, where to look).

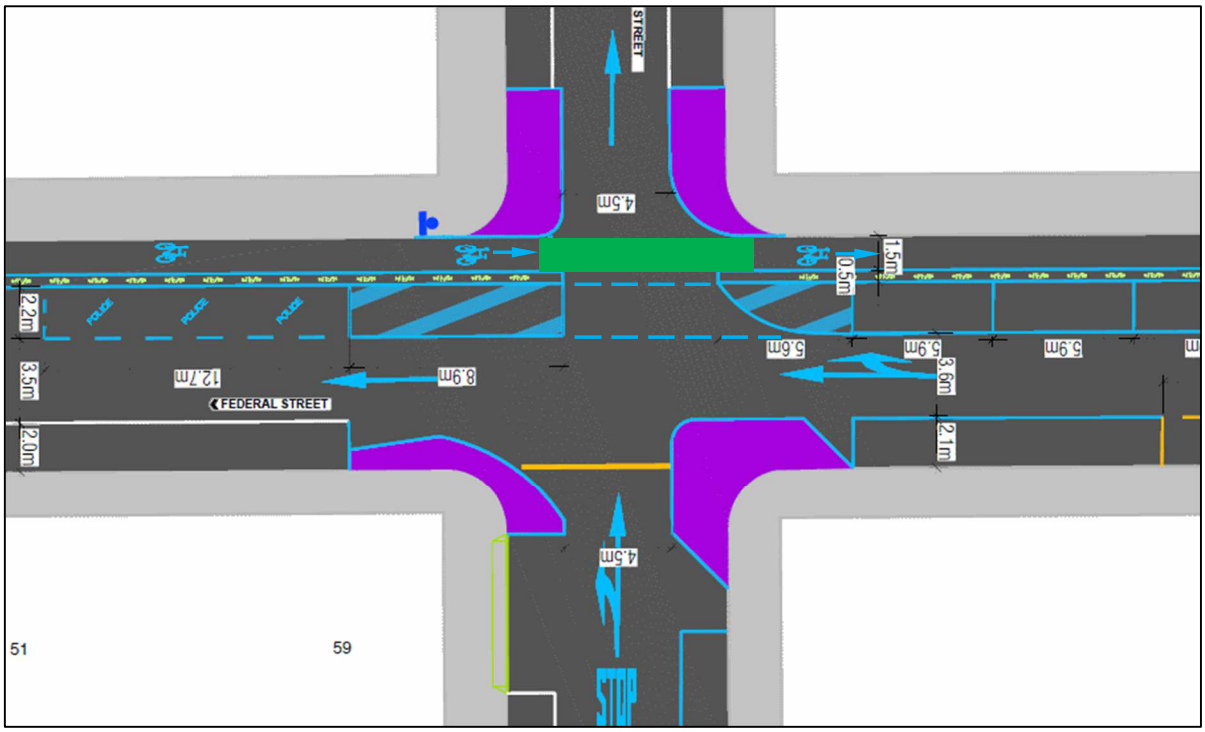


Figure 8: Side road treatment proposed on Federal Street contra-flow route (with suggested improvements)

3.3.5 Street gradient

NZTA (2016a) states that contra-flow cycling is not appropriate where contra-flow cyclists travel on a downhill gradient steeper than approximately -3%, as the operating speed of the cycleway is a function of gradient and may cause higher-speed crash problems. Selbourne Street, for example, has a slight gradient uphill in the contra-flow direction, so this is not an issue.

3.3.6 Before & after surveys

Because contra-flow cycle facilities are still relatively new, it would be desirable to measure various aspects of road user behaviour in project streets before the contra-flow cycle facilities are implemented. This would provide some base data on how the street is currently operating and allows a comparison with post-implementation survey data of how drivers and cyclists (both directions) are using the facility. This may inform any subsequent design tweaks required or ideas for any other streets that may be considered for contra-flow cycling.

Useful data to collect would include traffic counts and speeds for both motor traffic and cyclists (both directions). Positioning data for cyclists before and after would also be useful, e.g. how many with-traffic riders “take the lane” and how many people already ride contra-flow either on the road or footpath. Observing behaviours at intersections would also be valuable, e.g. who gives way.

3.4 Preferred scheme design for Selbourne Street

The detailed scheme plan for Selbourne Street is shown in Figure 9. Some of its advantages include:

- There will be good separation with through-cyclists well away from vehicles manoeuvring into and out of the angle parking spaces, and contra-flow cyclists protected by separators
- The design will integrate well with the Surrey Crescent and Williamson Avenue intersections
- It retains existing berms, and no major roadway or kerb reconstruction is required
- No dooring issues will arise with drivers or passengers exiting parked vehicles
- This option retains all of the existing parking

Disadvantages noted with this option include:

- It is possible that the separated contra-flow facility could be used by cyclists in the with-flow direction in preference to riding ‘with’ traffic
- Parked cars may slightly obscure inter-visibility between cyclists and drivers turning into the commercial driveway (although the design largely mitigates this)

- Occupants of parked vehicles will walk across the contra-flow cycle lane to access the commercial area
- There is conflict between with-traffic cyclists and reversing parked vehicles, but this is the current situation and is not changed with this proposal. Sharrows, may improve this issue.
- Drivers turning off Surrey Crescent may not notice cyclists on the shared path crossing

Generally, these are minor issues, largely due to the low speed environment, which shouldn't detract from the usefulness of the proposed contra-flow scheme.

4 CONCLUSION

The above discussion presents some examples of the types of factors that need to be considered when introducing contra-flow cycling provision to New Zealand streets. These case studies can provide a template for others considering contra-flow cycle provision on their networks. It is likely that a "softly softly" approach will be needed to introduce contra-flow cycling to the general NZ population; for example, using more delineated treatment options first rather than completely integrated ones.

It is recommended that New Zealand road controlling authorities consider contra-flow treatment options when struggling to provide space for all desired cross-section elements, or when looking to improve cycling convenience. Further trials of some of these layouts in New Zealand contexts would be useful to determine their wider applicability. As indicated previously, it would appear that a simple local bylaw (e.g. regarding allowed or prohibited traffic movements) should be sufficient to allow contra-flow cycling to occur. Cycling exemption signs and cycle facility markings already exist; probably some further consideration is needed about appropriate warning signage.

New Zealand road controlling authorities should employ a similar robust analysis of the pros and cons of different contra-flow treatments for their situation, to explore and identify any unexpected outcomes; typically, each site has specific features that warrant a "case-by-case" approach.

It is also recommended that additional guidance is provided in NZTA's *Cycling Network Guidance* on contra-flow cycling, including the cycle planning section (using CERTU's guidance as a basis), design guidance at end treatments and side roads, and the sharrow markings best-practice guide.

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Figure 9: Selbourne Street final preferred scheme plan