



Further developments in the design of contra-flow cycling schemes

**Prepared for Driver Information and Traffic Management
Division, Department of the Environment, Transport and the
Regions**

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First Published 1998

ISSN 0968-4107

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Executive Summary

Contra-flow cycle schemes have been operating satisfactorily in the UK for many years. Most of these involve a mandatory contra-flow cycle lane and segregation at the entrance and exit. However, the number of contra-flow schemes installed has been quite limited, particularly when compared with certain other European countries. This appears to be due to the difficulties of implementing conventional contra-flow schemes, and a largely-unfounded belief that contra-flow cycling is dangerous.

The objective of this study, commissioned by the Department of the Environment, Transport and the Regions, is to assess the safety implications and practical methods of accommodating contra-flow cycling in one-way streets in a variety of forms. These include contra-flow schemes that do not have a mandatory cycle lane or physical segregation at both ends. This variety is more widespread in continental Europe than in the UK. The evidence from Europe is that they operate safely. A range of alternative designs for contra-flow cycle schemes may be appropriate in different traffic environments.

Five alternative designs of contra-flow cycle schemes were chosen for this study, implemented in Bristol (three schemes), Chichester and Oxford. They included sites with considerable variation in traffic patterns, pedestrian flows and cycle flows, and very constrained carriageway widths. Sources of data included the local authorities responsible for the schemes, video film before and after scheme installation, and interviews with cyclists using the schemes.

The accident data and video evidence indicate that these contra-flow cycle schemes are generally operating safely. This was confirmed in the interviews with cyclists. Some concerns were raised at specific locations about excessive motor vehicle speeds, vehicles entering from side roads, obstruction by delivery vehicles and badly parked vehicles. Almost all cyclists interviewed found the contra-flow cycle schemes to be useful and convenient.

There is a case for considering alternative designs for contra-flow cycle schemes more widely in the UK. Recommendations are made for guidance on the design of contra-flow schemes. Relevant factors include the levels of motor vehicle speeds, motor vehicle flows, parking and loading activity, visibility at junctions, side roads, and carriageway width.

1 Introduction

1.1 Background

The Driver Information and Traffic Management Division of the Department of the Environment, Transport and the Regions (DETR) commissioned TRL to study the safety implications, and to propose practical methods, of accommodating contra-flow cycling in one-way streets. This research is part of a long-term TRL project for the DETR on innovative cycle schemes.

Conventional contra-flow arrangements have been operating apparently satisfactorily in the UK, albeit in small numbers, for many years. The objective of this study is to assess a range of schemes that permit contra-flow cycling in different traffic environments and to provide information for design advice.

One-way streets are often established to improve motor vehicle flow and reduce congestion. This can mean a detour for cyclists and additional hazards due to higher vehicle speeds, overtaking on both sides and more hazardous right turn manoeuvres. Contra-flow cycling can provide a shorter, more direct and safer route for cyclists.

Design guidelines on contra-flow schemes are given in publications by the IHT et al. (1996) and Sustrans (1997). Contra-flow schemes can be categorised into three main design types:

- a Conventional contra-flow schemes. This type of scheme has a mandatory cycle lane and physical segregation at both ends, authorised by a Traffic Regulation Order. On segregated entry for cycles, these schemes have a combination of a No Entry sign (Diag No. 616) and a Cycles Only sign (Diag No. 955)¹.
- b 'False' one-way streets. This is a road with two-way status, but motor vehicles are prevented from entering at one end.
- c Alternative contra-flow schemes. This type of scheme does not have a mandatory cycle lane or physical segregation at both ends. They may be particularly useful if waiting or loading cannot be restricted or if road width is too narrow for a mandatory contra-flow cycle lane. Signs to indicate the presence of cyclists in the contra-flow direction in this case will require authorisation from the DETR. The No Motor Vehicles sign (Diag No. 619) can be used as an alternative to the signing used for conventional schemes.

1.2 Contra-flow cycle schemes in the UK

There are examples of contra-flow cycle schemes in the UK that were implemented as far back as the 1970s, such as Geneva Street, Peterborough and Downing Street, Cambridge. The introduction of such schemes, however, has been quite limited. In order to find out why so few schemes have been introduced, a telephone survey of local authority cycling officers was undertaken.

¹The number in brackets refers to diagrams of signs (including road markings) specified in Department of Transport (1994) 'Traffic Signs Regulations General Directive'.

Thirteen local authority cycling officers were interviewed, comprising five from county councils, three from new unitary authorities, two from London boroughs, two from metropolitan districts, and the London Cycle Network Coordinator.

All authorities interviewed had installed, or were considering installing, contra-flow cycle schemes. In total, they had installed approximately 60 schemes. Just over half of these involved a mandatory contra-flow cycle lane; the remainder were 'false' one-way streets in which vehicles were permitted to travel in both directions but only pedal cycles were able to enter at both ends. There was a very uneven distribution of schemes amongst authorities. One authority (Bristol) had installed over 20 contra-flow schemes, four authorities had installed six to eight schemes, and seven had installed three or fewer schemes. The number of schemes installed was not a reflection of the size of the local authority area.

Two-thirds of the officers said that they knew of one-way streets where there was demand for a contra-flow cycle scheme but, for various reasons, they had been unable to install one. Of those officers who considered that demand had been met for contra-flow schemes, usually this was because there were few one-way streets in their areas, or a lack of opportunity to identify potential schemes.

The reasons given for not installing contra-flow schemes where demand was identified can be categorised into three groups:

- a the difficulty of prohibiting parking and the restricted carriageway width;
- b the complexity of implementing contra-flow schemes under current regulations;
- c opposition to contra-flow cycle schemes from some professionals and members of the public, based on the belief that contra-flow cycling is dangerous.

It was generally understood that contra-flow cycle schemes required a mandatory contra-flow cycle lane with physical segregation at both ends. In the view of some officers, the ability to consider other options was unclear. This gave rise to implementation problems as it was often difficult to achieve the parking and loading bans required for a mandatory contra-flow cycle lane. In residential streets, residents objected to parking bans and in streets with business uses there were sometimes objections to loading restrictions. Although the number of objections might be small - possibly only one or two - they could prove difficult to resolve or override.

There were also difficulties providing segregation at junctions. In narrow streets, islands could obstruct turning movements, particularly for large vehicles. This could sometimes be alleviated by setting the island back a few metres. For contra-flow schemes on lightly trafficked roads, the island was seen as unnecessary, expensive and unsightly by a number of officers and public.

The complexity of designing and implementing contra-flow schemes was also cited as a reason why they had not been installed. The Traffic Regulation Orders and signing were usually the most difficult items to specify correctly; some Traffic Regulation Orders were described as

extremely complex relative to those required for other traffic management purposes. Lack of comprehensive cycle audit procedures (to ensure that opportunities to promote cycling are fully considered in new schemes) was cited as a reason for some recent one-way schemes being introduced without contra-flow cycling provision.

Many officers said that there was a general view that contra-flow cycling was inherently dangerous. This sometimes caused difficulties with public consultation. However this concern was not based on evidence, as there were few contra-flow schemes to observe and no authority reported any significant problems with existing contra-flow schemes. None had removed a contra-flow scheme. Some cycling officers said that it was often assumed that one-way systems had been introduced for safety reasons, whereas, in fact, most were introduced to improve traffic flows. Safety auditors were said to be wary about contra-flow schemes, particularly those schemes without full segregation. More information on the safety of contra-flow cycling and 'endorsement' of the concept was seen as needed.

There was a clear demand for greater official (DETR) guidance on contra-flow cycling, firstly to overcome the general (mis)perceptions of dangers and secondly to provide more specific advice about appropriate treatments for different conditions. In addition, officers wanted greater flexibility to be able to install 'Continental' style contra-flow schemes without physical segregation at the entry or exit in appropriate streets. They also wanted to be able to use the Except Cycles plate (Diag. No 954.4) with the No Entry sign (Diag. No 616). Although the No Motor Vehicles sign (Diag. No 619) permits cycles to enter, some officers had experienced opposition to its use from the Police, on the grounds that motorists did not understand (or observe it) as well as the No Entry sign (Diag. No 616). (However, one authority reported that, in practice, compliance with No Motor Vehicles sign (Diag. No 619) was good.)

1.3 Contra-flow cycle schemes in continental Europe

This project follows a previous TRL study on contra-flow cycle schemes in Europe (Morgan, 1998). The report showed that contra-flow cycling is commonplace in the four continental European countries studied and recommends that it should be made more widespread in the UK. The contra-flow cycle schemes examined worked satisfactorily. The most common arrangement for contra-flow cycle schemes, at the European sites examined in the

report, was to exempt cyclists from the one-way restriction, without segregation. The exceptions are heavily trafficked routes or routes with a higher than normal speed limit, where segregation by cycle lane or physical measures would be used.

The report also contains a translation of a paper on contra-flow cycling in Germany, by a German Traffic Police Officer, which addresses the fear that contra-flow cycle schemes are necessarily dangerous.

2 Methodology

2.1 Site selection

The characteristics of alternative contra-flow schemes that were considered for investigation in this project were:

- a No physical segregation at the entrance to the contra-flow section
- b No physical segregation at the exit from the contra-flow section
- c An advisory contra-flow cycle lane
- d No contra-flow cycle lane
- e A narrow carriageway width
- f Side roads joining on the contra-flow side of the road

The schemes chosen in this study were selected for their individual geometric features, and are summarised in Table 1.

The three schemes in Bristol were installed in 1997, which enabled a 'before' and 'after' comparison of data. The schemes in Chichester and Oxford were installed in 1996 and 1985 respectively; data on these schemes were collected only after the schemes had been implemented. Elements of the schemes in Bristol required special authorisation from DETR.

2.2 Video filming

Video cameras were used at the five sites to record cyclist and motor vehicle manoeuvres at the contra-flow cycle schemes during a typical weekday. Between two and four cameras were set up at each site. All cyclist manoeuvres recorded were coded along with motor vehicle and pedestrian flows.

Filming was undertaken over a day (12 hours) at Oxford and Chichester in July 1997. A day of 'before' filming was undertaken in November and December 1996 at each site

Table 1 A summary of the contra-flow schemes studied

<i>Location</i>	<i>Date installed</i>	<i>Traffic Retention Order</i>	<i>Segregation at entrance/exit</i>	<i>Contra-flow lane markings</i>	<i>Number of side roads</i>
Conduit Place, Bristol	15/2/97	One-way with c/f cycling	None	Advisory/none	None
Braggs Lane, Bristol	15/2/97	One-way with c/f cycling	Exit ¹	Advisory	One
St Marks Road, Bristol	1/4/97	One-way with c/f cycling	Entrance	Advisory/none	One
North Street, Chichester	28/1/96	One-way with c/f cycling	None	Mandatory ²	One
Turl Street, Oxford	7/5/85	'False' one-way	None	None	Two

¹ Braggs Lane is split into two sections (East & West), and only one Braggs Lane West has a segregated exit

² Vehicles using parking bays are permitted to cross the cycle lane

in Bristol, and a day of 'after' filming in June and July 1997. The 'after' filming was conducted when the scheme had been operational for at least three months, to ensure that users had had a reasonable period to familiarise themselves with it.

2.3 Cyclist interviews

Interviews were carried out with 134 cyclists at the five sites in July 1997 to obtain their views on the contra-flow schemes. An interviewer was positioned at the sites from 8:00 to 16:00, or until a quota target of 25 interviews had been reached. Cyclists travelling contra-flow were interviewed: At sites where the number of cyclists was low, cyclists travelling with-flow were also interviewed, providing they had cycled contra-flow along the street within the previous three months. Respondents were asked about the design details of the contra-flow schemes, including usefulness of the scheme, how safe they felt cycling through the scheme, the design features that concerned them, and improvements that could be made to the scheme. A copy of the questionnaire used at Brags Lane is given in Appendix A.

The aim of the questionnaire was to obtain useful qualitative insights into the operation of the schemes, to back up observations from the video. Open questions were important to obtain this data, and interviewers were requested to record as much detail as possible. Quality rather than quantity of responses was emphasised.

3 Assessment of the contra-flow cycle schemes

3.1 Site descriptions

The three Bristol schemes were installed by Bristol City Council following a detailed assessment of cyclists' needs, design options, and safety. The Chichester scheme was introduced by West Sussex County Council, in order to permit cyclists to access the pedestrian area and avoid a lengthy and heavily-trafficked alternative route. The Oxford scheme was introduced by Oxford City Council as an amendment to town centre environmental traffic management measures and may form part of the proposed National Cycle Network.

In all schemes except Turl Street, the Traffic Regulation Orders permit motor vehicles to travel in one direction only, and cycles to also travel contra-flow. Turl Street is a 'false' one-way street where motor vehicles are permitted to travel in both directions but are prevented from entering at one end.

Design details of the five contra-flow schemes are described beneath, with site photos (Plates 1 to 10), followed by site plans (Figures 1 to 5).

3.1.1 Conduit Place, Bristol (Plates 1 & 2, Figure 1)

Conduit Place is a residential street in the St. Paul's area of Bristol, running East-West. Motor vehicles are prohibited from travelling the whole length of the street due to a road closure with cycle exemption. Before the introduction of the contra-flow scheme, cyclists had to use heavily-trafficked roads leading to the M32.

The contra-flow scheme in Conduit Place was completed on the 15th February 1997, over a short (30m), narrow (4m) section connecting the road closure to two other residential streets (Gordon Road and Ashley Grove Road). Cyclists are not segregated from vehicles at either end of the scheme, and there is a 4m length of coloured advisory cycle lane at the entrance to the scheme. The signing consists of two No Motor Vehicles signs (Diag. No 619) and one Pedal Cycle Route sign (Diag. No 967) at the entrance, and two Contra-flow Cycling signs (Diag. No 960.2) at the exit, facing the opposite direction. Parking is permitted on the with-flow direction side.

Before the contra-flow scheme, many cyclists were illegally travelling contra-flow. It was felt that the scheme would improve cyclist safety by raising motorists' awareness of contra-flow cycling. Segregation was not practicable at the site due to the narrow width of the road. This was not felt to be of concern to cyclist safety, due to low motor vehicle speeds and flows, good visibility for cyclists and motor vehicles, and a good approach sightline for cyclists entering the scheme.



Plate 1 Entrance to contra-flow scheme in Conduit Place, Bristol



Plate 2 Exit from contra-flow scheme in Conduit Place, Bristol

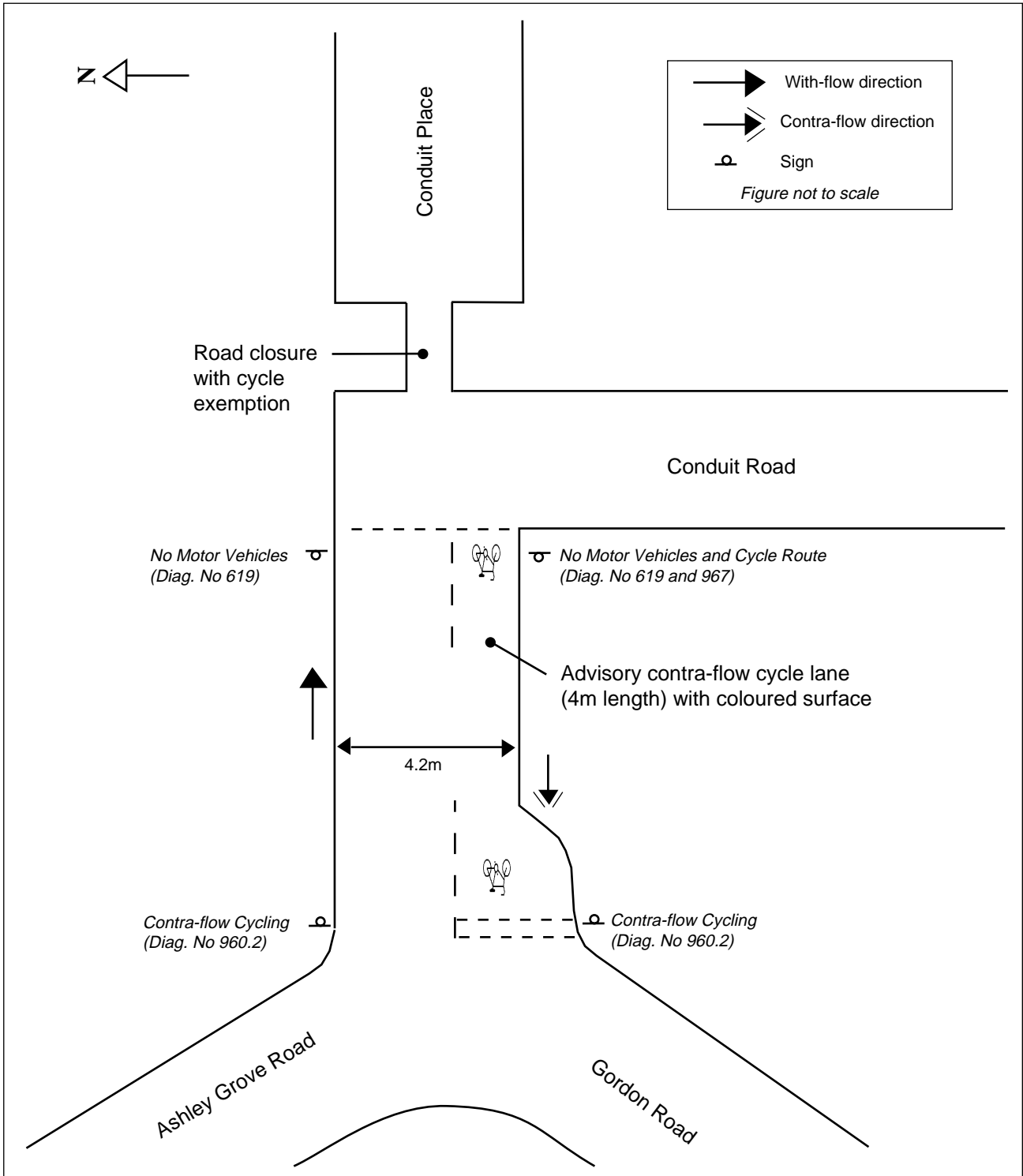


Figure 1 Conduit Place, Bristol

3.1.2 Braggs Lane, Bristol (Plates 3 & 4, Figure 2)

Braggs Lane is on the fringe of a suburban shopping area in Lawrence Hill, Bristol, with a land use comprising warehouses and garages.

The Braggs Lane contra-flow scheme is split into two sections, East and West of Gloucester Lane. Motor vehicles travelling with-flow converge at the junction with Gloucester Lane and must proceed Southwards along Gloucester Lane. Contra-flow cycling was permitted from the 15th February 1997 over a section 40m to the East of Gloucester Lane, which leads to a conventional contra-flow cycle lane along the rest of the road, and 75m to the West of Gloucester Lane. This enabled two-way cycling along Braggs Lane. The signing is the same for both sections: two No Motor Vehicles signs (Diag. No 619) and one Pedal Cycle Route sign (Diag. No 967) at the entrances (junction with Gloucester Lane) and two Contra-flow Cycling signs (Diag. No 960.2) at the exits, for vehicles travelling with-flow.



Plate 3 Junction with Gloucester Lane looking east.
Braggs Lane, Bristol



Plate 4 Junction with Gloucester Lane looking west.
Braggs Lane, Bristol

There is an advisory contra-flow cycle lane (1.3m wide) along the full length of both sections; prominence is given to the start of the cycle lane by coloured surfacing for 4m. Parking is permitted on one side of Braggs Lane: along Braggs Lane West parking is on the with-flow side, along Braggs Lane East parking is on the contra-flow side, inside the contra-flow cycle lane. There is a one-way gyratory around Braggs Lane, which cyclists can cross at the Braggs Lane West end of the contra-flow scheme, using a signalled crossing on Lamb Street. This gyratory system was the route cyclists (legally) had to take before the contra-flow cycle scheme was introduced.

Segregation on entry was not practical due to the narrow width (5m) of the carriageway and the need to maintain access to properties. This was not felt to be a concern for cyclist safety as the turning movements possible for motor vehicles at this point do not cross the path of these cyclists, and motor vehicle flows are low. The exit on Braggs Lane West is segregated from motor vehicles; there is no segregation on the exit on Braggs Lane East, as it runs into an existing contra-flow scheme.

Before the scheme was introduced, the one-way arrangements were frequently ignored by cyclists travelling contra-flow. The proposals were designed to raise motorists' awareness of the likelihood of encountering oncoming cyclists.

3.1.3 St Marks Road, Bristol (Plates 5 & 6, Figure 3)

St Marks Road is a 400m long street in Easton, and is at the centre of a suburban shopping area.

Contra-flow cycling was permitted from the 1st April 1997 on a section of St Marks Road, 100m in length, as the final part of a refurbishment programme of the whole street. The road width varies between 4m and 5m along the scheme, apart from three build-outs, where the road narrows to 2.5m; one of these includes a cycle bypass. Segregation from motor vehicles is provided for cyclists on entry to the scheme at a kerbside build-out. Short sections of advisory cycle lane are provided for cyclists at the start of the scheme, in front of accesses, and at the exit of Henrietta Street, a cul-de-sac half way along the scheme. This reminds motorists leaving Henrietta Street and accesses on St Marks Road of the possible presence of cyclists travelling in the contra-flow direction. At the exit from St Marks Road there is no segregation for cyclists.

The last section of the scheme, between Henrietta Street and Berwick Road, has parking bays on the with-flow side between two build-outs, and bollards on the footway of the opposite side to prevent parking. At each build-out there is a flat-top road hump raised to footway level. Over the whole length of St Marks Road there are granite sett areas at regular intervals to slow traffic, and parking for motor vehicles along most of the with-flow side. Parking is prohibited along the contra-flow side. The scheme terminates at the junctions of Berwick Road and Mivart Street where contra-flow cyclists must turn down one of these side roads.

There are two No Entry signs (Diag. No 616) and one Pedal Cycle Route sign (Diag. No 967) at the entrance to the scheme and two Contra-flow Cycling signs (Diag. No 960.2)

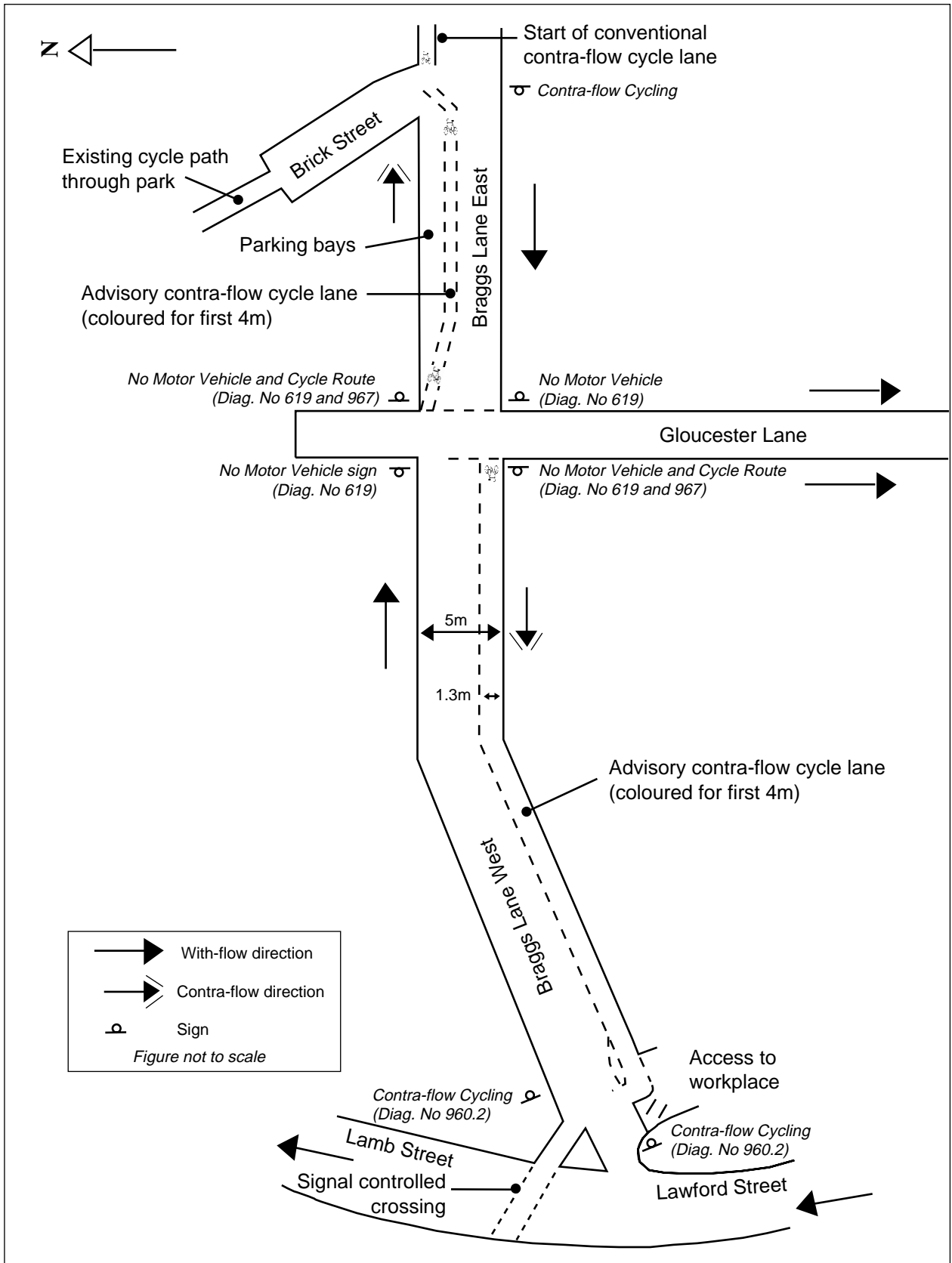


Figure 2 Braggs Lane, Bristol



Plate 5 Entrance to contra-flow scheme in St Marks Road, Bristol



Plate 6 Contra-flow scheme in St Marks Road, Bristol looking south

at the exit, for vehicles travelling with-flow. There is a No Motor Vehicles sign (Diag. No 619) half way along the scheme, at the junction with Henrietta Street, facing the contra-flow direction.

In the view of Bristol City Council, when designing the schemes, the discontinuous cycle lane and lack of segregation on exit were not expected to affect cyclists' safety. Although it was the busiest of the three sites in Bristol, motor vehicle speeds were low and motor vehicle flows were moderate. Use of the road was predominantly local so it was assumed that motorists would quickly become used to the arrangements. Before the scheme was introduced abuse of the one-way order by cyclists was high, and one aim of the new arrangements was to improve cyclist safety by raising motorists' awareness of the likelihood of meeting oncoming cyclists.

3.1.4 North Street, Chichester (Plates 7 & 8, Figure 4)

North Street links a large gyratory on the ring road with the central pedestrian area in Chichester town centre.

The contra-flow cycle scheme was installed on the 28th January 1996 along a section of North Street between the

junctions with Guildhall Street and St Peters Street. The scheme gives cyclists two-way access to the pedestrian area, where cyclists are permitted to cycle outside shopping hours (9:30-17:30 Monday to Saturday). Allowing cyclists into the pedestrian area was part of the Traffic Regulation Order which also permitted the contra-flow scheme.

The entrance and exit to the scheme are unsegregated for cyclists. At the start of the scheme vehicles must turn into Guildhall Street. The scheme is 75m long, and has a mandatory contra-flow cycle lane (1.4m wide). The cycle lane lies between the with-flow traffic (4.2m - 6m wide) on one side, and the parking bay on the other. At each end of the parking bay there is a build-out. There are also parking spaces for three motor vehicles on the other side (with-flow) of the carriageway. There is an exemption in the Traffic Regulation Order to allow access across the cycle lane to the parking bays.

There is a No Motor Vehicles sign (Diag. No 619) at the entrance to the scheme, with an exemption sign to allow loading before 9am and after 6pm. On the St Peters Street approach there is a Cycle Route Ahead sign (Diag. No 950).

The contra-flow cycle scheme was introduced to enable cyclists to reach key destinations, without dismounting or using parts of a very busy ring road.



Plate 7 Entrance to contra-flow scheme in North Street, Chichester



Plate 8 North Street contra-flow scheme from St Peters Street, Chichester

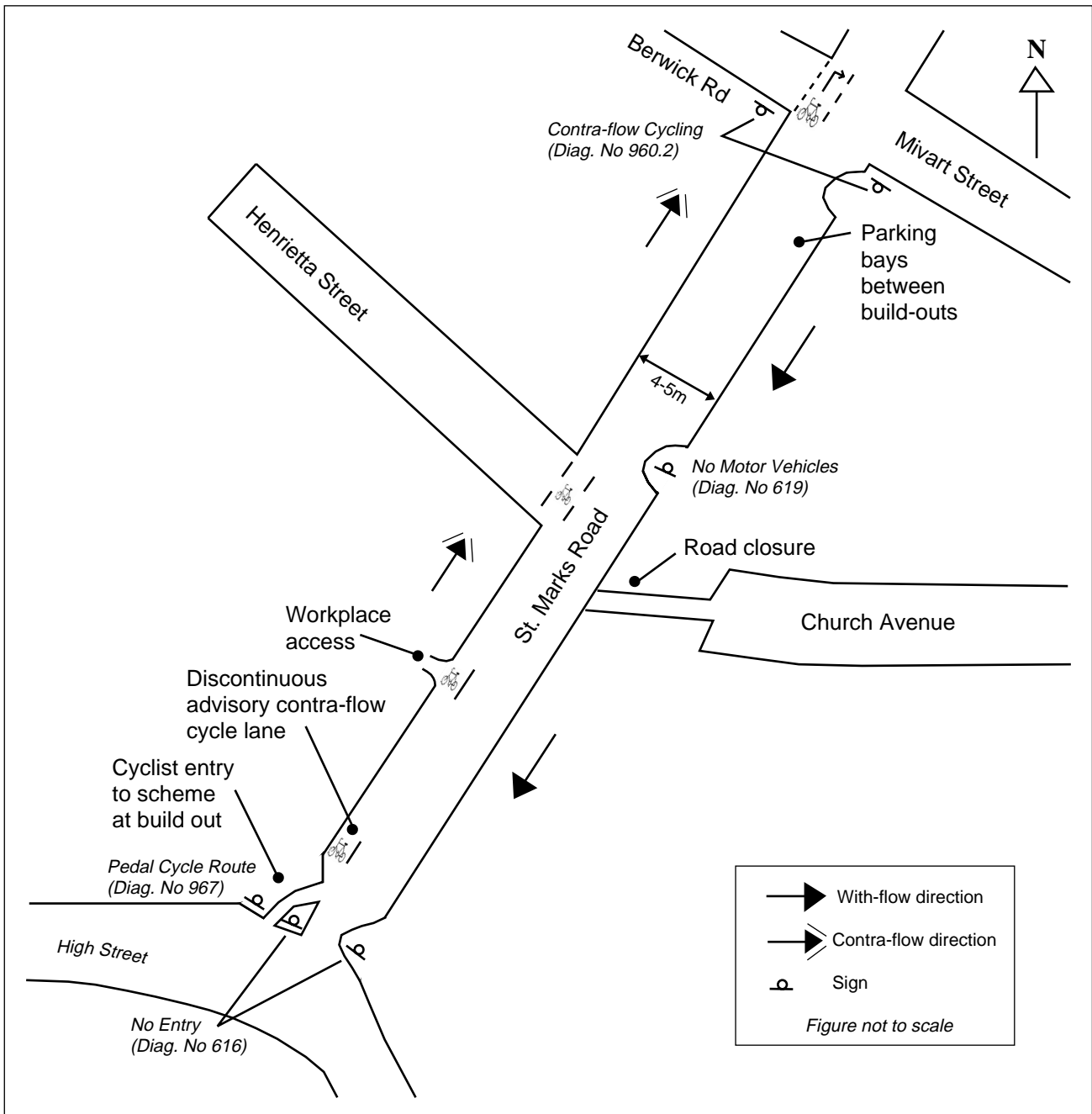


Figure 3 St Marks Road, Bristol

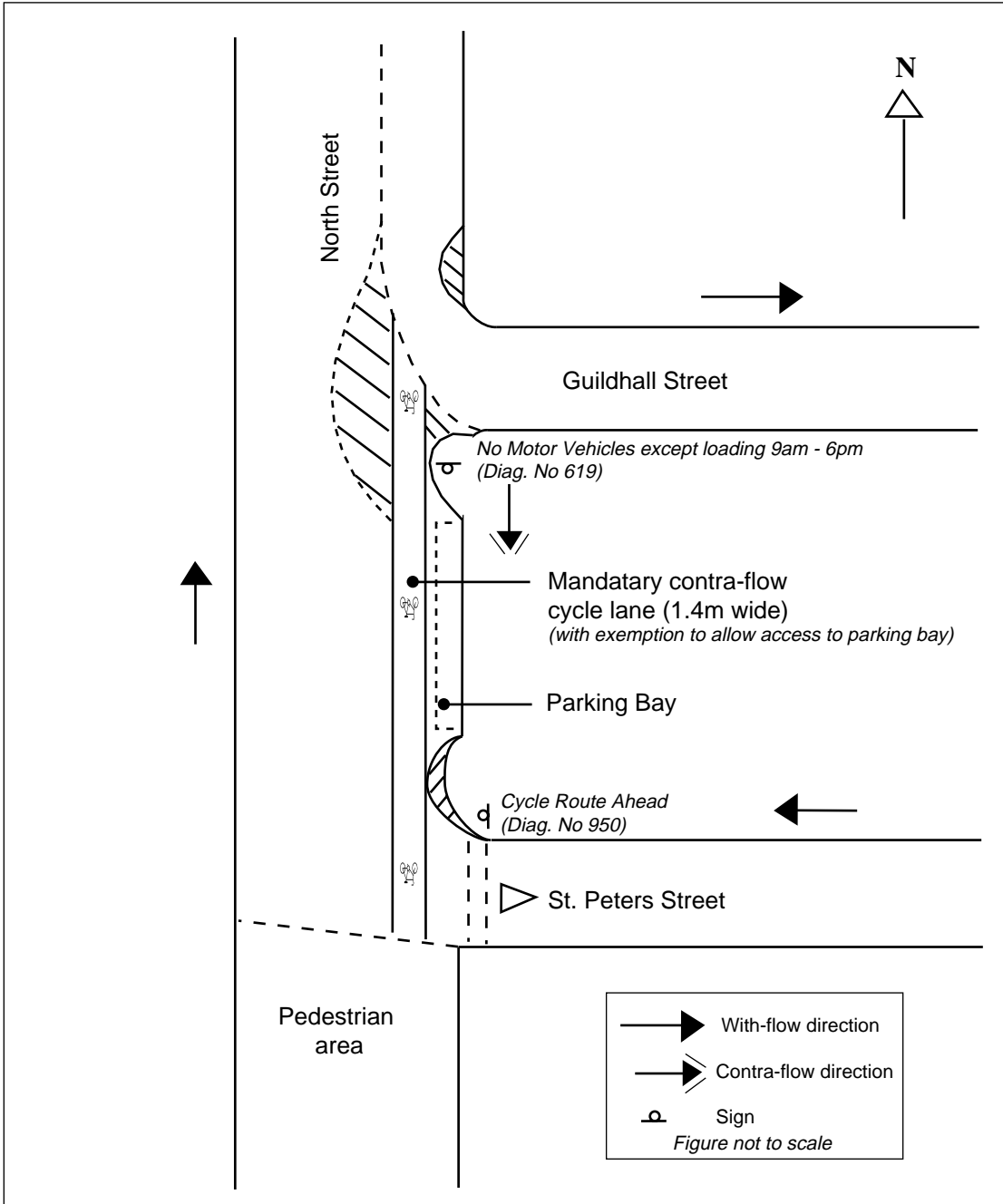


Figure 4 North Street, Chichester

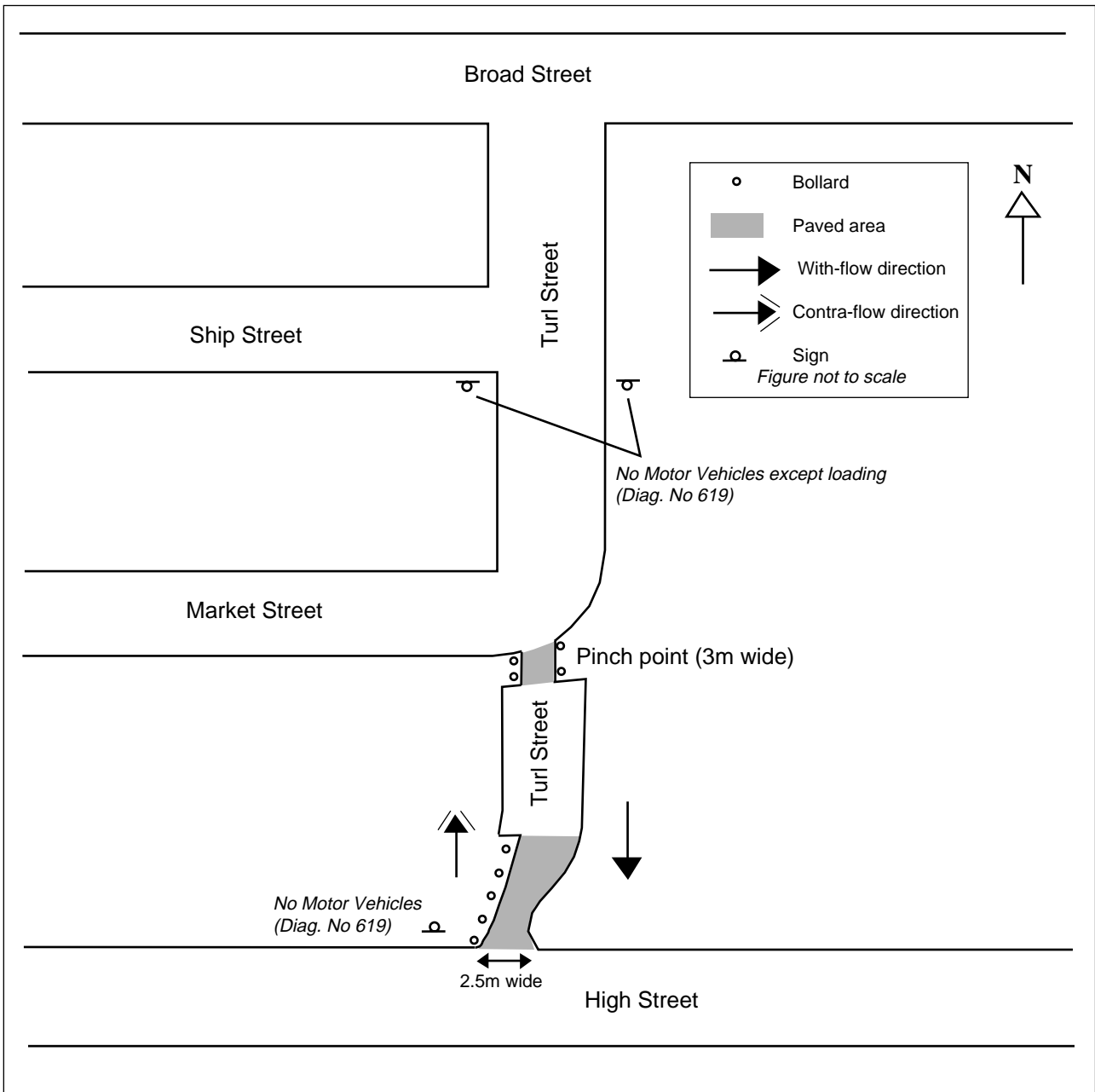


Figure 5 Turl Street, Oxford

3.1.5 Turl Street, Oxford (Plates 9 & 10, Figure 5)

Turl Street runs between Broad Street and High Street in the centre of Oxford and is a 200m long street on the fringe of the main shopping area in Oxford city centre.

Two-way cycling was permitted in Turl Street, previously a one-way street, on the 7th May 1985. This street is a 'false' one-way street: a No Motor Vehicle sign (Diag. No 619) at the High Street entrance to the scheme permits cyclists to travel contra-flow. There are no formal facilities for cyclists such as cycle lanes and no segregation from motor vehicles at either end. There are two side roads, Market Street and Ship Street, that join Turl Street on the 'contra-flow' side.

The entrance to Turl Street from High Street is paved for 25m and very narrow (2.5m wide); there are five bollards between the footway and the carriageway over this section. There is no kerb or difference in levels between the footways and carriageway at the narrowest point. The remainder of the street is straight and approximately 5m wide. There is a paved pinch point (6m long, 3m wide) with four bollards before the junction with Market Street. This is to assist pedestrians to cross to Lincoln College.

Motor vehicle entry is prohibited, except for access, from Broad Street (technically from the Turl Street / Ship Street junction). At the junction with Ship Street there are two No Motor Vehicles signs (Diag. No 619), with additional exemption signs for loading in Turl Street and Market Street. All vehicles exiting Turl Street via High Street must turn left. Parking is not permitted on either side of Turl Street, indicated by double yellow lines for the whole length of the street.



Plate 9 Entrance to contra-flow scheme in Turl Street, Oxford

3.2 Traffic flows, speeds and accidents

3.2.1 Traffic flows

Traffic flows at the five sites are shown in Table 2. At the sites with before and after data, there were more cyclists after installation of the contra-flow schemes. The percentage increase was 54%, from 167 cyclists before installation to 257 cyclists after installation. This was at least partly due to seasonal variations. At the sites with



Plate 10 Junction with Market Street looking South. Turl Street, Oxford

before data, the proportion of cyclists travelling contra-flow rose from 41% of all cyclists (69 out of 167) before installation to 49% of all cyclists (126 out of 257) after installation although this increase is not statistically significant. North Street had the lowest proportion of cyclists travelling contra-flow (35%); the design of the one-way system in Chichester is such that for some destinations it is more convenient to use an alternative route in this direction.

From the video film, instances were noted where cyclists passed close to other road users, including pedestrians, vehicular traffic and parked motor vehicles. This included any road user forced to alter their route, or where vehicle had to stop, wait, brake or swerve.

In 56 hours of film at the five sites, before and after contra-flow scheme installation, there were no instances where cyclists were judged to be put in any serious danger i.e. instances where injury to a cyclist or damage to their bicycle looked likely to occur. Nor were any cases observed where cyclists endangered pedestrians. There were a few isolated cases of cyclists having to wait for traffic to clear (usually delivery vehicles) before continuing their route, or having to squeeze through a narrow gap between parked and moving motor vehicles. These cases were more akin to the inconvenience of congestion rather than danger. However, it should be remembered that road accidents and even 'near misses' are, in general, very rare and statistically unlikely to be observed in such a time period.

All of the sites had motor vehicle flows of less than 1000 over a seven hour period; none of the sites are designated through routes and most have parking restrictions. Motor vehicle flows were higher at Conduit Place and St Marks Road after installation of the contra-flow cycle schemes, but lower at Braggs Lane. These changes may be attributable to the contra-flow schemes, traffic management schemes in the local area, to random variations or to seasonal variations when the data was collected. The increase in motor vehicle flow at Conduit Place is likely to be due to the introduction of traffic signals at a nearby junction, leading to greater use of Conduit Place by motorists to avoid this signalised junction.

Table 2 A comparison of before and after flows of cyclists, motor vehicles and pedestrians

	<i>Conduit Place</i>	<i>Braggs Lane East</i>	<i>Braggs Lane West</i>	<i>St Marks Road</i>	<i>North Street</i>	<i>Turl Street</i>
Before						
Date of filming	16/12/96	16/12/96	16/12/96	21/11/96	na	na
Cyclists	51	23	26	67	na	na
With-flow	32 (63%)	9 (39%)	16 (62%)	41 (61%)	na	na
Contra-flow	19 (37%)	14 (61%)	10 (38%)	26 (39%)	na	na
Motor vehicles	296	188	266	517	na	na
With-flow	295 (100%)	176 (94%)	259 (97%)	516 (100%)	na	na
Contra-flow	1 (0%)	12 (6%)	7 (3%)	1 (0%)	na	na
Pedestrians (both directions)	238	337	509	1289	na	na
After						
Date of filming	16/6/97	3/6/97	3/6/97	4/7/97	16/7/97	14/7/97
Cyclists	74	44	46	93	240	890
With-flow	41 (55%)	20 (45%)	28 (61%)	42 (45%)	157 (65%)	461 (52%)
Contra-flow	33 (45%)	24 (55%)	18 (39%)	51 (55%)	83 (35%)	429 (48%)
Motor vehicles	490	110	253	763	903	449
With-flow	490 (100%)	107 (97%)	249 (98%)	763 (100%)	893 (99%)	423 (94%)
Contra-flow	0 (0%)	3 (3%)	4 (2%)	0 (0%)	10 (1%)	26 (6%)
Pedestrians (both directions)	280	260	368	1520	5344	6357

¹Data obtained from video filming, 9:00 - 16:00

²Braggs Lane is shown in two sections (Braggs Lane East and Braggs Lane West) due to two separate contra-flow sections

³na = not applicable (no before filming at North Street and Turl Street)

At Conduit Place, Braggs Lane and St Marks Road, a small number of motor vehicles travelled contra-flow illegally before introduction of the contra-flow schemes. The ‘after’ surveys showed that, if anything, the introduction of the contra-flow cycle schemes reduced this problem. At North Street 10 motor vehicles were observed travelling in the contra-flow direction to access the parking bays, including delivery vehicles which are permitted to do so. At Turl Street 26 motor vehicles turned around in the section between Market Street and High Street. This manoeuvre is permitted as the scheme is a ‘false’ one-way street.

The No Motor Vehicles signs were respected by drivers at all sites and the concerns expressed in Chapter 1 about their use were not borne out by the evidence.

There were high flows of pedestrians at the sites, particularly at those near main shopping centres (North Street and Turl Street) where pedestrian numbers were over 700 an hour on average.

3.2.2 Vehicle speeds

The speed data collected by the local authorities show reasonably low speeds at the contra-flow schemes both before and after scheme implementation (see Table 3). The 85th percentile speeds at all sites were between 15 mph and 23 mph at the sites. At the three sites with before and after data, the 85th percentile speeds fell by between one and five mph after installation of the contra-flow schemes.

Table 3 Vehicle speeds at the contra-flow sites

	<i>Conduit Place</i>	<i>Braggs Lane</i>	<i>St Marks Road</i>	<i>North Street</i>	<i>Turl Street</i>
Before					
85th percentile speed	18	22	23	na	na
After					
85th percentile speed	15	21	18	23	17

All speeds were taken from automatic traffic counters at the site for 7 days (168 hours), except for Chichester, where a speed gun was used for 2 hours in the off-peak.

na = Not applicable, before data not available.

3.2.3 Accidents

No accidents were recorded in the three year period before installation of the contra-flow schemes at Conduit Place, Braggs Lane, St Marks Road or North Street. These schemes are too recent to allow a proper 'after' period assessment. However, at the time of writing, all schemes had been installed for at least eight months and no accidents had been reported.

Accident data was studied for both before (1980-1983) and after (1994-1996) installation of the contra-flow scheme in Turl Street. There were no accidents relating to the contra-flow scheme either in the before or after period.

3.3 Cyclists' views of the contra-flow schemes

In total, 134 cyclists were interviewed at the five sites. Of these, 80% were between 25 and 59 years of age and 66% were male. Cyclists were asked the main purpose of their current journey; the most frequent responses were commuting (34%), shopping (28%) and leisure (14%). Over three-quarters of these journeys (79%) took 15 minutes or less.

Virtually all cyclists (133 respondents) said that they found it useful to be able to cycle contra-flow along the road where they were interviewed. Nearly all felt safe cycling along the roads with contra-flow schemes. Of the total sample, 79% felt very safe or fairly safe, compared to 18% who felt fairly unsafe. None of the respondents felt very unsafe. Most of the minority who felt fairly unsafe were at Turl Street.

Each scheme was examined in detail with reference to the design and operation of the schemes. Although some concerns were raised about specific features or locations (these are shown in Table 4), this is to be expected of almost any traffic scheme in a mixed use urban area. Generally, cyclists were satisfied with the design and operation of the schemes.

3.3.1 Conduit Place, Bristol (Plates 1 & 2, Figure 1)

At Conduit Place, 26 cyclists were interviewed. Most of those interviewed were commuting (12 respondents) or on leisure trips (7 respondents). All interviewees found the scheme useful, mainly for reasons of convenience (15 respondents). Conduit Place provides a fast direct route for many cyclists, away from busy roads. Before the scheme was introduced in February 1997, 15 respondents said that they had cycled

contra-flow along Conduit Place. Most of the remainder (8 respondents) said that they did not make the journey. The two cyclists that had used an alternative route before the contra-flow scheme was installed both considered the contra-flow route to be safer and more convenient.

The characteristics of the contra-flow scheme that cyclists found most helpful were the road markings, the cycle symbol and the cycle lane. The main concern that cyclists had was that of motor vehicles travelled too fast round the corner from Ashley Grove Road into Conduit Place. Conduit Place is used as a 'rat run' to avoid delay on Lower Ashley Road, which leads onto the M32. Several cyclists mentioned poor visibility at this junction: the position of the buildings and the road layout prevented cyclists seeing motor vehicles approaching the junction.

The 85 percentile speeds recorded by the local authority were 18mph and 15mph before and after scheme installation respectively. Although these speeds are not high for 30 mph limits, it is apparent from the video film that some motor vehicles travel fast around the corner into Conduit Place, but then slow down dramatically to turn into Conduit Road, a 90 degree turn. The recorded speeds probably understate the actual speeds of some vehicles on some sections of Conduit Place. One improvement, mentioned by several cyclists, could be to install a speed reducing measure in Ashley Grove Road before motor vehicles enter the contra-flow scheme. Specific measures mentioned included limiting vehicle speeds to 20mph and introducing road humps. Cyclists were also concerned about motor vehicles encroaching into the contra-flow cycle lane. The after videos show that many motor vehicles do go over the contra-flow cycle lane but no conflicts were observed when cyclists were present.

Parked vehicles, although mentioned as a concern by only four respondents, appeared to be a problem on the video film. On the before film, motor vehicles were partially blocking the existing cycle gap in the road closure (see Figure 1) for two of the eight hours, which meant that five of the fifty-one cyclists had to slow down and squeeze through a narrow gap or dismount from their bikes. At one point, a parked van prevented a lorry from turning into Conduit Road, causing a queue of traffic. On the after video no vehicles blocked the cycle gap in the road closure. The contra-flow markings may have helped to deter motor vehicles from parking illegally in this location.

Table 4 Features of the contra-flow cycle schemes causing concern to cyclists interviewed

	<i>Conduit Place</i>	<i>Braggs Lane</i>	<i>St Marks Road</i>	<i>North Street</i>	<i>Turl Street</i>
Number of cyclists interviewed	26	26	22	30	30
Feature					
Entering section	12	10	8	7	18
Side road 1	-	-	5	-	16
Side road 2	-	-	-	-	1
Leaving section	8	12	4	20	10
Vehicles	9	6	14	5	11
Parked vehicles	4	6	14	6	17
Pedestrians	1	4	3	8	17

3.3.2 Braggs Lane, Bristol (Plates 3 & 4, Figure 2)

At Braggs Lane, 26 cyclists were interviewed (10 on Braggs Lane East and 16 on Braggs Lane West). Of these, half used to cycle contra-flow before the scheme was introduced.

There were four respondents who used an alternative route before the scheme was introduced. All considered the new contra-flow route to be safer and more convenient.

In terms of scheme design, cyclists that mentioned something helpful (14 respondents) were primarily referring to the cycle lanes (12 respondents). The most frequent response for those mentioning something unhelpful about the design (5 out of 11 respondents) was the junction with Gloucester Lane, where the cycle lanes meet. Some cyclists found this junction confusing because they can continue ahead, but vehicles must turn into Gloucester Lane. Several cyclists even thought they were supposed to cross from one cycle lane to the other, which would have resulted in them cycling the wrong direction in the cycle lane. The biggest improvement put forward by respondents was to make the cycle lane clearer to users, either by the use of additional signing or by colouring the whole length of the cycle lane.

Of the total sample, 12 cyclists expressed a concern about leaving the section. These were predominantly cyclists exiting Braggs Lane West (8 respondents). Leaving Braggs Lane West, cyclists felt there is a problem of vehicles travelling fast from the gyratory system into Braggs Lane; visibility is poor at this junction.

Cyclists also reported being 'squeezed' in Braggs Lane when vehicles are parked illegally or delivering to a building along the road. The effective road width can become very narrow at times, with vehicles often parked on the other side of the road. A lack of kerbside space for loading / unloading, due to parked vehicles, was clearly a problem. However, the videos showed that this rarely caused problems to cyclists, due to the low levels of bicycle and motor vehicle flows.

3.3.3 St Marks Road, Bristol (Plates 5 & 6, Figure 3)

At St Marks Road, 22 cyclists were interviewed. All users found the contra-flow scheme useful, primarily because it is convenient. Most (17 respondents) had cycled contra-flow before the scheme had been introduced.

The 11 respondents who found something helpful about the design of the scheme were mostly referring to the entrance to the scheme (6 respondents). This section is a cycle bypass to a build-out, a safer and more convenient option for cyclists than the main carriageway. However, cyclists entering the scheme from the right found this manoeuvre difficult because they have to cross a busy road and the geometry of the segregated entry is awkward. A few cyclists reported being 'ticked off' by drivers for (correctly) cycling contra-flow. This suggests a need for additional signing and publicity aimed at drivers.

The main concerns cyclists had were from traffic and parked vehicles, both mentioned by 14 respondents. At times the road can become too narrow for vehicles and cyclists to pass comfortably; cyclists mentioned the hazards of brushing wing mirrors and avoiding opened vehicle doors. There is a lot of short-term parking,

primarily to access the shops for delivery and trade. There was a shortage of kerbside loading spaces as most were occupied by parked vehicles. Amendments to the parking restrictions are due to be made during 1998 which should help to improve the situation.

Of the sample, 17 cyclists suggested improvements to the contra-flow scheme; the most popular being to extend the cycle lane over the whole length of the scheme, to restrict parking, and to ban motor vehicles. Two respondents mentioned that they had to turn left or right at the end of the contra-flow scheme at the junction with Mivart Street, and would like to see the contra-flow scheme extended along the whole length of St Marks Road.

Half of those interviewed (11 respondents) were on a shopping journey. Of the shoppers, nine had journeys lasting between one and five minutes, localised shopping trips to St Marks Road. Several users were keen to see more cycle parking provided along the street.

3.3.4 North Street, Chichester (Plates 7 & 8, Figure 4)

At North Street, 30 cyclists were interviewed. The North Street contra-flow scheme provided a useful link for cyclists travelling into Chichester town centre. Before its introduction in 1996, more than half of the sample had been making less convenient journeys, either using an alternative route (8 respondents) or walking the short journey into town (8 respondents).

The cycle lane in Chichester was popular with cyclists. There were ten respondents who specifically mentioned the cycle lane markings as a feature of the contra-flow scheme which helped them, or made them feel safe.

The parking bays on the footway side of the contra-flow cycle lane mean that motor vehicles have to nose out across the cycle lane facing oncoming cyclists and sometimes have to be half way out before they can see cyclists (most of the drivers are on the kerbside). Some cyclists (7) felt that parked cars were a problem at the scheme.

Two thirds of all cyclists expressed a concern about the junction with St Peters Street. Vehicles sometimes come out the junction at speed, unaware of cyclists travelling contra-flow. This may be partly due to parked vehicles obscuring the view to the right. The Give Way line in St Peters Street is set back approximately two metres from the cycle lane: cyclists were unsure as to who has right of way and felt wary approaching the junction (2 respondents said that they dismounted). There were six respondents who expressed a desire to see an improvement in the signing for motor vehicles exiting St Peters Street.

Several cyclists (7 in the sample) found the junction with Guildhall Street a problem. They dislike having to move out from the kerb to enter the cycle lane, with the possibility of left-turning motor vehicles 'cutting them up'. Another concern expressed by 8 respondents was pedestrians walking out in front of them.

3.3.5 Turl Street, Oxford (Plates 9 & 10, Figure 5)

At Turl Street, 30 cyclists were interviewed, and they were generally satisfied with the scheme. Turl Street provides a convenient route for cyclists, particularly those travelling

North-South. Cyclists were concerned about specific locations within the scheme where the road is narrow, particularly the entry to Turl Street from High Street and the pinch-point. They were also concerned about parked vehicles and pedestrians blocking their route.

The entrance from High Street caused concern to cyclists (15 respondents) because it is narrow for motor vehicles and cyclists to share (2.5m). Some cyclists dismounted to enter if motor vehicles were coming out of Turl Street.

The pinch-point near to the junction with Market Street is also narrow (3m) and heavily used by pedestrians to cross to Lincoln College. There were very high flows of pedestrians in Turl Street (900 per hour) many of whom walked in the carriageway, and this was of concern to 17 respondents. The bulk of the pedestrians are visiting the colleges and shops; some are large tourist groups on guided tours.

Stationary vehicles were a concern to 17 respondents despite a ban on parking along the street. Many of these were large vans and HGVs delivering goods to the colleges and shops on the street. Although parking is prohibited, loading and unloading are permitted at the kerbside as most premises have no off-street access.

About half of the sample (16 respondents) were confused about right of way at the junction of Turl Street with Market Street. Cyclists travelling from the pinch-point in Turl Street, towards Broad Street, are not sure whether motor vehicles approaching the Market Street junction will continue ahead or turn right across them into Market Street. There are no road markings to indicate that straight ahead traffic does not have priority, but drivers turning right tended not to signal, assuming that cyclists will give way.

4 Conclusions and recommendations

4.1 Conclusions

- Local authorities have identified a number of difficulties with introducing conventional contra-flow cycle schemes. These difficulties could be reduced by increased advice and guidance on contra-flow cycle schemes, particularly alternative design options, including signing.
- Many cyclists travelled illegally contra-flow before the schemes were introduced. The introduction of legal contra-flow cycling increased the proportion of cyclists travelling contra-flow from 41% to 49% at those sites with before and after data.
- There was no evidence from the video film of cyclists being put in significant danger by motor vehicles. There were a few cases of cyclists having to wait or squeeze through a narrow gap.
- Motor vehicle flows and motor vehicle speeds were generally low at all of the contra-flow cycle schemes, but excessive speed was still a concern to some cyclists.
- Despite considerable illegal contra-flow cycling before the schemes were introduced, no accidents involving cyclists were recorded in 15 years of before accident data.

- No accidents attributable to the contra-flow scheme were recorded in the after periods at any of the sites.
- Almost all of the cyclists interviewed found that the contra-flow schemes were useful and felt safe cycling along the schemes.
- Cyclists liked the design features of the schemes that made contra-flow cycling more visible, such as signing, lane markings and coloured surfacing.
- Compliance with the No Motor Vehicle signs (Diag. No 619) was good and shows that these signs can be used to stop motor vehicles from using one-way streets in the contra-flow direction.
- At Conduit Place, Braggs Lane, St Marks Road and Turl Street there were certain times when a combination of traffic, delivery vehicles and / or parked vehicles reduced the amount of road space available to cyclists.
- Experience at North Street highlighted the need to make drivers emerging from side roads, into roads with contra-flow cycle schemes, aware of the potential presence of cyclists from the right.
- The contra-flow cycle schemes in the study appeared to operate safely. They were also popular with the cyclists using them. They demonstrate that properly designed contra-flow cycle schemes can be successfully provided at sites with adverse conditions including very narrow streets, very high and low cycle flows, high numbers of pedestrians, kerbside parking (legal and illegal) and considerable loading / unloading activity.

4.2 Recommendations

A compilation of results from this study and other research (Morgan, 1998), have been used to produce these recommendations on contra-flow cycling. The recommendations include policy issues and design guidelines to assist designers, planners and engineers in the choice of location and nature of contra-flow cycling provision.

Policy issues:

- Contra-flow cycle schemes could have a wider application in the UK, for reasons of cyclist safety and convenience, in comparison with alternative routes that would need to be used if provision were not made. If appropriate techniques are used, this could often be achieved at relatively little cost or detriment to other road users, although some schemes may still require more costly treatment.
- Local authorities, as part of the wider provision of safe and attractive conditions for cyclists in their area, should review the one-way streets in their areas for opportunities to permit two-way cycling. Where cyclists are already (illegally) cycling contra-flow, either on the carriageway or footway, there will be a demand for a contra-flow scheme.
- Contra-flow cycle schemes can be important to discourage cyclists from using dangerous alternative routes. Schemes should be given particular priority where the alternative route involves fast or high capacity roads, gyratory systems or large roundabouts, particularly where

a right-turn manoeuvre for cyclists is required. In one-way streets where footway cycling is a concern, the introduction of contra-flow cycle schemes should help alleviate this problem, where conditions permit.

- DETR should emphasise to local authorities that a range of techniques for accommodating contra-flow cycling are available, including the mandatory cycle lane with segregation on entry and exit, and alternative contra-flow scheme designs which may be more appropriate in certain conditions. This should encourage and assist local authorities in assessing the opportunities for introducing such schemes where useful.
- The high level of compliance by drivers with the No Motor Vehicle sign (Diag. No 619) should be publicised, in order to reduce concerns by local authorities and the police about its use. Driver education material, and local publicity associated with schemes, should assist by featuring this sign more often to increase awareness.

Design guidelines:

- Where average motor vehicle speeds are above 30mph or where motor vehicle flows are much in excess of 1,000 vehicles per day, conventional contra-flow designs, including physical segregation, will generally be appropriate.
- Where motor vehicle speeds are below 30mph, or can be reduced to this level by traffic calming or other measures, and where motor vehicle flows are not high, alternative contra-flow designs may be preferable for a variety of reasons, including cost, aesthetics, and practicality.
- Narrow one-way streets can be converted to contra-flow cycling. Where the effective width of the street is too narrow to accommodate a mandatory contra-flow cycle lane, an advisory cycle lane or no cycle lane may be acceptable. It appears from this research that alternative contra-flow cycle schemes can function safely in some streets with sections as little as 2.5m wide over short distances. Greater widths are normally desirable.
- Because drivers and contra-flow cyclists are looking towards each other, safety is generally good. However, in narrow streets, cyclists can feel intimidated by oncoming motor vehicles and measures may be required to reduce motor vehicle speeds to around 20mph or even less. This may be achieved by conventional traffic calming techniques.
- In implementing false one-way streets, local authorities should normally avoid using turning restrictions or point No Entry restrictions to prevent vehicles exiting premises or car parks from travelling in the contra-flow direction. Some motor vehicles travelling 'contra-flow' will tend to make drivers more alert to the possibility of oncoming traffic including cycles.
- Where road widths, parking requirements, local access needs or aesthetic factors do not easily allow physical segregation at entry or exit to the contra-flow cycling section, alternative design options can be suitable provided the vehicle speeds are sufficiently low and visibility is adequate.
- Vehicles emerging from side roads or accesses are probably the greatest potential hazard to contra-flow

cyclists. At such locations, good signing will be important, possibly reinforced by colour contrast surfaces on the cycle lane, to alert drivers to the likely presence of cyclists. 'False' one way streets enabling motor vehicles to also travel 'contra-flow' may be helpful to raising drivers awareness of contra-flow traffic.

- Inconsiderate and illegal parking, and loading and unloading activity, can also be problematic. Although it may be possible to reduce kerbside parking or to improve enforcement, it is more difficult to prevent kerbside loading and unloading, especially as delivery vehicles are permitted to wait on double yellow lines. Providing allocated space for loading and unloading may produce a tidier solution. In cases where delivery vehicles need to wait on the contra-flow side, an advisory cycle lane or no cycle lane can offer an acceptable solution where traffic conditions are suitable.
- Cyclists expressed a preference for clear signing, markings and colour surfaces to indicate the contra-flow lane and rights of way at junctions. This was of more concern to cyclists at the schemes which had been introduced only recently and where the cycle flows were relatively low. It may be useful to erect additional signs in the first few months, and to use other publicity and education media such as leaflets and the local press. However, other than for temporary measures, excessive signing should be avoided for aesthetic and other reasons. 'False' one-way streets will reduce the need for signing.

5 Acknowledgements

The authors would like to thank John Lucas of Bristol City Council, Nigel Coates of Oxford City Council and Mark Peach of West Sussex County Council. The video filming and interviews were undertaken by in-house teams at TRL.

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Appendix A: Cyclist questionnaire

CONTRAFLOW CYCLING

BRAGGS LANE, BRISTOL, JULY 3, 1997

REFUSALS				

RESPONDENT NO. _____

Good morning / afternoon. I am from the Transport Research Laboratory and would like to ask you some brief questions about cycling in this area. It will only take a few minutes and will be entirely confidential.

Interview cyclists travelling with the vehicle flow only if they have ever cycled contraflow along Braggs Lane. If cycling with flow ask:

1. Have you cycled in the opposite direction along this road in the past 3 months? (CODE ONE ONLY)

DO NOT READ OUT Yes 1
 No (*terminate interview, do not code*)

SECTION A: USE OF BRAGGS LANE

2. How often do you cycle along this road, in this [contraflow] direction? (CODE ONE ONLY)

DO NOT READ OUT 6-7 days a week 1
3-5 days a week 2
1-2 days a week 3
1-4 days a month 4
Less than once a month 5
The first time 6

SECTION B: PREVIOUS USE BEFORE CONTRAFLOW SCHEME

3. Do you find it useful to be able to cycle in this direction [contraflow] along this road? (CODE ONE ONLY)

DO NOT READ OUT Yes 1
No (Go to Q.5) 2
Don't know (Go to Q.5) 3

4. In what way do you find it useful?

5. This road was changed from one-way to two-way for cyclists in February 1997. Do you remember this road before it was changed? (CODE ONE ONLY)

DO NOT READ OUT Yes 1
No 2

6. What did you do before cycling in this direction was permitted? (MULTI-CODE)

Did not make the journey 1
 Cycled the "wrong way" up the road 2
 Cycled on the pavement 3
 Walked with bicycle 4
 Used a different mode of transport ie. drove, walked 5
 Don't know 6
 Used an alternative route (specify route) 7

Other (please specify) 8

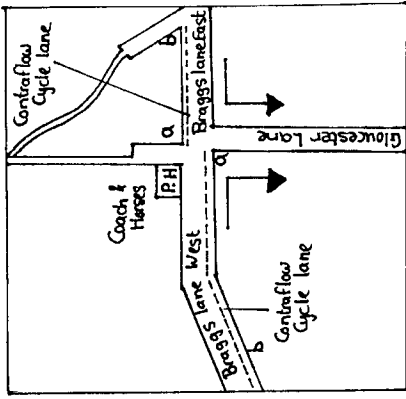
*If the respondent did not specify an alternative route then go to question 11.
 If the respondent answered "2", "Cycled the wrong way up the road" then go to question 12.*

7. Do you consider this alternative route or the route that you are now using to be more convenient? (CODE ONE ONLY)

DO NOT READ OUT Alternative route 1
Present route 2
Don't know (Go to Q.9) 3

SECTION C: DESIGN DETAILS OF THE ROAD

A plan of the road, to assist in questions 12 to 21.



8. Why is this?

9. Do you consider this alternative route or the route that you are now using to be safer?
 (CODE ONE ONLY)

- Alternative route 1
- Present route 2
- Don't know (Go to Q.11) 3

DO NOT READ OUT

10. Again, why is this?

11. Did you ever cycle in the "wrong way" up this street before it was changed to two-way for cyclists? (CODE ONE ONLY)

- Yes 1
- No 2
- Don't know 3

READ OUT

12. As a cyclist, is there anything about the design of this section of road that you find particularly helpful? (CODE ONE ONLY)

DO NOT READ OUT

- Yes 1
- No (Go to Q.14) 2
- Don't know (Go to Q.14) 3

13. Can you give me some more details please? (What features, where and why?)

14. As a cyclist, is there anything about the design of this section of road that you find particularly unhelpful? (CODE ONE ONLY)

DO NOT READ OUT
 Yes 1
 No (Go to Q.16) 2
 Don't know (Go to Q.16) 3

15. Again, can you give me some more details please? [What features, where and why?]

16. How safe do you feel cycling along this road? (CODE ONE ONLY)

READ OUT
 Very safe 1
 Fairly safe 2
 Neither safe nor unsafe (Go to Q.18) 3
 Fairly unsafe 4
 Very unsafe 5
 Don't know (Go to Q.18) 6

17. Why do you feel safe / unsafe?

18. Which of the following, if any, cause you concern when you cycle along this section of road? (CODE ONE FOR EACH ANSWER)

READ OUT
 Yes No Don't know / not applicable

- a. Entering the section 1 2 3
- b. Leaving the section 1 2 3
- c. Vehicles travelling along section 1 2 3
- d. Parked vehicles 1 2 3
- e. Pedestrians 1 2 3

If no concerns are given then go to question 20.

19. For each concern in question 18. (answer = "Yes"), ask what it is about the feature that concerns them and why it concerns them?

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

20. Is there an improvement or alteration you would like to see to make this road safer for cyclists travelling in this [contraflow] direction? (CODE ONE ONLY)

DO NOT READ OUT
 Yes 1
 No (Go to Q.22) 2
 Don't know (Go to Q.22) 3

21. What would this be?

SECTION D: INTERVIEWEE INFORMATION

22. What is the main purpose of your *current* journey? (CODE ONE ONLY)

- DO NOT READ OUT
- 1 Commuting to / from work
 - 2 On business
 - 3 Education (to / from school, college)
 - 4 Shopping
 - 5 Personal business (to bank, to doctors)
 - 6 Leisure (eg visit friends, to cinema, sports centre)
 - 7 Leisure ride (ie on a bike ride)
 - 8 Other (please specify)

23. Where did you start this cycle journey? (ie JOURNEY ORIGIN)

OBTAIN POSTCODE. ASK FOR STREET & AREA IF INDIVIDUAL CANNOT PROVIDE POSTCODE.

Postcode _____
 Street / road _____
 Area _____

24. Where are you cycling to? (ie JOURNEY DESTINATION)

OBTAIN POSTCODE. ASK FOR STREET & AREA IF INDIVIDUAL CANNOT PROVIDE POSTCODE.

Postcode _____
 Street / road _____
 Area _____

25. How long does this journey take? (FROM ORIGIN TO DESTINATION ABOVE)

Hours _____ Minutes _____

26. What was your age last birthday?

DO NOT READ OUT

- Under 18 1
- 18-24 2
- 25-39 3
- 40-59 4
- 60+ 5
- REFUSED 6

27. Any other comments (unprompted)

28. There are some cycling matters that we would like to ask more about. Would you be prepared to answer a few extra questions by phone? (CODE ONE ONLY)

- Yes 1
- No (End interview and Go to Q.30) 2

29. What is your phone number and when is the best time to contact you?

THANK YOU FOR YOUR HELP

30. Sex (OBSERVED)

- Male 1
- Female 2

31. Interviewer _____

32. Time (24 Hour) _____

33. Interviewer location along road _____

- Braggs Lane East 1
- Braggs Lane West 2

Abstract

This research investigates the safety implications and practical methods of allowing contra-flow cycling in one-way streets in the UK. Five 'alternative' contra-flow cycle schemes (i.e. schemes not including a mandatory cycle lane or physical segregation) were examined. Video filming and interviews with cyclists were used to collect data from the sites. The results were supplemented by data supplied by the local authority responsible for the schemes; this data included vehicle speeds and reported accidents. The schemes appeared to operate safely, supporting the wider use of alternative contra-flow cycle schemes in the UK. Design advice is proposed on how this can be best achieved. Important factors to consider when designing contra-flow schemes are motor vehicle flows, motor vehicle speeds, delivery vehicles, parking and side roads.

Related publications

- TRL302 *Roundabouts in continental Europe designed with cycle facilities or 'cycle-thinking'* by J M Morgan. 1998 (price £20, code E)
- TRL241 *Cyclists at road narrowings* by D G Davies, T J Ryley, S B Taylor and M E Halliday. 1997 (price £32, code I)
- TRL266 *Attitudes to cycling: a qualitative study and conceptual framework* by D G Davies, M E Halliday, M Mayes and R L Pocock. 1997 (price £20, code E)
- CT2.1 Cycling safety update (1993–1996). *Current Topics in Transport: abstracts selected from TRL Library's database.* (price £15)

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